MINISTRY OF ENVIRONMENT AND FORESTRY
DIRECTORATE GENERAL OF CLIMATE CHANGE
Manggala Wanabakti Building Block VII 12th Floor, Jalan Gatot Subroto – Senayan, Jakarta 10270
Phone : +62 21 5730144 Fax. : +62 21 5720194
Website :http ://ditjenppi.menlhk.go.id email : tusetditppi@gmail.com

Our ref : S.303 /PPI /MSAR/KLN.1 /10/2020 . Jakarta, 23 October 2020
Attachment : 1 (one) document
Subject : Request for Technical Assistance Indonesia NDE "Identification of Technical Practices for Climate-Smart Agriculture (CSA) in Indonesia

To:
Dr. Rose Mwebaza
Director, Climate Change Technology Center and Network (CTCN)
Marmorvej 51
Copenhagen 2100, Denmark

Dear Dr. Mwebaza,

Although it's been a year since your appointment as CTCN Director, allow me to congratulate you on your new position. As Director General for Climate Change at the Ministry of Environment and Forestry Indonesia, I am also Indonesian National Designated Entity for CTCN.

As you may know, at present we have a Technical Assistance Project supported by CTCN, i.e. "Support for e-mobility transition in Jakarta", and the project is ongoing. Recently we received another proposal from the Agency for the Assessment and Application of Technology Indonesia (BPPT), requesting technical assistance. The proposed request title is "Identification of Technical Practices for Climate-Smart Agriculture (CSA) in Indonesia.

The applicant has communicated with us and submitted a proposal and filled in the CTCN Request Submission Form. Please find enclosed the above mentioned proposal for CTCN consideration. The proposal from the Agency for the Assessment and Application of Technology Indonesia is in line with Indonesia's goal in energy efficiency in the agricultural sector and to achieve Indonesia's NDC targets, as well as Indonesia's target in food sufficiency.

We would also like to inform you that since 2017 we are in the process of developing Technology Needs Assessment and Capacity Building Needs Assessment documents, which are geared towards the achievement of our NDC. Therefore, all climate technology transfer and development, including TA's, will also be focused on NDC related priorities.

Thank you for your kind cooperation.

Yours sincerely,

Dr. Ruandha Agung Sugardiman,
Director General for Climate Change, and Indonesia NDE to CTCN
Ministry of Environment and Forestry Indonesia

CC.
1. Dr. Rajiv Garg, CTCN Regional Manager for Africa, West & Central Asia
2. Dr. Ir. Dudi Iskandar M. For. Sc, Director of Centre for Agricultural Production Technology, BPPT

CTCN
CLIMATE TECHNOLOGY CENTRE & NETWORK

CTCN Technical Assistance
Request Submission Form

Requesting country or countries:	Indonesia
Request title:	Identification of Technical Practices for Climate-Smart Agriculture (CSA) in Indonesia
NDE	Organisation: Ministry of Environment and Forestry Indonesia Contact person: Position: Director General of Climate Change Email: ndectcn.idn@gmail.com Telephone: +62 21 57902966; +62 21 5730144 Address: Manggala Wanabhakti Building, Block VII 12th Floor, Jalan Gatot Subroto, Jakarta, Indonesia
Request Applicant:	Organisation: Agency for the Assessment and Application of Technology Contact Person: Dr. Ir. Dudi Iskandar M. For. Sc Position: Director of Centre for Agricultural Production Technology Email: dudi.iskandar@bppt.go.id Address: LAPTIAB Building, Kawasan PUSPIPTEK, Tangerang Selatan, Banten 15343, Indonesia

Climate objective:

- ☐ Adaptation to climate change
- ☐ Mitigation of climate change
- ☒ Combination of adaptation and mitigation of climate change

Geographical scope:

- ☐ Community level
- ☐ Sub-national
- ☒ National
- ☐ Multi-country

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

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

Agricultural production accounts for 12.9 % of Indonesia's gross domestic product and 43.3 % of total employment (BPS-Statistics Indonesia, 2008). However, Indonesia's agriculture has faced some challenges such as reduction of arable land and climate change on the one hand, and the fast-growing population on the other hand. As an archipelagic country, Indonesia has a high risk resulting from the impacts of climate change. Climate change poses one of the most serious risks to food and nutrition security in Indonesia, especially for subsistence farming, and by year 2050, total rainfall in Indonesia is expected to increase on average by nearly 10% from April through June, but decrease by 10% to 25% from July through September. Climate change will have impacts on food security, environmental degradation and increase of poverty. Furthermore, results from a number of studies have indicated that climate change could result in a 9% to 25% reduction in farm level net revenue in Indonesia in the future. The incidence of food deficit is already reported in South Sumatera, Lampung, East Kalimantan, and Papua, whereas the incidence of lack of water availability occurred in Bali and West Nusa Tenggara.

According to the report by the Ministry of Foreign Affair (2018), climate change will affect water

availability and food security through sea water intrusion, reduction of river flow, reduction of rainfall and increase of temperature which triggers more crop pests and disease, higher risk of crop failure, reduction of food production due to severe flood and drought, reduction of rice production due to reduced number of cold night during planting season, harder crops and seeds preservation during unpredicted and sometimes intense rainfall, frequent fluvial flooding, and increasing number of tropical cyclones (in certain areas). Centre for Agricultural Data and Information System, Secretariat General, Ministry of Agriculture Indonesia (2015) have reported that 141.044,53 ha of paddy, 3.300,04 ha of maize, 2.031,00 ha of soybean planting area were damaged by flood in 2012-2014, while 35.423,45 ha of paddy, 2.306,32 ha of maize, and 394,50 ha of soybean area were damaged by drought. Some researchers have published that the decrease in food production due to rainfall change in 2050 compared to current condition is predicted to be as follows: rice (-4.6%), maize (-20%), soybean (-65.2%), sugar (-17.1%) and palm oil (-21.4%).

In response to the impacts of climate change, agricultural production and food systems need to undergo adaptation and mitigation measures. Food producers will have to adapt their farming system techniques in the context of new climate conditions, and increasingly limited natural resources, while at the same time reducing GHG emissions. Indonesian Agricultural Environment Research Institute claims that climate-smart agriculture (CSA) is a prospective technology. This technology promotes a realistic adaptation and mitigation efforts to be applied in a potential area for agricultural production. Climate-smart agriculture methods and technologies will offer solutions for mitigation and adaptation in response to climate change while achieving more sustainable productivity. Climate-smart agriculture technology investments improve productivity and profits for agribusinesses and their value chains while decreasing greenhouse gas emissions from land use, improving management of ecosystem services and increasing the resilience of productive systems. They are based on increasing agricultural output while maintaining the same or even lower amounts of inputs per unit, enhancing the environmental impact and building resilience to climate change and other production threats.

One of the CSA implementation technology is smart farming system. The use of smart farming technology in agricultural production will offer great potential for improving efficiency, effectiveness and productivity. This means enabling economically-viable and environmentally-friendly decision-making. The application of precision agriculture or smart farming method would be a potential solution for various problems impacted by climate change in agriculture. Application of smart farming system would give more precise treatment towards every part of land, so that it can increase the productivity level by increasing the yield, decreasing production cost and reducing environmental effect.

Through this CTCN Technical Assistance project, it is expected that basic information on current status, supply and demand of climate smart agriculture system for the adaptation of climate change effect on agricultural production in Indonesia can be gained. Besides, information on the implementation or new innovation technology of ICTs application in agriculture among stakeholders in research, education, innovation, industry and farming will also be collected.

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

Some projects have been implemented to reduce the impacts of climate change in Indonesia. The previous projects were held in the form of training, education program and study of public awareness with regards mitigation and adaptation action, development of renewable energy, development of best practices in agriculture and natural resources sectors and assessment of mitigation technology in reducing greenhouse gas emission from agricultural production.

However, application of smart farming technology is not fully explored as one of the solutions to overcome climate change effect to agricultural production.

Due to climate change issue, achievement of climate resilience through the implementation of National Plan for Climate Change Adaptability, will be conducted through the use of geospatial data, information and automation as a part of smart farming practices. This is in accordance with the Ministry of Industry's program "Making Indonesia 4.0" as an integrated roadmap to be implemented for the Industrial Revolution 4.0. The roadmap requires collaborative actions among multiple stakeholders consisting of governmental institutions, associations, industry and academic components.

In the National Mid-Term National Plan 2020-2024, the National Planning Agency (BAPPENAS) stated that one of the objectives of economic resources management strategies is to increase the availability, access and quality of food consumption, maintain the productivity and sustainability of adaptive agricultural resources with regards to climate change, agricultural digitalization, land management and irrigation. It is also mentioned the application of advanced technology especially in relation to industry 4.0 in some sectors; one of them is for increasing the efficiency, productivity and competitiveness of agriculture sector. The Agriculture 4.0 can play a key part in solving the food scarcity issue. The Indonesian government introduced the "Smart farming 4.0" in September 2018. The initiative was led by the Indonesian Ministry of Rural Development, with a pilot project in Situbondo, East Java.

Agricultural production varies widely across places and climate change affected each area specifically. Therefore, identification and dissemination of a climate-smart agricultural technology approaches is urgently needed. Indonesian government through The Ministry of Agriculture has published general guidelines of climate change adaptation in the agricultural sector (Pertanian 2011). However, the policy still lacked the details and will be difficult to implement.

The concept of CSA in Indonesia is still in the formulation process, conducted by the Ministry of Agriculture and CIAT (International Center for Tropical Agriculture), funded by the World Bank. The concept will cover the whole agricultural condition in Indonesia, starting from value chain, agriculture system, sensitive geographical areas which are affected by climate factors. Adaptation strategy should also be assessed by revealing program intervention and institution capacity effect on adaptation option that should be able to reduce agricultural risk and climate vulnerability (flood, drought, storm).

Some CSA technologies practices that could be conducted in addressing adaptation and mitigation of climate change in agriculture sector are the application of smart farming technologies in agriculture production, development of integrated crop-livestock system, improvement of food security through crop diversification, development and introduction of drought, flood and saline tolerant crops, improvement of water regime, application of matured animal manure to improve soil fertility and soil C sequestration, introduction of rice and other crops variety with low CH_4 emission potential, and avoidance of biomass burning for manure. Furthermore, the use of ICTs in agriculture offers great potential for improving efficiency, effectiveness and productivity under climate change adaptation. The application of ICTs in agriculture such as precision agriculture or smart farming method would be potential as an alternative solution for various problems in the Indonesian agricultural sector due to the impact of climate change.

Specific technology[1] barriers (up to one page):

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

Smart farming technology offer more opportunities for more precise treatment toward every parts of land, so that it can increase the productivity level by increasing product, decreasing production cost and reducing environmental effect. However, smart farming technology in Indonesia is still in an early stage development. The implementation and dissemination of this technology are facing some obstacles. Important barriers in implementing the smart farming technologies in Indonesia are insufficient of information, knowledge and skill, public awareness, financial support, policy and market. The lack of knowledge and skill in implementing smart farming technology mainly consisted of facility installment, preparation, application and post production maintenance. Furthermore, its application requires a concerted effort of government, investors, and innovative agricultural technologies because farms and agricultural operations will have to be run very differently, primarily due to advancements in technology including sensors, devices, machines, and information technology.

Another important barrier is social awareness. Community awareness of climate change and the implementation of smart farming technology as one of the alternative technologies to overcome climate change effect on agriculture in Indonesia is still limited. Therefore, promotion of climate smart agriculture should be enhanced which is expected to be adopted by the society widely. The adoption of this technology will support food sufficiency and will be able to solve the problem through the application of smart farming technology that can be controlled automatically and monitored in a real time.

Investment in Smart farming technology is another important barrier. Investment in smart farming technology is long-term and require additional working capital, which is often unable to be fulfilled by farmer and agricultural companies. Project revenue for such investments will be achieved over years and requires longer loan tenors than usual. Specific governmental support and regulation on smart farming implementation, one of them in supporting investment of this technology practices will be beneficial for enhancing the increase of agricultural production even when the effects of climate change still occurs.

Sectors:

Please indicate the main sectors related to the request:

☐ Coastal zones	☒ Early Warning and Environmental Assessment	☐ Human Health	☐ Infrastructure and Urban planning
☐ Marine and Fisheries	☒ Water	☒ Agriculture	☒ Carbon fixation
☐ Energy Efficiency	☐ Forestry	☐ Industry	☐ Renewable energy
☐ Transport	☐ Waste management		

Please add other relevant sectors:

Cross-sectoral enablers and approaches:

Please indicate the main cross-sectoral enablers and approaches

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

CTCN
CLIMATE TECHNOLOGY CENTRE & NETWORK

CTCN Technical Assistance
Request Submission Form

Technical assistance requested (up to one page):

The project requests the CTCN technical assistance on:

- Analysis of the structure of value chain in agriculture, key players and existing Climate-Smart Agriculture(CSA) initiatives in Indonesia
- Survey of international best practices on CSA application
- Identification of the potential options of smart solution in each segment of the value chain and analysis of their benefits, weaknesses, opportunities and challenges in Indonesia
- Analysis of the potential implications of CSA models on "Making Indonesia 4.0"
- Identification and development of potential Climate-Smart Agriculture(CSA) projects prioritizing smart farming technologies

Expected timeframe:
12 months

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

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

- Women can be powerful agents of change and leaders in promoting the smart farming technology as men did.
- Application of smart farming technology will significantly reduce the ecological destruction and loss of biodiversity.
- The use of smart farming technology in agricultural production offer great potential for improving efficiency, effectiveness and productivity which will be able to elevate better economy, social and culture.

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

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

Key stakeholders:

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

Stakeholders	Role to support the implementation of the technical assistance
National Designated Entity (Directorate General of Climate Change, Ministry of Environment and Forestry)	Manage the national submission process of technical assistance requests to the CTCN; monitor the implementation and evaluate the project

Request Applicant (Agency for The Assessment and Application of Technology)	Analysis of environmental and agricultural vulnerability in Indonesia, assessment of CSA technology demands and current situation in Indonesia, survey of smart farming technology demands and current conditions including level of technology, awareness level and related financing in Indonesia works closely with the NDE to provide CSA technical assistance and ensure coordination at the national and local levels, identify/mapping the key stakeholders and program at national level
Bogor Agricultural University (IPB), LIPI, BATAN	Provide data and information related to CSA practices and development
Indonesian Agency for Agricultural Research and Development, Ministry of Agriculture	Provide data and information related to CSA practices and development
Local governments, local farmers community	Provide data and information related to CSA practices and development

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

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

Indonesia has identified that smart farming technology could be applied as one part of the CSA practices and aligned with national adaptation and mitigation action plan, as follow:

- Indonesia Mid-Term National Plan 2020-2024 (Indonesia's National Development Planning Agency - BAPPENAS).
- National Action Plan for Climate Change Adaptation (RAN-API) 2014 as part of Indonesia Mid-Term National Plan 2015-2019 (Indonesia's National Development Planning Agency - BAPPENAS).
- Indonesian Ministry of Agriculture (MoA) Strategic Plan 2015-2019 (Ministry of Agriculture).
- Policy Recommendations on Agriculture Development and Investment in Indonesia for 2020–2045 (Ministry of Agriculture)
- National Research Priorities 2020-2024 (Ministry of Research and Technology /National Agency for Research and Innovation)
- 'Making Indonesia 4.0', as an integrated roadmap to implement a number of strategies to enter the Industrial Revolution 4.0 (Ministry of Industry).
- National Action Plan for Green House Gas 2011 ((Indonesia's National Development Planning Agency - BAPPENAS).

Reference document (please include date of document)	**Extract** (please include chapter, page number, etc.).
Nationally Determined Contribution (NDC)	Supports NDC Republic of Indonesia for sustainable food production. Particularly, food production from agriculture. (Page 1 and 3)
National Adaptation Plans	Supports National Adaptation Plans in sub-sector of Food Security

for Climate Change Adaptation (RAN-API) (2012)	such as adjustment of food production system to climate change and variation, development of innovative and adaptive technology, and development of information and communication system. (Chapter 4.1.1., Page 41)
Climate change adaptation strategies for Indonesia	http://www.onlynaturalenergy.com/2018/02/climate-change-adaptation-strategies-for-indonesia/
Indonesia Mid-Term National Plan 2020-2024	Building environment, increasing resilience on disaster and climate change was stated as 1 of 7 development agenda in 2020-2024 (page 5, 18-22, 38-39, chapter 7)
Nationally Appropriate Mitigation Actions	Government of Indonesia formed the National Council on Climate Change (DNPI) through Presidential Regulation No.46/2008 in an effort to respond to institutional problems handling climate change. The main duties of the DNPI are to: (i) formulate national policy related to climate change, (ii) coordinate climate change mitigation activities consisting of adaptation, mitigation, technology transfer and funding, (iii) formulate a policy mechanism for carbon trading, (iv) perform monitoring and evaluation of climate control policy, (v) strengthen Indonesia's position in encouraging developed counties to be more responsible for climate change control.
Add others here as relevant	

Development of the request (up to 2000 characters including spaces):

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

The request was submitted directly by The Agency for the Assessment and Application of Technology Indonesia to the Director General of Climate Change, Ministry of Environment and Forestry Indonesia as National Designated Entity.

In 2018 Korea Climate Technology Conference in Seoul, July 18-21, 2018, BPPT Director of Agricultural Production Technology got informed about CTCN and its TA Program through Indonesian NDE invited to that event. Later that year, BPPT Deputy of Agroindustry and Biotechnology and Director of Agricultural Production Technology visited Korea Institute of Science and Technology (KIST) Gangneung Branch, which conducts research on smart farming solution. During this visit, potential application of smart farming in Indonesia to answer the climate challenge is discussed between the two research institutions.

Background documents and other information relevant for the request:

- *Please list all relevant documents that will help the CTCN analyze the context of the request and national priorities. Please note that all documents listed/provided should be mentioned in this request in the relevant section(s), and that their linkages with the request should be clearly indicated. For each document, please provide web-links (if available) or attach to the submission*

form. Please add any other relevant information as required.

- *Please indicate if this request has been developed with the support of the CTCN Request Incubator.*

Indonesia's Technology Needs Assessment for Climate Change Adaptation 2012:
https://unfccc.int/ttclear/misc_/StaticFiles/gnwoerk_static/TNR_CRE/e9067c6e3b97459989b2196f12155ad5/eb57eb84801249d6ab4a9beb937cbd5d.pdf

Indonesia's Technology Needs Assessment for Climate Change Mitigation 2012:
https://unfccc.int/ttclear/misc_/StaticFiles/gnwoerk_static/TNR_CRE/e9067c6e3b97459989b2196f12155ad5/621d32b1f9704764be63a9e8004d176e.pdf

OPTIONAL: Linkages to Green Climate Fund Readiness and Preparatory Support

The CTCN is collaborating with the GCF in order to facilitate access to environmentally sound technologies that address climate change and its effects, including through the provision of readiness and preparatory support delivered directly to countries through their GCF NDA. These actions are in line with the guidance of the GCF Board (Decision B.14/02) and the UNFCCC, particularly paragraphs 4 and 7 of 14/CP.22 that addresses Linkages between the Technology and the Financial Mechanisms[2].

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

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

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

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

NDA name:

Date:

Signature:

Monitoring and impact of the assistance:

By signing this request, I affirm that processes are in place in the country to monitor and evaluate the technical assistance provided by the CTCN. I understand that these processes will be explicitly identified

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

in the CTCN Response Plan and that they will be used in the country to monitor the implementation of the technical assistance following standard CTCN procedures.
I understand that, after the completion of the requested assistance, I shall support CTCN efforts to measure the success and effects of the support provided, including its short, medium and long-term impacts in the country.

Signature:	
NDE name:	
Date:	
Signature:	

THE COMPLETED FORM SHALL BE SENT TO THE CTCN@UNEP.ORG
The CTCN is available to answer all questions and provide guidance on the application process.