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Adaptation Fund Climate Innovation Accelerator

Project Concept Note - Technical Assistance Response Plan

Country	**NEPAL**
Request ID#	**AF-2021000043**
Title	**Customized weather and climate information system for climate-resilient agriculture in Nepal.**
NDE	Ministry of Forests and Environment, Government of Nepal Mr. Raju Sapkota Under-Secretary and Head, Climate Change Section rajusapkota140@gmail.com Singhadurbar, Kathmandu, Nepal
Proponent	The Small Earth Nepal Dr. Dhiraj Pradhananga President dhiraj@smallearth.org.np Naya Baneshwor, P O Box 20533, Kathmandu, Nepal

Summary of the CTCN technical assistance
Nepal is one of the world's most climate vulnerable countries mainly due to its weak technical and financial capability to respond to increased climate change variability (Dulal et al., 2010). The climate change-induced hazards and risks particularly threaten Nepal's agriculture sector which are highly dependent on water resources and other climate-sensitive resources (MoPE, 2017a). Nepal's agricultural sector alone employs over two-thirds of the labor force and contributes to roughly one-third of the country's GDP. Despite several efforts in improving climate information services, weather forecasts produced by national bodies have limited dissemination in rural and remote areas thereby hindering the agriculture systems to be climate-smart and more productive. This project attempts to customize the weather and climate information products, issued by the Department of Hydrology and Meteorology (DHM), to the needs of the local farmers. The project will adopt a participatory approach with the objective to bridge the ever-existing gaps between the weather/climate change science and their users. The overall goal of the project is to develop 1) an application programming interface (API) for the automatic dissemination of location-specific customised 3-days weather forecast to farmers of the village in a user-friendly language through mobile and internet-based SMS, 2) to pilot the weather information dissemination system in selected communities and 3) to build farmer's capacity to use the available weather and climate information.

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Agreement:

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

National Designated Authority for the UNFCCC Technology Mechanism
Name: Raju Sapkota
Title: Under-Secretary and Head, Climate Change Section
Date: 8th October, 2021
Signature:

Proponent (signature of the Proponent is optional)
Name: Dhiraj Pradhananga
Title: President
Date: 7 October 2021
Signature:

UNFCCC Climate Technology Centre and Network (CTCN)

Name: Rose Mwebaza
Title: CTCN Director
Date: 11/10/2021
Signature:

1. Background and context:

Over the last decade, the Government of Nepal has taken a number of concrete steps to ensure that its development pathway is resilient to climate change and inclusive of the most vulnerable women and men (MoFE, 2018). By 2016, 20% of the climate change budget code was allocated for climate change adaptation and mitigation (MoF, 2016) primarily to the ministries responsible for urban development, agriculture, irrigation and finance. The government's analysis found that approximately 11% of the total climate change budget was allocated to the local level through programs led by line ministries (Bishokarma, 2017a). Currently, Nepal is in the formulation phase of its National Adaptation Process (NAP), undertaking stakeholder engagement, background research and analysis toward the development of a national plan for climate change adaptation. Nepal's updated Nationally Determined Contribution (NDC) under the Paris Agreement for the period 2021-2030, has included targets under Agriculture, Forestry and Other Land use (AFOLU): establishment of 200 climate-smart villages and 500 climate-smart farms; increased access of climate-smart agricultural technologies to women, indigenous people, smallholder farmers and marginalized groups, and establishment of Public Weather Services (PWS), including the Agro-Meteorological Information System, which falls under the key policy priorities of Nepal on adaptation.

The Department of Hydrology and Meteorology (DHM) is responsible for monitoring all meteorological and hydrological activities and providing hydrological and meteorological services in Nepal. Recently, DHM has been generating forecast data from the numerical weather prediction (NWP) model in two spatial resolutions, 12 km by 12 km and 4 km by 4 km. The NWP is simulated from Weather Research & Forecasting - Environmental Modelling System (WRF-EMS) and produces a 72-hour numerical weather forecast but the forecast information is disseminated to the public on the DHM website as maps only. These maps are not easily understood by general people. Similarly, DHM is providing province level 3 days weather forecast via Meteorological Forecasting Division (MFD) website and Special bulletin on extreme weather forecast. Flood forecasting during monsoon seasons have also been initiated by DHM through social media. Special bulletin for mountaineering has also been started by DHM. Further, weekly agro-met advisory bulletin has been prepared by Nepal Agricultural Research Council (NARC) and DHM at the regional level. DHM is planning to provide location based 3-day weather forecast (using NWP products) for selected prominent locations of Nepal through the DHM weather mobile App and its website. However, the 3-day NWP outputs have not be verified extensively yet. Along with complex topography, little infrastructure, for providing the higher resolution weather forecast, Nepal also lacks information on the functional relationship between various components of the Nepalese agriculture and weather. Before the use of NWP products for agriculture, the products need to be verified and bias correction needs to be done before their dissemination to the farmers. Furthermore, the change in the structure of the agriculture extension system in the federal policy, the dissemination of the information is challenging. Various NGOs and INGOs have been contributing their efforts on providing weather information however those are in course resolution and are not location specific. The Small Earth Nepal (SEN) has successfully customized and tested the feasibility of automatic mobile SMS systems to disseminate 3-day forecast information using NWP data in Nepal. For further details regarding the efforts of SEN, please refer the attached organization profile of SEN.

2. Problem statement:

Nepal is one of the world's most climate vulnerable countries mainly due to its weak technical and financial capability to respond to increased climate change variability (Dulal et al., 2010). The climate change-induced hazards and risks particularly threaten Nepal's agriculture sector which are highly dependent on water resources and other climate-sensitive resources (MoPE, 2017a). Nepal's agricultural sector alone employs over two-thirds of the labor force and contributes to roughly one-third of the country's GDP (CIA, 2017; World Bank, 2012). The agricultural sector plays a fundamental role in human welfare especially in rural households in Nepal which comprise 80% of Nepal's population

(World Bank, 2017) and whose livelihoods heavily depend on agricultural exports for their fiscal and socio-political stability (Keane et al., 2009). In addition, majority of the population are subsistence farmers in rural parts of Nepal and have low land holding capacity (~0.7 ha). The effects of global warming in Nepal, including temperature increase (Malla, 2008; Eriksson et al., 2009b), erratic rainfall, shorter winter, frequent and longer droughts (Sharma and Dahal, 2010), have negative influences on agricultural production and livelihood of agrarian communities, especially in subsistence farming (Bocchiola, 2017). Furthermore, the simulation results of the study by Chalise et al., (2017) revealed that Nepal's agriculture sector will be severely impacted by climate change–induced productivity loss by 2080 and climate-induced reduction in food production is projected to exert an upward pressure on food prices, which will aggravate food security problems in Nepal. Farmers have limited access to weather and climate information and agriculture related early warning systems, which could help them anticipate weather events and better manage their crops.

Thus, there is an urgent need for adoption of adaptive agricultural extension services to reinforce climate resilience in order to reduce climate change-induced loss of agricultural productivity in Nepal. Timely dissemination of reliable weather and climate information are crucial to farmers and agriculture planners for management decisions such as selection of crop type and variety, planting and harvest timing, field fertilization, grazing and migrating livestock, as these are directly connected to their livelihood (Klemm & McPherson, 2017). Therefore, piloting the mechanism of disseminating weather forecasts, building farmers' capacity as well as the capacity of government and relevant non-governmental and private organizations to using the mechanism, and defining a possible avenue for the institutionalization of the dissemination mechanism is crucial to developing climate resilient agricultural systems.

3. Logical Framework for the CTCN Technical Assistance:

	Months											
Objective: Develop an application programming interface (API) for the automatic dissemination of location-specific customised 3-days weather forecast to farmers in a user-friendly language through appropriate dissmination mechanisms that will be tested in selected communities in Nepal.												
Outcome: This TA to be financed by the UNEP-CTCN AFCIA programme could facilitate the implementation and replication of a weather forecasting system in Nepal, supporting to achieve the goal and strategies of its National Adaptation Plan (NAP), NDC and National Climate Change Policy of the country.												
Activities	1	2	3	4	5	6	7	8	9	10	11	12
Mandatory output: All implementers must undertake the following activities at the beginning and at the end of the CTCN technical assistance. **Activity i**: A detailed implementation plan for all activities, deliverables, outputs, deadlines and responsible persons/organizations, including a gender study and an itemized budget for implementing the Response Plan. The detailed implementation plan and budget must be based directly on this Response Plan. **Activity ii**: Based on the work plan, a monitoring and evaluation plan with specific, measurable, achievable, relevant, and time-bound indicators should be developed to evaluate the timeliness and appropriateness of implementation (a template will be provided). The indicators selected in the monitoring and evaluation plan should be aligned with the technical assistance closure report template. This will enable the implementer to complete the technical assistance closure report at the end of the CTCN technical assistance (please refer to Activity iv and Section 14 of the Response Plan). **Activity iii**: Impact statement of the CTCN technical assistance prepared at the start of the CTCN technical assistance and updated at the end of the CTCN technical assistance (a template will be provided). **Activity iv**: A technical assistance closure report completed at the end of the CTCN technical assistance (a template will be provided).											
Mandatory Deliverables:												
i) Implementation plan	X											
ii) Monitoring and evaluation plan	X											

iii) Impact statement (initial and final version)	X												X
iv) Technical assistance closure report													X
Output 1: Map Stakeholders and establish a stakeholder working group													
Activity 1.1 Map Stakeholders The activity will identify relevant stakeholders among government institutions at national and community levels (including Community Learning Centers, Krishi Gyan Kendra, community user groups), professionals in the agriculture sector, climatology, meteorology, early warning services, representatives of farmers, as well as women and youth.													
Activity 1.2 Establish a stakeholder working group. Of the stakeholders identified in Activity 1.1, a restrictive working group (up to 10 persons) will be created. The stakeholder working group shall maintain a gender balance and an adequate representation of vulnerable groups. It will provide a technical overview and a high-level guidance at every stage of the implementation of this TA. For this purpose, the members of the stakeholder working group should have the capacity to take key decisions with regards to the development, testing and definition of the framework for the operation of the application programming interface (API) and ensure that these decisions are aligned with the strategic priorities of the country.													
Activity 1.3 Conduct an inception meeting. Once the stakeholder working group (SWG) is created, an inception meeting will be held in presence of the SWG and of the team leader. It is expected that this meeting will be held presential in Nepal. The objective of this inception meeting is to introduce the team of experts, the goals, milestones, anticipated deliverables and the role of the SWG. During the inception meeting with the SWG, the implementer will raise the fact that communities should be selected in Nepal to test the API that will be developed during this TA. The selection of these communities will be made in cooperation between the SWG and the implementer. The SWG will ensure that the selected community will be representative of the challenges faced by the country, that the selected community will have the resources and capacity to deploy and test the technology, and that this small-scale testing will enable future replication and scale up of the technology to other territories of the country. The implementer will													

provide a list of technical specifications that should be met by these communities to ensure a smooth and efficient testing of the system. The selected communities might need, for example, to benefit from a minimum stable internet and energy access. Communities should not be selected during this meeting but will need to be identified at the latest for activity 2.4. Results of the inception meeting will be fed into the implementation plan elaborated under Activity i of the Mandatory Output.													
Deliverables:													
1.1 Report on stakeholder mapping	X												
1.2 Detailed description of the stakeholder working group, with name and contact details of the members, respective institutions, gender, etc.	X												
1.3 Minute of the inception meeting including a list of participants disaggregated by gender, the material used for the presentation (in English and Nepali).	X												
Output 2: Diagnose the existing system and define the needs													
Activity 2.1 Diagnose the existing climatological and meteorological information system in Nepal A) NWP products of DHM have not been verified extensively for the use of farmers yet. A mechanism will be developed to perform Forecast verification for the application of the products for farmers. Working in collaboration with MFD, the implementer will be responsible for verifying and correcting bias of the 3-day weather forecasts prior to their use in subsequent activities. B) During this activity, the implementer will organize bilateral interviews with all the members of the stakeholder working group in order to understand the architecture of the current Meteorological Information System. The implementer will need to understand what data is being generated from the numerical weather prediction (NWP) model, how does the NWP and the Weather Research & Forecasting - Environmental Modelling System (WRF-EMS) interface to produce a 72-hour numerical weather forecast as well as how the forecast information is disseminated to the public. All the forecasts will be analysed including (but not limited to) the extreme weather forecast, flood forecasting, mountaineering, etc. The implementer will also need to understand how weekly agro-met advisory bulletins are prepared by the Nepal Agricultural Research Council (NARC) and DHM at the regional level and how the information is													

disseminated to the public. At this stage, the implementer will also need to understand how the 3 days weather forecast generated at central level are sent to the province and transformed into special bulletins. It is expected that an average of 25 bilateral interviews or meetings (online or presential or a mix of both) will be organized, and that at the end of this activity, the implementer will have a clear understanding of the structure, architecture and design of the existing system, including (but not limited to) the way the weather data is managed, processed, formatted, calibrated, and communicated and how the system is operated including the responsible institution at each stage of the process. This information will be summarized in a report that will be shared with the stakeholder working group for revision.	
Activity 2.2 Series of meetings with the stakeholder working group and meteorologists and weather forecasters to validate the architecture of the existing system A meeting will be organized with the SWG and in presence of meteorologists/forecasters to validate the architecture of the system summarized by the implementer in the report 2.1. During and following this meeting the adjustments to the architecture will be done by the implementer and revised report will be sent to the SWG for review. Three rounds of comments are expected at this stage.	
Activity 2.3 Identify the needs of the users on weather forecast Once the current system will be understood and the design mapped, the implementer will work in identifying the needs of the users. The users can be of distinct natures and needs could differ from one user to another. Governmental bodies might be more focused on gathering information about extreme weather while farmers will probably be more interested on a daily management that will help them define whether to irrigate or not. The challenge is to reach local communities with appropriate information on future weather to support strategic and tactical crop management decisions. Meteorological information tailored to farmers can improve agricultural productivity and increase farmers' incomes, thereby reducing the impact of climate change and minimizing the risk of food insecurity. This activity will be used to question users and identify possible improvements that would be beneficial to the users. During this activity, interviews and bilateral meetings will be organized with the large group of	

stakeholders mapped in activity 1.1, including the farmers, the women and youth, as well as the local governments to identify their needs and expectations. This step is fundamental because this list of needs will define the specifications to be fulfilled by the API which will be design and deployed at small scale in one selected community. Some of the questions that could be asked during these interviews could be (but are not limited to): • Do weather forecasts for agriculture meet the needs of farmers in terms of decision support? • How should climatological data be transformed to allow agricultural management? • How could the current 3-days forecasts be sharpened, improved to have a greater impact on decision-making? • What are the relevant data for the users and how should they be organized? (Consecutive days of rain in mm, number of days of rain, number of days where it rains more than 20mm, maximum number of days without rain, etc.) • Is the degree of uncertainty of a data a problem? How can the uncertainty be reduced? • Who will the information be directed to? • Should the information system allow farmers to provide timely feedback on the information received, and its performance? The list of needs identified during these interviews with the large group of stakeholders will be classified and summarized in a report in a concise and structured way. This report will also make a list of the needs that could be covered by the existing Agro-Meteorological Information System (for example, Hamro-Krishi App and NAMIS, namis.gov.np), and what are the ones that should be considered while developing the application programming interface (API), as well as some preliminary identification of solutions or barriers that could support or interfere in achieving these needs.												
Activity 2.4 Organize a half day meeting with the stakeholder working group to disseminate the needs identified. During this meeting, the implementer will explain the needs that have been expressed by the stakeholders. This meeting will also discuss the limits of the current systems in achieving these needs, the opportunities offered by the API to respond to these needs, as well as possible barriers that could make it difficult to reach some of the stakeholders needs.													

During this SWG meeting, the communities in which the API should be tested should be discussed and specific locations should be agreed by consensus of all the participants.												
Deliverables:												
2.1 Diagnosis of the existing climatological and meteorological information system in Nepal and minutes of the interviews		X										
2.2 Minute of the SWG meeting with a list of participants disaggregated by gender, material used, and summary of the discussions held.		X										
2.3 Report on the need's identification with minutes of the interviews			X									
2.4 Minutes of the meeting with the stakeholder working group with a list of participants disaggregated by gender, material used, and summary of the discussions held.			X									
Output 3: Design an application programming interface (API) for the automatic dissemination of location-specific customised 3-days weather forecast												
Activity 3.1 Define location-specific parameters for the existing system The implementer will define the architecture of an application programming interface that will enable the automatic dissemination of location-specific customised 3 days weather forecast. This API should be compatible with the existing systems. All types of parameters (header, path and query string parameters) will be designed. For each of the parameters, a data type and a max and minimum value will be defined. Using the deliverable 2.1, the implementer will demonstrate what component of the existing system will be modified, in which way, and what will be the revised structure of the Meteorological Information System for Agriculture to integrate the API. The design of the system that will enable to define a location-specific parameters in the existing system will be defined in report.												
Activity 3.2 Design of the system that will extract the data for the specific location. The implementer will design and describe in a detailed report how would the API system extract the data from the central Meteorological Information System to a location specific information according to the parameters designed in the previous activity. The Meteorological Information System could be hosted at SEN during the project period and could be transferred to DHM/NARC or any other organizations as appropriate. This report will also provide clear instructions on the requirements that will need to be fulfilled to be able to ensure the extraction of data during the implemented and testing process expected in outcome 5. This may include (but not be limited) to the creation of a user interface for the implementer in the Meteorological Information System for farmers.												

The report will also clearly be exposed how the current system will be modified, or affected, and how the API will be structured, as well as what will be the final architecture of the system in order to transmit data from the central Meteorological Information System to the specific locations.													
Activity 3.3 Design the localized weather forecast bulletin Finally, the implementer will design the system, and the interface of the locally based weather forecast bulletin that will be published with 3 days forecast (updated everyday for the next three days).This report will provide the architecture of the system, how these bulletins will be generated (from where the information will be provided), how will it be routed, as well as how will it be disclosed to the users. This system and architecture will be defined in a detailed report.													
Activity 3.4 Develop a framework for the use of this API Finally, the implementer will formulate a framework for the administrators of the system, describing in a very precise way, who (which entity) will be responsible for each component of the system, as well as the editing rights of each administrator, some guidelines on how the quality of the data should be secured, what kind of maintenance of the system will be requested, along with its frequency and finally the expected cost of operation and maintenance of the system.													
Activity 3.5 Full day meeting with the Stakeholder working groups to present the API designed. At least 2 weeks before the full day meeting, the implementer will share the reports 3.1, 3.2 and 3.3 with the SWG and any other relevant stakeholders for their review. It is expected that this full day meeting will be held presential, in the presence of at least 2 international experts. During this meeting, the future administrators of the system should be present as they might be able to identify possible bottlenecks or technical issues that might have not been identified so far. The implementer will explain the full architecture of the API. The full day meeting will enable the participants to raise their questions, to make amendments to the system, and will give the opportunity to the implementer to explain the full procedure and implementation plan expected to be deployed in the next phases. At the end of this full day meeting, the stakeholders should understand the structure and architecture of the designed API, how the API will modify the existing systems, what will be the functionalities of the future system.													

All questions raised will be addressed, and all relevant modifications will be made to the design by the implementer following meeting and recirculated to the attendees for review and approval. 3 rounds of reviews are expected to be held at this stage.												
Deliverables:												
3.1 Report on the definition of the parameters			X									
3.2 Report on the process that will enable to extract locally specific weather forecast from the central Meteorological Information System				X								
3.3 Report on the architecture and interface of the bi-weekly local weather bulletin				X								
3.4 Draft framework of the system for the administrators				X								
3.5 a. Minutes of the meeting with the stakeholder working group with a list of participants disaggregated by gender, materials, and summary of the discussions held. b. Framework of the system for the administrators reviewed and approved by the SWG and administrators. c. Report on the design of the system (3.1; 3.2; 3.4) reviewed and approved by the SWG and administrators.				X								
Output 4 Design the interface to disseminate location-specific customised 3-days weather forecast to farmers using identified communication mechanisms including mobile- and Internet-based SMS												
Activity 4.1 Analyse technological options. At this stage of the process, the implementer will analyse the existing technologies that could be used to disseminate location-specific customised 3-days weather forecast through several appropriate communicaion mechanisms to the farmers. Each existing technology will be presented in fact sheet with some basic descriptions (name of the technology, characteristics of the technology, estimated costs of development/operation/ maintenance) as well as the identification of barriers or opportunities that could ease of make its use difficult in Nepal. The fact sheets will be presented in a report. The barriers and opportunities of the identified technologies will be represented in a matrix (including suitability for institutionalization and their readiness for upscaling). A pre-selection of the most adequate technologies (or up to 5 suitable technologies) will be made by the implementer, in consultation with the NDE, the proponent, and DHM if needed.												

For each of these prioritized technologies, the implementer will then define business models (a minimum of 1 and a maximum of 3 business models) that could be used for their respective implementation. It is possible that distinct technologies could have similar business models. Some of the aspects described in these business models could be: - Will users need to subscribe to an app to get the mobile and Internet-based SMS? - Is the data accessible to all persons who will download the app on their phones? - Should the app be free? - Should all the locally 3 days forecast be free? Or should access to some of them request a subscription? - Could the technology be easily implemented by a public institution (e.g. DHM)? - Other relevant specificities													
Activity 4.2 Stakeholder working group meeting to discuss the conditions of use of the identified communication mechanisms including mobile- and Internet-based SMS. A half day meeting will be organized with the SWG to discuss the technological options, and the conditions that should be associated with the use of the SMS. At the end of this meeting, the SWG should have selected the technology and associated conditions of use that should be programmed and will be tested.													
Activity 4.3 Design the communication system that will enable farmers to access location-specific customised 3-days weather forecast by identified communication mechanisms including mobile- and Internet-based SMS. The implementer will design the architecture, structure, and operational system that will enable to disseminate location-specific customised 3-days weather forecast to farmers by the communication mechanisms. This report will be shared with the SWG and other stakeholdersfor their review.													
Activity 4.4 Half Day meeting to present the SMS design to the SWG as well as the selected communities. The design and architecture of the final system, including the possibility to share location-specific customised 3-days weather forecast with farmers by **identified communication mechanisms including** mobile- and Internet-based SMS will be explained to the SWG and Department of Hydrology and Meteorology (DHM) as well as the selected communities of Nepal. At the end of this meeting, the report 4.3 will be amended if necessary and shared with the attendees until approval of the stakeholders. It is expected that 3 rounds of comments will be requested.													

Deliverables:												
4.1 Report on technological options (technology fact sheets) and respective business models				X								
4.2 Minute of the stakeholder working group, with the selected technology and business model to be implemented.				X								
4.3 Report on the design of the communication channels that will ensure that the location-specific customised 3-days weather forecast is shared with the farmers by the communication system incluing mobile- and Internet-based SMS.					X							
4.4 a) Minute of the meeting with the stakeholder working group with list of participants disaggregated by gender, material used, summary of the discussion held b) Final report (approved by stakeholders) of the Report on the design of the communication channel that will ensure that the location-specific customised 3-days weather forecast is shared with the farmers by mobile- and Internet-based SMS					X							
Output 5: Test the designed API and identified communication mechanisms including mobile- and Internet-based SMS technologies in the selected communities												
Activity 5.1 Pilot the development of application programming interface (API) for the automatic dissemination of location-specific customised 3-days weather forecast to farmers in a user-friendly language through identified communication mechanisms in selected communities of Nepal. The implementer will implement the API in the central Meteorological Information System, extract the locally specific data, create the local bi-weekly weather bulletin, and design the system that will disseminate the information to users by mobile- and Internet-based SMS for the selected communities of Nepal.												
Activity 5.2 Half a day demonstration workshop to present the API and identified communication mechanisms to the Stakeholder Working Group A demonstration workshop of the pilot information system will be organized in the presence of the small working group and Department of Hydrology and Meteorology (DHM). It will be a hands-on and interactive demonstration of the pilot system. The workshop will be organized with a demonstration of the system functionalities by the implementer and will be followed by a testing exercise of the SWG. For this purpose, the implementer will prepare simple exercise that will help the participants in testing the different functions and starting to understand the way												

the system has been built. The budget for this workshop should consider the rental of equipment (laptops, internet connection) for one day and for a maximum of 20 people.												
Activity 5.3 Solve the bugs Following the demonstration workshop, the implementer will solve the bugs that could have been identified during the workshops and make any changes that could be requested by the attendees.												
Activity 5.4: 2 hours demonstration meeting The implementer will demonstrate that the bugs have been addressed and changes included to the SWG and DHM during a 2-hours demonstration meeting. This meeting can be organized online.												
Deliverables:												
5.1 The API is operational and functional as well as the applicable communication mechanisms including mobile- and Internet-based SMS system in the selected commune of Nepal						X						
5.2 Minute of the demonstration workshop with a list of participants disaggregated by gender, the materials used in English and Nepali.						X						
5.3 De-bugged API and the communication systems.						X						
5.4 Minute of the demonstration workshop with a list of participants disaggregated by gender, the materials used in English and Nepali.						X						
Output 6 : Deploy the system in the selected communities, build capacity of local government, farmers and civil society, and develop strategy for upscaling the system												
Activity 6.1 On-site 3 days' workshop to present the system to the selected local government, local farmers and civil society. The implementer will organize an on-site 3 days' workshop to present the system to a) the local government that will act as the administrator of the locally designed system b) the farmers that will be the users of the system and c) the civil society. During this workshop (day 1), the administrators will be trained to the use of the application programming interface (API) for the automatic dissemination, as well as to the maintenance of the system. For system administrators, special attention should be paid to building the capacity of local technicians in programming and processing local data. Administrators must be trained in programming language (syntax and semantics), operating system, software configuration, data processing.												

During the workshop for farmers (day 2), the users will also be trained to the system, as well as to the way to access the data generated by the API, the functionalities of the API, the meaning of the information provided as well as the best way to transform the data available into a crop management tool. During this workshop, the implementer will emphasize how the data provided are adapted to their needs, how to interpret these data, the speed of transmission, the frequency to which the data will be updated, the equipment necessary to benefit of the service (a mobile phone, an app, and potentially a subscription). During the workshop for the civil society (day 3), the NGOs, private sector, academia, women and youth of the selected communities will be trained on the positive impact of such technologies for farmers, to ensure food security, to increase farmer´s revenues, to improve crop management. Following this on-site, practical and demonstration 3 days' workshop, the implementer will remain connected with the administrators and farmers 4 months testing period.												
Activity 6.2 Capacity building at the commune level The implementer will be responsible for the launch of the system for 4 months. This means that the implementer will oversee updating any bugs, make any amendments to the system, respond to any technical or practical questions from the administrator or the users in an acceptable timeline (respond expected within 72 hours after reception of a request) during the first 4 months of the operationalisation of the system. Following this first 4 months of testing, the selected communities and the country of Nepal will oversee the maintenance of the system. The implementer will be responsible for the deployment and success of this test phase, which means: - Stimulating the participation of farmers by the means of their choice, - Assisting users and administrators in getting started with the system and this means that he will be easily reachable and will respond effectively (within 3 days) and adequately (facilitating information or explanation required) - Solving technical problems (bugs) and applying the relevant improvements that may be submitted during the test phase. As a result of this activity, the implementer will formulate detailed, simple and explicit manuals on the operation of the API and mobile- and Internet-based SMS systems. These manuals will be written in												

English and Nepali and could be translated, at the request of the NDE, into a maximum of 2 additional traditional languages.													
Activity 6.3 Scale up step by step implementation guide and strategy for upscaling the system in Nepal Finally, the implementer will design a step-by-step guide to facilitate the replication and scale up of the system to other communes. This guide will include the technical specificities to be considered while selecting new territories (access to internet, minimum size of the territory) as well as a clear step by step process that the government of Nepal will need to follow to replicate the automatic dissemination of location-specific customised 3-days weather forecast and selected communication mechanisms to other territories. The implementer will also design a short- to medium- term strategy for scale up of the system and the services it provides, with a detailed action plan for the first 1.5 years following the completion of this TA. This work will build on consultations held with key stakeholders throughout the implementation of the project, since its inception.													
Activity 6.4 Stakeholder working group meeting to introduce the Scale up step by step implementation guide, strategy and action plan. A final meeting will be held with the SWG and agricultural stakeholders to introduce the Scale up step by step implementation guide and the strategy and action plan for scale up. Comments provided at the meeting will be integrated into the final documents.													
Deliverables													
6.1 Minutes and materials of the 3-days' workshop in Nepali and English with a list of participants, disaggregated by gender.								X					
6.2 a) Report on the 4 months assistance delivered and methodology deployed to ensure the success of the testing period. b) Detailed manuals of use in English, Nepali and 2 more traditional languages if requested by the NDE c) Strategy and action plan for scale up.											X		
6.3 Scale up step by step implementation guide.											X		
6.4 Minutes of the last workshop with the SWG with a list of participants disaggregated by gender.											X		

4. Resources required and itemized budget:

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**
Mandatory output: All implementers must undertake the following activities at the beginning and at the end of the CTCN technical assistance					***5,900***	***7,900***
Activity 1 i) Implementation plan, ii) Monitoring and evaluation plan, iii) Impact statement, iv) Technical assistance closure report	*I1: 12 days* *I3: 2 days* *N2: 1 day*				*5,900*	*7,900*
Output 1: Map Stakeholders and establish a stakeholder working group					***10,900***	***16,900***
Activity 1.1 Map Stakeholders	*I1: 5 days* *N1: 2 days* *N2: 5 days*				*2,900*	*4,900*

Activity 1.2 Establish a stakeholder working group	*I1: 2 days* *N2: 5 days*				*1,000*	*3,000*
Activity 1.3 Conduct an inception meeting	*I1: 5 days* *N1: 1 day* *N2: 5 days*	*[International travel]* *1 international expert for the inception meeting* *[Domestic travel]* *1 international expert and 2 national experts for the inception meeting*	*Inception meeting, 10 participants (including women's representative), 1 day*		*7,000*	*9,000*
Output 2: Diagnose the existing system and define the needs					***31,200***	***39,200***
Activity 2.1 Diagnose the existing climatological and meteorological information system in Nepal	*I1: 11 day* *I2: 2 days* *I3: 8 days* *N2: 30 days*			*1,000 (meteorological data from AWS for verification and bias correction of forecast data)*	*16,500*	*18,500*
Activity 2.2 Series of meetings with the stakeholder working group to validate the architecture of the existing system	*I1: 3 days* *I2: 1 day* *I3: 5 days* *N2: 5 days*		*Online meetings, 15 participants (including women's representative)*		*4,500*	*6,500*
Activity 2.3	*I1: 1 day* *I2: 5 days* *I3: 5 days*				*6,500*	*8,500*

Identify the needs of the users on weather forecasting	*N1: 5 days* *N2: 5 days*					
Activity 2.4 Organize a half day meeting with the stakeholder working group to expose the needs identified	*I1: 5 days* *I2: 1 day* *I3: 1 day* *N1: 1 day* *N2: 5 days*		*Online meeting, 10 participants (including women's representative), 0.5 day*		*3,700*	*5,700*
Output 3: **Design an application programming interface (API) for the automatic dissemination of location-specific customised 3-days weather forecast**					***35,700***	***45,700***
Activity 3.1 Define location-specific parameters for the existing system	*I1: 1 day* *I2: 2 days* *I3: 5 days* *N2: 2 days*				*3,400*	*5,400*
Activity 3.2 Design of the system that will extract the data for the specific location	*I3: 5 days* *I4: 5 days* *I5: 5 days* *N2: 2 days*				*6,900*	*8,900*
Activity 3.3 Design the localized weather forecast bulletin	*I3: 1 day* *I3: 5 days* *I5: 5 days*				*4,500*	*6,500*
Activity 3.4	*I1: 5 days* *I2: 1 day*				*7,800*	*9,800*

Develop a framework for the use of this API	*I3: 10 days* *N1: 2 days* *N2: 2 days*					
Activity 3.5 Full day meeting with the Stakeholder working group to present the API designed	*I1: 5 days* *I3: 5 days* *I4: 1 day* *I5: 1 day* *N1: 2 days* *N2: 5 days*	*[International travel]* *2 international experts for the meeting* *[Domestic travel]* *2 international experts and 2 national experts for the meeting*	*Meeting, 25 participants (including women's representative), 1 day*		*13,100*	*15,100*
Output 4 **Design the interface to disseminate location-specific customised 3-days weather forecast to farmers using identified communication mechanisms**					***17,100***	***25,100***
Activity 4.1 Analyse technological options	*I1: 1 day* *I2: 1 day* *I3: 5 days* *N1: 1 day* *N2: 1 day*				*2,900*	*4,900*
Activity 4.2 Stakeholder working group meeting to discuss the conditions of use of the identified communication mechanisms	*I1: 3 days* *I3: 1 day* *N1: 1 day* *N2: 1 day*		*Online meeting, 10 participants (including women's representative), 1 day*		*1,400*	*3,400*

Activity 4.3 Design the communication system that will enable farmers to access location-specific customised 3-days weather forecast by identified communication mechanisms	*I3: 5 days* *I5: 10 days* *N1: 1 day* *N2: 1 day*				*6,900*	*8,900*
Activity 4.4 Half Day meeting to present the SMS design to the SWG as well as the selected communities	*I1: 5 days* *I2: 1 day* *I3: 5 days* *I4: 1 day* *I5: 1 day* *N1: 1 day* *N2: 1 day*		*Online meeting, 20 participants (including women's representative), 0.5 day*		*5,900*	*7,900*
Output 5: **Test the designed API and identified communication mechanisms including mobile- and Internet-based SMS technologies in the selected communities**					***35,600***	***43,600***
Activity 5.1 Pilot the development of application programming interface (API) for the	*I1: 5 days* *I3: 10 days* *I4: 10 days* *I5: 10 days* *N1: 2 days*				*17,300*	*19,300*

automatic dissemination of location-specific customised 3-days weather forecast to farmers in a user-friendly language through identified communication mechanisms in selected communities of Nepal	*N2: 2 days*					
Activity 5.2 Half a day demonstration workshop to present the API and identified communication mechanisms to the Stakeholder Working Group	*I1: 5 days* *I2: 1 day* *I3: 2 days* *I4: 1 day* *I5: 1 day* *N1: 1 day* *N2: 5 days*	*[International travel]* *2 international experts for the workshop* *[Domestic travel]* *2 international experts and 2 national experts for the workshop*	*Workshop, 20 participants (including women's representative), 0.5 day*	*Rental of equipment (laptops, internet connection, etc.)*	*13,900*	*15,900*
Activity 5.3 Solve the bugs	*I3: 5 days* *I4: 2 days* *I5: 2 days*				*3,500*	*5,500*
Activity 5.4 2 hours demonstration meeting	*I1: 1 day* *I3: 2 days* *N1: 1 day* *N2: 1 day*		*Online meeting, 15 participants (including women's representative), 2 hours*		*900*	*2,900*
Output 6 : **Deploy the system in the selected communities and building capacity of**					***22,600***	***30,600***

local government, farmers and civil society						
Activity 6.1 On-site 3 days' workshop to present the system to the selected local government, local farmers and civil society	*I1: 5 days* *I3: 5 days* *N1: 5 days* *N2: 5 days*	*[International travel]* *2 international experts for the workshops* *[Domestic travel]* *2 international experts and 2 national experts for the workshops*	*Workshops, 50 participants (including women's representative), 3 days*		*15,700*	*17,700*
Activity 6.2 Capacity building at the commune level	*I1: 2 days* *N1: 2 days* *N2: 2 days*				*800*	*2,800*
Activity 6.3 Scale up step by step implementation guide and strategy for scale up of the system in Nepal	*I1: 10 days* *N1: 1 day* *N2: 4 days*				*5,000*	*7,000*
Activity 6.4 Stakeholder working group meeting to introduce the Scale up step by step implementation guide, strategy and action plan	*I1: 3 days* *N2: 3 days*		*Online meeting, 15 participants (including women's representative), 1 day*		*1,100*	*3,100*
Estimated range of costing for the entire Response Plan					***159,000***	***209,000***

5. Profile and experience of experts:

Experts required	Brief description of required profile
Expert in Climate and Meteorological Information System (International expert 1)	The project manager shall have the following expertise and experience: • Master's degree or above (or equivalent experience) in information systems, climatologist, meteorologist, computer engineer, or an affiliated major. • Experience in leading and managing a project and a team of experts from different cultural background and fields of expertise. • At least 10 years of experience in the definition and development of climate or meteorological information systems. • At least 5 references demonstrating experience in either the implementation of climate and meteorological information systems, climate change technologies applied to agriculture, climate change data processing, weather forecast definition or affiliate. • Experience in weather forecast modeling, including procedures for location-specific verification and bias-correction of forecast data. • Experience in organising workshops and/or capacity building trainings. • Previous experience in Nepal will be valued. • Excellent written and communication skills in English are required.
Agriculture Expert (International expert 2)	The expert agriculture design shall have the following expertise and experience: • Master's degree or engineering degree in agriculture, climate smart agriculture, agronomist, botanist or affiliate. • At least 8 years of experience in identifying, evaluating, designing deploying climate technologies for the agriculture sector. • At least 3 references demonstrating experience in the analysis, design, testing and implementation of climate smart technologies for the agriculture sector in developing countries. • Experience in organising workshops and/or capacity building trainings. • Previous experience in Nepal will be valued. • Excellent written and communication skills in English are required.
IT Designer (International expert 3)	The IT Designer shall have the following expertise and experience: • At least 8 years of experience in the creation, design, development of digital information systems.

	• At least 5 references demonstrating experience in developing climate smart technologies/platforms /online visors, database or similar.
Front-end developer (International expert 4)	The Front-end developer shall have the following expertise and experience: • At least 8 years of experience in defining digital information system interfaces. • At least 5 references demonstrating experience in developing countries. • Previous experience in Asia will be valued.
Back-end developer (International expert 5)	The Back-end developer shall have the following expertise and experience: • At least 8 years of experience in digital information system coding. • At least 5 references demonstrating digital information system coding from national to local scale.
Gender expert (National expert 1)	The gender expert shall have the following expertise and experience: • Bachelor's degree or above (or equivalent experience) in social science or an affiliated major. • At least 5 years of experience in gender studies and/or management of equality policies. • At least 2 references demonstrating experience in gender studies in agriculture sector in developing countries. • Excellent written and communication skills in Nepali and English are required. • It is expected that the gender expert will be based in Nepal or with the availability to travel frequently and for long periods of time in Nepal.
Agricultural engineer / agro-meteorology expert / meteorologist (National expert 2)	The agriculture engineer / meteorologist / agro-meteorology expert shall have the following expertise and experience: • Master's degree or above (or equivalent experience) in agriculture engineering, agro-meteorology, meteorology, agronomy, environmental studies or closely related field. • At least 8 years of experience in the field of agriculture and climate technologies in Nepal • Experience working with governement agencies at national and local levels is strongly preferred. • Experience working with farmers and rural communities in Nepal is preferred. • Excellent written and communication skills in Nepali and English are required. • It is expected that this expert will be based in Nepal or with the availability to travel frequently and for long periods of time in Nepal. • It is also expected that this expert will have in-depth understanding of agro-meteorology issues in Nepal and that, as part of his functions, he/she will serve as the liaison person with DHM, and provide support to DHM

	in tasks related to the project (including verification and bias correction of forecasts), ensuring that DHM´s participation is efficiently and successfully conducted.

6. **Intended contribution to impact over time:**

The use of meteorological services for decision-making in the agricultural sector is beneficial both economically and socially.

Food security is seriously threatened in Nepal due to the impacts of climate change on agricultural activities. About 75% of the inhabitants of Nepal work in the agricultural sector. Access to meteorological information for farmers help them to better adapt to weather conditions, which reduces climate risks in agricultural production and will lead to greater food security. This has a direct impact on vulnerable groups, women and children.

7. **Relevance to NDCs and other national priorities:**

The project supports Nepal's priority targets set out in its NDC[1] under Paris agreement. The project will test a customized set of weather forecast products for smallholder farmers for increased access to climate-smart agricultural technologies which falls under the coverage of the Nationally Determined Contribution (NDC) - Agriculture, Forestry and Land Use (AFOLU) (Page no. 2 under Mitigation Component of Nationally Determined Contribution (NDC)). The project will strengthen and establish Public Weather Services (PWS), including the Meteorological Information System, which falls under the Key policy priorities of Nepal on adaptation (Page no. 19 under Adaptation Component of NDC). The project will integrate Gender Equality and Social Inclusion (GESI) target of NDC (Section 1 c of page no. 8) through involvement of women, children, youth, indigenous peoples and marginalized groups (Page no. 18) in consultations and workshops at national, district and village levels in order to incorporate their voices into the development of the customization and dissemination mechanism and climate-change-related policy.

The NAP[2] has been formed with the goal of reducing vulnerability and building resilience to climate change by integrating adaptation across sectors and levels of government. So, through this project, we will be capacitating and enhancing the climate-resilience of the farmers of four local levels (municipalities and rural municipalities) identified by NAP and work in close-coordination with the central, provincial and local level of government.

National Climate Change Policy[3]: The project focuses on thematic area (Agriculture and Food Security) (Section 8.1 of page no. 7) and cross-cutting area (Research, Technology Development and Expansion) (Section 8.11 of page no. 18) under the adaptation priorities as per the National Climate Change Policy (2019). Similarly, one of the objectives of National Climate Change Policy 2019 is to conduct research, make effective technology development and information service delivery related to climate change (Section 7 of page no. 7) and through this project we are testing a technology for customized information service delivery to the farmers to enhance their climate resilience. This project will also integrate the GESI component which aligns with another objective (Section 7 of page no. 7).

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

The Meteorological Forecasting Division (MFD) at the DHM has been broadcasting the coarse resolution daily weather forecasts via radio/television/newspaper/website. The DHM also delivers

[1] https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Nepal%20Second/Second%20Nationally%20Determined%20Contribution%20(NDC)%20-%202020.pdf)
[2] http://mofe.gov.np/downloadfile/MOFE_2019_Climate%20change%20scenarios%20for%20Nepal_NAP_1562647620.pdf
[3] https://mofe.gov.np/downloadfile/climatechange_policy_english_1580984322.pdf

weather information for agro-advisory to the Agriculture Management Information System (AMIS) project. However, under its existing data transmission system, the weather and climate information products have not reached the local levels.DHM has been producing short and medium range weather forecasts, there is still a lack of dissemination mechanism to the end users.

The Government of Nepal has proposed climate smart model villages in its national development plan. Our proposed project will further develop the proposed climate smart villages by incorporating weather forecast services as shown in the attached document (*location map*). The project will thereby contribute substantially to the NAP process.

Nepal has initiated the establishment of 200 climate-smart villages and 500 climate-smart farms; increased access of climate-smart agricultural technologies to women, indigenous people, smallholder farmers and marginalized groups, and establishment of Public Weather Services (PWS), including the Agro-Meteorological Information System, which falls under the key policy priorities of Nepal on adaptation.

The Small Earth Nepal (SEN) has successfully customized and tested the feasibility of automatic SMS systems to disseminate 3-day forecast information using NWP data in Nepal.

Also, some consultations with the farmers, district level officials (https://bit.ly/2Kt6kBw) and national level experts (https://bit.ly/3nUoidV), and weather forecasters conducted during the development of this project and their feedback and further requirements have been taken as the basis for developing the concept of the proposed project.

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

This technical assistance will have long term perspective as the API system will be used and could remain operational for many years.

During phase 5, a deployment of the pilot system will be carried out in a municipality selected during the mission.

The objective is to provide the various users with useful, locally based meteorological information, allowing better management of agricultural production. This information, transmitted in the right way, on time and on the scale required, will be very useful to rural populations.

This should have significant impacts on the economy, as well as the quality of life of rural populations by enabling them to increase their income and ensure food security.

10. Gender and co-benefits:

Imbedded into the design of the activities:	Smallholder farmers, including women farmers, marginalized and ethnic minorities will be the direct beneficiaries of this project. The capacity building activities – training, coaching, and mentoring - will be conducted during the project. This will help to empower the women to build their leadership capacity, analyze their situation, identify and prioritize the problem, plan for programs/activities that solve the problem, explore, negotiate and mobilize resources to execute the program
Gender and co-benefits of the activities:	Since women and marginalized communities are facing higher risks and greater burdens from the impacts of climate change, this project effectively ensures their needs to be addressed for equitable climate change actions. This

	project, through a participatory approach, specifically aims to enable the women, girls, and vulnerable communities to develop a climate-resilient agriculture system by providing them with customized weather and climate services. The technology which we are piloting helps to reduce women's and disadvantaged groups workloads through the promotion of proactive decision making in agriculture by providing them with customized weather and climate information via communicaton mechanisms including mobile- and Internet-based SMS. They will be provided with the training on the usage of the information they receive for agricultural decision making.

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

National Stakeholder	Function in the implementation of the technical assistance
National Designated Entity (Directorate General of Climate Change, Ministry of Environment and Forestry)	Member of the stakeholder working group, supervise the implementation of the TA, ensure quality checks of the deliverables and implementation of the mission.
NDA	Member of the stakeholder working group, Member of the stakeholder working group, supervise the implementation of the TA, ensure quality checks of the deliverables and implementation of the mission.
The Small Earth Nepal (SEN)	Proponent
Department of Hydrology and Meteorology (DHM)	Member of the stakeholder working group as main owner of data.
Nepal Agricultural Research Council (NARC)	Member of the stakeholder working group as relevant data provider.
Ministry of Agriculture and Livestock Development (MoALD)	Stakeholder
Ministry of Forests and Environment (MoFE)	Stakeholder
Food and Agriculture Organization (FAO)	Stakeholder
World Food Program-WFP	Stakeholder
Province government	Stakeholder
Local government	Stakeholder
Ama Samuha, farmers' groups	Stakeholder
Local governments, local farmers' communities	Provide data and information related to CSA practices and development
Youth and Women associations	Stakeholders

12. SDG Contributions:

Goal:	Sustainable Development Goal	Direct contribution from CTCN TA
1	End poverty in all its forms everywhere	The Technical Assistance will provide access to meteorological data that will improve agricultural planning and therefore ensure food security and increase the income of rural communities.
2	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	The TA aims to develop an meteorological information system that will be able to facilitate relevant information on time and at the right scale to users (administrative, farmers, private sector and others).
3	Ensure healthy lives and promote well-being for all at all ages	
4	Ensure inclusive and equitable quality education and promote lifelong 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	The system will consist of an API with 3 days forecast locally based information and communicated by mobile- and Internet-based SMS to the farmers. This technology is useful for planning but will also facilitate regular climate and weather information which should enable farmers in rural areas to use this information as an agricultural management tool.
	13.1 - Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	This climate technology will help farmers to become more resilient to the effects of 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	The project includes numerous workshops, meetings and 4 months of testing for system administrators, system users and civilian population (with a focus on vulnerable populations).
	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	The agrometeorological information system is a planning tool.
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 tick the relevant boxes below	Primary	Secondary
☐ 1. Decision-making tools and/or information provision		
☐ 2. Sectoral road maps and strategies		
☐ 3. Recommendations for legal reforms, policies and regulations		
☐ 4. Financing facilitation		
☐ 5. Private sector engagement and market creation		
☐ 6. Research and development of new technologies	X	
☐ 7. Feasibility of technology options		
☐ 8. Piloting and deployment of technologies in local conditions	X	
☐ 9. Technology identification and prioritization		

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

14. Monitoring and evaluation process:

Upon contracting the implementing partners to implement this Response Plan, the lead implementer will produce a monitoring and evaluation plan for the technical assistance. This 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) THE COUNTRY on overall satisfaction level with the technical assistance service provided; (ii) the Lead Implementer on the experience and knowledge gained through the technical assistance; and (iii) the CTCN Director on the timeliness and appropriateness of the activities and outputs.