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Adaptation Fund Climate Innovation Accelerator

Project Concept Note - Technical Assistance Response Plan

Country	**Saint Kitts and Nevis**
Request ID#	**AF-2021000183**
Title	*Incorporating drought risks modelling as a planning tool for climate change adaptation measures in Saint Kitts and Nevis.*
NDE	Department of Environment June Hughes Director June.hughes@gov.kn
Proponent	Department of Environment Cheryl Jeffers Conservation Officer jeffers31@gmail.com

Summary of the CTCN technical assistance

Rainfall is the only source of water in St. Kitts and Nevis. This water is retrieved via three water resources namely, surface water, ground water, and direct rainfall. Demand for water is expected to increase as the economy of St. Kitts and Nevis expand, particularly in the tourism and agriculture sectors where water requirements could double in the next ten years.

The objective of this technical assistance will be to:

- Assess drought risk and water resources in Saint Kitts and Nevis;
- Benchmark, design and implement a drought prediction model in Saint Kitts and Nevis
- Train national officers in the use of the drought prevention model.

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Agreement:

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

National Designated Entity to the UNFCCC Technology Mechanism
Name: June Hughes

Title: Director

Date: 8th June, 2021
Signature:

Proponent (signature of the Proponent is optional)
Name: Cheryl Jeffers

Title: Conservation Officer

Date: 8th June, 2021
Signature:

UNFCCC Climate Technology Centre and Network (CTCN)

Name: Rose Mwebaza
Title: CTCN Director
Date: 08/06/2021
Signature:

1. Background and context:

St. Kitts and Nevis are already experiencing some of the effects of climate variability and change through damages from an increase in average atmospheric temperature, reduced average annual rainfall, and the potential for an increase in the intensity of tropical storms.

St. Kitts distribution system is supplied primarily by 31 ground water wells which provide 70% of the country's drinking water with surface water contributing the remaining 30%.
In Nevis 90% (4.50 mLD) of water is derived from groundwater and remaining 10% (0.5 mLD) fromsurface water.

St. Kitts Water Services Department (WSD) executes government policy objectives, implements water conservation programmes (particularly during drought conditions), and carries out public education and awareness initiatives related to water resources. However, conflicting and growing demands for water from various sectors place pressure on the limited financial resources available to the WSD.
A few recording stations were installed by the Ministry of Sustainable Development. There is no existing telemetry system or technology for collection and remote monitoring to support data management.

There is however a GIS office in the Ministry of Sustainable Development, but access to data is a challenge. Some data related to surface and ground water is stored at the Statistical Division in the Ministry where it is published. There are however significant gaps in the water sector data. This is mainly due to the lack of adequate human resources and other equipment . Also, there is a lack of understanding of the importance and need for gathering such information and the analysis of data is weak.

2. Problem statement:

The island has been exploring groundwater sources to meet demands. With the growing tourism sector, the government has undertaken initiatives to explore additional groundwater sources. A 2003/2005 Groundwater Study identified likely drilling sites for wells. However, to exploit groundwater resources that are not currently exploited will require substantial capital investments to gain access to these aquifers. Hydrological assessment has been completed in 201 together with mapping by BEAD, Bedrock Exploration and Development Company.

Key Issues affecting the water supply in St. Kitts:

- Acute shortage during the dry season when natural springs are subjected to periodic water shortages as a result of high tourism water demand. In these episodes, water is sourced from areas that have wells.
- Drought frequency is not well documented so monitoring of collection and water storage is recommended to enhance management regulations

Key issues affecting Water Supply in Nevis:

- Hurricane activity can impact on water infrastructure and SLR can contaminate coastal

aquiferswith saline water;

- There have also been reports of heavy metal contaminants in ground water resources;
- The majority of population utilises septic tanks and this therefore causes the concern that heavy rainfall leading to flooding can introduce bacteriological contaminants into the aquifers;
- Conversely during dry spells and drought conditions, ground water recharge rates decrease affecting the available water resources.
- When droughts occur in Nevis, they generally last for between 2 to 3 months. Depending on the severity, water rationing may be carried out; and,
- It is estimated that if there is a 10 to 20% decline in annual precipitation ground water recharge rates would be affected.
- The agriculture sector is most affected during drought conditions.

3. Logical Framework for the CTCN Technical Assistance:

Objective: *Incorporating drought risks modelling as a planning tool for climate change adaptation measures in Saint Kitts and Nevis.*												
Outcomes: - Assess drought risk and water resources in Saint Kitts and Nevis; - Benchmark, design and implement a drought prediction model in Saint Kitts and Nevis - Train national officers in the use of the drought prevention model												
Activities	**Months**											
	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, professionals in the agriculture and tourism sectors, experts in water management and use, in climatology, meteorology, early warning services, representatives of farmers, as well as women and youth for the 2 islands of Saint Kitts and Nevis. The identification of main stakeholders will be supported by the NDE and NDA. The final groups of relevant stakeholders will be presented in a report in which each actor will be linked to its sector of expertise, person of contact, and contact details.												
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 high-level guidance at each stage of technical assistance development. The members of the restrictive working group should have the capacity to make sound decisions on some key aspects of the technical assistance, such as the collection of climate and meteorological data needed for the vulnerability study (Activity 2), the definition of the drought prediction model (Activity 3), and the training of the official representatives of Saint Kitts and Nevis to the drought prediction system. The composition of the stakeholder working group will be summarized in a report, disaggregated by gender.												
Activity 1.3 Conduct an inception meeting Once the stakeholder working group is created, an inception meeting will be held in presence of the stakeholder working group and of the team leader. It is expected that this meeting will be held presential in Saint Kitts or in Nevis, to be defined based on the most convenient flights for the team leader. The objective of this inception meeting is to introduce the team of experts, the goals, milestones, anticipated deliverables and the role of the stakeholder working group.												

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	X											
Output 2: Assess drought risk and water resources in Saint Kitts and in Nevis												
Activity 2.1 Assess drought risk in Saints Kitts and in Nevis and generate GIS risks maps for Saints Kitts and for Nevis. In times of drought, groundwater recharge rates in St. Kitts and Nevis decrease, affecting available water resources. The frequency of drought is not well documented. There is no telemetry system or technology for remote collection and monitoring to support data management. There is a GIS office, but access to data is a challenge due to lack of resources and equipment. Drought events are one of the most frequent types of disasters in St. Kitts and Nevis. Well-conducted drought risk and hazard assessments can provide valuable support for a range of decisions, such as overall land use planning, infrastructure design, and emergency response preparedness. Proper risk estimation is challenging and requires careful consideration of a number of factors, including water table properties such as size, topography and land use, the types and characteristics of drought events the region, and the number, location and types of buildings and other assets that could be damaged. This drought risk assessment will provide clarification on, among other things: **Risk Identification** • Type of drought: meteorological – precipitation below average or hydrological drought with low river flows for example, environmental drought (combination of above). • Categorization of the drought by their probability and intensity • Definition of hazard levels (1 to 5 for example) with different ranges of drought: change in land use, change in land cover, water demand and use. • Demographics data of the Saint Kitts and Nevis.											

Risk analysis

- Production of Drought Hazard Maps through satellite-based imagery
- Classification of the zones by land use codes, categories (crop field, forest, wasteland for example) and definition of land use data (grassland, buildings, road and else).
- Definition of drought vulnerability and development of indexes to define vulnerability
- Exposure analysis of economic assets and activities endangered by the drought.
- Adaptative capacity of Saint Kitts and of Nevis (is there any systems in place such as disaster prevention, early warning system, spatial planning for example?) and sensibility (ratio of population of young children below 15 of older people over 65, poverty level, female to male ratio etc) to drought.
- Define levels of future potential exposure and sensibility to drought.
- Generate climate risks maps with possible future exposure and sensibility to drought.

Risk Evaluation

- Estimation of drought risk level by district in Saint Kitts and Nevis
- Identification of a the most vulnerable sites in Saint Kitts as well as in Nevis for which water recharge could be necessary in times of drought based on the necessity (high exposure, high sensibility, low adaptative capacity).
- Definition of the principal parameters that should be addressed to reduce the risk of drought for each of sites identified as the most vulnerable.

These elements are examples of the indicators that could be considered, but they will be adapted to the location and completed by the implementer and clearly described in a report.
The drought risks analysis will be developed for the 2 islands, Saint Kitts and Nevis.

Activity 2.2 Map the total water resources including the groundwater through 3D aquifer mapping based on resistivity and high density induced polarization by use of mobile equipment in Saint Kitts as well as in Nevis.
In this activity, the implementer will be requested to map water resources of Saint Kitts as well as in Nevis including the groundwater. It is expected that these results will be achieved based on resistivity and high density induced polarization mapping, by use of mobile equipment which provide 3D maps of aquifers. This

mapping will assist the government in estimating the quantity and quality of ground water and assess the sustainable level of ground extraction. This activity will be done in Saint Kitts as well as in Nevis, in the presence of the international relevant team of experts. The results of the 3D aquifer mapping will be explained in a detailed report including the process that was used to generate the 3D aquifer mapping, the presentation of the maps with their key explanations, as well as some conclusions that could be taken based on these results.													
Activity 2.3 Estimate the water balance in Saint Kitts as well as in Nevis The implementer will access data available related to water consumption in the 2 islands, all sectors included, and will calculate, based on the results of the previous activity, the current water balance of the 2 islands of Saint Kitts and Nevis. The results of this activity will be described in a clear, concise and visual report.													
Activity 2.4 Identify water conservation measures and recommend technologies to save water in the high consuming water sectors for Saints Kitts as well as Nevis. Based on the consumption data analysed in the activity 2.3, the implementer will provide some recommendations on water conservation measures and technologies that could be used to save water in the high consuming sectors. These measures will be presented in action/technology fact sheets, that will include the sector of activity concerned, title of the measure, short description of the measures, as well as its implementation/ operation and maintenance costs within the context of Saint Kitts and Nevis and possible sources of financing. Each action sheet should also provide information about the impact that each action could have on the vulnerability identified in Activity 2.1, as well as an entity responsible for its implementation, if it is a mitigation / adaptation or mix action , some monitoring and evaluation indicators, the time horizon for the implementation of the action, and more component if relevant.													
Activity 2.5: Organize a meeting with the stakeholder working group to summarize the results of outcome 2 A half day meeting will be organized to present the results of the outcome 2 to the stakeholder working group. The meeting will be held virtually.													
Deliverables:													
2.1 Saint Kitts and Nevis drought assessment		X											
2.2 Detailed report on the 3D mapping of aquifers in Saint Kitts and Nevis		X											

2.3 Report on the water balance in Saint Kitts and Nevis		X										
2.4 Report on water conservation measures and technologies recommended to save water in the high consuming water sectors for Saint Kitts and Nevis			X									
2.5 Minute of the SWG meeting with a list of participants disaggregated by gender, material used, and summary of the discussions held.			X									
Output 3 : Benchmark, design and implement a drought prediction model in Saint Kitts and in Nevis												
Activity 3.1 : Benchmark and select the most suitable drought prediction model for Saint Kitts During this activity, the implementer will benchmark the existing drought prediction models. Each model will be described in a fact sheet providing fundamental information such as if the model is based on a statistical, dynamical, and hybrid method, on historical records or climate forecast or a mix of both, the name and characteristics of the model, data requested, indicators defined, forecast generated, prediction obtained, the relevancy of the system to predict Meteorological, Agricultural, Hydrological drought, time horizon of the forecast, etc. Based on the on the results of the drought assessment (activity 2.1), as well as the quantity and quality of climate and water data available in Saint Kitts and Nevis, the implementer will prioritize the existing technologies and select the one(s) that would be more suitable to Saint Kitts and to Nevis. The prioritization criteria for the selection of the best model will be defined and explained in a report, and a matrix of the results will be made.												
Activity 3.2: Organize a meeting with the SWG, St. Kitts Water Services Department (WSD), The Nevis Water Department (NWD) and the to discuss the characteristics of the drought prediction model. The implementer will organize a half day virtual meeting with the SWG, in presence of the relevant representatives St. Kitts Water Services Department (WSD), The Nevis Water Department (NWD) and any other relevant stakeholders to discuss and present the results of the activity 3.1. At the end of the meeting, it is expected that a) the model to be developed and used to predict drought in Saint Kitts and in Nevis will be approved and selected in a consensual way with all the members of the SWG, as well as representatives for the St Kitts Water Services Department and The Nevis Water Department (NWD), b) the relevant agencies provide the requested authorizations to the implementer to support the effective development of the drought prediction model in Saints Kitts and Nevis.												
Activity 3.3 : Design the architecture of the drought prediction model for Saints Kitts and Nevis												

Once the model that seems the most suitable for Saint Kitts and Nevis will have been approved by the SWG as well as representatives of St. Kitts Water Services Department (WSD), and The Nevis Water Department (NWD), the implementer will design the different component of the system including but not limited to the: - Access to data - Data analysis and treatment - Generation of regular forecast bulletin (the frequency will need to be defined) - Implementation of early drought warnings - Communication channels (how would the information be released, who will access it) - Other relevant criteria. The design of this system will be detailed in a report along with an expected implementation plan. The implementation plan will describe the resources required for the development and implementation of the drought prediction model, as well as the entity and person responsible at each step, and a timeline. Also, as part of the design, it is expected from the implementer to propose a framework for the use of the drought prediction model. This framework will clarify the roles and responsibilities of the different agencies involved, the rights of the administrators and other users, the cost of the maintenance and operation of the system as well as which agency should be in charge of budgeting these costs, as well as any other relevant operational aspects that will ease the efficient use of the tool in the short-, medium- and long-term perspective.												
Activity 3.4: Organize a meeting with SWG, St. Kitts Water Services Department (WSD), The Nevis Water Department (NWD) and the national climate agency to present the drought prediction model and the implementation plan. During the first half of the day, the implementer will organize a full day meeting with the SWG, Kitts Water Services Department (WSD) and The Nevis Water Department (NWD) to present the design of the drought prediction model and the expected implementation plan. Some adjustments could be made. It is expected that at the end of the meeting, the design and implementation plan will be endorsed by the regulatory bodies of Saint Kitts and Nevis. This is important as the implementer will need to connect the drought prediction model to the existing database of St. Kitts Water Services Department (WSD), and The Nevis Water Department (NWD). Thus, the implementer will need to access the existing systems to create the drought												

prediction model. Without the authorization of the relevant bodies, the implementation would not be able to be managed successfully. It is also important that the framework for the operationality of the model be discussed and amended if necessary until it gets approved by the stakeholders.												
Activity 3.5: Implement the drought prediction model in Saints Kitts and Nevis. The implementer will develop the online, interconnected drought prediction model for Saint Kitts and Nevis. This model should be automatically updated with the most recent data collected by St. Kitts Water Services Department (WSD), The Nevis Water Department (NWD) and should use a direct access to the most recent data on water consumption. Only like this, the drought prediction model will be able to provide on-time information on the level of the aquifer and groundwater and deliver the relevant early drought warnings that will lead to a sustainable risk management.												
Deliverables												
3.1 Benchmarking of drought selection models suitable for Saint Kitts and Nevis				X								
3.2 Minute of the meeting and selection of the drought selection model to be deployed in Saint Kitts and Nevis.				X								
3.3 Design of the drought prediction model, including a suggested implementing plan and an operational framework.					X							
3.4 Minute of the meeting, design of the drought and framework endorsed by the country					X							
3.5 Drought prediction model deployed and functioning						X						
Output 4: Train administrators and users of Saints Kitts and Nevis to the drought prediction model												
Activity 4.1:Develop a manual of use for the administrators of the drought prediction model Procedural guides will be written for system administrators, explaining how use of the drought prediction model properly, how to ensure a satisfactory operation and maintenance of the model. These guides should explain the cost of maintenance (if relevant), the frequency of such cost, as well as explanations on how should the administrator control that data have been updated appropriately, how and when to create new categories of data, how the model works, how the architecture is made, if there are different parties involved in the operation of the system, who is responsible for what, how to fix system bugs, and any other aspect that may be necessary to the system administrators. These guides are expected to be explained throughout a workshop (activity 4.3) and can be revised 3 times to incorporate user recommendations.												

This guide will be delivered in English and may be translated into 1 traditional language if required by the NDE.												
Activity 4.2 : Develop a manual of use for the users of the drought prediction model Operation and maintenance guides will be written for users of the system. These guides will explain exhaustively how, when, why the drought prediction model can be used. They will also explain that the data sources used allow, how to analyze the data received and under what circumstances. It will also describe the functions and functionalities of the model, how to proceed to access specific types of information that may be necessary for users in order to select adaptation actions, identify the vulnerable zones to drought, their evolution, how to download reports, how to report actions implemented in the model, and all other criteria that may be necessary for users. These guides are expected to be explained throughout a workshop (activity 4.4) and can be reviewed 3 times to incorporate user recommendations. This guide will be delivered in English and may be translated into a traditional language if required by the NDE.												
Activity 4.3 Train administrators and users to the drought prediction model and test the model The administrators and the users of the drought prediction model will be trained during a 2 days presential training. During this training, the implementer will explain the architecture of the system, the role of each participant, the functionalities of the system, how to use each one of each functionality, as well as the maintenance, updates, software requirements that should be guaranteed to ensure the efficient and sustainable use of the drought prediction model. The participation of about 25 experts is expected. The detailed manuals prepared in activity 4.2 will be delivered to each of the members. The administrators and users will be encouraged to test the model and will have the opportunity to request the support of the implementer to solve bugs or provide explanations until the end of the Technical Assistance. The implementer will provide support to the administrators and users until the closure of this TA. This means he will answer any queries, solve any bugs, and support the users and administrators in their successful acquisition of the tool. The objective of this testing period will be that the users and administrator should be totally independent in the use of the tool once the TA is closed.												
Deliverables:												
4.1 Manual for administrators							X					
4.2 Manual for users							X					

4.3 Minutes of the training, materials used (including the manual), report on the testing period (bug solved, modification to the system made, etc) + final report of any bugs that would have been solved during the testing period, support that would have been delivered to the administrators.							X					X

4. Resources required and itemized budget:

The maximum budget for this Technical Assistance is between 225,000 USD.

Activities and Products	Human Resources	Travels	Meetings and events	Equipment and materials	Estimated costs	
					Minimum	Maximum
Mandatory Output: Develop communication documents and implementation work plan	I1: 14 I3: 2 N2: 1	*None*	*None*	*None*	*6,000*	*8,000*
Output 1: Map stakeholders and establish a stakeholder working group	I1:12 I2: 1 I3: 1 I4: 1 I5: 1 N1: 1 N2: 5	*1 international trip for the leader of the team of consultants.* *Members of the limited work group traveling nationally to attend activity 1.3*	*Activity 1.3 : Kick-off meeting*	*None*	*14,000*	*18,000*
Output 2: Assess drought risk and water resources in Saint Kitts and in Nevis	I1: 45 I2: 41 I3: 6 I4: 41 I5: 21 N1: 16 N2: 21	*Activity 2.5: Team leader travelling for the meeting*	*Activity 2.5: Organize a meeting with the stakeholder working group to summarize the results of outcome 2*	*None*	*80,000*	*80,300*
Output 3: Benchmark, design and implement a drought prediction	I1: 30 I2: 7 I3: 27	*Activity 3.2: The team leader travelling for the meeting.*	*Activity 3.2: Organize a meeting with the SWG, St. Kitts Water Services*	*None*	*60,000*	*70,000*

model in Saint Kitts and in Nevis	I4: 22 I5:22 N1: 5 N2: 10	*Activity 3.4: The team leader travelling for the meeting.*	*Department (WSD), The Nevis Water Department (NWD) and the to discuss the characteristics of the drought prediction model.* *Activity 3.4: Organize a meeting with SWG, St. Kitts Water Services Department (WSD), The Nevis Water Department (NWD) and the national climate agency to present the drought prediction model and the implementation plan.*			
Outcome 4 : Train administrators and users of Saints Kitts and Nevis to the drought prediction model	I1: 14 I2: 20 I3: 9 I4:5 I5: 4 N1: 12 N2: 12	*Activity 4.3 and 4.4: Team leader travelling for the trainings*	*Activity 4.3 Train administrators to the use of the drought prediction model and test the model* *Activity 4.4: Train users to the use of the drought prediction model and test the model*		*40,000*	*48,700*
Rango de costo estimado para la totalidad del plan de respuesta					***200,000***	***225,000***

5. Profile and experience of experts:

Experts required	Brief description of required profile
Expert in Water management and Team Leader (International expert 1).	The project manager shall have the following expertise and experience: • Master's degree or above (or equivalent experience) in water management, climatologist, meteorologist, water 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 drought prevention system, management of water resources, management of aquifers. • At least 5 references demonstrating experience in either the implementation of drought prediction systems, and groundwater management systems or affiliate. • Experience in organising workshops and/or capacity building trainings • Previous experience in LAC or in islands will be valued. • Excellent written and communication skills in English are required.
Water Climate Technologies (International expert 2)	The expert water design shall have the following expertise and experience: • Master's degree or engineering degree in water management, climate smart water management, or affiliate. • At least 8 years of experience in identifying, evaluating, designing deploying climate technologies for the water sector. • At least 3 references demonstrating experience in the analysis, design, testing and implementation of climate smart technologies for management of water resources in developing countries • Experience in organising workshops and/or capacity building trainings • Previous experience in LAC or in developing islands 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.

3D aquifer mapping and SIG expert (International expert 4)	The 3D aquifer mapping shall have the following expertise and experience: • At least 8 years of experience in 3D mapping of aquifers • At least 8 years of experience in SIG • At least 5 references demonstrating experience in developing countries. • Previous experience in LAC will be valued.
Front-end and Back-end developer (International expert 5)	The Back-end developer shall have the following expertise and experience: • At least 8 years of experience in defining digital information system interfaces and digital information system coding. • At least 5 references demonstrating digital information system coding from national to local scale. • Experience in developing countries will be valued.
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 8 years of experience in gender studies and/or management of equality policies • At least 2 references demonstrating experience in gender studies in water sector in developing countries • Excellent written and communication skills in English are required • It is expected that the gender expert will be based in Saint Kitts or with the availability to travel frequently and for long periods of time in Saint Kitts.
Water engineer (National expert 2)	The water engineer shall have the following expertise and experience: • Master's degree or above (or equivalent experience) in water engineering, water management technology and/or management or an affiliated major • At least 8 years of experience in the field of water management and climate technologies in LAC or in islands • Excellent written and communication skills in English are required • It is expected that this expert will be based in Saint Kitts or with the availability to travel frequently and for long periods of time in Saint Kitts.

6. Intended contribution to impact over time:

In an effort to address the impacts of climate change and climate variability in a sustainable way, access to critical information within the water sector is vital. This project will enable Sant Kitts and Nevis to benefit from a drought prevention system. The drought prevention model will enale to identify the areas most at risk of droughts and consequently, water variability and shortages, by drought risk assessment and mapping.

7. Relevance to NDCs and other national priorities:

In its INDC, St. Kitts and Nevis underline the importance of protecting the water, agricultural and coast al zone sectors for reason s of social andeconomic sustainability .

Over 60% of the population of the island resides in coast al areas. As such, St Kitts and Nevis is significantly vulnerable to the rise in sea levels, coast al erosion and flooding, which are exacerbated by human- induced deforestation and climate-change hazards. Overall, the most vulnerable sectors and areas in St Kitt s and Nevis are forest r y and terrestrial ecosystems, coastal ecosystems, water resources, human settlements, agriculture, tourism and human health.

The island's water resources are highly vulnerable to the rise in sea levels and increases in temperatures, which lead to higher rates of water evaporation. One priority is therefore for the country to maintain and protect its underground water resources

St. Kitts and Nevis National Climate Change Adaptation Strategy andAction Plan highlights the impacts of climate change and climate variability on the water sector. It also proposes ways of addressing these impacts.

8. Linkages to relevant parallel on-going activities:

Adaptation Measures Legislative:

• As in St. Kitts, the Watercourses and Waterworks Ordinance 1956 is the main legislation that governs management of water resources in Nevis, however it is out-dated and does not make reference to or have any provisions for groundwater resources.

• A Water Resources Management Act is being drafted; and,

• The Nevis Water Department (NWD) worked with the Caribbean Development Bank on a project entitled the Nevis Water Supply Enhancement Project as well as the Nevis Water Distribution Master Plan.

Groundwater sources:

The island has been exploring groundwater sources to meet demands. With the growing tourism sector, the government has undertaken initiatives to explore additional groundwater sources. A 2003/2005 Groundwater Study identified likely drilling sites for wells. However, to exploit

groundwater resources that are not currently exploited will require substantial capital investments to gain access to these aquifers. Hydrological assessment has been completed (2013) together with mapping by BEAD, Bedrock Exploration and Development Company.

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

Maintenance of the drought prediction model as well as maybe the analysis of suitable technologies to recharge the aquifers of Saint Kitts and Nevis in tine of drought.

10. Gender and co-benefits:

Imbedded into the design of the activities:	Saint Kitts and Nevis has a high number of female-headed households where women have to provide for the family alone. If there is a lack of water, the situation is especially difficult for these women because they are simply alone with this task. Especially poor households benefit from improved water supply systems and planning tools for climate change adaptation through: • Better access to water: Improved water supply systems benefits households, especially of the most vulnerable, to apply water saving measures. • Sustainable water delivery to the communities: With more informed planning, water cuts will be avoided, and a more better-informed supply structure will be put in place, paying special attention to the needs of women and youth and those in vulnerable situation.
Gender and co-benefits of the activities:	The access to water in time of drought affect all the activities, and species, but the most affected are the female and youth population.

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 Cooperatives)	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.
Department of Environment	Proponent

St. Kitts Water Services Department (WSD)	Member of the stakeholder working group as main owner of data.
Private sector	Stakeholder
National Climate Agency	Member of the stakeholder working group as main owner of data.
Youth and Gender Associations	Stakeholders
The Nevis Water Department (NWD)	Member of the stakeholder working group as main owner of data.
St. Kitts Meteorological Services	Stakeholder

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 a drought prevention model that will improve agricultural and use of water resources 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 a drought prevention model that will be able to facilitate relevant information on time and at the right scale to users. The TA will also assess the vulnerability of the island and define the water balance.
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 various aspects that will be useful for planning and conservation of water resources in a small island of the pacific.
	13.1 - Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	This climate technology will help Saint Kitts and Nevis 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 6months of testing of the drought prediction model.
	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 drought prediction 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		
☐ 7. Feasibility of technology options	X	
☐ 8. Piloting and deployment of technologies in local conditions	X	
☐ 9. Technology identification and prioritization	X	

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.