CTCN
CLIMATE TECHNOLOGY CENTRE & NETWORK

Instructions to lead Implementers for drafting the Technical Assistance Closure and Data Collection Report

Objective of the technical assistance (TA) Closure Report and Data Collection Report:

- To communicate publicly in one synthesis document a summary of progress made and lessons learned under the technical assistance (TA) towards the anticipated impact (main template).
- Compile TA-specific information required for internal use in donor and UN reporting (annex 1).

Steps for completing the TA Closure report:

1. The lead TA implementer drafts the report at the end of the assignment as a final deliverable /product. The TA Closure report will capture all activities conducted under the TA hence it is expected that duplication of information will occur from earlier documents. Please copy and summarise relevant material from previous TA outputs/deliverables and the Response Plan, as relevant.
2. A CTCN Manager will review and revise the report before final approval by the CTCN Director.

Important note on public and internal use of the closure report:
Once approved by the CTCN Director, the TA Closure and Data Collection Report will be a public document available on the CTCN website. Annex 1 is for internal use only and will not be publicly available.

Closure and Data Collection Report for CTCN Technical Assistance

1. Basic information

Title of response plan	Capacity building on technology development for efficient use of resources in agricultural sector in Thailand
Country / countries	Thailand
NDE focal point and organisation	Dr. Surachai Sathitkunarat National Science and Technology Innovation Policy office, Thailand
Proponent focal point and organisation	Prof. Morakot Tanticharoen National Science and Technology Development Agency (NSTDA), Thailand
Sector(s) addressed	**Adaptation: Agriculture**
Technologies supported	Hyper/Multi-spectral and thermal imaging Sensor technology Smart irrigation and fertigation Geoinformatics
Implementation period and total duration	September 2016-April 2018 (Response plan design + Implementation of the plan)
Total budget for implementation	USD 59,225
Designer of the response plan	**Asian Institute of Technology**
Implementer of response plan	**Asian Institute of Technology**

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 had three broad outputs: 1. Capacity building workshop on "Technology development for climate resilience and efficient use of resources in the agricultural sector in Thailand" during 26-30 September 2016 2. Workshop of selected researchers on "Piloting precision farming technologies in Thailand" on 27 December 2017 3. Workshop of Proposal Drafting Team of selected Thai researchers on "Resource-use efficiency for cassava production in Thailand" during 23-24 January 2018 The outputs resulted in the following deliverables, corresponding to each of the outputs: 1. A total of 56 mid-career researchers/professionals/practitioners mainly from Thailand were exposed to advanced technologies in Precision Agriculture 2. Workshop reports with key discussion-points that were used as input to the next phase 3. Identification of crop and corresponding intervention in light of the Thailand's national priorities, i.e. Irrigation in Cassava 4. A proposal of project on "Precision agriculture to increase productivity and improve water use efficiency – using cassava as a case study crop" – for possible submission to potential donors for funding to implement
Partners organisations	Asian Institute of Technology (Implementing organization) NSTDA (Recipient)
Beneficiaries	NSTDA
Methodologies applied to produce outputs and products	Capacity building workshops On-the-job mentoring
Deviations	A minor deviation was necessary in the final deliverables. Based on the request from the NSTDA, and subsequent endorsement from the NDE (i.e. STI, Thailand), an additional workshop was organized.
Achieved or anticipated gender benefits from the TA	Twenty female researchers were involved in the project (out of 56). Their technical and operational capacities with regards to precision agriculture and resource-use efficiency have been enhanced as a result of this TA.
Achieved or anticipated co-benefits from the TA	While this TA was focused on Cassava crop in Thailand, its outputs can be customized and scaled-up to other crops in the country.
Anticipated follow up activities and next steps	The NSTDA and STI will now explore to find additional funding for implementation of the Precision farming in Cassava. The project

	proposal developed, and enriched (through the inputs from International Experts) can be used for this purpose. After securing necessary resources, based on which appropriate interventions will be implemented (including the pilot project design) based on the outputs of this TA.

3. Lessons learnt

	Lessons learnt	**Recommendations**
Lessons learnt for this TA. Describe 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.)	The technical assistance implementation faced hurdles from time to time because of lack of clarity on the proponent's side with regards to some of the activities. It is important to flesh these out in detail as early as possible, and stick to these.	The role of the point of contact from the proponent's side is very crucial to ensure that the TA proceeds smoothly. Careful thought must be put into identifying this person.
Lessons learnt related to climate technology transfer Describe 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	• With a wide gamut of available technologies, it is important to identify the most appropriate technology (even if the most suitable is not the most elaborate or accurate) • One way to facilitate the sustainability of the TA outputs is to link it with a GCF proposal.	• Technology is a tool. In some contexts, simple technologies are more useful than sophisticated ones. • It will be worthwhile to link each TA to a GCF project proposal.
Lessons learnt related the CTCN process for TA	• The timelines for the TA are heavily dependent on in-country processes and activities carried out by local stakeholders.	• The CTCN should factor in the delay caused by in-country stakeholders in order to arrive at feasible dates of completion.

4. Illustration of the TA and photos

CTCN TA Activities

Activity 1

Capacity building workshop on "Technologies for efficient use of resources in Agricultural sector in Thailand"

Activity 2

Technical assistance in designing a pilot project based on the workshop outputs

CTCN TA Outputs and Results

Activity 1: Capacity building workshop

Workshop participants

Field visit

CTCN TA Outputs and Results

Activity 1: Capacity building workshop

AIT technical experts delivering the training for the capacity building programme

Pre-recorded video message by the CTCN Director

CTCN TA Outputs and Results

Activity 2(a): Designing a pilot project

Workshop-1 of Activity-2 with selected Thai experts with a task to identify design problem relevant to Thai agriculture

CTCN TA Outputs and Results

Activity 2(b): Designing a pilot project

International technical experts engaged in preparation of project proposal

Field visit to cassava research farm

5. Information for TA impact description

The information in the table below will be used 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	Agriculture plays an important role in Thailand. More than 40% of the labor force is engaged in the agricultural sector, which is heavily impacted by climate change. In the future the agricultural sector will further be impacted by

	extreme weather, resource scarcity and environmental degradation. Existing applied technologies may not be robust enough to cope up with the anticipate changes. Thus, technology development and technology transfer on the efficient use of resources are necessary for the agricultural sector to address climate change, to increase productivity, as well as to meet the sustainable productivity goal of the country
CTCN Assistance: 2 to 4 bullet points. Approximately 450 characters with spaces	• Conducting a capacity building workshop for a wide variety of stakeholders on the topic "Technologies for efficient use of resources in Agricultural sector in Thailand" • Support the proponent's team in the development of the design for a pilot project on precision agriculture
Anticipated impact: 2 to 4 bullet points to summarise anticipated impact. 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.	• The agriculture sector contributes around 53 Million Tonnes of CO_2 (2011 data) of GHG emissions. Precision farming technologies, as targeted in this assistance, lower fuel and energy use leading to less carbon dioxide production. It also involves optimizing nitrogen fertilizer use, thereby helping to reduce the amount of nitrous oxide released from the soil. This TA has a special emphasis on cassava production. Scientific studies[1] indicate that the estimated total GHG emissions of cassava starch production per year in Thailand are approximately 10, 500 MtCO2 eq. Precision farming technologies have the potential to reduce these by half to 5,250 $MtCO_2$ eq. • 40% of Thailand's labour force is engaged in agriculture, amounting to around 22 Million people. Successful scaling up of this TA has the potential to help these people to adapt to climate change Around 500,000 farmers cultivate cassava in Thailand. It can be estimated that one-fourth of them can start

[1] Usubharatana and Phungrassami (2015). Carbon footprint of cassava starch production in North East Thailand. Procedia CIRP 29 (2015): 462-467

	using precision farming amounting to 125,000 people.
Linkages and contribution to NDC: 2 to 4 bullet points. Approximately 350 characters with spaces	• This CTCN TA directly supports Thailand's NDC to "Safeguard food security through the guidance of Sufficiency Economy Philosophy e.g. an application of the New Theory in agriculture and land management to promote appropriate resource allocation and economic diversification… and promoting sustainable agriculture and Good Agricultural Practice (GAP)" • The NDC also cite Thailand's Technology Needs Assessment (TNA) report that has identified three highly impacted sectors in urgent need of adaptation technologies. One of these is Agriculture, in need of forecasting and early warning system technologies, crop improvement technologies, and precision farming technologies.
The narrative story: Approximately 1200 characters with spaces	On 30th November 2015, the National Designated Entity (NDE) of Thailand submitted a request to CTCN entitled "Technology development for climate resilience and efficient use of resources in the agricultural sector in Thailand". The request was made by the National Science and Technology Development Agency (NSTDA) of Thailand, which was routed through the Thai NDE. The request was accepted by the CTCN, and AIT was engaged to provide technical support. After several rounds of interaction between AIT and NSTDA, the scope of the technical assistance was defined fleshed out. The primary objective of the CTCN assistance in this context is to enhance the capacities of Thai stakeholders in the knowledge and application of agricultural technologies that will help better manage the allocation of resources required for optimal crop productivity. The CTCN assistance comprised of two main activities:

	• Conduction of a capacity building workshop with a range of in-country stakeholders on topics relevant to improving resource use efficiency through technological interventions. • Design of a pilot project to demonstrate real-time application of agricultural technologies for resources management.
Contribution to SDGs: Always include contribution to SDG 13, and to the extent possible, please include contribution to 2 other 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/	• The CTCN TA directly addresses SDG 13.1 by building capacities of national level and regional level government agencies in Thailand to help build resilience to climate-related hazards in the agricultural sector. • The capacity building activities under this CTCN TA also contribute to SDG 13.3, i.e. "Improve education, awareness-raising and human and institutional capacity on climate change mitigation". • Given that the overall objective of the TA is to improve the efficient use of resources in the agricultural sector, it has a direct bearing on SDG 2 (improving food security). • The CTCN TA has ensured the effective participation of women in the project. This contributes to SDG 5.

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

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

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

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.

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 technical assistance provided to counterparts or stakeholders by international experts and consultants	**110**	Precision agriculture expert (60) Capacity building experts (10) International consultants (10) Coordinator (30)
Number of active person-days (not full duration) of technical assistance provided to counterparts or stakeholders by national experts and consultants		
Number of for external communication and outreach activities conducted to showcase the assistance (news release, newsletters, articles on website, etc.)	**2**	The in-country stakeholders, through their internal communication channels, disseminated a brief event article of the training programme. AIT also did so through its social media channels. However no formal outreach conducted. CTCN published one news article related to the TA.
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		
Number of participants in the events above		
Number of national technology and knowledge sharing events	**2**	Workshops on "Piloting precision farming technology in Thailand' Workshop on "Resource use efficiency for cassava production in Thailand"
Number of participants in the events above	14 (1st workshop) 25 (2nd workshop)	Participants from • NSTDA • Burapa University • King Mongkut's University of Technology • Suranaree University

		• Digital Economy Promotion Agency • National Electronics and Computer Technology Center • National Center for Genetic Engineering and Biotechnology • VSN China and Biosci Thailand • Office of Agricultural Research and Development • DGI Production Co., Ltd. • Khon Kaen University
Number of public-private events related to technologies		
Number of participants in the events above		
3. Training and capacity building activities conducted during the assistance		
Number of training sessions and capacity strengthening activities	**1**	Capacity building programme on "Technology development for climate resilience and efficient use of resources in the agricultural sector in Thailand"
Number of people who received the training	**21 Core (and 25 Non-core)**	
Number of men	**12**	
Number of women	**9**	
Total number of organisations trained	**13**	• THAUS Co.,Ltd. • Nakhon Prathom Rajabhat University • Department of Fisheries • Mitr Phol Sugarcane Research Centre • Thailand Institute of Scientific and Technological Research • Khon Kaen University • Kasetsart University • Royal Irrigation Department • King Mongkut's Institute of Technology Ladkrabang • Suranaree University of Technology • Irrigation Development Institute of Technology • UbonRatchathani University

		• NSTDA
Number of research organisations, laboratories and universities	**9**	
Number of private companies	**2**	
Number of cities and local government	**2**	
Number of communities		
Number of ministries		
Number of specialised governmental institutions		
Number of non-profit organisations		
Level of satisfaction of participants after the training (from training feedback form). Categories include: From very satisfied, satisfied, partly not satisfied, not satisfied at all	**Very satisfied**	A detailed training evaluation can be found in the capacity building workshop report submitted as one of the deliverables.
Percentage of participants that increased their capacities thanks to the training (from training feedback form). Categories include: Significantly, very, moderately, to none.	**Significantly**	A detailed training evaluation can be found in the capacity building workshop report submitted as one of the deliverables.
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		
Number of technical reports strengthened, revised or created		
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		
Number of policies, strategies, and plans drafted addressing climate change mitigation		
Number of documents developed to inform other policies, strategies, and plans on climate change adaptation (sectoral strategies, national development plans, etc.)		
Number of documents developed to inform other policies, strategies, and plans on climate change mitigation (sectoral strategies, national development plans, etc.)		
Number of laws, agreements, or regulations drafted addressing climate change adaptation		

Number of laws, agreements, or regulations drafted addressing climate change mitigation		
Number of documents developed to inform laws, agreements, or regulations on climate change adaptation		
Number of documents developed to inform laws, agreements, or regulations on climate change mitigation		
6. Institutional strengthening supported by the assistance		
Number of institutional arrangements in place to coordinate near and long-term national adaptation plans (NAPs)		
Number of organisations with increased technical capacity to advance near and long term national adaptation plans (NAPs) which integrate EbA		
Number of organisations with increase awareness and knowledge among countries to better own and drive national adaptation planning processes		
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)		
Number of South-South collaboration enabled during or through the assistance, when stakeholders from other countries were involved in the assistance		
Number of North-South collaboration enabled during or through the assistance, when stakeholders from other countries were involved in the assistance		
Number of Triangular collaboration enabled during or through the assistance, when stakeholders from other countries were involved in the assistance		

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

CTCN standardised performance indicators	**Quantitative 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 mobilised (in USD) from the beneficiary country for climate change activities as a result of the TA				
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	The total project budget for a project proposal that is a deliverable of this technical assistance is THB27,485,000 (approx. USD833, 900.			The NSTDA has the project proposal ready (as a result of the CTCN assistance); which will be submitted by NSTDA to potential donor agencies for possible funding.
c)	Anticipated amount of private investment mobilised (in USD) from the beneficiary country for climate change activities as a result of the TA				
d)	Anticipated amount of private investment mobilised (in USD) from international and regional 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				
	Anticipated number of policies, strategies, plans, addressing climate change adaptation officially proposed, adopted, or implemented as a result of the TA.				
b)	Anticipated number of laws, agreements, or regulations addressing climate change				

mitigation officially proposed, adopted, or implemented as a result of the TA.				
Anticipated number of laws, agreements, or regulations addressing climate change adaptation officially proposed, adopted, or implemented as a result of the TA.				
c) Anticipated laws, policies, regulations, strategies and plans where climate change mitigation will be mainstreamed as a result of the TA				
Anticipated laws, policies, regulations, strategies and plans where climate change adaptation will be mainstreamed as a result of the TA				
18. Anticipated number of public-private partnerships created	1	The TA is expected to lead to the formation of an in-country network of practitioners with enhanced capacities in agricultural technologies required to manage resources judiciously	Up to a year	NSTDA
19. Anticipated twinning arrangements created as a result of the TA				
20. Anticipated number of technology projects prepared and implemented to support action on low emission and climate-resilient development	1	The TA is expected to herald new technological products and decision support systems are	Up to a year	NSTDA

		developed to manage agricultural resources efficiently.		
21. Anticipated number of strengthened National Systems of Innovation and technology innovation centres in recipient country				
22. Anticipated Clean Energy Generation Capacity Clean supported by the TA that has achieved financial closure				
23. Anticipated and projected GHG reductions. Quantity of greenhouse gas (GHG) emissions, measured in metric tons of CO_{2-e}, anticipated to be reduced or sequestered as a result of projects supported by the TA	5,250 $MtCO_2$ eq	This TA has a special emphasis on cassava production. Scientific studies[2] indicate that the estimated total GHG emissions of cassava starch production per year in Thailand are around 10, 500 MtCO2 eq. Precision farming technologies have the potential to reduce these by half.	Long-term	Ministry of Agriculture and Cooperatives Ministry of Energy Ministry of Science and Technology
24. Anticipated clean energy generation capacity supported by the TA that has achieved financial closure				
25. Anticipated and projected greenhouse gas emissions reduced or avoided through				

[2] Usubharatana and Phungrassami (2015). Carbon footprint of cassava starch production in North East Thailand. Procedia CIRP 29 (2015): 462-467

2030, in metric tons of CO_{2-e}, from adopted laws, policies, regulations, or technologies related to clean energy/sustainable landscapes as a result of the TA				
26. Anticipated number of people improving their livelihood as co-benefits as a result of the TA	125,000	40% of Thailand's workforce is engaged in agricultural occupations. Around 500,000 farmers cultivate cassava in Thailand. It can be estimated that one-fourth of them can start using precision farming amounting to 125,000 people.	Long-term	Ministry of Agriculture and Cooperatives Ministry of Energy Ministry of Science and Technology
27. Anticipated technology types effectively deployed in the country	3	Geo mapping Sensors and remote sensing Variable rate technology	Long-term	Ministry of Agriculture and Cooperatives Ministry of Energy Ministry of Science and Technology
28. Anticipated UNFCCC processes implemented as a result of the TA (NAMA, NAPA, NDC, etc.)				
29. Anticipated Technology Needs Assessments (TNA) and technology Action Plans (TAP) as a result of the TA				

30. Anticipated cooperative research, development and demonstration programmes within and between developed and developing country Parties facilitated as a result of the TA				
31. Anticipated improved climate change observation systems and related information management in developing country Parties.				

Feedback summary for workshop

Session	Excellent (5)	Good (4)	Fair (3)	Poor (2)	Very poor (1)	Total	Average
	จำนวน	จำนวน	จำนวน	จำนวน	จำนวน		
Plant phenotyping, density mapping and yield estimation	7	8	2	1	0	18	4.17
Hyper/Multi-spectral and thermal imaging	3	12	3	0	0	18	4.00
Sensor technology	3	13	1	1	0	18	4.00
Smart irrigation and fertigation	7	8	2	1	0	18	4.17
Geoinformatics	4	12	2	0	0	18	4.11
Overall เฉลี่ยรวม							**4.09**