CTCN
CLIMATE TECHNOLOGY CENTRE & NETWORK

Technical Assistance Response Plan – Terms of Reference

Country	**Jamaica**
Request ID#	**2021000051**
Title	*Enhance multi-scalar mapping and research of food security risk, due to the impacts of climate change on rural and urban environments.*
NDE	***Mr. Ajani Alleyne*** *Research and Development Officer, Climate Change Division* *Ministry of Economic Growth and Job Creation* *Telephone: +1 876 633 7354* *Email: ajani.alleyne@megjc.gov.jm*
Proponent	***Mr. Winston Simpson*** *Chief Executive Officer, Rural Agriculture Development Authority* *Telephone: +1 876 977 1158* *Email:executive@rada.gov.jm*

Summary of the CTCN technical assistance

Agriculture is a climate-sensitive sector where changing climatic conditions can impact production levels, and the availability of food crops. According to Jamaica's Food and Nutrition Security Policy (Government of Jamaica 2013), the island has been faced with low food production and a high dependency on food imports. The situation has been further compounded by the island's exposure to external shocks such as the Covid-19 pandemic.

The agriculture sector in Jamaica contributes approximately 7.1% to the island's GDP (Planning Institute of Jamaica 2019) and is also the economic lifeblood of over 200,000 farmers across rural Jamaica. The majority of these farmers are smallholders cultivating less than 2 hectares of land and are often dependent on rainfall as their main source of water for their farms. There are several agricultural producing parishes across the island, including Manchester, St. Elizabeth, Clarendon, Trelawny, St. Ann and St. Catherine. St. Elizabeth contributes approximately 22% of domestic food production (Tingling 2014), supplying various local markets and the hospitality sector. Nevertheless, policy makers and sector stakeholders have been unable to identify the food insecure regions across the island in relation to climate change.

According to the International Food Security Assessment, 2020–2030: COVID-19 Update and Impacts on Food Insecurity report, approximately 12.8% (400,000) of Jamaica's population is currently food insecure (Felix Baquedano, et al. 2021). Climate variability and change not only pose a significant risk to the livelihoods of rural communities, but also threatens the food security within rural and urban environments across the island. Therefore, under a new climate regime, the affordability, availability, and access to food is dependent on the ability of the island's food system to become resilient.

This technical assistance will provide knowledge on the spatial distribution of current and future food security risk across the island. This should range from the community scale to the parish level. Research contributions in assessing the impacts of climate change and measure food security risk will be done to discover: Who are the food insecure or vulnerable people across the island? How many are there? Where do they live? Why are they food insecure or vulnerable? How is the situation likely to evolve and what are the risks threatening them? What should be done to improve their situation?

will answer key questions such as how changing climatic conditions align with food scarcity, food prices etc. For example, how does changing climatic conditions such as temperature increase, season unpredictability, extreme hydrometeorological events, variable rainfall, proliferation of pest and diseases among other adverse challenges affect the availability and access to food for rural and urban areas? The visual representation of food security risk serves as a tool to inform current and future strategic plans and monitoring mechanisms on the nation's food security and strengthening local food systems. This information will provide decision-makers a holistic assessment of vulnerability to food insecurity and the areas or hot spots that may need to be targeted for intervention strategies.

Agreement:

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

National Designated Entity to the UNFCCC Technology Mechanism
Name: ***Mr. Ajani Alleyne***
Title: *Research and Development Officer, Climate Change Division, Ministry of Economic Growth and Job Creation*
Date: 13/07/2023
Signature: A.Alleyne

Proponent (signature of the Proponent is optional)
Name: **Mr. Winston Simpson**
Title: *Chief Executive Officer, Rural Agriculture Development Authority*
Date: 13/7/2023
Signature:

UNFCCC Climate Technology Centre and Network (CTCN)

Name: **Rajiv Garg**
Title: CTCN Director (a.i.)
Date:
Signature:

1. Background and context

Food security is acknowledged as a state in which "all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (Food and Agriculture Organization 2003).

Studies have highlighted the importance of considering the social dimensions of food security in the region when identifying and implementing adaptation strategies, particularly in the context of achieving the Sustainable Development Goals. These social dimensions include the Caribbean's historical and social context as well as its demographics, which feature varying population densities and poverty rates. They serve to increase vulnerability but are imperative considerations for understanding and minimizing the threat climate change poses to food security in the region (Lenderking, Robinson, Lincoln and Carlson 2021).

As a Small Island Developing State (SIDS), Jamaica is vulnerable to the negative impacts associated with climate change. Climate scenarios simulated for the island has projected increased temperature, prolonged droughts, increased evapotranspiration, and reductions in average annual rainfall (Taylor 2015). Along with experiencing these warming and drying trends, the island's north and south coasts are also expected to be impacted by sea level rise. This may result in a "loss of agricultural lands due to direct erosion, temporal flooding and contamination of the agricultural soil via salination", hence impacting livelihoods, production and economic output (Eitzinger et al. 2013).

Furthermore, even though there remains some uncertainty concerning an increase in the development, frequency and pathways of extreme events such as tropical cyclones, the island is expected to experience increase rainfall intensity and wind speeds associated with these extreme weather systems (Climate Studies Group Mona and Planning Institute of Jamaica 2017). This may also increase multiple hazard events in the island such as storm surges, coastal inundation, flooding, and landslides. Even though these changes in climatic conditions are not projected to be spatially uniform across the island (Barker 2012), Jamaica's food security remains threatened.

Several projects have been done or is currently being conducted to increase the adaptive capacity and resilience of the agriculture sector (please refer to section 8). Linkages to relevant parallel on-going activities. However, amidst these projects/programmes there remains significant knowledge and technology gaps. There is a lack of research measuring current and future food security risk across rural and urban environments, as well as the absence of a technological tool/software application that can visualize the spatial vulnerability of food insecure areas across the island.

2. Problem statement

The agriculture sector has made significant strides in the implementation of climate-related technologies. This includes the use of indigenous knowledge, experimentation and/or the transfer of technical skills through training initiatives such as those implemented by RADA and other organizations. Even with these improvements within the sector, a review of Jamaica's Technology Needs Assessment (TNA) revealed the prioritized technologies required for further climate change adaptation on the ground. These include sprinkler and drip irrigation for crop farmers, as well as rainwater harvesting systems and water storage for the agriculture sector. However, even though multiple climate change adaptation projects and/or programmes have been implemented across Jamaica, particularly within the agriculture sector, a quantification of their contribution towards food security has been unaccounted for.

Under Objective 4 of the National Poverty Reduction Programme (NPRP), to 'enhance food and nutrition security of the poor' several commitments were made to reduce food poverty. One such

commitment includes "identifying and providing support to reduce risk from natural hazards and phenomena such as climate change to areas/communities at risk to mitigate livelihood losses to domestic farmers, fishers, fish farmers and other producers" (PIOJ 2018). Likewise, the National Food and Nutrition Security Policy (Government 2013) acknowledged the need to establish a national database on the state of food security for vulnerable groups, "recognizing that each group may require a different intervention, to ensure their access to livelihoods based on self-sufficiency and sustainable income earning activities." The policy stated that this database would be "effected through collaboration among its agencies, and with external partners and extensive and continued consultation with vulnerable groups, to provide timely socio-economic and nutrition information on vulnerable population groups; this will further enable the design of more effective and targeted interventions." Currently, the information and communications technology ICT systems in place are insufficient at the scale needed to be able to track food insecurity throughout communities and among vulnerable groups in the face of poverty levels and changing climatic conditions.

According to consultation with the Research and Development Division at the MOAF, the current databases available include the Agricultural Marketing Information System (AMIS), while RADA manages the Agriculture Business Information System (ABIS). Both platforms were developed to provide farmers with information, resources, skills and access to buyers/markets to generate revenue and maintain their livelihoods. Furthermore, even though the Planning Institute of Jamaica (PIOJ) and the Statistical Institute of Jamaica (STATIN) have mapped food poverty for parishes and communities across the island, this is usually in the form of a report that provides a snapshot of food poverty for a specific period of time.

Additionally, Jamaica a small island developing state (SIDS) is vulnerable to many shocks chief among these are climate events which can be catastrophic to the island's economy, food security and the livelihoods of citizens. Studies from The Climate Studies Group at the University of the West Indies have stated in the publication "State of the Jamaican climate" that storms will become more intense, dry spells will become longer and a shifting of weather patterns across the island. Jamaica's agriculture is primarily rain fed with small holding on uplands and hillsides with low to medium technology use. These respectively mean water starved crops and livestock resulting in lower yields in: Milk, Meat, Eggs, kilograms per hectare of crop harvested; and landslides resulting in the loss of productive land, siltation of water resources, loss of livestock or /and built infrastructure.

It may be argued that Jamaica's agriculture faces a double vulnerability in that one, the people which are engaged within the sector are primarily small farmers and rural folk with moderate income levels making it a challenge to response to shocks and two, the farmlands available to this group are mostly upland/hillside agricultural plots more acute are those interacting with watersheds. It is important to note that this group makes up the majority by number of Jamaica's faming population. This is exacerbated by the lack of transfer of Knowledge, Information, Technology and Skills to farmer which lowers the adaptive skills and knowledge transfer. The farmers' vulnerability is further challenge by his/her economic state and lack of sustained income because of the inadequacies of the fresh produce marketing on the island.

Jamaica's agriculture must be one which deploys techniques and technology which mitigates and adapts to the changing climate if Jamaica is to achieve and remain food secure.

Consequently, for this technical assistance, a tool/software application is needed to map/visualize the current areas across the island that are food insecure, as well as areas which may become food insecure in the future. This will assist decision-makers in assessing how and where targeted interventions strategies are designed and implemented, as well as monitoring and evaluating the contribution of future projects/programmes to reducing food insecurity. Barriers to achieve this may include the technical capacity to design and install systems, as well as the cost for implementation,

monitoring, and maintenance.

Furthermore, this technical assistance will retrofit the various farmers databases mentioned above to capture the post-harvest processes of select produce. This may include GIS data showing how produce is transported, where/how it is stored and processed. Additionally, this will allow for the provision of specific technical information in specific areas to develop a roadmap for ad hoc technology intervention. The technical assistance will also examine methods of sustainable land management and crop/livestock management for the most vulnerable areas that will be identified. This will allow for suggestion of technologies throughout the value chain from the moment the food is produced until it is sold. This should help farmers to store food properly, avoid losses and overall reduce food insecurity.

3. Logical Framework for the CTCN Technical Assistance:

	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
***Objective**:1) To develop a technology tool/software application that maps current and future food insecure areas across Jamaica within the context of climate change projections.* *2) For the participating farmers that will be identified, provide suggestions on technologies that will help throughout the value chain, as the produce is being stored, transported and marketed. This is to avoid losses and increase food insecurity within the vulnerable areas identified. As well as train farmers on the importance of the use of these technologies.*												
Outcome: Increase climate resilience ……...												
Output 1: Development of implementation planning and communication documents												
Activity 1: *All implementers must undertake the following activities at the beginning and at the end of the CTCN technical assistance.* i) A detailed work plan of all activities, deliveries, outputs, deadlines and responsible persons/organisations and detailed budget to implement the Response Plan. The detailed work plan and budget must be based directly on this Response Plan; ii) Based on the work plan, a monitoring and evaluation plan with specific, measurable, achievable, relevant, and time-bound indicators used to monitor and evaluate the timeliness and appropriateness of the implementation. The monitoring and evaluation plan should apply selected indicators from the Closure and Data Collection report template and enable the lead implementer to complete the CTCN Closure and Data collection report at the end of the assignment (please refer to item iv below and section 14 in the Response Plan); iii) A two-page CTCN Impact Description formulated in the beginning of the technical assistance and update/revised once the technical assistance is fully delivered (a template will be provided); iv) A Closure and Data Collection report completed at the end of the technical assistance (a template will be provided).												
Deliverable 1: i) Detailed work plan ii) Monitoring and evaluation plan iii) CTCN Impact Description iv) Closure and Data Collection report												
Output 2: Develop and implement a baseline survey administered to a sample of rural and urban areas, including those which have benefitted from climate-smart interventions.												
Activity 2.1: Development of robust baseline survey to sample rural areas, including areas benefitted from climate-smart intervention.		x										

Activity 2.2: Implementation of baseline survey based a robust methodological design.			x	x	x								
Deliverable 2: *D2.1 Food security data collection, processing and analysis for the country report. This will be a comprehensive analytical report developed based on survey data and other information sources on food security. It will include agricultural production, food import & export, cost of food production, food prices, agricultural output projection, food security forecast, vulnerability assessment, food insecurity mapping, linkages with climate change projections. This report will shed light on the determinants and consequences of food insecurity within the context of climate change.*						x							
D2.2 Robust baseline survey						x							
Output 3: Retrofit the various farmers databases to capture the post-harvest processes. This may include GIS data showing how produce is transported, where/how it is stored and processed.													
Activity 3.1: Enable and Update existing farmers databases to capture the post-harvest processes. How produce is stored, transported and processed. Evaluate the existing farmer's databases to understand their structure, data fields, and capabilities. The activity will identify any gaps or missing information related to post-harvest processes. Identify post-harvest data requirements, with specific data points that need to be captured for post-harvest processes. This may include information such as processing methods, storage conditions, transportation details, quality assessments, packaging, and distribution.					x	x	x	x					
Activity 3.2: Enable Farmers databases to be able to capture crop and livestock by species, varieties and any other relevant information allowing agriculture software to better inform climate smart decisions, especially as it relates to the post-harvest process. Based on the identified post-harvest data requirements, design a data structure for selected fields. The activity will evaluate how the existing data structure can be modified or expanded to capture the additional information effectively. Determine the most suitable methodology for collecting post-harvest data from farmers. This may involve using mobile applications.					x	x	x	x					
Deliverable 3: D3.1: A comprehensive report on the existing farmer databases available and the information captured in them. D3.2: Recommendations as to the data needed to fully capture the post-harvest process. D3.3: A comprehensive list of recommendations on possible improvements to be made as it pertains to capturing a wider selection of crop/livestock data within the post-harvest process and how to integrate these into the various programmes available.									x				
Output 4. Develop an interactive map/software application to spatially visualize current and future food security risk rates among communities, vulnerable groups and gender by parish within the context of changing climatic conditions.													
Activity 4.1: Generate national and sub-national food security forecasts based on climate modeling systems.						x	x	x	x	x	x		

Climate modeling systems are valuable tools for predicting future climate conditions and their potential impact on food security. The activity will estimate the potential effects of changing climate conditions on crop yields. By simulating the interactions between temperature, precipitation, CO2 levels, and other variables, the climate modeling system will project how different crops may respond to future climate scenarios. These yield projections help assess potential changes in agricultural productivity and inform planning and adaptation options. In addition, the model will provide insights into the frecuency and intensity of extreme weather events, including droughts, floods, and storms													
Activity 4.2: Database set-up (server and hardware specifications) Determine the specific data that needs to be stored and managed. Identify the entities, relationships, and attributes that will be part of the database. Choose the database system, considering factors such as scalability, performance, security, and compatibility with the existing databases. Create a logical data model that represents the structure of the database.						x	x	x	x	x	x		
Activity 4.3. Database Maintenance/Hosting and Infrastructure Develop a maintenance plan that includes regular updates and monitoring to ensure the efficiency of the database. On hosting and infrastructure, consider scalability for current and future database growth requirements and assess the level of technical support provided by the hosting provider to address any issues or concerns that may arise.						x	x	x	x	x	x		
Activity 4.4: Generate short-term, medium-term, and long-term forecasts through enhanced downscaling to the local context. Based on the interactive map/software application developed to spatially visualize current and future food security risk rates by communities, vulnerable groups (disaggregated by gender) and parish within the context of changing climatic conditions, demonstrate the ability to generate forecasts related to food security risk rates for each of the levels stated, in light of future changing climatic conditions						x	x	x	x	x	x		
Activity 4.5: Develop thresholds and triggers to inform early actions against food security risks. Based on the interactive map/software application developed to spatially visualize current and future food security risk rates and the ability to generate forecasts, develop warning thresholds and triggers to inform early actions against food security risks. This will include a baseline of where we are at each level. It will also include various critical points where food security is threatened. These thresholds will be based on future climatic conditions.						x	x	x	x	x	x		
Deliverable 4: *D4.1 Database used to provide information required for the assessment and monitoring of the food security situation and policy planning across the island.*											x		
Output 5: Training on sustainable land management and Crop/livestock management													
Activity 5.1: Develop training manual or model to train several farmers in sustainable crop and land management principles.. Additionally, conduct one (1) training session that will include a field day. It should also include analyzing the post-harvest process. This will include how the products are stored,					x	x	x	x					

and how they are transported.											
Activity 5.2: Empower Farmers to adopt climate smart land and crop/livestock management practices on their holdings. This will include one (1) capacity building session as it relates to the use of sustainable farming systems and agriculture programmes. This will encourage farmers to adapt to the changing conditions based on future climate conditions.					x	x	x	x			
Deliverable 5: *D6.1: Develop a roadmap for ad hoc technology intervention in specific areas along the value chain for participating farmers.* *D6.2: Training and capacity building materials and guidelines* *D6.3: Training report, including a full list of participants with gender-disaggregated data* *D6.4: Workshop Report* *D6.5: Based on the information gathered at the sessions, provide suggestions on technologies that will help along the post-harvest process.*								x	x		
Output 6: Improve the economic resilience of farming systems through increased market access and sustainable production											
Activity 6.1: Enable a digital ecosystem by linking the various farming databases and systems as well as online marketing platforms with the Jamaica Agricultural Market Information System to provide market intelligence, product sourcing and trade support for farmers. This will include at least one (1) capacity building session.					x	x	x	x			
Deliverable 6: *D6.1: Training and capacity-building materials and guidelines on the use and importance a digital ecosystem as it pertains to producing and marketing products using technology.* *D6.2: Training report, including a full list of participants with gender-disaggregated data*								x	x		
Output 7. Capacity building to a specialized group that will provide oversight on the monitoring and maintenance of the database, as well as the ability to perform the analysis regularly.											
Activity 7.1 Development of training and capacity-building materials											

Activity 7.2 Conduct at least one (1) training and capacity-building workshop for ministries, department, and agencies to successfully monitor and maintain database. *Organize the training of a specialized group that will provide oversight on the monitoring and maintenance of the database. The selection of the participants will be done in collaboration with the Climate Change Division, RADA and the Ministry of Agriculture, Fisheries and Mining and will have to fulfil certain requirements in order to participate.*										x	x	x
Deliverable 7: *D7.1 Training and capacity-building materials and guidelines.* *D7.2 Training report, including a full list of participants with gender-disaggregated data. The training will aim to strengthen government capacities to generate climate and food security information and promote their dissemination and usage for forecasting risks, mobilizing early action, and developing tailored services for communities in order to mitigate risks.*												x

4. Resources required and itemized budget:

Activities and Outputs	Input: Human Resources	Input: Travel	Inputs: Meetings/events	Input: Equipment/Material	Estimated Cost	
	(Title, role, estimated number of days)	*(Purpose, national vs. international, number of days)*	*(Meeting title, number of participants, number of days)*	*(Item, purpose, buy/rent, quantity)*	**Minimum**	**Maximum**
Output 1: Development of implementation planning and communication documents					**6,460**	**6,978**
Activity 1.1 Detailed work plan of all activities	CI-1 4 d				**1,520**	**1,642**
	CI-2 2 d				**760**	**821**
Activity 1.2. Monitoring and evaluation plan with specific, measurable, achievable, relevant, and time-bound indicators	CI-1 4 d				**1,520**	**1,642**

Activities and Outputs	Input: Human Resources	Input: Travel	Inputs: Meetings/events	Input: Equipment/Material	Estimated Cost	
	(Title, role, estimated number of days)	*(Purpose, national vs. international, number of days)*	*(Meeting title, number of participants, number of days)*	*(Item, purpose, buy/rent, quantity)*	**Minimum**	**Maximum**
Activity 1.3. A two-page CTCN Impact Description formulated in the beginning of the technical assistance and update/revised once the technical assistance	CI-1 2 d				**760**	**821**
Activity 1.4. A Closure and Data Collection report completed at the end of the technical assistance	CI-1 3 d				**1,140**	**1,231**
	CI-2 2 d				**760**	**821**
Output 2: Develop and implement a baseline survey administered to a sample of rural and urban areas, including those which have benefitted from climate-smart interventions. This will shed light on the determinants and consequences of food insecurity within the context of climate change.					**36,890**	**46,377**
Activity 2.1. Development of robust baseline survey	CI-1 6 d				**1,140**	**1,231**
	CN-1 1 m				**1,250**	**1,350**
Activity 2.2. Implementation of baseline survey based a robust methodological design.	CN-1 1 m				**1,250**	**1,350**
	CN-2 1 m				**1,250**	**1,350**
	Field Supervisors - 3 60 d				**4,200**	**4,536**
	Surveys US$20/survey q. 500				**10,000**	**18,000**

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Activities and Outputs	Input: Human Resources		Input: Travel	Inputs: Meetings/events	Input: Equipment/Material	Estimated Cost	
	(Title, role, estimated number of days)		*(Purpose, national vs. international, number of days)*	*(Meeting title, number of participants, number of days)*	*(Item, purpose, buy/rent, quantity)*	**Minimum**	**Maximum**
					12 Tablets for data collection + shipping	**7,000**	**7,560**
			Travel National 90 US$120/travel			**10,800**	**11,000**
Output 3: Retrofit the various farmers databases to capture the post-harvest processes. This may include GIS data showing how produce is transported, where/how it is stored and processed.						**4,780**	**5,162**
Activity 3.1: Enable and Update existing farmers databases to capture the post-harvest processes. How produce is stored, transported and processed.	**CI-1**	**6d**				**1,140**	**1,231**
	CN-1	**1m**				**1,250**	**1,350**
Activity 3.2: Enable Farmers databases to be able to capture crop and livestock by species, varieties and any other relevant information allowing agriculture software to better inform climate smart decisions, especially as it relates to the post-harvest process.	**CI-1**	**6d**				**1,140**	**1,231**
	CN-1	**1m**				**1,250**	**1,350**
Output 4: Develop an interactive map/software application to spatially visualize current and future food security risk rates among communities, vulnerable groups and gender by parish within the context of changing climatic conditions.						**108,410**	**112,463**
Activity 4.1. Generate national and sub-national food security forecasts based	CN-2	5 m				**12,500**	**13,000**
	CI-2	7 d					**3,780**

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Activities and Outputs	Input: Human Resources		Input: Travel	Inputs: Meetings/events	Input: Equipment/Material	Estimated Cost	
	(Title, role, estimated number of days)		*(Purpose, national vs. international, number of days)*	*(Meeting title, number of participants, number of days)*	*(Item, purpose, buy/rent, quantity)*	**Minimum**	**Maximum**
on climate modelling systems.						**3,500**	
	Software Application Developer- and GIS Expert1	60 d				**11,800**	**12,000**
Activity 4.2. Database set-up (server and hardware specifications)	Software Application Developer and GIS Expert-1	60 d				**11,800**	**12,000**
Activity 4.3. Database Maintenance/Hosting and Infrastructure	Software Application Developer and GIS Expert-1	60 d				**11,800**	**12,000**
					1 server (computer) to host database on. This will provide resources, data services or host programs that will connect to other computers over the existing network	**19,750**	**20,930**

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Activities and Outputs	Input: Human Resources		Input: Travel	Inputs: Meetings/events	Input: Equipment/Material	Estimated Cost	
	(Title, role, estimated number of days)		*(Purpose, national vs. international, number of days)*	*(Meeting title, number of participants, number of days)*	*(Item, purpose, buy/rent, quantity)*	**Minimum**	**Maximum**
Activity 4.4. Generate short-term, medium-term, and long-term forecasts through enhanced downscaling to the local context.	CN-2	1 m				**2,500**	**2,700**
	CI-2	7 d				**2,660**	**2,873**
	Software Application Developer and GIS Expert-1	60 d				**11,800**	**12,000**
Activity 4.5. Develop thresholds and triggers to inform early actions against food security risks	CN-1	1 m				**2,500**	**2,700**
	CN-2	1 m				**2,500**	**2,700**
	CI-2	7 d				**3,500**	**3,780**
	Software Application Developer and GIS Expert	60 d				**11,800**	**12,000**
Output 5: Sustainable land management and Crop/livestock management						**15,500**	**16,500**
Activity 5.1: *Develop training manual or model to train several farmers in sustainable crop and land*	CN-1	2 m	Travel to and from the venue is included in this cost USD 45/travel			**1,750**	**1,800**

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Activities and Outputs	Input: Human Resources		Input: Travel	Inputs: Meetings/events	Input: Equipment/Material	Estimated Cost	
	(Title, role, estimated number of days)		*(Purpose, national vs. international, number of days)*	*(Meeting title, number of participants, number of days)*	*(Item, purpose, buy/rent, quantity)*	**Minimum**	**Maximum**
management principles. Additionally, conduct one (1) training session that will include a field day. It should also include analyzing the post-harvest process. This will include how the products are stored, and how they are transported.	CN-2	2 m	Travel to and from the venue is included in this cost USD 45/travel			**1,750**	**1,800**
	CI-2	25 d				**2,250**	**2,600**
				One (1) Workshop to be held during the 2 months/ 20 people	This includes venue, catering, and equipment rental (microphones, screens and projectors)	**2,000**	**2,000**
Activity 5.2: *Empower Farmers to adopt climate smart land and crop/livestock management practices on their holdings. This will include one (1) capacity building session as it relates to the use of sustainable farming*	CN-1	2 m	Travel to and from the venue is included in this cost USD 45/travel			**1,750**	**1,900**
	CN-2	2 m	Travel to and from the venue is included in this cost USD 45/travel			**1,750**	**1,900**

Activities and Outputs	Input: Human Resources		Input: Travel	Inputs: Meetings/events	Input: Equipment/Material	Estimated Cost	
	(Title, role, estimated number of days)		*(Purpose, national vs. international, number of days)*	*(Meeting title, number of participants, number of days)*	*(Item, purpose, buy/rent, quantity)*	**Minimum**	**Maximum**
systems and agriculture programmes. This will encourage farmers to adapt to the changing conditions based on future climate conditions.							
	CI-2	25 d				**2,250**	**2,500**
				One (1) Workshop to be held during the 2 months/ 20 people	This includes venue, catering, and equipment rental (microphones, screens and projectors)	**2,000**	**2,000**
Output 6: Improve the economic resilience of farming systems through increased market access and sustainable production						**4,390**	**4,500**
Activity 6.1 Enable a digital ecosystem by linking the various farming databases	**CI-1**	**6d**				**1,140**	**1,200**

Activities and Outputs	Input: Human Resources		Input: Travel	Inputs: Meetings/events	Input: Equipment/Material	Estimated Cost	
	(Title, role, estimated number of days)		*(Purpose, national vs. international, number of days)*	*(Meeting title, number of participants, number of days)*	*(Item, purpose, buy/rent, quantity)*	**Minimum**	**Maximum**
and systems as well as online marketing platforms with the Jamaica Agricultural Market Information System to provide market intelligence, product sourcing and trade support for farmers. This will include at least one (1) capacity building session.	**CN-1**	**1m**				**1,250**	**1,300**
				One (1) capacity building session to be held during the month/ 20 people	This includes venue, catering, and equipment rental (microphones, screens and projectors)	**2,000**	**2,000**
Output 7: A specialized group -task force - that will provide oversight on the monitoring and maintenance of the database, as well as the ability to perform the analysis regularly.						**38,280**	**48,420**
Activity 7.1. Training and capacity-building workshop for ministries, department and agencies to successfully monitor and maintain database	CI-1	4 d				**1,520**	**1,600**
	CI-2	2 d				**760**	**820**
	CN-1	3m				**7,500**	**8,000**
	CN-2	3m				**7,500**	**8,000**
	Certificate program			US$1500/student - 6modules -		**21,000**	**30,000**

Activities and Outputs	Input: Human Resources		Input: Travel	Inputs: Meetings/events	Input: Equipment/Material	Estimated Cost	
	(Title, role, estimated number of days)		*(Purpose, national vs. international, number of days)*	*(Meeting title, number of participants, number of days)*	*(Item, purpose, buy/rent, quantity)*	**Minimum**	**Maximum**
	training			14professionals			
Estimated range of costing for the entire Response Plan						**214,710**	**240,400**

5. Profile and experience of experts

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

Experts required	Brief description of required profile
International Expert 1 – CI-1 and Team Leader	**Essential** • Formal academic qualifications in agricultural sciences, and/or engineering, with advances studies (Ph.D. or M.Sc.) in Climate change (impacts, risk, vulnerabilities, and adaptation) • Ten (10) years of experience providing technical consultancy services within a developing country, at least two (2) years of experience in the Caribbean region • Experience in developing plans that involve the assessment of climate change impacts and adaptation in the agriculture sector • Experience with initiatives focusing on mitigation of climate change impacts and adaptation measures in the agriculture sector • Familiarity with the UN process, research needs assessment methodology and research planning • Experience in conducting technology prioritization and multi-criteria analysis • Fluency in English **Highly Desirable** • In-depth understanding of policy measures and drivers in the agriculture sector of the Caribbean region
International Expert 2 – CI-2	**Essential** • Formal academic qualifications in engineering and/or economy with advances studies (Ph.D. or M.Sc.) in science, technology, and innovation policy and management.

	• Ten (10) years of experience providing technical consultancy services within a developing country, at least two (2) years of experience in the Caribbean region • Experience in developing national plans that involve rigorous assessment of technological options in order to lessen the impact of climate change in economic activities, and sectoral analysis at a country level in the agriculture sector • Familiarity with the UN process, technology needs assessment methodology and technology action planning • Facilitation skills in delivering dedicated training workshops regarding the research and technological development needs assessment process • Experience in conducting technology prioritization and multi-criteria analysis • Experience with initiatives to lessen the impact of industrial activities, agriculture, and transport • Fluency in English **Highly Desirable** • Understanding of wider policy measures and drivers to overcome barriers of the deployment of technologies and sectors for mitigation and adaptation in the Caribbean region • Knowledge and experience working in the development of enabling environments and incentives to foster innovation aimed towards reducing environmental impacts in the agriculture sector
National consultant 1 – CN-1	**Essential** • Advanced studies (M.Sc.) in social sciences and/or related fields, with experience in multidisciplinary research (desirable) • Six (6) years of professional experience in the agriculture sector and/or food industry • Understanding of the industrial policy and dynamics of the Jamaican productive sectors • Experience in facilitating and delivering stakeholder workshops and group facilitating aimed at engaging multiple actors, promoting inter-institutional and multisectoral coordination • Experience in the preparation of technical reports on climate change and sustainable development **Highly Desirable** • Knowledge of the Jamaican national science, technology and innovation system • Knowledge of the state of the art of climate change policies and programs in Jamaica (regulation, voluntary standards, etc.) • Understanding of statistics regarding climate change indicators (emissions, desertification, changes in land uses, etc
National consultant 2 – CN-2	**Essential** • Graduate in agronomy, economics (or related field), statistics and/or engineering, with advanced studies in science, technology and innovation policy and management, or natural resources management

	• Six (6) years of professional experience in the agriculture sector and/or food industry • Experience with the preparation of technical reports on climate change and sustainable development • Experience in modeling and performing data analysis (management of databases and statistical programs) • Experience with climate finance and preparation of concept notes **Highly Desirable** • Understanding of statistics on climate change indicators of productive sectors (emissions, energy consumption, etc.) • Knowledge of state of the art of environmental impact mitigation in some of Jamaica's productive sectors (industry, agriculture, transport) (identification of implemented environmental technologies, technological innovations to reduce the environmental impact, etc.) • Knowledge of the use of combined financial instruments for private investment in climate initiatives and in preparing proposals for multilateral funds
Software Application Developer-1	**Consulting Software Developer with the following requirements:** • A bachelor's degree in computer science or related field. • Ten (10) years of professional experience • A working knowledge of programming languages such as Java and Oracle. • A working knowledge of GIS mapping and software development • Experience in application and software development. • Knowledge of software design and programming principles. • Experience in preparing and delivering trainings for IT tools users • Fluency in English

6. Intended contribution to impact over time

The main outcome of this technical assistance is a technology tool that will allow to spatially visualize current and future food security risk rates among communities, vulnerable groups and gender by parish within the context of changing climatic conditions. It will also retrofit the various farmers databases available to capture the post-harvest processes of select produce. Additionally, this will allow for the provision of specific technical information in specific areas to develop a roadmap for ad hoc technology intervention.

In the short-term, this technical assistance will provide information about the main limiting factors that lead to food insecurity, thereby identifying intervention points for enhancing food security. As well as examine methods of sustainable land management and crop/livestock management for the most vulnerable areas that will be identified.

In the mid-term, it will assist decision-makers in assessing how and where targeted interventions strategies are designed and implemented, as well as monitoring and evaluating the contribution of future climate change projects/programmes to reducing food insecurity. As well as allow for suggestion of technologies throughout the value chain from the moment the food is produced until it is sold. This should help farmers to store food properly, avoid losses and overall reduce food insecurity.

7. Relevance to NDCs and other national priorities

The promotion of national food security as a means of meeting the food and nutritional requirements of the population has been rooted in Vision 2030 Jamaica, particularly in the context of global economic shocks and climate change. Hence, the technical assistance is aligned with the island's development policies, plans and strategies that target a reduction food poverty and increase adaptation to changing climatic conditions. It also facilitates the strengthening of partnerships among agencies, and academia while increasing their capacity to provide climate adaptation information and services. Similarly, the technical assistance also aligns with sectorial plans that aim to implement measures that would strengthen the databases on the vulnerable groups. Also, strengthening the existing data collection mechanisms within ministries, departments and agencies (MDAs) so that quality data on food security and climate change are generated and used for programme assessment and improvement as well as for monitoring progress.

Update of Nationally Determined Contribution (NDC) of Jamaica, 2020

Jamaica will undertake a range of actions concerning the sectors not covered by its quantitative commitments. These include in the agriculture sector: The Climate Change Policy Framework for Jamaica (2015) identifies the agriculture sector as a critical sector of importance for both mitigation and adaptation. Strategic aims include facilitating the use of water (and hence energy) efficient agricultural methods, improved food storage systems, and diversifying food production techniques including the expansion of agroforestry and aquaculture; pg. 3.

Technology: The need for new innovations are embedded in the need to be more efficient and to produce from cleaner technologies. The availability and transfer of technologies that are environmentally sound and which support low carbon and climate-resilient development is paramount. As a small island developing state these opportunities are not often readily accessible and so the spirit of the Paris Agreement would help to foster North-South Cooperation; pg. 7

Technology Needs Assessment, 2020

Though the TNA provides adaptation and mitigation technology options that are more suitable for on the ground agricultural activities, it also acknowledged the need for advancing research and development, as well as providing value-added climate information services for agriculture.

Decision Context; pg. 39

National Poverty Reduction Programme (NPRP), 2018-2030
The NPRP supports the National Policy on Poverty and is expected to contribute directly to the policy goals of eradicating extreme (food) poverty by 2022 and reducing national poverty to less than 10 per cent by 2030.

The Climate Change Policy Framework, 2015
The policy includes research as a key objective towards building climate resilience.

Food and Nutrition Security Policy, 2013
Food Stability Objective – To improve the food and nutrition security resilience of the national community to natural and socio-economic shocks and climate change; pg 29

Third National Communication to the UNFCCC, 2018
Climate change and the natural resource sectors; pg 195-196

Draft Fisheries Policy, 2008
Importance of Fisheries: Fisheries currently play an important part in food security, and given the existing resources, have the potential to increase their role in ensuring the availability of nutritious, affordable and accessible source of food; pg 1

Agriculture Sector Plan-Vision 2030
Goal #7: National Food Security; pg 97

8. Linkages to relevant parallel on-going activities:

Several projects have been done or is currently being conducted to increase the adaptive capacity and resilience of the agriculture sector. These include:

- **Pilot Programme for Climate Resilience Jamaica:** This is a funding mechanism under the Climate Investment Funds (CIF), which helps developing countries integrate climate resilience into development planning and investment through enhancing adaptive capacity across priority sectors. One of the many projects include the **Promoting Community-Based Climate Resilience in the Fisheries Sector Project (PCBCR)** which is a five-year project (2018-2023) seeking to build community-based climate resilience among targeted fishing and fish farming communities (https://ppcrja.org.jm/).

- **RADA Production Incentive Project, 2019-2020:** This project supports climate resilience in select agricultural initiatives by funding the inputs needed to prepare, maintain and harvest produce demonstrating climate-smart techniques. In addition, this project funds inputs needed to resurrect farms impacted by disaster – floods, drought, and hurricane (https://www.rada.gov.jm/blog/production-incentive-programme-2019-2020-high-gear).

- **Strengthening Community Resilience while Ensuring Food Security through Efficient Management of Natural Resources with the Use of Energy Efficient Technology, to be implemented in Northern Clarendon:** This project which is currently being executed aims to enhance economic, food, and nutrition security in selected communities, improve community and household capacities for water resource management and enhance community adaptation and management capacities to respond to natural hazards.

- **Sustainable Agriculture in the Caribbean**: The World University Service of Canada

Caribbean in the Caribbean secured funding for the implementation of a five-year project entitled Sustainable Agriculture in the Caribbean. Jamaica is 1 of 5 countries in which the SAC project will be implemented. Under the project, women and youth (f/ m) will become central players in the targeted agricultural market systems so they can restore the dwindling number of farmers in the region, while strengthening more climate resilient domestic agricultural production to enhance food security, and reduce reliance on imported agricultural products, for more sustainable economic growth. Recognizing that adult males are currently dominant actors in market systems, the project will also work with them so they can become advocates for women and youth (f/ m) fostering the right conditions for equitable participation.

- **Barilla Centre for Food and Nutrition Foundation Young Earth Solution (BCFN YES!) Research Project "Surviving the Drought: An Irrigation Curriculum for Jamaica's Small-Scale Farmers"**: This is an adaptive participatory project in which farmers in the parish of St. Elizabeth benefit from a Knowledge Transfer Curriculum (KTC). This educational design is used to enhance the knowledge capacity of farmers through adaptive irrigation strategies. Adaptation at the local level through education, improved irrigation methods and social capital, may improve farming livelihoods and maximize yields, thus strengthening national food security. Details of the project can be found at (https://irrigationffs.wixsite.com/jamaica).

- **Improving Technical and Institutional Capacities for Disaster Risk Management and sustainable Agriculture in Jamaica, Guyana and Suriname, 2021**. Building on the "Surviving the Drought: An Irrigation Curriculum for Jamaica's Small-Scale Farmers" project, a Technical Corporation Programme was conducted by the FAO, Ministry of Agriculture and Fisheries, and RADA. This project aimed to improve the technical and institutional capacities for disaster and **climate** risk management and sustainable agriculture in Jamaica, Guyana and Suriname. Yardley Chase Female Farmers are building resilience one shade house at a time | FAO in Jamaica, Bahamas and Belize | Food and Agriculture Organization of the United Nations

- **Hungry Cities Project: The State of Household Food Security in Kingston, Jamaica 2019.** Provides analyses regarding emergent patterns related to various food security measures among urban households. The questionnaire survey was administered to 702 households distributed across seven communities in the Kingston Metropolitan Area, Jamaica. (https://hungrycities.net/wp-content/uploads/2019/06/HCP15.pdf)

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

Expected future use of the outputs and deliveries produced by this TA

Output 1/Delivery 1 – Output/delivery 1 can be used to:

- Enhance food and nutrition security of vulnerability groups, communities, and parishes.
- Development of policies and legislation that will assist decision-makers in assessing how and where targeted interventions strategies are designed and implemented. This will target specific groups, communities and parishes that are most in need.

Output 2/Delivery 2 –

- The availability and accessibility of baseline data/information for future climate change adaptation projects and/or programmes to be implemented across Jamaica, particularly within the agriculture sector.

- Further collect data to identify and provide support to reduce risk from natural hazards and phenomena such as climate change to areas/communities at risk to mitigate livelihood losses to domestic farmers, fishers, fish farmers and other producers

- The database behind the system when updated regularly can be used to make timely decisions regarding the vulnerable groups socio-economic and nutritional needs. This will enable the government to be more effective and have targeted interventions

Output 3/Delivery 3 –

- Justify the prioritization and acquisition of technologies required for further climate change adaptation on the ground in the agriculture sector that will assist with increasing food security.

- Availability and accessibility of interventions that will counter the factors that lead to food insecurity. This will lead to future projects/programmes that will assist in implementing these interventions and have a real impact on national food insecurity.

Output 4/Deliver 4 –

- The database behind the system when updated regularly can be used to make timely decisions regarding the vulnerable groups socio-economic and nutritional needs. This will enable the government to be more effective and have targeted interventions.

- The communications technology being used can be used to make decisions to eliminate food insecurity as they arise in certain communities, in certain vulnerable groups and parishes. This will be done continuously, as the information is updated and changing poverty statistics, food insecurity statistics and climate change conditions vary.

- Consolidate the available databases (AMIS, RADA, ABIS etc.) so that the information can be updated at once, the maintenance costs can be reduced, and the overlay of the different databases can be provide more data and information to inform vulnerable groups as best as possible.

- The continuous update of these databases can show a real time snapshot of food poverty across the island ensuring that decisions can be made at anytime, reports can be produced more easily and data which includes agricultural production, food import & export, cost of food production, food prices, agricultural output projection, food security forecast, vulnerability assessment, food insecurity mapping and linkages with climate change projections can be available to everyone at any point in time.

Output 5/Delivery 5 –

- Allow for greater collaboration with various stakeholders within the agriculture sector as well as cross sectoral collaborations.

- Greater capacity in the agriculture sector specifically, private sector, research institutes and

the public sector to tackle food insecurity in Jamaica.

- A specific specialized group will ensure information is deiminated regularly throughout the relevant stakeholders or personnel about the projects that are currently being implemented that is addressing food insecurity, the database will be updated and maintained regularly and access to information will be of priority.

- Assist decision-makers and stakeholder in assessing how and where targeted interventions strategies are designed and implemented, as well as monitoring and evaluating the contribution of future projects/programmes to reducing food insecurity.

What organizations or stakeholders will use the outputs of the TA

Rural Agriculture Development Authority (RADA)
Planning Institute of Jamaica (PIOJ)
Private Sector Organization of Jamaica (PSOJ)
Scientific Research Council (SRC)
National Spatial Data Management Division (NSDMD)
Ministry of Agriculture and Fisheries (MFA)
Statistical Institute of Jamaica (STATIN)
University of the West Indies (UWI)
University of Technology (UTECH)

What purpose will the organization or stakeholders use the outputs for

The outputs coming out of this TA directly corresponds with the mandate of RADA and MFA. They both have a responsibility to promote the development of agriculture in Jamaica, through an efficient, modern, and sustainable extension service, which will enhance the national economy and improve the quality of life of rural farm families. As well as facilitate the broad integration of technology, research and the overall improvement of the sector. This means that these stakeholders/organizations will find the outputs from this TA very useful. They will use it to collect and store data on vulnerable groups and communities in Jamaica in a more targeted and specific way, inform decisions being made, justify the acquisition of technology that will improve food security in Jamaica, inform research areas, develop, monitor and evaluate projects and programmes that tackle specific problems and provide interventions in specific areas affecting food security, build capacity within this area for the people of Jamaica and their personnel and develop policies and legislation that will ultimately help build food and nutrition security for those who need it most nationally.

Data surround agricultural production, food import & export, cost of food production, food prices, agricultural output projection, food security forecast, vulnerability assessment, food insecurity mapping and linkages with climate change projections will collected within this TA. This data if collected regularly can assist these various organization or stakeholders especially STATIN and PIOJ to plan ahead in regard to their reporting when it involves the agriculture sector of Jamaica.

The data as well as the map software application can assist these organizations such as SRC, UWI, UTECH, NSDMD and others to formulate and carryout research that is surrounding Jamaica's food security/insecurity presently or in the future. It can also assist with building the capacities in these institutions to carry out such research. Can assist with research surrounding topics related to the data being collected such as food import and export. This is a benefit to these organizations as there are a multitude of research areas, knowledge gaps and topics that are being investigated or will be in the future and this data as well as the software can assist to formulate these research areas and provide access to real time data that can help.

The private sector can build their capacity and knowledge as it regards to Jamaicas food insecurity especially considering climate change and the effects this will have and is currently having on our food production and access. This will allow for innovative methods to be developed and implemented to adapt to these changes and the data can justify why these changes are occurring, where there must occur and who will benefit.

By using this data gathered from this TA and the software we can also estimate the budgetary needs in the future to address this issue. This will take Public-Private partnerships to address, and a multitude of stakeholder buy in and assistance, as well as political will. The data and outputs from this TA can justify these needs and the eventual development of new policies and legislation that will have to be developed to address or prevent the issue of food insecurity in Jamaica.

What scale and scope the outputs and deliveries will be applied

The outputs and deliveries will be applied nationally. Vulnerable groups and communities across the island will be targeted.

When and what will be the next steps undertaken

The next step is to develop and implement a pilot project containing adaptive intervention strategies that will have a targeted impact on food insecurity among vulnerable groups and communities in the face of high poverty levels and changing climatic conditions. This will include capacity building/training and the procurement of infrastructure and technology that will assist with the goal of building food security in this or/and these specific groups or/and communities in Jamaica.

10. Gender and co-benefits:

Imbedded in design of the activities:	The impact on the design of the activities is linked to the inclusion of women in the work teams that carry out this technical assistance.
Gender and co-benefits intended as result of the activities:	"Food security may vary with age, status, gender, income, geographic location and ethnicity" (Government of Jamaica 2013). The availability, access, stability and consumption of safe, nutritious food is particularly important to the health and sustenance of vulnerable groups within the population, including children, adolescents, pregnant and lactating women and the elderly. Generally, research has found that women and girls are not only disproportionately vulnerable to the impacts of climate change but are also vulnerable to all dimensions of food security (Tibesigwa et al. 2015; Ramachandran 2013). For Jamaica, women make up approximately 50.48% of the population (STATIN 2018), where there is also prevalence of female-headed households. However, the extent to which women and other vulnerable groups experience greater levels of hunger is unclear. The National Food and Nutrition Security Policy (Government of Jamaica 2013, 32) acknowledges the importance of taking a gender-sensitive approach towards identifying and mapping the areas and groups across the island that are susceptible to "chronic or transitory food insecurity". The policy also advocates the establishment of a database that captures this information. Hence, CTCN's technical assistance will provide an opportunity to generate this country-wide data in a disaggregated format to capture the gendered nuances of food insecurity under changing climatic conditions.

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

In country stakeholder	Role in implementation of the technical assistance
Climate Change Division - Ministry of Housing, Urban Renewal, Environment and Climate Change	The CCD has the specific mandate to address climate change issues. It will facilitate and provide oversight to the actions related to the TA
Rural Agriculture Development Authority (RADA)	Promotes the development of agriculture in Jamaica, as the main engine of economic growth in rural communities, through an efficient, modern and sustainable extension service, which will enhance the national economy and improve the quality of life of rural farm families.
National Spatial Data Management Division	The Spatial Data Management Division has the responsibility for coordinating, implementing and managing national GIS programmes and projects.
Ministry of Agriculture and Fisheries	Facilitates the broad integration of technology, research and the overall improvement of the sector.
CARDI	Contribute to sustainable development by the generation, transfer and application of appropriate technologies through agricultural research for development
Planning Institute of Jamaica (PIOJ)	One of the chief planning bodies for the GOJ.
Statistical Institute of Jamaica (STATIN)	STATIN has the responsibility to collect, compile, analyze, abstract and publish statistical information relating to the commercial, industrial, social, economic and general activities and condition of the Jamaican people
The University of the West Indies	Provides research and technical competencies

12. SDG Contributions:

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

Goal	Sustainable Development Goal	Direct contribution from CTCN TA (1 sentence for top 1-3 SDGs)
1	End poverty in all its forms everywhere	
2	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	The technical assistance will develop a technology tool/software application that maps current and future food insecure areas across Jamaica within the context of climate change projections to achieve food security.
3	Ensure healthy lives and promote well-being for all at all ages	
4	Ensure inclusive and equitable quality education and promote life-long learning opportunities for all	
5	Achieve gender equality and empower all women and girls	
6	Ensure availability and sustainable management of water and sanitation for all	
7	Ensure access to affordable, reliable, sustainable, and modern energy for all (consider adding targets for 7)	
	7.1 - By 2030, ensure universal access to affordable, reliable and modern energy services	
	7.2 - By 2030, increase substantially the share of renewable energy in the global energy mix	
	7.3 - By 2030, double the global rate of improvement in energy efficiency	
	7.a - By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable	

	energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology	
	7.b - By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support	
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	
9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	
10	Reduce inequality within and among countries	
11	Make cities and human settlements inclusive, safe, resilient and sustainable	
12	Ensure sustainable consumption and production patterns	
13	Take urgent action to combat climate change and its impacts	*All TAs should indicate relevance to Goal 13 and at least one target below (13.1 to 13.b).*
	13.1 - Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	The technical assistance will help enhance resilience of the agriculture sector in Jamaica by strengthening local capacities to generate climate and food security information and promote their dissemination and usage for forecasting risks, mobilizing early action, and developing tailored services for communities in order to mitigate risks and improve adaptive capacity.
	13.2 - Integrate climate change measures into national policies, strategies and planning	
	13.3 - Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	
	13.a - Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible	
	13.b - Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities	
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	
15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	
17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	

13. Classification of technical assistance:

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

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

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

14. Monitoring and Evaluation process

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