Technical Assistance Response Plan – Terms of Reference

Country	**Ghana**
Request ID#	**AF-2021000106**
Title	Promoting climate adaptation by upscaling appropriate solar irrigation technology options for smallholder farmers in Ghana through innovative financing mechanisms, a conducive policy framework for technology regulation and tailored training modules.
NDE	Environmental Protection Agency (EPA) Mr. Joseph Amankwa Baffoe Acting Director Email: jabaffoe@gmail.com Address: No. 91 Starlet Street, Opp. Ghana News Agency M 362 Accra, Greater Accra, Ghana
Proponent	Environmental Protection Agency (EPA) Dr. Antwi-Boasiako Amoah Deputy Director and National Adaptation Plan Project Coordinator Email: aantwib@gmail.com/antwi.boasiakoamoah@epa.gov.gh Address: No. 91 Starlet Street, Opp. Ghana News Agency M 362 Accra, Greater Accra, Ghana

Summary of the CTCN technical assistance

The objective of this technical assistance is to promote smallholder farmers' adaptation to climate change by providing a sustainable and efficient means of irrigation through the assessment of solar technology options, design of an appropriate and sustainable business model for the lowest income, and formulation of a policy framework for the use of Solar Powered Irrigation System (from now on referred as SPIS) in Ghana. This will include (i) a benchmark of available technology options best suited to smallholder farmers and water-scares environments, (ii) a policy framework to drive the setting of standards and certification that will support the deployment of a local market, (iii) recommendations on financing structures to extend credit and reach the unbanked smallholder farmers and (iv) training modules targeted at the users and administrators of the technology across the supply chain to support its sustainable use and long-term maintenance. The TA will focus on SPIS that builds on existing hard technology options in the country, and soft technology solutions that create an enabling environment for the uptake and dissemination of the technology (policy, training, and financing). The TA will ensure the involvement of financial institutions including micro finance institutions, rural banks and non-bank entities that could participate in the provision of financing services for smallholder farmers. The financing structures will consider appropriate risk mitigation instruments including insurance and guarantee structures aimed at crowding in private sector investments. Implicit for a successful financing structure is the aggregation of smallholder farmers to increase the scale of the opportunity.

Agreement:

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

National Designated Entity to the UNFCCC Technology Mechanism
Name: Joseph Amankwa Baffoe
Title: Acting Director
Date: 6th December 2021
Signature:

Proponent (signature of the Proponent is optional)
Name:
Title:
Date:
Signature:

UNFCCC Climate Technology Centre and Network (CTCN)

Name: Rose Mwebaza
Title: CTCN Director
Date: 08/12/2021
Signature:

1. Background and context

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

Smallholder farmers in Ghana, who rely primarily on rainfed agriculture, are highly vulnerable to the impacts of climate change in the country. About 90% of farm holdings in the country are less than 2 hectares in size, resulting in small scale, subsistence farming, with most of the farmers relying on rainfall[1]. This is particularly true in semi-arid northern Ghana where 90% of the population depend on rain-fed agriculture for their livelihoods. Ghana's 4th National communication to the UNFCCC indicates that temperatures in the country are most likely to increase by at least 3^{o}C by 2080 nationwide with the savanna regions recording temperatures above 30^{o}C. The impacts of this increased temperature includes a decrease in the length of the wet season, an increase in the number of dry days per month, heatwaves and potential evapotranspiration leading to increasing risk of droughts. In parallel, an increase in rainfall intensity could also exacerbate the risks of flooding. This change of temperature as well as intensity and frequency of rainfall will directly affect water availability for agriculture, leading in turn to a decrease in productivity for smallholder farmers, resulting in prolonged periods of food shortages. Smallholder farmers already experience severe food insecurity for about three to six months in Northern Ghana during the dry season and, if nothing is done, this phenomenon will worsen in the coming years and decades due to climate change. A recent study from the International Food Policy Research Institute shows a yield decrease of around 25% for main rainfed crops (maize, rice, and groundnuts) by 2050 due to climate change impacts. However, global projections also indicate that with adequate adaptation interventions including improved access to irrigation, yields of main staple crops in Ghana may be sustained or even increased.

Also, nationally, the climate smart agriculture and food security action plan (CSAFSAP), climate smart agriculture investment plan (CSAIP) and the national climate change policy (NCCP) of the government of Ghana all acknowledge the vulnerability of Ghana's food systems to climate impacts and prioritizes the need to build the resilience of farmers especially smallholders.

The agriculture sector in Ghana employs about 47% of the country's labour force, most of which are smallholder farmers. These farmers produce about 80% of the country's total food needs. Staple food such as maize, rice, cowpea, cassava, yam, millet etc. is produced by these smallholder farmers. Lack of irrigation negatively impact existing agricultural practices that still use rudimentary technology resulting in overall low productivity.

2. Problem statement

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

Solar Powered Irrigation System (SPIS) is an adaptation intervention that can address water insecurity issues caused by climate change helping to buffer the effects of drought and to overcome water stress during dry seasons therefore securing benefits for productivity and profitability, as well as water and crop management and food security. Rather than solely depending on rainfall for irrigation, smallholder farmers would benefit from irrigation systems that efficiently utilise available surface water and ground water reservoirs. As costs for solar powered irrigation systems (SPIS) have

dramatically decreased over the past decade, solar technologies are becoming a viable adaptation option for smallholder farmers.

Solar power provides reliable and affordable energy for irrigation especially in remote rural areas where diesel fuel is expensive or where access to electricity from the grid is lacking. In this context, SPIS can provide a flexible and climate-friendly alternative energy source. In addition, the adoption of appropriate SPIS technology has the potential to support sustainable water management practices hereby reducing pressures on key water resources and surrounding ecosystems. In addition, some recent studies conducted by Winrock International in Ethiopia and Kenya showed that the right SPIS technology can also be low maintenance and have a relatively long lifespan.

Although SPIS technology has been widely introduced in agriculture in some countries, it has not yet fully penetrated the Ghanaian market. Several barriers remain to its uptake, including accessible supply chains and viable financing. With about 90% of farm holdings in Ghana being less than 2 hectares in size, it is essential to aggregate (the mostly unbanked) smallholder farmers and implement scaled-up solar irrigation solutions that could potentially lower technology implementation and operation costs, and collectively address credit issues for financing. SPIS, run by renewable solar energy, could offer smallholder farmers with a longer-term solution for irrigation, whilst providing them with a means to adapt to rainfall variability and change. In addition, SPIS provide mitigation co-benefits that could better enable the financial viability of the technology.

The Government of Ghana, mostly through the Ministry of Food and Agriculture – Ghana Irrigation Development Authority - has some policies and programmes in place for irrigation on which to build upon. However, these do not focus on solar powered irrigation systems and concentrate mostly on formal irrigation systems. Only about 19.7% of smallholder farmers in Ghana have access to formal irrigation programmes. There are about 57 small scale irrigation schemes (i.e., for smallholder farmers) across Ghana developed by Ghana Irrigation Development Authority, implemented using public funds. However, Government budgets are stretched and inadequate to address the water scarcity problem for smallholder farmers. Available funding is also used to maintain the existing public irrigation systems.

Financing solutions to address smallholder farmers' lack of credit worthiness are not in place, with most unbanked smallholder farmers still without access to finance.
The result is that smallholder farmers are left to their own devices to try and maintain agricultural productivity in the face on increasing climate change impacts leading to worsening water shortages.

There are several barriers preventing the uptake of solar powered irrigation technology among smallholder farmers in Ghana. The main barriers are:

- <u>High capital costs of SPIS.</u>

Despite an important reduction of price over the last decade, solar powered irrigation systems entail a relatively high upfront cost that smallholder farmers are unable to afford, and even when there is a willingness to pay there is lack of access to credit. Most existing successful donor programmes are grant based and do not leave behind a sustainable financing solution to scale and increase the reach of solar powered irrigation technology solutions.

- <u>Lack of information and training on for solar powered irrigation technology systems.</u>

Solar irrigation technology is not a new technology in Ghana, but there is a general lack of awareness and trust of it in the market – from smallholder farmers to financial institutions. Smallholder farmers are unaware of the available technology options, costs, and operations. They often resort to cheaper options of diesel pumps which have a short life span (quick fix solutions) which end up being expensive in the long run. There is also a fear of the unknown by the farmers i.e., breakdowns, product quality, performance. Optimal operation and maintenance of solar irrigation technology requires a certain degree of technical knowledge and skill, so farmers need to

be trained and such services need to be available with the technology as a combined package. Financial institutions avoid lending into the sector because of unfamiliarity with the product, lack of track record and lack of secondary resale value.

- Absence of an integrated equipment supply chain and certification standards.

The market for solar powered irrigation systems is still relatively underdeveloped and lacks organisation in Ghana. Most of the known distributors are concentrated in Accra, with distribution networks being limited to areas around the capital. As a result, lower quality and uncertified equipment is often sold to smallholder farmers without proper guarantee and maintenance contracts. Yet there is no means by which to aggregate the solar irrigation opportunity across smallholder farmers, and to implement more efficient large-scale solar powered irrigation systems that, for example are combined with drip irrigation, across farm holdings. This could potentially drive down technology, operations and maintenance, and insurance related costs, whilst ensuring a most advance technology solution that monitors water-use thereby avoiding maladaptation (i.e., overuse of water resources). Above all, those SPIS technologies best suited to the farming practices of smallholder farmers needs to be assessed, and those options made available through appropriate supply chains.

- Lack of creditworthiness, affordability, and willingness to pay.

Access to finance is one of the main challenges to the uptake of solar powered irrigation systems. majority of smallholder farmers in Ghana are subsistence farmers and largely 'unbanked'. This makes them unable to meet lenders requirements for creditworthiness (collateral, credit history, financial statements etc). Due to this low bankability, smallholder farmers mostly access credit through informal loans from family members and credit groups. However, these informal structures can make smallholder farmers vulnerable to irregularities and mismanagement. Formal financial products and services need to be made accessible to smallholder farmers by adopting appropriate structures and tools which reduces their risk of default and the cost of borrowing.

- Insufficient enabling policies and institutional frameworks.

Although there are some Government policies in place that encourage solar powered irrigation systems, such as imported irrigation equipment (including solar) being exempt from customs duties and value-added tax, other fiscal incentives and enabling framework conditions are needed. This includes standards for certification, equipment subsidies targeted at manufacturers providing equipment to smallholder farmers, formal structures, and guidelines for nucleus farmers and other smallholder collaboratives, and ways to ensure access to market for smallholder produce.

Solar powered irrigation systems can provide a relatively flexible and renewable energy source that would enable smallholder farmers to access water resources in an efficient manner during periods when there is water scarcity. In addition to providing a proof of technology concept, working with smallholder farmers group and financial institutions could create a financing solution to enable uptake of the technology at scale. The mitigation co-benefits of the technology are an added advantage in devising a viable financing solution.

The Government of Ghana has constrained resources, both in meeting the gap between formal and informal irrigation systems but also in the capacity and skills required for the uptake of solar powered irrigation systems. A structured technical solution accompanied with the skill sets and financing approach for smallholder farmers will support the Government of Ghana overcome the barriers listed above and address water scarcity issues for its smallholder farmers whilst also addressing food security issues faced by the country and reducing pressures on its increasingly scarce water resources and key ecosystems.

3. Logical Framework for the CTCN Technical Assistance:

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

***Objective**:* The objective of the technical assistance is to promote smallholder farmers' adaptation to climate change by establishing a sustainable and efficient means of irrigation through the assessment of technology options that could be used in Ghana, the design of a sustainable business model that targets accessible financing for smallholder farmers, and the formulation of a policy framework for the use of Solar Powered Irrigation System (SPIS) which are the conditions for the establishment of an enabling environment for the uptake and scale up of the technology in Ghana.
Outcome: *(Guidance: The Outcome articulates changes in the institutional and behavioural capacities for climate technology development or deployment. Activities and Outputs contribute to the Outcome, but the Outcome is not within the direct control of the CTCN activities). (Maximum 400 characters including spaces)* The main outcomes are arranged around four pillars: technology options that are best suited to the smallholder farmers, policy framework for technology standards and certification, financing options for the smallholder farmers, and capacity building for key users and providers of the technology.

Activities and outputs	Months														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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	X X X														

iv) Closure and Data Collection report														X
Output 2: Benchmark solar powered irrigation technologies suitable to smallholder farmers in Ghana and assess their respective cost-benefits.														
Activity 2.1: Map relevant stakeholders and establish a stakeholder working group The activity will map relevant stakeholders among governmental institutions at the national and sub-national levels. These stakeholders will include at least the NDA, the NDE, the project proponent, the relevant ministries, and possible representative of the private sector specialized on irrigation solutions for small farmers. The mapping will also include private sector organisation in the supply chain including technology providers, distributors (intermediaries) and financing institutions. Financing institutions will include but not limited to banking institutions, investors in climate technologies, micro-grant institutions, and other counterparties relevant to this assignment. A key part of the stakeholder mapping will be on the smallholder beneficiaries, farmer groupings including village associations and other microfinance institutions. From these stakeholders, a restrictive working group (up to 8 persons) will be created. The working group shall maintain a gender balance and an adequate representation of vulnerable groups. It will provide a technical overview and a high-level guidance at every stage of the technical assistance. For this purpose, the members of the working group should have the capacity to take key decisions with regards to the selection of the appropriate technology, and the formulation of the policy and legislature that will support its use.														
Activity 2.2: Conduct an inception meeting An inception meeting with the stakeholder working group will be organized to present the team of experts, the goals, milestones, anticipated deliverables, and the responsibility and role of the stakeholder working group. It is expected that this meeting will be held in-person in Ghana, in presence of at least one international expert. The inception meeting should also be an opportunity for the implementer to list and further access any existing relevant documents including but not limited to laws, regulations, draft of standard, ongoing initiatives, programmes approved or under evaluation that could support the definition of a policy framework to set up a compliance standards and certification for solar irrigation technology or be relevant to achieve any other activities defined in this Response Plan. Taking advantage of its presence in the country, the international expert will plan bilateral meetings with the main stakeholders to gather as much relevant information as possible as well as clearly understand the expectations of the country. Outcomes of the inception meeting will be fed into the implementation plan elaborated under Activity i of the Mandatory output. This meeting, as all the other meetings is expected to be held in-person in the country.														
Activity 2.3: Desk analysis of agricultural and irrigation practices under a changing climate in Ghana to assess smallholder farmers' needs SPIS refers to solar-powered pumps being used for irrigation. SPIS are relatively complex systems, and their														

design requires not only a fit-for-purpose PV pump system and irrigation infrastructure (supply side), but also an assessment of water requirements and irrigation calendar (demand side) which will vary under climate change conditions as well as skills and knowledge of the end user. This TA will be developed at the national level; however, end users' needs will be considered through smallholder farmer groupings. As the SPIS options are being developed for smallholder farmers, it is essential that the requirements are aligned to their requirements – both technical and financial. The current irrigation infrastructure, climate change conditions and their impacts on agriculture as well as types of crops cultivated in Ghana with a specific focus on the Northern and Coastal Savannah of Ghana, will be assessed. This will support the selection of the sustainable and efficient existing technologies, for solar pumping system as well as irrigation practices. Thus, it is expected that a desk review of the types of cultures and irrigation practices by location, as well as an overview of water source, and specific weather data of Ghana will be done using existing international and national data including maps, regulations, laws, policies, reports, studies. The NDE and project proponent will support the implementer in accessing the most updated and relevant data available at country level. This bibliographical review will be completed by a series of interviews with stakeholders including ministries, NGO, farmers, academia, private sector, lowland farming cooperatives, gender, and youth association to understand the irrigation system used in different remote regions of Ghana as well as its limits, technological failures, bottlenecks, opportunities, advantages. It is expected that 15 in-person interviews will be held, including stakeholders outside Accra. These interviews could be initiated while the international expert is in Ghana. The expected deliverable is a diagnosis of agricultural and irrigation practices in Ghana including maps of the crops cultivated by region, along with a matrix listing the types of irrigation systems that are being used by region (RE versus diesel-based irrigation systems), cost-benefit analysis, investment levels required as well as some relevant information about water availability and crop requirements by region.	
Activity 2.4 Organize a stakeholder workshop to introduce the SPIS to Ghana´s future users, national officers, investors, and private sector. Following the desk analysis of the irrigation practices in Ghana, the implementer will organize an in-person stakeholder workshop in presence of the working group as well as all the other stakeholders listed in activity 1.1 including the community of smallholder farmers as well, academia, NGOs, private sector (solar tech providers), governmental officers, representatives of the financial sector, etc. At least one international expert should be present during this workshop, and around 30 persons are expected to be participating. The methodology and results of the outcome 2 will be explained and presented to the stakeholders. A presentation of the next steps of the technical assistance will also be provided to the participants, insisting on the importance of their active participation during the future workshops and training sessions. One of the main purposes of this stakeholder workshop will be to identify the barriers for the access to finance and the uptake the use of Solar Powered Pumping Irrigation for smallholders' farmers in Ghana from the views	

of the users (smallholder farmers), of the providers (private sector) as well as the government officers that will have a good understanding of existing laws, regulations, and financial incentives. With the identification of the barriers, the implementer will understand the main factors of change required to create an enabling environment. These inputs will be fundamental at the time to select the best suited technology for the use of solar powered irrigation system by smallholder farmers in Ghana.	
Activity 2.5: Elaborate a guide of the solar irrigation and improved irrigation technology systems most suitable to smallholder farmers in Ghana The project will be held at national scale, with a special focus but not limited to the Northern Savannah and Coastal Savannah of Ghana, and designs of most suitable SPIS for the smallholder profile will be suggested by region. The main components of solar pumping and improved irrigation systems for remote areas and lowest income in Ghana will be assessed. The objective of this activity will be to develop a guide of solar irrigation technology options. The guide will provide clarifications on the technology that should be used in different contexts and under climate change conditions. It should include as an example, but not limited to: - What are the main components of a SPIS, what are their functions, and how these components are connected? - What improved technology and irrigation practices are most appropriate to support smallholder farmers adapt to the changing climate in remote Ghana? - What type of SPIS technology is easiest to use and less demanding in term of maintenance? - What is the source of water that will be used to irrigate: What technologies for groundwater pumping, and what others for pumping from tanks? In case of groundwater pumping, how should Ghana control its groundwater availability? - What technology could be considered to reduce pressure on water resources? What are the adequate mechanisms to control and reduce the overuse of water resources? - What are the technologies that could be implemented to monitor the use of water? - What would be the options to avoid that all the farmers start irrigating at the same time? - What should the distribution network consider? - How should the distribution network be designed and according to what? - What are the technologies used to activate the SPIS (automatically through soil moisture and then what does this implies are additional components? Through an alarm and in that case which communication channels should be used?) - How can a business model such as pay as you use could affect the architecture of the system and support uptake among smallholder farmers? - Etc. The deliverable should be a menu of solar irrigation and improved irrigation technology options, that will include a list of technologies classified based on their appropriateness for smallholder farmers and their	

respective suppliers and distributors. Only certified suppliers and distributors will be listed. The suppliers and distributors listed should provide products that are aligned with international standards to guarantee the quality of the components. The suppliers and distributors that are already working (successfully) in West Africa should be highlighted. The local suppliers and distributors providing certified products will also be listed. Finally, this report will provide the architecture for the design of at least 3 Solar irrigation and improved irrigation system that could be used in remote areas of Ghana to support smallholder farmers' adaptation to climate change. These architectures could differ based on the source of water used, the remote technology in place to activate the irrigation, the business model of else. Each architecture will be explained with a graph where all the components will be described in a legend, and the context in which each system could be used will be explained in a narrative.														
Activity 2.6 Cost analysis of the SPIS and improved irrigation architectures During this activity, the implementer will provide a cost estimation of all the components required in a SPIS as well as the cost analysis of each of the system architectures designed in the previous activity (at least 3). The cost estimation should provide the estimated costs per unit and for an implementation in Ghana. For this exercise, it is suggested that the implementer should identify, in collaboration with the stakeholder working group, a specific location /area where the SPIS in Ghana could be implemented. This will ease the exercise to estimate the cost of the system based on the remoteness of the area, the size and configuration of the system, the type of crop, any other uses of the water, where the water will be used, and will also include at least: - Cost of PV panels (per unit and at scale) - Cost of the pumps. - Efficient irrigation systems (drip irrigation for example) - Cost of filtration, fertigation, water storage (if necessary) - Solar pump: unit and at scale - Pump controller - Electric cables - Pump installation - Monitoring equipment - Cost of maintenance (for each component a clear description of how often spare parts should be replaced and costs of these pieces)? - Cost of installation - Cost of operation - Any other relevant aspects. This study will also include the annual savings expected (in energy and USD), the payback period in Ghana. The GIZ-FAO Toolbox on Solar-Powered Irrigation could provide some useful tools for this: https://energypedia.info/wiki/SPIS_Invest														
Deliverable 2: 2.1 Stakeholder mapping report containing a complete stakeholder list as well as a description of the stakeholder working group (including name, position, institution, gender, and role of each member).		X												

2.2 a) Inception meeting report with materials, list of participants disaggregated by gender, photos, material used during the meeting. b) list of bibliographical documents to be shared with the implementer with the institution and person in charge. c) Planning of bilateral meetings to be held by the international expert while he is in the country.		X												
2.3a) Diagnosis of agricultural and irrigation practices to assess smallholder farmers' needs in Ghana b) minutes of the interviews held during this phase including the names of participants, type of meeting (virtual or in-person), themes treated, questions raised.			X											
2.4 Minute of the stakeholder workshop with a list of participants, disaggregated by gender, list of questions raised, materials used, etc.			X											
2.5 a) Guide of most appropriate solar irrigation technology systems for smallholder farmers in Ghana including a list of accredited suppliers and distributors. b) At least 3 architectures of SPIS that could be efficient and sustainable in remote areas of Ghana for smallholder farmers.				X										
2.6 Cost analysis of the technologies and system architecture presented in the previous deliverable.				X										
Output 3: Define a business model targeting smallholder farmers for the use of Solar Powered Irrigation Systems in Ghana														
Activity 3.1: **Organize a stakeholder meeting with representative of local smallholder farmers as well as financial institutions** A stakeholder workshop will be organized to understand the main barriers to finance faced by smallholder farmers in Ghana and investment risks that create bottlenecks for financial institutions in providing loans and other financial products to smallholder farmers. This workshop will be held in-person in the presence of at least 1 international experts. Around 30 participants are expected to attend, including but not limited to local smallholder farmers, national officers, NGO. An international expert will be in the country for the workshop planned in activity 3.1. It is expected that this workshop will be held while this expert is in the country to limit the number of trips. Likewise, the results of the business model could also be fed into the policy framework. Outputs from the literature review will be used to design these workshops aligned with the barrier assessment already done. During this workshop, discussion about the most suitable business model (s)for smallholder farmers to access affordable finance and ways to mitigate investment risks for financial investors will be discussed. For example, would farmers prefer to pay for the water they use only? How would they like to do so (before use / after use based on a metering system)? what would be the preferred channel for the payment? (In a shop of the nearest village, by an APP, in a 24h service equipment?) For the financial institutions, which level of risks would be acceptable and which criteria should be analysed? Which financing instruments are the best suited to mitigate risk – including insurance and guarantee structures, and the role of blended finance – including public domestic and international funds.														

Results will be clear recommendations on business models that can be used to (1) aggregate smallholder farmers to scale the demand for SPIS (2) financing structures to provide accessible and affordable finance – as approved by the finance sector, smallholder farmer, solar technology provider and government stakeholders (3) possible blended finance approaches including risk mitigation instruments														
Activity 3.2: Define business model(s) that would enable the use of SPIS by smallholder farmers in Ghana Based on the recommendations from 4.1, the implementer will design at least one and up to 3 business models targeting the smallholder farmers of Ghana that lack access to irrigation and that proposes solutions that are also aligned with the requirements/address the investment risks of financial institutions. Different models will be analysed, including the "pay -per-use" model that do not require any investment or maintenance cost. The pay-per-use system allows farmers, who normally possess irregular cash flow, to pay for high-quality solar products with a small amount of money over time. Manufacturers and dealers, on their side, will use this model to enlarge their business and win more clients. Other options will also be considered based on the definition of the needs collected from the previous workshop. It is expected that the implementer will come up with a sustainable blended finance structure (s) (up to 3) that could enable smallholder farmers to access SPIS: This could include the scaling up and/or combination of existing financing models. The business model will include: • The approach • Payment terms • What happens when credit is no longer available? • How should payment be made? • How will the use of water be calculated? • What would be the monitor devices used? • Services and functionalities of the system considered for the business model with its respective architecture. • Maintenance and technical support • Recommendations on the implementation of such business models. The business model should be defined to be sustainable within long term perspective.														
Activity 3.3 Business model validation workshop During the validation workshop, the draft business model will be explained to the stakeholder working group, the smallholder farmers, and the representatives of the financing sector. This workshop should last one full day, in presence of at least one international expert. A participation of around 30 persons is expected including but not limited to local smallholder farmers, NGOs, national officers. It is expected that the different scenario, functionalities, options, flexibility, price, of a potential SPIS system, as														

well as the maintenance and technical service designed will be explained to the smallholder farmers. This workshop will ensure that both women and youth are represented.														
Deliverables 3:														
3.1 a) Report of the meeting with list of participants disaggregated by gender, photos, materials used 3.1 b) SWOT analysis of the access to financial mechanisms from smallholder farmers for the purchase of solar pumping irrigation system 3.1 c) needs of the farmers / needs of the financial institutions					X									
3.2 At least 1 and up to 3 Business models targeting smallholder farmers for SPIS with their respective SPIS architecture						X								
3.3 Minute of Stakeholder workshop							X							
Output 4: National framework on solar powered irrigation technology														
Activity 4.1: High level governmental meeting The market of SPIS in Ghana is currently fragmented and lacks a framework to ensure a quality driven approach for uptake and dissemination of the technology. The framework needs to be aligned with implementation recommendations developed closely with Ministries, Department and Agencies (MDAs), and also Metropolitan, Municipal and District Assemblies (MMDAs) that will be responsible for its enforcement. For this purpose, this activity will be initiated with a meeting in presence of the ministries, MDAs, MMDAs and other governmental bodies, and agencies that should be involved in the development of the framework and the definition of standards and certification schemes that will create the enabling environment to support the deployment of the SPIS in remote areas of Ghana. This meeting will have different objectives: Firstly, it will give the municipal (sub-national) and national officers the chance to define in a consensual way the framework policy vision and mission. For this purpose, the implementer will have prepared examples of "mission and vision" defined in other frameworks for Renewable Energy in Africa. Secondly, governmental officers should define the policy objectives and the goals that the policy framework will aim to achieve. The objective should be clear and concise. The implementer will play an important role in moderating the discussion to ensure that the objectives promote sustainable management of water, with a long-term perspective, increase food security, balance environmental, socio-economic, cultural, and recreational objectives; reduce ecosystem degradation; and conserve and maintain existing ecosystems from potential climate change impacts. Thirdly, this meeting will be used to define principles that will guide the implementation of the policy. This should include for example some Policy Statement, Strategic Actions requested, Results expected, Timeline, Institution responsible for its implementation, budget associated (and crediting line if available), quantitative monitoring indicators, etc.														

It is expected that this meeting will be held in-person in Accra, Ghana in presence of at least one international expert and will a last a full day. 20 persons are expected to be participating.	
Activity 4.2 Stakeholder consultation with the private sector (solar tech providers, distributors). Following the workshop with governmental officers, the implementer will organize a workshop with the private sector, including the technology providers and distributors. The objective of this workshop will be to present and comment the draft national framework on solar powered irrigation system and to how the national framework could provide the right incentives and enabling environment to support SPIS introduction and update among smallholder farmers in Ghana. Around 20 persons will be expected to this workshop.	
Activity 4.3: Draft policy framework to set up a compliance standards and certification for solar irrigation technology. Well written standards have an important role to play in supporting communication and understanding, trade and commerce, legislation and regulation, environmental protection, enhanced resource efficiency and confidence in the products and services provided. However, standards can also potentially be barriers to the above if written poorly, biased to one set of stakeholders' requirements, or if their requirements restrict the ability to innovate or deploy and trade the technologies or services. The objective of this activity will be to develop a draft an ambitious but realistic policy framework to set up a compliance standards and certification for solar irrigation technology. A policy framework should provide the parameters and pathways for public and private investments to sustainably scale solar irrigation. This means the framework will enhance equitable access to and affordability of solar irrigation (equal benefit for different groups of smallholder farmers) and improve environmental sustainability through integrated water and land management. This second dimension aims to achieve sustainable water resource management (focusing on groundwater) and efficient agricultural water use through appropriate aquifer management, conveyance and application systems, and irrigation efficiency at the farm plot. In this sense, this policy framework should include sections, including at least, the following aspects: **Introduction** - framework policy vision and mission (as defined in the previous workshop) - Policy objectives and goals (as defined in the previous workshop) - Guiding principles (as defined in the previous workshop) **Policy statements** - On integrated planning and coordination that will be necessary to scale up the use of SPIS in Ghana - On Sustainable Economic Development. This section should at least consider Community empowerment and sustainable livelihoods, resource use conflicts and benefits sharing. - On Water management and use of aquifers	

- On Environmental Risk management - On capacity building, education, awareness, and research - On institutional arrangements and legal frameworks that should analyse and propose policy statement on the best way to create a holistic approach (that would overcome the barriers of the sectoral approach). **Standard and certification for solar irrigation technology aspects such as:** - Regulatory Requirements (Laws, Regulations, Legislation) - Technology Requirements (Technical specificities, Conformity assessment requirements) - Benchmark of International – Regional – National Standards: the more harmonized standards are, better it is for trade. This part will include an analysis of existing standards for Solar Pumping Irrigation System as well as a guide of the suggested standards for solar irrigation technology that should be implemented in Ghana. - Measurement Standards - Suggested accreditation system to be used in Ghana for SPIS - Suggested certification system to be used in Ghana for SPIS - Suggested structured to be implemented in Ghana to control the deployment of the policy framework (who, how, what) - Suggested Verification and auditing system - Suggested testing process (conformity assessment) - Suggested research and development for the regional SPIS sector **Financial incentives** - Encourage the adoption of SPIS technologies through favourable fiscal policies, including taxation incentives, subsidies and ad hoc funds and programmes. - Closely align recommended fiscal incentives to identified business models, and closely assess the need for dedicated insurance and/or guarantee product – including the better use of existing ones (e.g., GIRSAL, GAIP) - Providing an integrated value chain solutions through innovative input (SPIS etc.) financing to post-harvest solutions by creating linkages to institutions like the Ghana Commodity Exchange (GCX) which will ensure farmers are able to pay off loans because there is always a ready market for their produce - Enabling environment measures **Compatibility with existing legislation** **Any other relevant section.**	
Activity 4.4 Circulate first draft of the policy framework and collect official feedback First draft of the policy framework to set up a compliance standards and certification for solar irrigation technology will be circulated to all concerned national ministries, governing authorities and to the stakeholder working group for official feedback and comments. This round is expected to last 2 weeks.	

Activity 4.5 Conduct an official review workshop with the concerned national ministries, governing authorities and to the stakeholder working group The workshop will allow for a discussion on comments received so that joint decisions can be taken on points of debate. The workshop will be held in -person in Ghana, in presence of at least one international expert. It is expected to last a day. 20 persons are expected to participate.														
Activity 4.6 Incorporate comments and develop second draft of the policy framework Comments and inputs from governmental authorities and stakeholder working group on the first draft will be incorporated into second draft of the policy framework.														
Activity 4.7 Circulate second draft and collect official feedback Revised draft of the policy framework will be circulated to all concerned national ministries, governing authorities and to the stakeholder working group for final feedback and comments. This round is expected to last 2 weeks.														
Activity 4.8 Incorporate comments and develop final draft of the policy framework Comments and inputs from governmental authorities and stakeholder working group on the revised draft will be incorporated into third and final draft of the policy framework.														
Deliverables 4: 4.1a) High Level Governmental minute with photos, a list of participants disaggregated by gender, materials used, conclusion of the meeting. 4.1 b) Definition of the policy framework vision and mission 4.1 c) Definition of the policy framework objectives and goals 4.1d) Definition of the policy framework guiding principles							X							
4.2 a) Stakeholder consultation with the private sector including minutes with photos, a list of participants disaggregated by gender, materials used, conclusion of the meeting. 4.2 b) Identification of the barriers faced by the private sector to promote SPIS technology 4.2 c) Discussion about standards, certification, and financial incentives. 4.2 d) Definition of actions that could help promoting an enabling environment							X							
4.3 Draft policy framework to set up a compliance standards and certification for solar irrigation technology.							X							
4.4 Compiled feedback and comments on first draft of the policy framework								X X						
4.5 Official workshop review report								X						
4.6 Second draft of the policy framework									X					
4.7 Compiled feedback and comments on revised draft of the policy framework										X				
4.8Final draft of the policy framework										X				
Outcome 5: Capacity training to raise awareness on the benefits of solar pumping irrigation systems for smallholder farmers in Ghana.														

Activity 5.1: Design the comprehensive training modules targeting smallholder farmers and investors The project's main contribution to national climate change adaptation, climate-resilient agriculture, energy, sustainable water management and planning will be evidenced by the design of comprehensive 10 training modules on SPIS, which will be developed based on the identified gaps and needs and focus, among others, on the following topics: • Overview of viable solar pumping irrigation technologies for smallholder farmers in Ghana. • Cost benefits of the implementation of SPIS for smallholder farmers of Ghana under a climate change context • Promotion of business models, financing options based on user needs for SPIS technologies, along with the financial and credit instruments and investment risk analysis. • Description of the policy framework. • Role of certifications and standard in enabling market opportunities for the private sector in Ghana. • Implementation, installation and training modalities, operations and maintenance and monitoring and evaluation of the SPIS. • Guide of providers and suppliers • Step by step description of the architecture and use of the SPIS • Benefits on food security, resilience to climate change, water use in Ghana for smallholder farmers. The topics could be discussed and amended according to the needs identified throughout the implementation of the project and in discussion with the stakeholder working group. The modules will be developed in English and translated, if needed, into one local language to be defined by the stakeholder working group.														
Activity 5.2: Validation of the training modules through a meeting with the stakeholder working group The implementer will introduce all the training modules to the stakeholder working group and modify the modules based on the comments received. Final versions of the training modules will be shared to all the members of the stakeholder working group for final validation and approval. Once approved, training modules will be translated into one national language if considered necessary by the stakeholder working group.														
Activity 5.3: Creation of a webpage about SPIS to be hosted in the Environmental Protection Agency The implementer will develop a webpage to be hosted in the Environmental Protection Agency to diffuse all the information gathered during the implementation of the project and most specifically the training modules designed. At the end of this technical assistance, the EPA will be responsible to maintain this webpage for at least 2 years and to disseminate and use wisely the capacity trainings designed to promote solar pumping irrigation system to local farmers of Ghana. EPA and the implementer will discuss the format of the website to ensure compatibility in advance. The														

implementer will design a webpage easy to host, free of cost, that can be updated in the time. The webpage will be introduced to the stakeholder working group before its launch to gather comments and be updated accordingly.														
Activity 5.4: Dissemination of the training modules through a 3 stakeholder´s workshop. 3 in-person stakeholder workshops will be held in Ghana. The first one will be for smallholder farmers, along with the presence of NGOs and Academia. An average of 25 persons will be expected. The objective will be to present the results of the technical assistance and encourage smallholder farmers to implement SPIS by justifying the benefits of using such technology. Materials for a successful implementation will be created. A second workshop will be targeting the private sector, suppliers of SPIS system and technology providers. This workshop will emphasize the framework on standards and certification and the advantages of suppling technologies that are conformed to these standards. Relevant materials will be generated to explain the benefits of standards and certification on the short/medium- and long-term horizon. An average of 25 persons are expected. A third workshop will be organized with the EPA and national officers, to present the webpage as well as the training modules that have been designed to disseminate knowledge about SPIS. This training should be made as a training of trainers to ensure that the modules and the webpage created as part of this TA to support the use of SPIS by the smallholder farmers in Ghana will be used and disseminated in the correct manner. A dissemination plan should be elaborated by the participants to this training in the presence and with the support of the implementer. An average of 15 persons are expected to participant.														
Deliverable 5 5.1 Draft Training modules designed											X			
5.2a Minute of the validation meeting with the stakeholder working group and revised training modules. b. Modules translated into one local language (if considered necessary by the stakeholder working group)											X			
5.3 a. Draft webpage b) meeting of the meeting to validate the content of the webpage with the stakeholder working group. c) The webpage is operational and main reports and training modules are uploaded in EPA website.												X		
5.4 Minute of the meeting with the list of participants disaggregated by gender, photos, materials used.													X	

1. 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.

Activities and Outputs	**Input: Human Resources** *(Title, role, estimated number of days)*	**Input: Travel** *(Purpose, national vs. international, number of days)*	**Inputs: Meetings/events** *(Meeting title, number of participants, number of days)*	**Input: Equipment/Material** *(Item, purpose, buy/rent, quantity)*	**Estimated cost** *Please accumulate the costing at Activity and Output level and provide an estimated costing range for each activity and the total Response Plan*	
					Minimum	**Maximum**
Output 1: **Development of implementation planning and communication documents**						
Activity 1.1: Formulation of a) Detailed work plan, ii) Monitoring and evaluation plan, iii) CTCN Impact Description, iv) Closure and Data Collection report.	*I1 : 8 w/d* *N1 : 5* *N2: 11*	*/*	*/*	*/*	*6,500*	*6,900*
Output 2: Benchmark solar powered irrigation technologies suitable to smallholder farmers in Ghana and assess their respective cost-benefits.						
Activity 2.1: Map relevant stakeholders and establish a stakeholder working group	*I1: 5* *N1: 10* *N2: 2*				*4,500*	*4,900*
Activity 2.2: Conduct	*I1: 5*	*One international*	*1 inception meeting,*	*/*	*9,500*	*9,600*

an inception meeting	*I2: 1* *I3: 1* *I4: 1* *I5: 1* *N1: 5* *N2: 2*	*expert travelling to Ghana for the inception meeting estimated at 2,200 USD including flights, accommodation and DSA for 5 days in Ghana.* *For this inception meeting, the SC will be participating, so a total to 8 -10 persons. 100 USD/persons has been considered to ensure their participation.*	*with a cost of 500 USD planned.*			
Activity 2.3: Desk analysis of the agricultural and irrigation practices in Ghana.	*I1 : 5* *I2: 1* *I4: 5* *N1: 8* *N2: 2*	*/*	*/*	*/*	*7,000*	*7,500*
Activity 2.4 Organize a stakeholder workshop to introduce the SPIS to Ghana´s future users, national officers, investors and private sector.	*I1 : 5* *I2: 3* *I4: 3* *N1: 8* *N2: 2*	*One international expert travelling to Ghana for the inception meeting estimated at 2,200 USD including flights, accommodation and DSA for 5 days in Ghana.* *For this stakeholder*	*1 stakeholder workshop estimated at 1,500 USD/day.*	*/*	*14,000*	*14,400*

		workshop, 30persons are expected at 100 USD/persons to ensure their participation.				
Activity 2.5: Elaborate a guide of solar irrigation technology systems that could be used in Ghana	*I1: 5* *I2 : 2* *I4:10* *N1: 5* *N2;: 1*	*/*	*/*	*/*	*9,500*	*9,700*
Activity 2.6: Cost analysis of the technologies and SPIS architectures	*I1: 2* *I2: 5* *I3: 10* *I4: 2* *N1: 2* *N2: 1*	*/*	*/*	*/*	*10,000*	*10,100*
Output 3: Define a business model targeting smallholder farmers for the use of Solar Pumping Irrigation Systems in Ghana						
Activity 3.1 Organize a stakeholder meeting with representative of local smallholder farmers as well as financial institutions	*I1: 5* *I2: 2* *I3: 5* *N1: 5* *N2: 5*	*One international expert travelling to Ghana for the inception meeting estimated at 2,200 USD including flights, accommodation and DSA for 5 days in Ghana.* *For this stakeholder workshop, 30 persons are expected at 100 USD/persons to ensure*	*1 stakeholder workshop estimated at 1,500 USD/day.*	*/*	*14,500*	*14,700*

		their participation.				
Activity 3.2 Define business model(s) that would enable the use of SPIS by smallholder farmers in Ghana	*I1: 15* *I2: 5* *I3: 15* *I4: 5* *N1: 5* *N2: 2*	*/*	*/*	*/*	*16,000*	*16,400*
Activity 3.3 Business model validation workshop	*I1: 5* *I2: 5* *I3: 5* *N1: 5* *N2: 2*	*One international expert travelling to Ghana for the inception meeting estimated at 2,200 USD including flights, accommodation and DSA for 5 days in Ghana.* *For this stakeholder workshop, 30 persons and 3 technical support/administrative staff are expected at 250 USD/persons to ensure their participation.*	*1 residential validation workshop estimated at 5,000 USD/day, including lunch fr the participants and a high standard venue.*	*/*	*22,000*	*22,100*
Output 4: National framework on solar powered irrigation technology						
Activity 4.1: High level governmental meeting	*I1: 5* *I2: 2* *I3: 5*	*No travels have been planned as it is considered that the*	*1 High level governmental meeting estimated at 3,000*	*/*	*15,000*	*15,100*

	N1: 5 *N2: 2*	*international expert will already be in Ghana for activity 3.3 For this stakeholder workshop, 20 persons and 3 technical support/administrative staff are expected at 100 USD/persons to ensure their participation.*	*USD, including lunch for the participants and a high standard venue.*			
Activity 4.2: Stakeholder consultation with the private sector (solar tech providers and distributors)	*I1: 5* *I2: 2* *I3: 5* *N1: 5* *N2: 2*	*No travels have been planned as it is considered that the international expert will already be in Ghana for activity 3.3 and 4.1* *For this stakeholder workshop, 20 persons are expected at 100 USD/persons to ensure their participation.*	*1 stakeholder consultation estimated at 1,500 USD.*	*/*	*13,000*	*13,300*
Activity 4.3 Draft policy framework to set up a compliance standards and	*I1: 5* *I2: 5* *I3: 5* *I4: 5*	*/*	*/*	*/*	*21,500*	*22,000*

certification for solar irrigation technology.	*I5: 20* *N1: 5* *N2: 5*					
Activity 4.4: Circulate first draft of the policy framework and collect official feedback	*I1: 5* *I5: 2* *N1 :2*	*/*	*/*	*/*	*3,500*	*4,000*
Activity 4.5: Conduct an official review workshop with the concerned national ministries, governing authorities and to the stakeholder working group	*I1: 5* *I3: 1* *I4: 1* *I5: 1* *N1: 5* *N2: 1*	*One international expert travelling to Ghana for the inception meeting estimated at 2,200 USD including flights, accommodation and DSA for 5 days in Ghana.* *For this stakeholder workshop, 20 persons and 3 technical support/administrative staff are expected at 250 USD/persons to ensure their participation.*	*1 residential official review workshop at 5,000 USD including lunch for the participants and a high-quality venue.*	*/*	*18,000*	*18,650*
Activity 4.6: Incorporate comments and develop second draft of the policy framework	*I1: 3* *I5: 1* *N1: 1*	*/*	*/*	*/*	*2,000*	*2,200*

Activity 4.7: Circulate second draft and collect official feedback	*I1: 5* *I5: 3* *N1: 5*	*/*	*/*	*/*	*4,500*	*5,000*
Activity 4.8: Incorporate comments and develop final draft of the policy framework	*I1: 1* *I5: 5* *N1: 1*	*/*	*/*	*/*	*3,000*	*3,200*
Output 5: Capacity training to raise awareness on the benefits of solar pumping irrigation systems for smallholder farmers in Ghana.						
Activity 5.1: Design the comprehensive training modules targeting smallholder farmers and investors	*I1: 23* *N1: 10* *N2: 10*	*/*	*/*	*/*	*15,000*	*15,500*
Activity 5.2: Validation of the modules through a meeting with the stakeholder working group	*I1: 5* *N1: 1* *N2: 1*	*One international expert travelling to Ghana for the inception meeting estimated at 2,200 USD including flights, accommodation and DSA for 5 days in Ghana.* *For this stakeholder workshop, 8 persons and 2 technical support/administrative staff are expected at 100 USD/persons to*	*1meeting to validate the training modules with a cost of 500 USD planned.*	*/*	*6,000*	*6,600*

		ensure their participation				
Activity 5.3 Creation of a webpage about SPIS to be hosted in the Environmental Protection Agency	*I1: 20* *N1:5*	*/*	*/*	*/*	*12,800*	*11,000*
Activity 5.4 Dissemination of the training modules through 3 stakeholder´s workshop.	*I1: 5* *N1: 5* *N2: 1*	*One international expert travelling to Ghana for the inception meeting estimated at 2,200 USD including flights, accommodation and DSA for 5 days in Ghana.* *For these 3 dissemination workshops, 65 persons and 3 technical support/administrative staff are expected at 100 USD/persons to ensure their participation.*	*3 dissemination workshops*	*/*	*16,500*	*17,200*
Estimated range of costing for the entire Response Plan					*245,200*	*250,000*

2. 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 experts	
Team leader and expert in water irrigation for agriculture	- Team Leader and expert in water agriculture and irrigation - Master's in agriculture, water management, climate change adaptation, agriculture engineer, or similar. - At least 10 years of experience in the nexus between climate change, agriculture, and water management/irrigation - At least 5 references demonstrating experience in the design and implementation and monitoring & evaluation of irrigation system in developing countries. - Experience in capacity building, organizing workshops and capacity building - Experience in managing complex projects in the presence of various stakeholders. - Previous experience in Africa or in Ghana will be valued. - Fluency in English is mandatory.
Climate Change adaptation expert	) Expert in climate change adaptation and climate adaptation finance.) M.Sc. Minimum 10 years' experience in climate risk assessment. Experience in conducting vulnerability matrices to climate change impacts, M&E, formulating adaptation plans, and accessing climate finance.) At least 3 experiences in accessing climate finance for adaptation projects in developing countries.) Experience in Africa required.) Fluency in English is mandatory.
Economist	) Master or above in economy, finance, management of companies, international economics, agriculture economics, renewable energy economics, water economics) Minimum of 10 years' experience in designing business models.) At least 5 references in the developing models for climate technologies, technologies used in the agriculture sector, pay as you use model.) At least 3 experiences in developing business models for the developing countries) Previous experience in Africa or in Ghana will be valued.) Fluency in English is mandatory.
Expert in solar irrigation pumping system	) Master or above in solar energy, solar irrigation system, water management, agricultural engineer, food production, or affiliate) Minimum of 10 years' experience in irrigation for agriculture purposes) At least 5 references in designing solar water pumping systems in developing countries.) Experience in capacity building.

	⎫ Previous experience in Africa will be valued ⎫ Fluency in English is mandatory.
Legal expert	⎫ A minimum of 10 years relevant work experience in drafting environmental policies, laws, frameworks. ⎫ At least 5 demonstrated experience in drafting environmental laws, frameworks, policies in Africa. ⎫ Excellent abilities to interact with local stakeholders, collect and evaluate data and transform the information into high quality documentation tangible to the target audience. ⎫ Excellent written and communication skills in English. ⎫ Understanding of climate technologies is valued.
National experts	
Agriculture expert (N1)	- Master or above in agriculture, food production, water management, agricultural engineer, or affiliate - Minimum 8 years' experience in agriculture and water management in Ghana or West Africa. - Strong knowledge of climate change adaptation issues for smallholder farmers - At least 5 years experiences in irrigation in Africa. - Presence in Ghana desired or availability to travel frequently and for long periods of time. - Fluency in English is mandatory.
Gender expert (N2)	- Sociologist, anthropologist, gender management graduate or affiliate. - Minimum 8 years of experience in carrying out socio-economic surveys. - Gender experience in the context of water management, food production, food safety, agriculture or similar. - At least 5 references in Africa. - Presence in Ghana desired or availability to travel frequently and for long periods. - Fluency in English is mandatory.

3. Intended contribution to impact over time

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

This Technical Assistance should have benefits for climate change adaptation, food security, efficient water use, health. It will act as an adaptative solutions to the effect of climate change by ensuring water access in time of drought to the lowest income groups in Ghana.

4. Relevance to NDCs and other national priorities

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

Ghana's intended nationally determined contribution (INDC) and accompanying explanatory note. 2015. P. 7, 11, 15 (reference to improved water resource management as an adaptation intervention, increased penetration of renewable energy solutions for rural areas, increased agriculture resilience for food security, and increased community-based conservation agriculture).

TAP Ghana. P 33
Report on Barrier Analysis and Enabling Framework for Diffusion of Prioritized Adaptation Technologies in the Water and Agriculture Sectors' 43
2018. Climate Change, Innovations and Syecomp. 2018.

These documents provide the context for irrigation in Ghana, and the barriers to climate technologies for irrigation.

- Regassa E. N, Horowitz L., Nyamadi B., and Barry B. (2011). Irrigation Development in Ghana: Past experiences, emerging opportunities, and future directions. Ghana Strategy Support Program (GSSP) Working Paper No. 0027. 43p
- Boldt, J., I. Nygaard, U. E. Hansen, S. Trærup (2012). Overcoming
- Barriers to the Transfer and Diffusion of Climate Technologies. UNEP Risø Centre, Roskilde, Denmark, 2012. 130 p.
- NWP (2007). National Water Policy. Government of Ghana Ministry of Water Resources, Works, and Housing, 2007. 64p

NAP
These documents clearly indicate the impacts of climate change to water availability, low agricultural productivity and outdates practices, leading to an increase in food insecurity, and the focus of the Government of Ghana in addressing these issues. The National Climate Change Policy (particularly sections 4.1 and 4.2 on agriculture and food security, and natural resources, provides the policy framework under which technology solutions for solar powered irrigation systems can be considered. The National Adaptation Strategy provides the context for supporting vulnerable farming groups within the context of climate change impacts, lack of credit facilities, increasing shortages of food, and decreasing productivity amongst other exacerbating factors for poverty and food insecurity in Ghana.

- Environmental Protection Agency [EPA] in partnership with the National Development Planning Commission and the Ministry of Finance. 2012. Ghana's National Adaptation Plan Framework.
- Government of Ghana. 2012. National Climate Change Adaptation Strategy
- Ministry of Environment Science, Technology and Innovation, Government of Ghana. 2013.
- National Climate Change Policy.

Other documents
The documents listed below provide the context of climate related impacts to agriculture – including water scarcity – and the need for climate smart solutions to address productivity issues for smallholder farmers.

- Akrofi-Atitianti, F., Ifejika Speranza, C., Bockel, L. and Asare, R., 2018. Assessing climate smart agriculture and its determinants of practice in Ghana: A case of the cocoa production system. Land, 7(1), p.30.
- Anuga, S.W., Gordon, C., Boon, E. and Surugu, J.M.I., 2019. Determinants of Climate Smart Agriculture (CSA) Adoption among Smallholder Food Crop Farmers in the Techiman Municipality, Ghana. Ghana Journal of Geography, 11(1), pp.124-139.
- Benefoh, D.T. and Ackom, E., 2016. Energy and low carbon development efforts in Ghana: institutional arrangements, initiatives, challenges, and the way forward. Aims energy, 4(3), pp.481-503.
- Essegbey, G.O., Nutsukpo, D., Karbo, N. and Zougmoré, R., 2015. National climate-smart agriculture and food security action plan of Ghana (2016-2020). CCAFS Working Paper, (139).
- Ministry of Environment, Science, technology, and Innovation (MESTI),
- Government of Ghana (2016). Ghana's Low Carbon Development Strategy (LCDS).
- UNEP DTU Partnership, UNEP, Facilitating Implementation and Readiness for Mitigation (FIRM) Ghana
- Ministry of Environment, Science, technology, and Innovation (MESTI)
- Government of Ghana (2012). Technology Needs Assessment Report – Ghana. Ç
- Global Environment Facility (GEF) and implemented by the United Nations Environment Programme (UNEP) and the UNEP-Risoe Centre (URC)
- National Development Planning Commission, Government of Ghana (2017). Long-term National Development Plan for Ghana (2018-2057).
- Ministry of Food and Agriculture (MoFA) (2018). Agriculture in Ghana. Facts and Figures 2018; Statistics, Research, and Information Directorate.
- Ministry of Food and Agriculture (2015). Agricultural Sector Progress Report.

This document provides information on some of the previous donor initiative on (solar) irrigation.

- JICA (2006). A Study of the Effectiveness and Problems of JICA's Technical Cooperation from a Capacity Development Perspective:

Chapter 1 Historical Changes in Technical Cooperation Provided to Ghana's Irrigated Agriculture Sector

This document provides information on smallholder farmers in Ghana, and their specific circumstances.

- Jordan Chamberlin; International Food Policy Research Institute (IFPRI) (2007). Defining smallholder agriculture in Ghana: who are smallholders, what do they do and how are they linked with markets?

The technology concept development was led by the Ministry of Environment, Science, Technology & Innovation's Environment Protection Agency of Ghana under the hub of the NDC Action Project.

The Ministry prioritised Solar Powered Irrigation Systems as an adaptation intervention for improving food security among smallholder farmers in Ghana under climate change and requested support to take this priority forward. Under the NDC Action project supported by UNEP and UNEP/DTU, a scoping study was conducted aiming at better understanding the key barriers to SPIS finance and technology implementation as well as identifying potential solutions. At least 30 stakeholders were consulted from across stakeholder groups including financial institutions, government ministries, technology providers, smallholder farmers, associations and academic institutions. The response was overwhelmingly positive in supporting Solar Powered Irrigation Solutions.

Based on this initial assessment the Environment Protection Agency of Ghana decided to request additional technical assistance to put in place the basis needed to scale up the adoption of SPIS for smallholder farmers in Ghana. The template and required contents for the CTCN Adaptation Fund Climate Innovation Accelerator was developed with the NDE. Based on inputs from the review, the proposal was finalised and submitted.

5. Linkages to relevant parallel on-going activities:

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

The Government of Ghana, mostly through the Ministry of Food and Agriculture – Ghana Irrigation Development Authority - has some policies and programmes in place for irrigation on which to build upon.

One Village One Dam initiative, launched by the Government of Ghana to harvest water for both crop and livestock activities in the northern savanna zone which is most vulnerable landscapes of Ghana.
Some public private partnerships (PPPs) for irrigation schemes in place, but these are mostly for the private day to day management with financing still provided through public funds.

Ghana Agricultural Insurance Pool (GAIP)
Initiated by the German International Development Agency (GIZ) and currently supported by the Ghana Insurers Association and the National Insurance Commission provides insurance products to farmers across the country based on a drought index and an area yield index which ensures farmers are protected against loss from climatic events like drought and also loss of yield.

Ghana Incentive-based Risk-Sharing for Agricultural Lending (GIRSAL) Project housed by the Bank of Ghana and financed by the African Development Bank, are not necessarily accessible to smallholder farmers and could be better utilised.

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

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

It is expected that the country will select a specific area to define a fit for purpose SPIS and implement it.

The framework will create the enabling environment for the development of a local market for the sales of high-quality solar pumping irrigation systems that respect the quality and standards/certification defined by the country.

7. Gender and co-benefits:

Imbedded in design of the activities:	*A gender mainstreaming analysis is mandatory to include for all technical assistances. A gender expert will be assigned to carry out an assessment and evaluation regarding gender mainstreaming during the implementation of the TA.* *In addition, please describe all support to gender aspects, women's equality and other co-benefits embedded into the Response Plan (please include a reference to the actual activities and outputs as described in section 3).* The 2010 Population and Housing Census released by the Ghana Statistical Service found 49% of Ghana's agricultural labour force to be female and 51% male. Women play a crucial role as farmers and businesswomen in Ghanaian agricultural activities, particularly within the smallholder farmer segment. Smallholder farmers primarily practice subsistence farming, for which the women sow the seeds, do the weeding etc. Having access to a sustainable source of water supply through solar powered irrigation systems, could enable women engaged in agricultural practices in Ghana to improve agriculture productivity and food security for their families.
Gender and co-benefits intended as result of the activities:	*Please describe all gender aspects, women's equality and other co-benefits expected as a result of the CTCN technical assistance.* Women usually need to walk long distances to access water. Providing solar irrigation solutions at the farm site will increase security for the women and increase time management. Several women-centric farming associations exist in Ghana, which can be leveraged whilst constructing the financing solution for solar irrigation technologies. Access to credit for the unbanked farmer is very much dependent on farmer groups and considering the potential to aggregate opportunities to bring them to scale. Other co-benefits the solar irrigation technology is that it replaced, in some instances, diesel use for makeshift irrigation pumps that are concerns for air pollution and can cause health issues. By increasing the productivity of smallholder farmers, and targeting women specifically, it is more likely that additional revenue will be spend on healthcare, children's education, and more nutritious meals.

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

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

In country stakeholder	Role in implementation of the technical assistance
National Designated Entity	*Supervisor and member of the stakeholder working*

	group
Designated Authority	Oversee the project in all its stages
Project Proponent	Oversee the project in all its stages and is a member of the stakeholder working group
Ministry of Food and Agriculture –	The ministry is responsible for the development and growth of agriculture in Ghana, and is key in promoting programmes for sustainable agriculture and agribusinesses through its national programmes, collaboration with donor programming and extension services for agricultural activities. It will play a main guiding role for CTCN in the formulation of appropriate solar powered irrigation technology solutions for smallholder farmers in Ghana.
Ghana Irrigation Development Authority	GIDA, which is located within MoFA, is charged with managing irrigation dams, developing irrigation schemes for farmers, and maintaining water quality in the geographic areas where the Authority works. It is also responsible for identifying irrigation opportunities and facilitating private investments in irrigation and will play a crucial role in guiding CTCN in its activities under this proposal.
Non-profit and Non-governmental Organizations	Providing technical knowledge and other project related insights for its success
Ministry of Environment, Science, Technology & Innovation	Oversee the project in all its stages, will be key in the support and facilitation of CTCN's activities in the country, and be responsible in overseeing the follow-though of recommendations/outcomes from the assessment.
Environmental Protection Agency (EPA)	Oversee the project in all its stages, will be key in the support and facilitation of CTCN's activities in the country, and be responsible in overseeing the follow-though of recommendations/outcomes from the assessment.
Ministry of water	Oversee the project in all its stages, will be key in the support and facilitation of CTCN's activities in the country, and be responsible in overseeing the follow-though of recommendations/outcomes from the assessment.
Smallholder farmers, farmer groups and associations, Women-centric farming associations	As main target group for this technical assistance, smallholder farmers and existing farmer groupings (including women associations) will be crucial in providing feedback on which solutions (technical and financial)
Investors /Financial institutions	include both the private and public sector, rural banks, microfinance institutions, informal formal financing groups etc. These financial institutions will provide a clear means by which to develop a financing structure that address barriers faced by smallholder farmers and aligns with potential financial inclusions services that can be offered
Community organisations and civil society	These groups have an important role to play in

	disseminating information on solar powered irrigation technologies to smallholder farmers, and financial institutions. They can be key in addressing the lack of confidence and trust in the technology.
Academic institutions	Disseminate the trainings.
Private sector	The existing supply chain for solar irrigation systems – manufacturers, suppliers, distributers etc – need to be engaged to better understand the quality and prices of available technology, and what is needed to support them expand their supply chains and provide credit to smallholder farmers
Development partners and key donor programmes	the existing small scale solar powered irrigation technology programmes that have been successfully implemented need to be referred to, as in some instances, it is not the solution itself that is an issue but scaling of it. Its addition is essential to address the fragmented nature of the donor involvement in solar irrigation programmes by understanding where and how they function.

9. 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	Yes, the project aims at designing a business model for the use of solar water pumping irrigation systems that will fit the smallest income. Ghana is dependent on agriculture to ensure its food security. Better irrigation systems can also improve the quality of life of smallholder farmers, including women and youth.
2	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	Yes, the project aims at designing a business model for the use solar water pumping irrigation systems that will fit the smallest income. Ghana is dependent on agriculture to ensure its food security. Better irrigation systems can also improve the quality of life of smallholder farmers, including women and youth.
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	The 2010 Population and Housing

	and girls	Census released by the Ghana Statistical Service found 49% of Ghana's agricultural labour force to be female and 51% male. Women play a crucial role as farmers and businesswomen in Ghanaian agricultural activities, particularly within the smallholder farmer segment. Smallholder farmers primarily practice subsistence farming, for which the women sow the seeds, do the weeding etc. Having access to a sustainable source of water supply through solar powered irrigation systems, could enable women engaged in agricultural practices in Ghana to improve agriculture productivity and food security for their families.
6	Ensure availability and sustainable management of water and sanitation for all	A framework for the use of the SPIS and the water will also be designed, which is one of the main requirements to establish the enabling environment for the development of the technology.
7	Ensure access to affordable, reliable, sustainable, and modern energy for all (consider adding targets for 7)	Solar pumping systems are also related to RE as they work with solar energy.
	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	Solar pumping along with business model that is sustainable for smallholder farmers along with a legal framework for the technology should enable the technology to be introduced in Ghana and create a market for the private sector that will ensure the scale up of the technology.
	7.b - By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, 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	Beneficiating from an irrigation system is a way to increase the resilience of the populations at times of drought and ensure food security as well.
	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	One of the outcomes of the TA is to train future users and administrators on the importance and relevance of SPIS as well as introduce the framework to the users and administrators.
	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	

10. 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	☐	☐
☐ 2. Sectoral roadmaps and strategies	☐	☐
☐ 3. Recommendations for law, policy, and regulations	☐	☐
☐ 4. Financing facilitation	X	☐
☐ 5. Private sector engagement and market creation	☐	☐
☐ 6. Research and development of technologies	☐	☐
☐ 7. Feasibility of technology options	X	☐
☐ 8. Piloting and deployment of technologies in local conditions	☐	☐
☐ 9. Technology identification and prioritization	X	☐

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

11. 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.

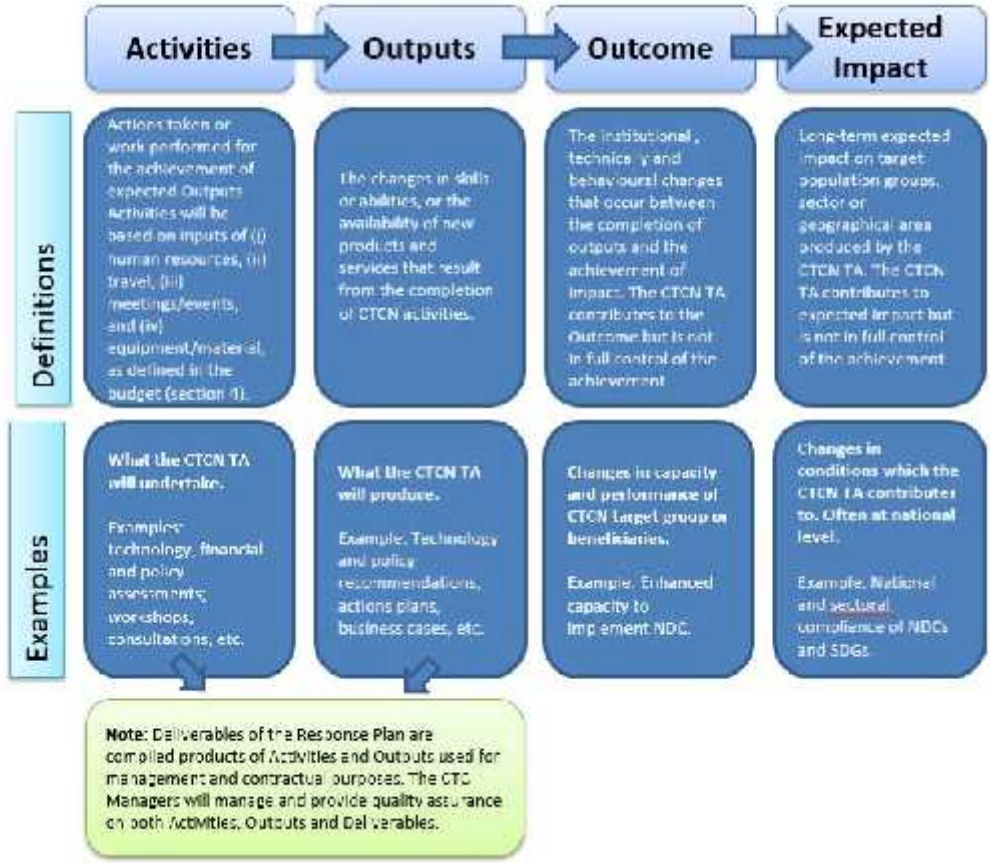
Annex 1: Guidance note for designing a Response Plan (to be deleted when submitting the Response Plan)

1. Objective of the Response Plan

The Response Plan is developed by CTCN specialists in response to a country request for technical assistance. It constitutes the Terms of Reference of the CTCN technical assistance that will be provided to the country, and it provides the formulation of and subsequent basis for the monitoring and evaluation of the Response Plan implementation, as well as its expected outcomes and anticipated impacts.

2. Results chain and Logical Framework Approach to be defined in the CTCN Response Plan

The result chain is the causal sequence that stipulates the necessary flow of actions and processes to achieve desired objectives and results – beginning with inputs, moving through activities and outputs, and culminating in individual outcomes. The outcome will contribute to the desired impact in the society. The Logical Framework Approach is an analytical process used to support objectives-oriented project planning and management. It provides a set of pre-defined concepts which are used as part of an iterative process to aid structured and systematic analysis and management of the CTCN technical assistance.



3. Role of the Response Planning Design Team

The Response Planning Design Team is selected by the Climate Technology Centre (CTC). The composition of the team depends on each request but may include the National Designated Entity (NDE), the request Proponent, Climate Technology Manager of the CTCN, experts from the CTCN Consortium, UNIDO and UNEP experts from regional offices and other experts as needed.

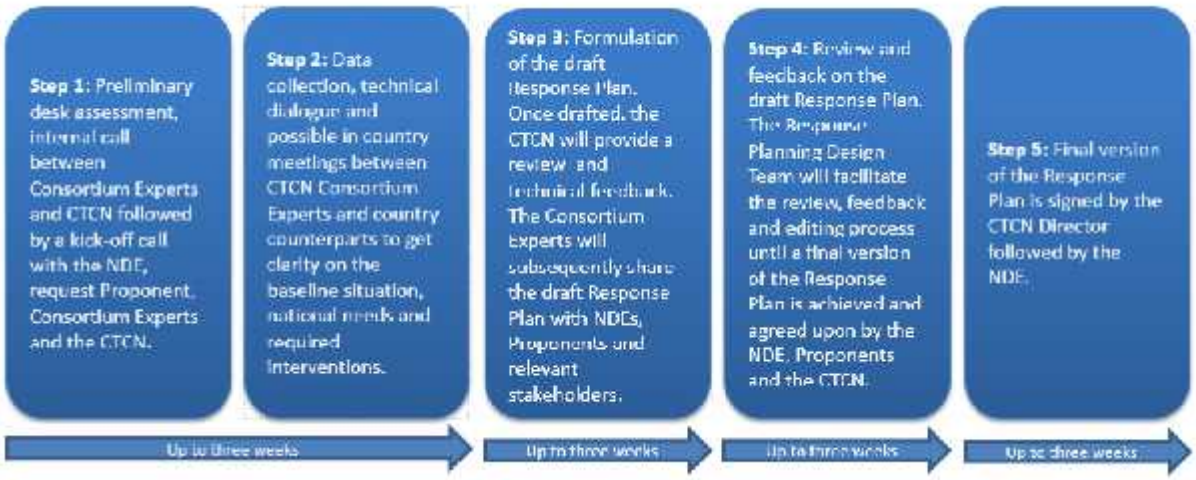
The role of CTCN Consortium experts is to lead the design of the Response Plan. The NDE will provide overall guidance on national context and priorities whereas the request Proponent will provide more detailed information on the sector, barriers and requested assistance. The Climate Technology Manager of the CTCN will provide quality assurance of timeliness and appropriateness of the Response Plan.

The Response Planning Design Team will draft all sections of the Response Plan template building on the information contained in the CTCN Request, based on expertise on the given topic and potentially further data collection, as required. This will be done by the CTCN Consortium Experts in consultation with the NDE, request Proponent and relevant stakeholders. The Response Plan must be agreed to and approved by the NDE and the CTCN Director. This Response Plan will serve as the basis to identify, select, and engage an expert institution from the Climate Technology Network or Consortium to lead the implementation of the CTCN Response Plan in the requesting country.

To the extent possible, staff from UNEP and UNIDO Regional, Sub-Regional and/or National Offices should be involved in all stages of formulation of the Response Plan to maximize synergies and avoid overlap with ongoing initiatives, as well as ensure relevance to regional and national context.

4. Process for designing the Response Plan

The Response Planning process should be completed over a period of up to 60 working days (12 weeks). Indicative steps and related timelines are laid out below:



5. Design Considerations

To maximize the impact of the technical assistance provided by the CTCN and provide an effective M&E process, the Response Plan should integrate as much as possible the considerations below:

Climate Technology focus: The Response Plan should have a clear focus on climate technologies, and identify activities that enable the identification, development, deployment, or diffusion of one or several specific technologies (including equipment, techniques, knowledge, and skills).

Barrier removal / Problem solving: The activities should contribute to address the specific problem statement identified in the Request. The barriers identified should be those hampering the identification, development, deployment, or diffusion of one or several climate technologies or climate actions. Therefore, it may be necessary to limit the CTCN Response Plan to a set of activities for technical assistance commonly agreed with the NDE (and Proponent when needed) compared to the original request submitted. The CTCN will liaise with NDEs and Proponent in case the scope of the technical assistance deviates from the original request.

Use of the CTCN assistance by stakeholders: The Response Plan should identify clearly how the products of the CTCN assistance will be used in the short term once support is delivered, by who and when, to ensure it will lead to specific impacts in the country. The activities should engage the stakeholders that will use the concrete results of the assistance to deploy the technologies, including from the private sector, the public sector, research institutions, etc.

Within the scope of CTCN resources: The cost of the technical assistance provided by the CTCN cannot exceed USD 250,000 per Response Plan. Therefore, it may be necessary to prioritize activities and limit the CTCN Response Plan to a set of priority activities commonly agreed with the Proponent and the NDE to remain under this value. Under section 4 of the Response Plan template, an indicative activity-based budget should be presented. The proposed budget is indicative and should present an estimated costing range per activity, output as well as a total costing range for the delivery of the Response Plan. Once the Response Plan is finalised and published for tendering, interested parties will provide competitive offer against the indicative budget.

CTCN activities and outputs should be linkable to monitoring and evaluation indicators: All proposed activities and outputs must be linkable to monitoring and evaluation indicators that are specific, measurable, achievable, relevant, and time bound. The monitoring and evaluation process and corresponding indicators will be developed by the Lead Implementer as part of the work plan and will allow the CTCN technology Manager to monitor the timeliness and appropriateness of the implementation.

Synergies with existing efforts: The Response Plan should focus on activities that are not already being fully supported or that are in the process of being fully supported by another national, regional, or international organization. Synergies and complementarity also require that the CTCN assistance is not duplicating past activities. It is possible in the Response Plan to indicate co-financing from the government, the Proponent, or another stakeholder, that will maximize the effectiveness of the CTCN assistance.

Gender mainstreaming: The CTCN mission is to build or strengthen developing countries' capacities to identify technology needs, to facilitate the preparation and implementation of technology projects and strategies considering gender considerations. The Response Plan must therefore describe how gender considerations will be included and monitored within the proposed activities, and any gender co-benefits that will be gained because of implementing the CTCN technical assistance.