Developing Jamaica's Climate Change Research Agenda

Product 5.1 Concept note for the project "Enhance multi-scalar mapping and research of food security risk, due to the impacts of climate change on rural and urban environments."

CTCN – NDE Solicitation format

CATIE
Solutions for environment and development
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CLIMATE TECHNOLOGY CENTRE & NETWORK

NDC PARTNERSHIP

This report was prepared for the Climate Change Division under the Climate Action Enhancement Package Program (CAEP). The CAEP is an offering of the NDC Partnership to support member countries to enhance quality, increase climate ambition and implement the NDC.

Guidelines:

- This Request Submission Form should be completed by the organisation requesting technical assistance from the Climate Technology Centre & Network (CTCN) in collaboration with the National Designated Entity (NDE) of the country in question
- The Form must be signed by the NDE. Please see updated contact list of NDEs here: http://unfccc.int/ttclear/support/national-designated-entity.html
- The Form can be submitted as a Word file containing a digital signature or as a signed and scanned PDF file in combination with an un-signed Word file
- For requests submitted by multiple countries, all the NDEs of the respective countries shall sign identical Forms before official submission to the CTCN
- NDEs have the opportunity to submit CTCN requests in collaboration with National Designated Authorities (NDAs) for the Green Climate Fund (GCF) if targeting the GCF Readiness Programme.

Requesting country or countries:	Jamaica
Request title:	Enhance multi-scalar mapping and research of food security risk, due to the impacts of climate change on rural and urban environments.
NDE	**Ms. Una May Gordon** Principal Director, Climate Change Division Ministry of Economic Growth and Job Creation Telephone: +1 876 633 7354 Email: unamay.gordon@megjc.gov.jm
Request Applicant:	**Ms. Una May Gordon** Principal Director, Climate Change Division Ministry of Economic Growth and Job Creation Telephone: +1 876 633 7354 Email: unamay.gordon@megjc.gov.jm

Climate objective:

☒ Adaptation to climate change

☐ Mitigation of climate change

☐ Combination of adaptation and mitigation of climate change

Geographical scope:

☒ Community level

☒ Sub-national

☐ National

☐ Multi-country

If the request is at a sub-national or multi-country level, please describe specific geographical areas (provinces, states, countries, regions, etc.).

Problem statement related to climate change (up to one page):

This section should answer the question "what is the problem?" Please summarise the problem related to climate change and/or the negative impacts of climate change in the country that the request aims to address.

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). However, 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. 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). Furthermore, due to the increased intensity of climatic hazards, the island has become increasingly "prone to temporary food insecurity" (Government of Jamaica 2013). Hence, 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.

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 these extreme weather systems (Climate Studies Group Mona and Planning Institute of Jamaica 2017). This may also result in the island experiencing multiple hazard events 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.

Agriculture is a climate-sensitive sector where changing climatic conditions can impact production levels, and the availability of food crops. The agriculture sector 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 is considered the breadbasket parish of the island as it contributes approximately 22% of domestic food production (Tinling 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.

Knowledge is needed 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. Using the 2011 Population and Housing Census, and the 2012 Jamaica Survey of Living Conditions, the Planning Institute of Jamaica (PIOJ) and the Statistical Institute of Jamaica (STATIN) mapped food poverty for parishes and communities across the island (PIOJ 2019). However, research is needed 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?

Furthermore, research is needed to not only measure food security risk, but to also develop a technological tool/software application that will visualize the spatial vulnerability of food insecure areas across the island. The technical assistance 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 etc. affect the availability and access to food for rural and urban areas? It is important have a visual representation of food security risk. This can 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.

Past and on-going efforts to address the problem (up to half a page):

This section should answer the question "what has been done or is currently being done to address the problem?" Please describe past and on-going processes, projects or initiatives implemented in the country or region to tackle the climate problem as described above.

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.

- **RADA Production Incentive Project:** 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.

- **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**: 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.

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.

Specific technology1 barriers (up to one page):

This section should answer the questions "what are the technology barriers that hinder national efforts described above" and "how will the CTCN technical assistance complement these efforts?" Building upon the problem statement and taking into consideration the existing efforts described above, please describe the specific technology barriers encountered by the requesting applicant to identify, assess or deploy climate technology(ies) in an effort to address the problem statement. The described barriers should be within the scope of the requested CTCN technical assistance (described in the section below).

Technology Barriers

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. 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.

1 *"**any equipment, techniques, practical knowledge and skills** needed for reducing greenhouse gas emissions and adapting to climate change" (Special Report on Technology Transfer, IPCC, 2000)*

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 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. Consequently, for the project **"Enhance multi-scalar mapping and research of food security risk, due to the impacts of climate change on rural and urban environments"**, 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.

Sectors:

Please indicate the main sectors related to the request:

☐ Coastal zones	☐ Early Warning and Environmental Assessment	☐ Human Health	☐ Infrastructure and Urban planning

☒ Marine and Fisheries	☐ Water	☒ Agriculture	☐ Carbon fixation
☐ Energy Efficiency	☐ Forestry	☐ Industry	☐ Renewable energy
☐ Transport	☐ Waste management		

Please add other relevant sectors:

Cross-sectoral enablers and approaches:

Please indicate the main cross-sectoral enablers and approaches

☒ Communication and awareness	☐ Economics and financial decision-making	☒ Governance and planning	☒ Community based
☐ Disaster risk reduction	☐ Ecosystems and biodiversity	☐ Gender	

Technical assistance requested (up to one page):

Founded on the problem statement, past/on-going efforts and technology barriers, please describe the requested technical assistance. The technical assistance should clearly contribute to mitigation or adaptation to climate change as described in the problem statement and contribute to overcome the specific technology barriers.

Within a clearly defined scope, the description of technical assistance should be structured into the following:

Overall objective: To develop a technology tool/software application that maps current and future food insecure areas across Jamaica within the context of climate change projections.

To develop the technical assistance the framework proposed by Misselhorn et al. (2012) will be use as reference (Figue 1).

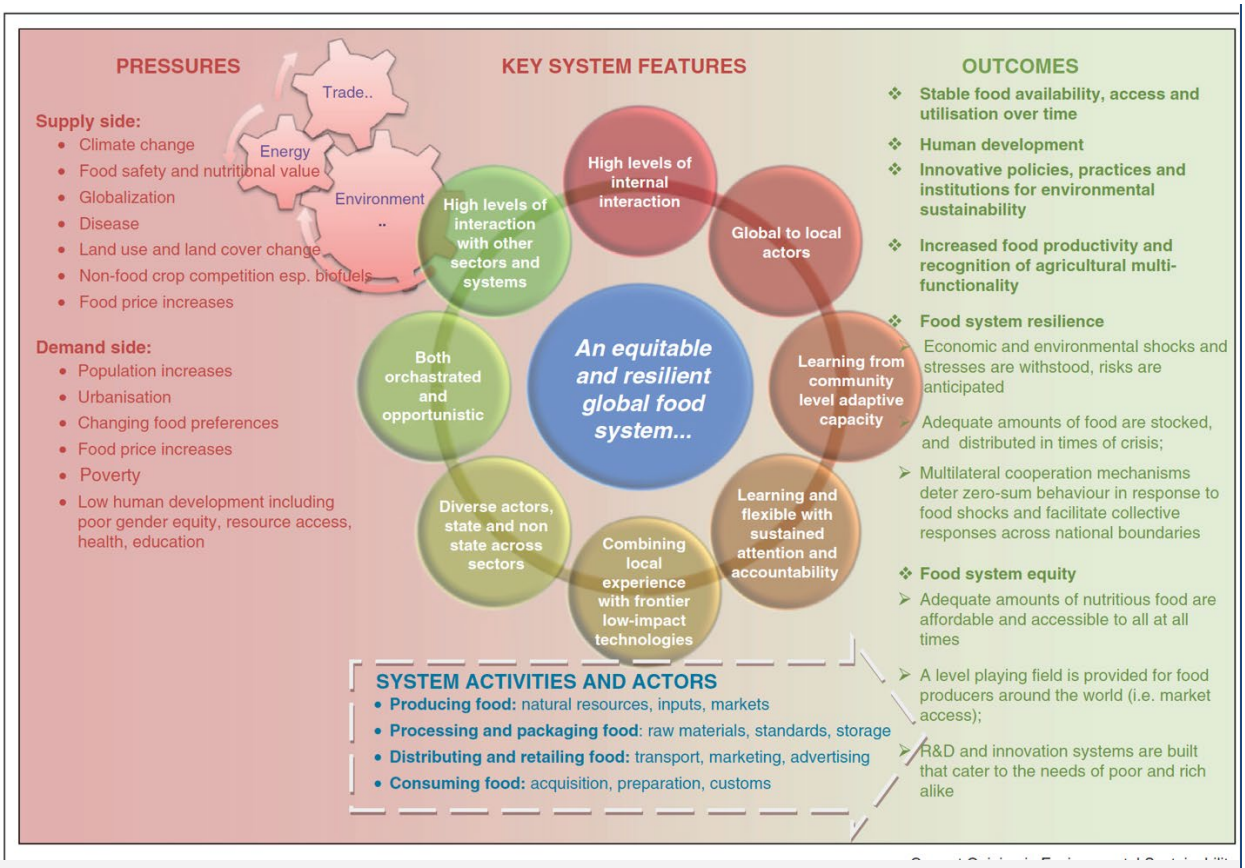

Figure 1. Pressures, features and potential outcomes of a 'resilient and equitable food system (Misselhorn et al. 2012)

- Anticipated products to be delivered by the technical assistance.

1. Development of implementation planning and communication documents
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.
3. Determine the main limiting factors that lead to food insecurity, thereby identifying intervention points for enhancing food security.
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.
5. 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.

The **Statistical Institute of Jamaica (STATIN)** will be performing an Agricultural Census in the 2021-2023, identified as a partner to forged collaboration by incorporating questions on the survey.

Please note that the CTCN facilitates technical assistance and is not a project financing mechanism.

Expected timeframe:
Please indicate the expected duration period for the requested technical assistance. Please note CTCN technical assistance is limited to a maximum duration of 12 months. The expected timeframe is of 12 months, starting in March 2022

1. Logical Framework for the CTCN Technical Assistance:

***Objective**: To develop a technology tool/software application that maps current and future food insecure areas across Jamaica within the context of climate change projections.*
Outcome: • ***Output 1:*** Development of implementation planning and communication documents • ***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. • ***Output 3:*** Determine the main limiting factors that lead to food insecurity, thereby identifying intervention points for enhancing food security. • ***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. • ***Output 5:*** 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.

Description	Months											
	1	2	3	4	5	6	7	8	9	10	11	12
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,	x											x

Description	Months											
	1	2	3	4	5	6	7	8	9	10	11	12
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:												
1.1 Detailed work plan	x											
1.2 Monitoring and evaluation plan	x											
1.3 CTCN Impact Description	x										x	
1.4 Closure and Data Collection report												x
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.												
Activity 2.1: Development of robust baseline survey		x										
Activity 2.2: Implementation of baseline survey based a robust methodological design.			x	x	x							
Deliverable 2: *2.1 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*						x						
2.2 Robust baseline survey						x						

Description	Months											
	1	2	3	4	5	6	7	8	9	10	11	12
Output 3. Determine the main limiting factors that lead to food insecurity, thereby identifying intervention points for enhancing food security.												
Activity 3.1 Data collection through surveys, desk review, bilateral interviews							x					
Activity 3.2 Workshop consultations with stakeholders and community members							x					
Deliverable 3: *3.1 A comprehensive report on the main limiting factors that lead to food insecurity*								x				
3.2 A comprehensive list of recommendations on possible intervention points based on analysis of data.								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 modelling systems.						x	x	x	x	x	x	
Activity 4.2: Database set-up (server and hardware specifications)						x	x	x	x	x	x	
Activity 4.3. Database Maintenance/Hosting and Infrastructure						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.						x	x	x	x	x	x	
Activity 4.5: Develop thresholds and triggers to inform early actions against food security risks.						x	x	x	x	x	x	
Deliverable 4: *4.1 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. 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 5.1 Training and capacity-building workshop for ministries, department, and agencies to successfully monitor and maintain database											x	x
Deliverable 5: *5.1 Strengthened 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

2. Resources required and itemized budget:

Please provide an indicative overview of the resources required and itemized budget required to implement the CTCN technical assistance, including for M&E-related activities, using the table below. Important to note that minimum 1% of the budget should explicitly target gender specific activities related to the technical assistance (please see section 10 for further information on gender). Once the Response Plan is completed, a Response Implementation partner(s) will be selected by the Climate Technology Centre (CTC). A detailed activity-based budget for the CTCN assistance will be finalized by the CTCN and selected Implementer.

Budget Narrative:

The estimate budget to achieve the outputs proposed above is of U$235,000. The budget used the following criteria:

- Cost of international consultant US$380/day
- Cost of national consultant US$2,500/month – based on previous experience working in Jamaica
- To carry out we budget an associated cost of US$20/survey, hiring local surveyors. With field technicians hired to monitoring progress of the data collection process. We estimate data collection in a month, requiring 20 tablets @US$1500/tablet – this equipment will remain for the use of the specialized group that will provide oversight on the monitoring and maintenance of the database, as well as the ability to perform the analysis regularly for further data collection
- The cost for a consulting Software Developer is estimated at US$59,000. This is split among 5 activities, costing approximately US$11,800. (Source: https://cgspace.cgiar.org/bitstream/handle/10947/4012/Project%20Proposal_%20Global%20Food%20Database%20and%20EAT%20Report.pdf?sequence=1&isAllowed=y)
- Training of specialized group that will provide oversight on the monitoring and maintenance of the database is proposed as a certificate program, 6 learning modules at US$1,500 per person, for a group of 25 participants. The selection of the participants will be done in collaboration with the DCC and will have to fulfil certain requirements in order to participate.

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)*			
Output 1: Development of implementation planning and communication documents												**9,120**
Activity 1.1 Detailed work plan of all activities	CI-1	6										**2,280**
	CI-2	2										**760**
Activity 1.2. Monitoring and evaluation plan with specific, measurable, achievable, relevant, and time-bound indicators	CI-1	*5*										**1,900**
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	3										**1,140**
Activity 1.4. A Closure and Data Collection report completed at the end of the technical assistance	CI-1	5										**1,900**
	CI-2	3										**1,140**
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.												**73,980**

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)*			
Activity 2.1. Development of robust baseline survey	CI-1	6										**2,280**
	CN-1	1										**2,500**
Activity 2.2. Implementation of baseline survey based a robust methodological design.	CN-1	1										**2,500**
	CN-2	1										**2,500**
	Field Supervisor-3	60										**4,200**
	Surveys (US$20/survey)	1000										**20,000**
										Tablets	Data collection	**30,000**
			Travel	90								**10,000**
Output 3: Determine the main limiting factors that lead to food insecurity, thereby identifying intervention points for enhancing food security.												**21,400**
Activity 3.1. Data collection through surveys, desk review, bilateral interviews	CN-2	2										**5,000**
Activity 3.2. Workshop consultations with stakeholders and community members	CN-2	2										**5,000**
	CI-2	30										**11,400**
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.												**88,000**

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)*			
Activity 4.1. Generate national and sub-national food security forecasts based on climate modelling systems.	CN-2	5										**12,500**
	CI-2	7										**3,500**
	Software Application Developer-1	60										**11,800**
Activity 4.2. Database set-up (server and hardware specifications)	Software Application Developer-1	60										**11,800**
Activity 4.3. Database Maintenance/Hosting and Infrastructure	Software Application Developer-1	60										**11,800**
Activity 4.4. Generate short-term, medium-term, and long-term forecasts through enhanced downscaling to the local context.	CN-2	1										**2,500**
	CI-2	7										**3,500**
	Software Application Developer-1											
		60										**11,800**
Activity 4.5. Develop thresholds and triggers to inform early actions against food security risks	CN-2	7										**3,500**
	CI-2	7										**3,500**
	Software Application Developer	60										**11,800**

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)*			
Output 5: 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.												**42,500**
Activity 5.1. Training and capacity-building workshop for ministries, department and agencies to successfully monitor and maintain database	CN-2	2										**5,000**
	Certificate program training (US$1500/student - 6 modules - 25 professionals)											**37,500**
												235,000

3. 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	**Essential** • Formal academic qualifications in science and/or engineering, with advances studies (Ph.D. or M.Sc.) in Climate change (impacts, risk, vulnerabilities and adaptation) • Five (5) years of experience providing technical consultancy services within a developing country • Experience in developing plans that involve the assessment of climate change impacts and adaptation • Familiarity with the UN process, research needs assessment methodology and research planning • Experience in conducting technology prioritization and multi-criteria analysis • Experience with initiatives focusing on mitigation of climate change impacts and adaptation measures • Fluency in English **Highly Desirable** • In-depth understanding of policy measures and drivers
International Expert 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. • Eight (8) years of experience providing technical consultancy services within a developing country • Experience in developing national plans that involve rigorous assessment of technological options in order to lessen the impact of economic activities and sectoral analysis at a country level • 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

Experts required	Brief description of required profile
	• 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. • Knowledge and experience working in the development of enabling environments and incentives to foster company innovation aimed towards reducing environmental impacts
National consultant 1	**Essential** • Advanced studies (M.Sc.) in social sciences and/or related fields, with experience in multidisciplinary research (desirable) • Five (5) years of professional experience • 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.) • Understanding of the industrial policy and dynamics of the Jamaican productive sectors
National consultant 2	**Essential** • Graduate in economics (or related field), statistics and/or engineering, with advanced studies in science, technology and innovation policy and management, or natural resources management • Five (5) years of professional experience • 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.)

Experts required	Brief description of required profile
	• 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

Anticipated gender and other co-benefits from the technical assistance:

Please describe the activities with gender linkages as well as the anticipated gender and other co-benefits (e.g. biodiversity, economic, social, cultural, etc.) that are likely to be generated as a result of the technical assistance.

"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.

For more information you can find guidelines on the CTCN's website here:
https://www.ctc-n.org/technologies/ctcn-gender-mainstreaming-tool-response-plan-development

Further reading on gender can be found on the CTCN website here:
https://www.ctc-n.org/technology-sectors/gender

Key stakeholders:

Please list the stakeholders who will be involved in the implementation of the requested CTCN technical assistance and describe their role during the implementation (for example, government agencies and ministries, academic institutions and universities, private sector, community organizations, civil society, etc.).

Stakeholders	Role to support the implementation of the technical assistance
Climate Change Division - Ministry of Housing, Urban	The CCD has the specific mandate to address climate change issues. It will facilitate and provide oversight to the actions related to the TA

Renewal, Environment and Climate Change	
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, analyse, 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

Alignment with national priorities (up to 2000 characters including spaces):

Please describe how the technical assistance is consistent with national climate priorities such as: Nationally Determined Contribution, national development plans, poverty reduction plans, technology needs assessments, Low Emission Development Strategies, Nationally Appropriate Mitigation Actions, Technology Action Plans, National Adaptation Plans, sectorial strategies and plans, etc.

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.	
Reference document (please include date of document)	**Extract** (please include chapter, page number, etc.).
Nationally Determined Contribution (NDC)	Direct alignment and contribution to NDC implementation is required for all CTCN technical assistances. Please include a direct reference to the INDC/NDC document (chapter, page number, etc.).
Technology Needs Assessment	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 Adaptation Plans	A NAP for Jamaica is not yet available but will be produced in the next 2 years.
National Poverty Reduction Programme (NPRP)	Managed by the PIOJ, 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	The policy includes research as a key objective towards building climate resilience.
Food and Nutrition Security Policy	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	Climate change and the natural resource sectors; pg 195-196
Draft Fisheries Policy	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

Development of the request (up to 2000 characters including spaces):
Please describe how the request was developed at the national level and the process used by the NDE to approve the request before submitting it (who initiated the process, who were the stakeholders involved and what were their roles?) and describe any consultations or other meetings that took place to develop and select this request, etc.

This concept note proposal stemmed from the recently completed National Climate Change Research Agenda. In an effort to mobilize financing, a list of priority research areas were identified. Through stakeholder engagement, this topic **"Enhance multi-scalar mapping and research of food security risk, due to the impacts of climate change on rural and urban environments"**, was selected as a Research Adaptation project. An early draft of the concept note was prepared by CATIE's National Consultants and reviewed by the CCD for suggested amendments. Consultations were also conducted with key stakeholders including the Research and Development Division at the Ministry of Agriculture and Fisheries, and the Rural Agriculture Development Authority (RADA-Principal Director Technical Services, and ICT Manager). Contact was also made with a representative at the Statistical Institute of Jamaica (STATIN), and a representative from E-Gov Jamaica Ltd (the technical arm of the Government of Jamaica that specializes in ICT services and solutions for ministries, departments and agencies)..

Background documents and other information relevant for the request:

- Please list all relevant documents that will help the CTCN analyse the context of the request and national priorities. Please note that all documents listed/provided should be mentioned in this request in the relevant section(s), and that their linkages with the request should be clearly indicated. For each document, please provide web-links (if available) or attach to the submission form. Please add any other relevant information as required.
- Please indicate if this request has been developed with the support of the CTCN Request Incubator.

OPTIONAL: Linkages to Green Climate Fund Readiness and Preparatory Support

The CTCN is collaborating with the GCF in order to facilitate access to environmentally sound technologies that address climate change and its effects, including through the provision of readiness and preparatory support delivered directly to countries through their GCF NDA. These actions are in line with the guidance of the GCF Board (Decision B.14/02) and the UNFCCC, particularly paragraphs 4 and 7 of 14/CP.22 that addresses Linkages between the Technology and the Financial Mechanisms2.

The CTCN is therefore implementing some of its technical assistance using GCF readiness funds accessed via the country's NDA. Any application for GCF support, including the amount of support provided, is subject to the terms and conditions of the GCF and should be developed in conjunction with the NDA.

Please indicate whether this request has been identified as preliminarily eligible by the NDA to be considered for readiness support from the GCF.

☐ Initial engagement: The GCF NDA of the requesting country has been engaged in the design of this request and the NDA will be involved in the further process leading to an official agreement for accessing GCF readiness support.

2 Please see:
https://unfccc.int/files/meetings/marrakech_nov_2016/application/pdf/auv_cop22_i8b_tm_fm.pdf

☐ Advanced engagement (preferred): The GCF NDA of the requesting country has been directly involved in the design of this request and is a co-signer of this request, the signature indicating provisional agreement to use readiness national funds to support the implementation of the technical assistance.

NDA name:

Date:

Signature:

Monitoring and impact of the assistance:

By signing this request, I affirm that processes are in place in the country to monitor and evaluate the technical assistance provided by the CTCN. I understand that these processes will be explicitly identified in the CTCN Response Plan and that they will be used in the country to monitor the implementation of the technical assistance following standard CTCN procedures.
I understand that, after the completion of the requested assistance, I shall support CTCN efforts to measure the success and effects of the support provided, including its short, medium and long-term impacts in the country.

Signature:

NDE name:

Date:

Signature:

THE COMPLETED FORM SHALL BE SENT TO THE CTCN@UNEP.ORG

The CTCN is available to answer all questions and provide guidance on the application process.

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