

Please fill in the form in the grey spaces, by following the instructions in italic.

<b>Requesting country:</b>	Thailand
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<b>Request title:</b>	High resolution regional climate model projections for Thailand
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<b>Contact information:</b>		
<i>{Please fill in the table below with the requested information. The request proponent is the organization that the request originates from, if different from the National Designated Entity (NDE).}</i>		
	<b>National Designated Entity</b>	<b>Request Applicant</b>
Contact person:	Mr. Surachai Sathitkunarath	Mr. Chakrit Chotamonsak
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<b>Technology Needs Assessment (TNA):</b>
<i>{Select one of the three boxes below.}</i>
<input checked="" type="checkbox"/> <b>The requesting country has conducted a TNA in 2012</b>
<input type="checkbox"/> <b>The requesting country is currently conducting a TNA</b>
<input type="checkbox"/> <b>The requesting country has never conducted a TNA</b>
<i>{If the requesting country has completed a TNA, please indicate what climate technology priority this request directly relates to. Please indicate reference in TNA/TAP/Project Ideas.}</i>
<b>Adaptation modeling sector - According to the technology prioritization process, the national data centre ranked the highest among the technologies in the hardware category</b>

<b>CTCN Request Incubator Programme:</b>
<i>{Please indicate if this request was developed with support from the Request Incubator Programme:}</i>
<input type="checkbox"/> Yes
<input checked="" type="checkbox"/> No

**Geographical focus:**

*{Select below the most relevant geographical level for this request:}*

- Community-based
- Sub-national
- National
- Multi-country

*{If the request is related to the sub-national or multi-country level, please indicate here the areas concerned (provinces, states, countries, regions, etc.)}*

**Theme:**

*{Select below the most relevant theme(s) for this request:}*

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

**Sectors:**

*{Please indicate here the main sectors related to the request. e.g. energy, industry, transport; waste, agriculture/fisheries, forestry, water, ecosystem/biodiversity, coastal zones, health, education, infrastructure/human settlement, tourism, businesses, early warning/disaster reduction, institutional design and mandates, cross-sectorial}*

Cross-sectorial - The affected sectors include the climate sector, water resource management sector, natural disaster sector, transportation sector, industrial sector, energy sector, agriculture sector, social sector, economic sector, and health sector. Special attention is placed on the water resource management and agricultural sectors

**Problem statement (up to one page):**

*{Please describe here the difficulties and specific gaps of the country in relation to climate change, for which the country is seeking support from the CTCN. Please only provide information directly relevant to this request, and that justifies the need for CTCN technical assistance.}*

A growing body of empirical evidence suggests that climate change is likely to impact the agriculture and water resource management sector in Thailand significantly. The areas of concern include: reliability of water supply, the risk of flooding and droughts, impacts on health, agriculture, energy and aquatic ecosystems. Thailand is one of the world's major food exporters. It continues to rely heavily on rainfall as a major factor in the planning and management of irrigation projects and crop yields. The agricultural sector takes up 70% of the nation's total water supply. Hence, any climate change, especially in terms of overall precipitation levels and distribution patterns, carries huge consequences for the agricultural sector.

A key challenge for effective agriculture and water resource management in Thailand is the lack of adequate regional climate models, collection, and distribution of spatial and temporal meteorological and hydrological data. Thus, medium- to long-term plans and strategies toward climate change adaptation are difficult to initiate. As meteorological uncertainties increase further due to climate change, it is even more important for Thailand to set up a climate data centre.

The climate data center contains the essential hardware, regional climate projections, a large collection of data from various relevant and creditable sources. In addition, it also serves as a data distributor to users and organizations that can benefit from using the network. Without a reliable data center, it is difficult to obtain a meaningful modeling result. Because modeling climate change impacts can be useful for the adaptation of various sectors, ranging from the climate sector to the health and

economic sectors, an integrated data center is highly desirable. Such a data center would make it easy for users to access all of the data required for cross-sectoral modeling efforts. Although Thailand has a few data centers, these data centers only store data dedicated to specific purposes to comply with the authority and responsibilities of their corresponding governmental agencies, making it more difficult to obtain data for cross-sectoral modeling efforts. In other words, unlike several other countries, Thailand does not have an integrated national data center. The benefits of having a national data centre include enhancing the efficiency of domestic and international data collection and exchange, providing a data network for all the stakeholders and responsible parties, and serving as an official information distributor to all the stakeholders and responsible agencies. A national data centre can promote both data collection, data application, and research in the short term and long term.

Yet, there are several barriers that Thailand has to overcome with the assistance from CTCN. The barriers include both human capacity barrier such as the lack of skilled climate modelers and technology barrier such as the lack of an effective regional climate models as the existing database is inadequate and outdated. Even though some institutions are trying to collect climate data for their own modeling purposes, the institutions lack a central data centre to connect their data through a well-established network.

**Past and ongoing efforts** (*up to half a page*):

*{Please describe here past and on-going processes, projects and initiatives implemented in the country to tackle the difficulties and gaps explained above. Explain why CTCN technical assistance is needed to complement these efforts, and how the assistance can link or build on this previous work.}*

Currently, Thailand has several data centres with specific purposes corresponding to their institutions/governmental agencies. However, Thailand does not have a national climate data centre like other countries.

Some of the past and ongoing data/modeling centres include (but are not limited to):

1. Cooperation between King Mongkut's University of Technology Thonburi and Thai Meteorological Department (Climatological Center) :
  - Investigation & development of a weather forecasting model in Thailand in 2009
  - Not successful at forecasting rainfall accurately, but received acceptable results for temperature forecasting
2. Chiang Mai University :
  - Weather simulation of the impacts of active Southwest monsoon in 2009
  - Developed an accurate Numerical Weather Prediction model for its region
  - Climate change simulations for Thailand and SE Asia using regional climate models
3. Thailand's National Disaster Warning Center Thailand (NDWC):
  - NDWC under Climate Risk Management Program of Asia Disaster preparedness Center (ADPC) has been working with Danish International Development Agency (DANIDA) by sharing weather/climate data
4. Meteorological Department is receiving these data to forecast typhoons, land slide, and flood with more precision
5. Thai Research University Network for Climate Change and Disaster Management (RUN-CCDM)
  - To understand interactions and key processes of climate change and disaster system components
  - To build models and database to predict dynamics of climate change and disaster management
  - To manage resources with society for better adaptation and mitigation based on efficient options by models and database

To educate next generations of scientists, professionals and society with research and outreach experiences

**Assistance requested (up to one page):**

*{Please describe here the scope and nature of the technical assistance requested from the CTCN and how this could help address the problem stated above and add value vis-à-vis the past and on-going efforts. Please note that the CTCN facilitates technical assistance and is not a project financing mechanism.}*

This request requires CTCN assistance for the following components:

- Technical assessments
- Tools and methodologies
- Capacity building

The CTCN assistance is required to undertake the following activities:

1. Perform the technical assessments to select the appropriate instruments, models, and scope, for the NCDC: The CTCN is requested to provide technical expertise and help identifying the knowledge and data gaps, capacity development needs as well as relevant instruments (e.g. methods, models, data sources) that will be used to develop the climate database, models, and adaptation strategies. The NCDC, in this context, accounts for both meteorological and hydrological variables. Furthermore, the data of the NCDC are to be distributed for effective management of water resource management and agriculture sector. Hence, the centre will be expected to address a range of functions, which may include (but not limited to):

- Regional climate downscaling
- Regional/local climate phenomena, their variability and changes
- Seasonal climate predictions
- Climate data service for a variety of applications
- Hydrological modeling
- Land surface modeling (to better understand the role of land surface processes on climate)
- Irrigation and crop modeling

2. Provide tools and methodologies for downscaling climate based on the outcomes of the technical assessments. It is expected that the framework will:

- Outline a clear approach for climate downscaling techniques, collecting the data, and its subsequent handling, for the various predictions, at different scales (both temporal and spatial)
- Provide definitive technical guidelines on the use of modeling instruments
- Provide grid computing (high performance computing facility) for regional climate downscaling
- Establish a mechanism for continuous monitoring and storage of the information
- Make provisions for reporting the relevant information to all stakeholders and the general public through online portals and websites
- Outline a strategy for dynamic improvement of the system to take into account more pertinent issues as they arise.

3. Build capacities of staffs from the agency managing the NCDC and other concerned agencies, in collection and distribution of climate data, preparing them to use and apply the data to climate models and adaptation strategies effectively. The training will be provided for the technical and managerial issues established in the feasibility study and the methodological framework.

It is desired that this capacity building exercise will upgrade the participants' knowledge, both theoretical and practical, regarding the implications of climate change and its potential impacts on water resources and agriculture. Furthermore, it will equip them with fluency in using state-of-the-art technological tools and methods required to develop, monitor and sustain the NCDC.

To summarize, the methods for this assistance from the CTCN could include (but not limited to):

- Technical assistants: technical expertise in climate downscaling techniques, seasonal climate forecasts, land surface models, hydrological models, and crop yield models.
- Tools and methodologies: grid computing (high performance computing facility) for downscaling climate data and downscaling techniques
- Human capacity building: knowledge/resource exchanges and tutorials/trainings/workshops

**Expected benefits (up to half a page):**

*{Please outline here the medium and long-term impacts that will result from the CTCN technical assistance, including how the assistance will contribute to mitigate and/or adapt to climate change.}*

**Medium-term:**

- Provide invaluable data for the forecasting and early warning systems of the agriculture sector
- Synergize with the precision farming in agriculture sector
- Complement the seasonal climate prediction in water resource management sector.

**Long-term:**

- Raise Thailand as the hub of climate change knowledge and technology in the region
- Enhance the efficiency of domestic and international weather and climate data collections and exchange
- Provide a data network for all stakeholders and serve as an official information distributor to all stakeholders and agencies
- Recommend the climate mitigation strategies to tackle climate issues with higher precision

**Post-technical assistance plans (up to half a page):**

*{Please describe here how the results of the CTCN technical assistance will be concretely used by the applicant and national stakeholders, to pursue their efforts of resolving the problems stated above after the completion of the CTCN intervention (list specific follow-up actions that will be undertaken).}*

- Application of the climate data and models in the development of climate adaptation and mitigation strategies
- Integrate obtained data into agriculture and water resource management sectors
  - *Agriculture:* According to the agriculture sector's TNA, two of the three technology needs for the sector will greatly benefit from the NCDC. These technologies are precision farming technologies and forecasting & early warning systems. For climate mitigation, farmers will be able to utilize the models that NCDC develops to conduct precision farming and maximize their resource use efficiency. While for adaptation, the climate data and models from the NCDC will be invaluable components to both the pest outbreak and weather forecasting systems.
  - *Water Management:* The recurring extreme droughts and floods in Thailand are currently disastrous because of the lack of adequate data and models to guide experts when they're devising water management plans. Climate data from NCDC will assist the water-resource management sector by significantly improving the seasonal climate prediction system. This does not only allow for effective dam regulation, but also for the development of climate adaptation strategies.

**Key stakeholders:**

*{Please list in the table below the main stakeholders who will be involved in the implementation of the requested CTCN technical assistance, and what their role will be in supporting the assistance (for example, government agencies and ministries, academic institutions and universities, private sector, community organizations, civil society, etc.). Please indicate what organization(s) will be the main/lead counterpart(s) of CTCN experts at national level, in addition to the NDE.}*

<b>Stakeholder</b>	<b>Role to support the implementation of the assistance</b>
Chiang Mai University	Implementing agency (making arrangements for training)
Thai Meteorological Department, Ministry of Information and Communication Technology (Government agency)	Support in providing specific technical inputs
Thailand Research Fund (Government agency)	Support in providing specific technical inputs
National Science and Technology Development Agency, Ministry of Science and Technology (Government agency)	Participate, and contribute, in the training workshop
Geo-Informatics and Space Technology development Agency (Public organization), Ministry of Science and Technology (Government agency)	Participate, and contribute, in the training workshop
Hydro and Agro Informatics Institute, Ministry of Science and Technology (Government agency)	Participate, and contribute, in the training workshop
The Royal Irrigation Department, Ministry of Agriculture and Cooperatives (Government agencies)	Participate, and contribute, in the training workshop
Department of Agriculture, Ministry of Agriculture and Cooperatives (Government agencies)	Participate in the training as beneficiaries.
Department of Groundwater Resources, Ministry of Natural Resources and Environment (Government agencies)	Participate in the training as beneficiaries.
Department of Disaster Prevention and Mitigation, Ministry of Interior (Government agencies)	Participate in the training as beneficiaries.
Department of Water Resources, Ministry of Natural Resources and Environment (Government agencies)	Participate in the training as beneficiaries.
Private Sector	Participate in the training as beneficiaries.

**Alignment with national priorities (up to half a page):**

*{Please demonstrate here that the technical assistance requested is consistent with documented national priorities (examples of relevant national priorities include: national development plans, poverty reduction plans, technology needs assessments (TNAs), LEDS, NAMAs, TAPs, NAPs, sectorial strategies and plans, etc.). For each document mentioned, please indicate where the priorities specifically relevant to this request can be found (chapter, page number, etc.)}*

In recent years, Thailand has begun to mainstream 'climate change' into all its major policies from different ministries e.g.

- The 1<sup>st</sup> National Science Technology and Innovation Policy and Plan 2012 – 2021 (Ministry of Science and Technology) [Thai version]
- The 2<sup>nd</sup> National Strategy on Climate Change Management 2014 – 2018 (Ministry of Natural Resources and Environment) [Thai version]
- Climate Change Master Plan 2015 – 2050 (Ministry of Natural Resources and Environment) [Thai version]
- Research Strategy on Climate Change 2013 – 2016 (National Research Council of Thailand) [Thai Version]

Thailand's TNA has modeling as one of the three prioritized sectors for climate change adaptation. Moreover, the development of the database and climate models synergizes directly with the TAP of the other two prioritized sectors of water resource management and agriculture (Thailand Technology Needs Assessments for Climate Change: Adaptation, 2012)

**Development of the request (up to half a page):**

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

This proposal was initiated by National Science Technology and Innovation Policy Office (STI) as national policy office based of the project idea of TNA in Modeling sector. The development of this proposal was supported by National Science Technology and Innovation Policy Office (STI) as Thailand NDE.

The stakeholders involved are Thai Meteorological Department (TMD), Thailand Research Fund (TRF), National Science and Technology Development Agency (NSTDA), Hydro and Agro Informatics Institute (HAI), National Astronomical Research Institute of Thailand (NARIT), National Research Council of Thailand (NRCT), Chulalongkorn University (CU), King Mongkut's University of Technology Thonburi (KMUTT), Chiang Mai University (CMU), Prince of Songkla University (PSU) and STI. Some consultations have been conducted among the stakeholders during the development of this proposal. This proposal was reviewed by the technical team of the Thailand NDE that consists of related stakeholders and was approved by the head of NDE through steering committee meeting.

**Expected timeframe:**

*{Please propose here a duration period for the assistance requested.}*

The project will be accomplished within 6 (six) months of its initiation.

**Background documents:**

*{Please list here relevant documents that will help the CTCN understand the context of the request and national priorities. For each document, provide weblinks if available, to attach to the submission form while submitting the request. Please note that all documents listed/provided should be mentioned in this request in the relevant question(s), and that their linkages with the request should be clearly indicated.}*

Thailand Technology Needs Assessments for Climate Change: Adaptation, 2012  
[http://unfccc.int/ttclear/templates/render\\_cms\\_page?TNR\\_cre](http://unfccc.int/ttclear/templates/render_cms_page?TNR_cre)

**Monitoring and impact of the assistance:**

*{Read carefully and tick the boxes below.}*

By signing this request, I affirm that processes are in place in the country to monitor and evaluate the assistance provided by the CTCN. I understand that these processes will be explicitly identified in the Response Plan in collaboration with the CTC, and that they will be used in the country to monitor the implementation of the CTCN assistance.

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: Mr. Surachai Sathitkunarath

Date: Nov 25, 2015

Signature: 

**THE COMPLETED FORM SHALL BE SENT TO THE [CTCN@UNEP.ORG](mailto:CTCN@UNEP.ORG)**

*Need help? The CTCN team is available to answer questions and guide you through the process of submitting a request. The CTCN team welcomes suggestions to improve this form.*

*>>> Contact the CTCN team at [ctcn@unep.org](mailto:ctcn@unep.org)*