Closure and Data Collection Report for CTCN Technical Assistance

1. Basic information

Title of response plan	**Improving resiliency of crops to drought through strengthened early warning within Ghana**
Country / countries	Ghana
NDE focal point and organization	Joseph Baffoe jabaffoe@gmail.com, EPA, Ghana
Proponent focal point and organization	Water Resources Commission, Ghana, Bob Alfa <bobalfa@yahoo.com>
Sector(s) addressed	Water resources, agriculture, disaster preparedness
Technologies supported	Climate change vulnerability assessment, Early Warning Systems Communication, Cropland management, Open source climate data and tools, Seasonal to inter annual weather forecast
Implementation period and total duration	01-09-2016 to 31-05-2018
Total budget for implementation	Budget: 229,777 + 76,132 USD Pro bono contribution from DHI: 15,000 USD (workshop in Ghana) 20,000 USD (GCF concept note preparation, procurement of consultancy from C4)
Designer of the response plan	Water Resources Commission, Ghana
Implementer of response plan	UNEP-DHI

2. Summary of all activities, outputs and products that contribute to the expected impact of the technical assistance.

Description of delivered outputs and products as well as the activities undertaken to achieve them. In doing so, review the log frame of the original Response Plan and refer to it as appropriate.	The technical assistance was initiated in October 2016 by an **Inception workshop** held in Accra. Based on feedback and discussions from stakeholder consultations a **Needs Assessment report** was prepared to present the objectives and requirements for the technical assistance. The recommendations have then been taken into consideration to draft a more detailed description of the proposed outcome in the **Technology specification report** delivered in February 2017. Based on the outlined requirement the **Drought Monitoring and Early warning system for Ghana** has been developed and a first version was presented at a **national training** held in Accra in October 2017. This was the opportunity to give insight into the developed system and get feedback from the key stakeholders. In October 2017, a **Second National workshop** was held at the Water Resources Commission in Accra to initiate the **GCF Readiness funds** that had been allocated to this CTCN technical assistance. Following this workshop, the main applicant (WRC) supported by National experts has carried out a thorough review of the system followed by a validation of the performance of the system. The findings have been described in the **Technology Validation report** delivered in January 2018. National experts have also assisted WRC to develop a **baseline assessment and gap analysis** of the drought management and forecasting in Ghana. In addition, a Climate **vulnerability assessment** of the agricultural sector has also been carried out. These outcomes constitute a basis to develop a draft **Concept Note** for the Green Climate Fund.

Partners organizations	Water Resources Commission, Ghana
Beneficiaries	*Participating national organisations:* • Department of Earth Science, University of Ghana • Environmental Protection Agency • Ghana Meteorological Agency • Ghana Irrigation Development Authority • Global Water Partnership, Ghana • Hydrological Services Department • National Disaster Management Organisation • Ministry of Water Resources Works and Housing • Ministry of Food and Agriculture • Ministry of Finance • Water Resources Commission, White Volta • Water Resources Commission Indirect beneficiaries would be the regional government offices in the northern part of Ghana and local farming organizations using the disseminated information.
Methodologies applied to produce outputs and products	Key stakeholders have been actively involved throughout the implementation of the GCF readiness and CTCN supported activities. During the GCF Readiness and CTCN activities the Ministry of Finance of Ghana (NDA), the Environmental Protection Agency (EPA), the Water Resources Commission (Executing Entity) with the technical assistance of UNEP-DHI have organised four national workshops in Accra (October 2016, October 2017, January 2018 and April 2018) where key stakeholders were invited to discuss the project results and lesson learned from the project. A technical training and a number of stakeholder consultations were conducted during the assistance as well.
Deviations	None
Achieved or anticipated gender benefits from the TA	The developed Drought Early Warning system provides a risk based assessment of the drought impact within Ghana. The risk will be expressed based on the vulnerability towards the impact from a specific hazard, or as the likelihood of harm, loss or disaster for a specific drought related hazard. Risk is defined as the likelihood of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions (UN-ISDR, 2009, EC, 2011). The risk analysis will identify areas or groups at different risk levels, which will be the targets for the following adaptation or mitigation planning. Gender relevant indicators are used to express the drought risk towards vulnerable groups in Ghana, and a range of gender specific indicators are made available in the system. In case of further upscaling of the system within Ghana additional focus will be made towards identification of additional gender relevant indicators.
Achieved or anticipated co-benefits from the TA	None
Anticipated follow up activities and next steps	Responsible agency: The Water Resources Commission (WRC) will be the anchoring stakeholder for the technology and will ensure that all relevant stakeholders are kept updated and involved after the closure of the CTCN assistance. UNEP-DHI will support WRC with support through

	e-mail and Skype to solve any questions or issues that may arise after the closure of the assistance. The validation of the system will continue as on ongoing process, and the system is expected continually provide forecast information to the local farmers. National stakeholders: The relevant national stakeholders where identified during the implementation of the assistance, and the majority of the stakeholders have been actively engaged in the technical training and workshops. WRC will be responsible for dissemination of information and follow up on the engagement and use of the technology by the stakeholders after the closure of the assistance. Additional stakeholders approaching WRC or UNEP-DHI will be granted access to the drought early warning portal, and the associated user guides and technical descriptions.

1. Lessons learnt

Instruction: Per lesson, indicate which stakeholders would benefit most from what you have learned. In formulating your lessons, see them as recommendations for those that will be put in a similar situation like yourselves in the future. What would they need to do (or not do) based on your learning? This will enable CTCN to incorporate your lessons in other technical assistances.

	Lessons learnt	**Recommendations**
Lessons learnt in the area of the TA *Instructions: Indicate essential factors contributing to successful implementation, as well as specific challenges. Recommendations include considerations on what would need to be in place for increasing success of similar efforts (i.e. regulatory, legal, stakeholders, communication, etc.)*	Drought is currently a serious issue in the northern part of Ghana but the experience from the stakeholders is that even the southern part of the country are experiencing impacts from drought affecting the food security and cropping patterns. The expectation is that the impact will increase over the coming years and decades. Access to near real time satellite based data and indices provides great value and a strong supplement to existing data from ground stations. There is a need for further extending the local knowledge of satellite data and performing additional validation and ground proofing on the use of satellite data for drought management in Ghana. Capacity building and training is vital for a successful implementation of such a system, and an important lesson learned is that these	Its recommended that the CTCN and GCF activities are followed by a full size project where the developed solutions are up-scaled to national level.

	activities should be increased and that its important to have capacity building events not only with the technical staff but as well on management level to ensure the buy-in and long term sustainability of the implemented system.	
Lessons learnt related to climate technology transfer *Instructions: Indicate Opportunities, challenges and barriers for the use and deployment of the technology or technologies supported by the TA. The objective is to identify specific success factors for technology transfer. This information will feed the CTCN technology library and will contribute to increase learning on specific technologies*	The development and implementation of a web based platform requires that the infrastructure with respect to mobile data exist within the country. This is an area which is growing very rapidly and during the project implementation period feedbacks on the use of an web based platform was positive. This makes it much easier to disseminate information and provide access to new users. The technical level of the implemented Drought Early Warning System have been discussed during the implementation of the system, and the lessons learned is that the active engagement and involvement of key national agencies is very important.	Its recommended to maintain the focus on web based solutions in future projects. For future drought projects its recommended to involve key agencies in the design through focus on actual cases at the different agencies, as this will enable identification of the required functionality to an even higher degree than what was possible during the current CTCN and GCF activities.
Lessons learnt related the CTCN process for TA	NA	NA

4. Illustration of the TA and photos

Instruction: For communication purposes, please provide 2-4 Power Point slides with illustrations or charts showing the TA process, applied methodology, activities, outputs and achieved results. The illustrations must be copied into the TA Closure report but must also be delivered as power point files. Also, please provide at least five high-resolution pictures in jpg format, capturing technical assistance (to be used as communication materials on the website, in progress report, etc.). The pictures should illustrate how the TA has impacted the lives of the beneficiaries in particular and the communities in general.

5. Information for TA impact description (for public use)

Instruction: The information in the table below will be used by the CTCN to produce the CTCN TA Impact Description. The TA Impact description is a 2-page summary document for communication purposes. Please copy information from sections above and technical delivery reports as required.

Challenge (approx. 500 characters with spaces)	Agricultural production in Ghana is predominantly rain-fed and changes in rainfall pattern are having a serious impact on the country's productivity and economy. These changes have deepened rural vulnerability and increased land degradation and desertification. Current information and early warning systems are insufficient to adequately prepare and cope with the extreme climate events.
CTCN Assistance (2 to 4 bullet points. Approximately 450 characters with spaces)	• Design an early warning system for dry season management • Adjust and validate drought early warning and forecasting technologies to local conditions • Create stronger collaboration among national and local institutions for drought management and climate resilience of crop production • Design a road map to scale up deployment with financing of this early warning technology
Anticipated impact (2 to 4 bullet points. Approximately 250 characters with spaces). As a minimum, please include one of the following: i) Quantity of greenhouse gas emissions reduced, avoided or sequestered; or ii) Number of people with increased capacity to adapt to the impacts of climate variability and change.	• Contribution to reduced crop losses and improved livelihood of farmers in Ghana • Improved information provision on drought characteristics to help farmers proactively take adaptive measures
Linkages and contribution to NDC (2 to 4 bullet points. Approximately 350 characters with spaces).	1. Promote the development of modern information management system including E-Governance process 2. Develop systems for data collection, processing and dissemination of information 3. Promote evidence-based decision making 4. Promote timely dispatch of strategic information to targeted areas
The narrative story (Approximately 1200 characters with spaces)	The Technology Needs Assessment of Ghana (TNA) identified a Climate Change Monitoring System as a priority adaptation technology in order to improve the water management during dry and the wet seasons. UNEP DHI Partnership, in coordination with the NDE and the Water Resource Commission, implemented this technical

	assistance to strengthen the early warning for droughts based on existing expertise and warning systems in the country. The drought early warning system will increase adaptive capacity within the agriculture and water sectors. Deployment of this system will be piloted with key local actors in the North of Ghana. The CTCN technical assistance will also recommend a roadmap to further refine scale-up deployment of this early warning technology nationally. Objectives of this technical assistance are to: • Support farmers with timely and detailed information for them to plan and implement drought management actions to minimise the negative impacts of increasingly frequent and severe droughts • Enhance awareness and expertise to use spatially distributed drought issues • Increase the accessibility of drought-related data on relevant near real-time satellite information • Strengthen institutional coordination for disseminating and using drought early warning information
Contribution to SDGs (to the extent possible, please include contribution to +/- 3 SDGs) , describing the contribution with a few sentence for each SDGs concerned). A complete list of SDGs and their targets is available here: https://sustainabledevelopment.un.org/partnership/register/.	• Improve agriculture and food security by building agriculture resilience in climate vulnerable landscapes • Early warning and disaster prevention • Managing climate-induced health risks • Resilience for gender and the vulnerable

Note: Please see example of a TA Impact Description at the following link:
https://www.ctc-n.org/sites/www.ctc-n.org/files/benin_a_ag_forestry.final_.pdf

CLIMATE TECHNOLOGY CENTRE & NETWORK

Annex 1 (for internal use in donor and UN reporting)

A. Standardised CTCN performance indicators for donor and UN internal reporting

Instruction:

Please add quantitative values for indicators relevant to the particular TA in the list below. Non-relevant indicators should be left blank.

Please only fill in the table for activities and outputs conducted or produced directly by the CTCN assistance, and that are verified by the end of the assistance.

CTCN standardised performance indicators	**Quantitative value**	**Qualitative description** *List the various elements corresponding to the quantitative value*
1. Overview		
Number of active person-days (not full duration) of assistance provided to counterparts or stakeholders by international experts and consultants	**60**	**Workshops** **Training events** **Consultations and meetings**
Number of active person-days (not full duration) of assistance provided to counterparts or stakeholders by national experts and consultants	**40**	**Consultations by national experts**
Number of for external communication and outreach activities conducted to showcase the assistance (news release, newsletters, articles on website, etc.)	**1**	**CTCN presentation by the NDE**
2. Events (other than trainings) held as part of the assistance		
Number of international and multi-country (at regional or sub-regional level) technology and knowledge sharing events	**NA**	
Number of participants in the events above	**NA**	
Number of national technology and knowledge sharing events	**2**	**National workshops**
Number of participants in the events above	**70**	
Number of public-private events related to technologies	**NA**	
Number of participants in the events above	**NA**	
3. Training and capacity building activities conducted during the assistance		
Number of training sessions and capacity strengthening activities	**3**	Technical training events
Number of people who received the training	**60**	
Number of men	**40**	
Number of women	**20**	
Total number of organizations trained	**12**	
Number of research organizations, laboratories and universities	**3**	
Number of private companies	**0**	
Number of cities and local government	**4**	
Number of communities		
Number of ministries		
Number of specialized governmental institutions	**5**	
Number of non-profit organizations		
Level of satisfaction of participants after the training (from training feedback form).	**Very satisfied**	Based on feedback from stakeholders

From very satisfied, satisfied, not really satisfied, not satisfied at all		
Percentage of participants that increased their capacities thanks to the training (from training feedback form) *From significantly, very, moderately, to none*	**100**	Based on feedback from stakeholders
Percentage of men	**100**	
Percentage of women	**100**	
4. Tools, technical reports and information material supported by the assistance		
Total number of tools, technical reports and information material supported by the assistance (excluding mission, progress and internal reports)		
Number of tools strengthened, revised or developed	**1**	**Early warning tool**
Number of technical reports strengthened, revised or created	**12**	**All reports available at https://www.ctc-n.org/technical-assistance/projects/improving-resiliency-crops-drought-through-strengthened-early-warning**
Number of other information materials strengthened, revised or created		
5. Policies, laws and regulations supported by the assistance		
Number of policies, strategies, and plans drafted addressing climate change adaptation	**NA**	
Number of policies, strategies, and plans drafted addressing climate change mitigation	**NA**	
Number of documents developed to inform other policies, strategies, and plans on climate change adaptation (sectoral strategies, national development plans, etc.)	**Information not available at the moment**	**The assistance will be used to develop national and local action plans related to climate change adaptation and drought mitigation**
Number of documents developed to inform other policies, strategies, and plans on climate change mitigation (sectoral strategies, national development plans, etc.)	**NA**	
Number of laws, agreements, or regulations drafted addressing climate change adaptation	**NA**	
Number of laws, agreements, or regulations drafted addressing climate change mitigation	**NA**	
Number of documents developed to inform laws, agreements, or regulations on climate change adaptation	**NA**	
Number of documents developed to inform laws, agreements, or regulations on climate change mitigation	**NA**	
6. Institutional strengthening supported by the assistance		
Number of institutional arrangements in place to coordinate near and long-term national adaptation plans (NAPs)	**2**	**WRC and EPA**
Number of organizations with increased technical capacity to advance near and long term national adaptation plans (NAPs) which integrate EbA	**2**	**WRC and EPA**

Number of organizations with increase awareness and knowledge among countries to better own and drive national adaptation planning processes	**NA**	
7. Partnerships and cooperation		
Number of private companies directly engaged in the assistance (that partnered with the proponent, the beneficiaries or the CTCN to implement the assistance)	**NA**	
Number of South-South collaboration enabled during or through the assistance, when stakeholders from other countries were involved in the assistance	**NA**	
Number of North-South collaboration enabled during or through the assistance, when stakeholders from other countries were involved in the assistance	**NA**	
Number of Triangular collaboration enabled during or through the assistance, when stakeholders from other countries were involved in the assistance	**NA**	

B. Indicators of anticipated impacts that may occur after the TA is completed

CTCN standardised performance indicators	**Quantit-ative value** *Insert the request value and unit*	**Content** *List the elements included in the number provided*	**Expected timeline** *Indicate when the indicator and value are expected to be achieved*	**Responsible institution** *Indicate the institution(s) that will play leading role in enabling the indicators and anticipated values to be achieved*
16. Anticipated finance mobilised				
a) Anticipated amount of public/donor investment mobilized (in USD) from the beneficiary country for climate change activities as a result of the TA	1 to 5 mio USD	Co-financing related to upcoming GCF application	Late 2019 – GCF process initiated in 2018	NDA office in Ghana
b) Anticipated amount of public/donor investment mobilized (in USD) from international and regional sources for climate change activities as a result of the TA	10 mio USD	GCF funding from (SAP application).	Late 2019 – GCF process initiated in 2018	NDA office in Ghana and UNEP-DHI
c) Anticipated amount of private investment mobilized (in USD) from the beneficiary country for climate change activities as a result of the TA.	1 mio USD	Related to GCF application and implementation of items in the road map	2019 to 2020	Ministry of sanitation and Water Resources
d) Anticipated amount of private investment mobilized (in USD) from international and regional	NA			

sources for climate change activities as a result of the TA.				
17. Policies				
a) Anticipated number of policies, strategies, plans, addressing climate change mitigation officially proposed, adopted, or implemented as a result of the TA.	1 to 2	Drought management action plans and national strategies	NA	Ministry of sanitation and Water Resources
Anticipated number of policies, strategies, plans, addressing climate change adaptation officially proposed, adopted, or implemented as a result of the TA.	1 to 2	Drought management action plans and national strategies	NA	Ministry of sanitation and Water Resources
b) Anticipated number of laws, agreements, or regulations addressing climate change mitigation officially proposed, adopted, or implemented as a result of the TA.	NA			
Anticipated number of laws, agreements, or regulations addressing climate change adaptation officially proposed, adopted, or implemented as a result of the TA.	NA			
c) Anticipated laws, policies, regulations, strategies and plans where climate change mitigation will be mainstreamed as a result of the TA	NA			
Anticipated laws, policies, regulations, strategies and plans where climate change adaptation will be mainstreamed as a result of the TA	NA			
18. Anticipated number of public-private partnerships created	NA			
19. Anticipated twinning arrangements created as a result of the TA	1 to 2	Evaluate options for relevant twinning events associated with regional or international conferences or workshops	2019 to 2020	UNEP-DHI and CTCN

20. Anticipated number of technology projects prepared and implemented to support action on low emission and climate-resilient development	1	GCF application for a national up-scaling of the technology	GCF application (concept note) submitted in 2018.	NDA office in Ghana and UNEP-DHI
21. Anticipated strengthened National Systems of Innovation and technology innovation centres in CTCN recipient country.	NA			
22. Anticipated Clean Energy Generation Capacity Clean supported by the TA that has achieved financial closure	NA			
23. Anticipated and projected GHG reductions Quantity of greenhouse gas (GHG) emissions, measured in metric tons of CO2e, anticipated to be reduced or sequestered as a result of projects supported by the TA.	NA			
10. Clean Energy Generation Capacity Clean energy generation capacity supported by the TA that has achieved financial closure.	NA			
24. Anticipated and projected GHG reductions to 2030 Projected greenhouse gas emissions reduced or avoided through 2030, in metric tons of CO2e, from adopted laws, policies, regulations, or technologies related to clean energy/sustainable landscapes as a result of the TA.	NA			
25. Anticipated co-benefits Number of people receiving livelihood co-benefits as a result of the TA.	500,000	Local farmers and farming organisations in the northern part of Ghana	2018 to 2020	Ministry of sanitation and Water Resources
26. Anticipated technology types effectively deployed in the country	1-2	Drought early warning system, access to relevant and required data	2018 to 2020	Ministry of sanitation and Water Resources
27. Anticipated UNFCCC processes implemented as a result of the TA (NAMA, NAPA, NDC, etc.)	NA or no knowledge at the moment			

28. Anticipated Technology Needs Assessments (TNA) and technology Action Plans (TAP) as a result of the TA				
29. Anticipated cooperative research, development and demonstration programmes within and between developed and developing country Parties facilitated as a result of the TA				
30. Anticipated improved climate change observation systems and related information management in developing country Parties.	1	CTCN assistance providing improved climate change observation system through the drought early warning and access to near-real time data	2018	Ministry of sanitation and Water Resources