CTCN
CLIMATE TECHNOLOGY CENTRE & NETWORK

CTCN Technical Assistance
Request Submission Form

2Please fill in the form in the grey spaces, by following the instructions in italic.

Requesting country:	Thailand

Request title:	Urban Flood – Early Warning System

Contact information:

{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).}

	National Designated Entity	Request Applicant
Contact person:	Dr. Surachai Sathitkunarat	Mr. Sunsern Rueangrit
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Technology Needs Assessment (TNA):

{Select one of the three boxes below:}

☒ *The requesting country has conducted a TNA **in 2012***

☐ *The requesting country is currently conducting a TNA*

☐ *The requesting country has never conducted a TNA*

{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.}

There are totally six priority technologies need for climate adaptation in Thailand Technology Needs Assessments Report for Climate Change: Adaptation (2012). Urban flood management in Integrated Urban Water Resources Management (IUWRM) and early warning are two technologies related to their ranking are based on impact assessment and capacity assessment jointed criteria. All technologies require external funding /technology transfers.

CTCN Request Incubator Programme:

{Please indicate if this request was developed with support from the Request Incubator Programme:}

☐ *Yes*

☒ *No*

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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.)}

Bangkok, Thailand.

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}

Transport, Water, Health, Infrastructure, Early Warning, Disaster reduction

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.}

Bangkok, being a coastal megacities will flood more often, on a larger scale, and affect millions more people, if current climate change trends continue. The report *Climate Risks and Adaptation in Asian Coastal Megacities* examines the impact of climate change on Bangkok, Ho Chi Minh City, and Manila, under a range of different scenarios through to 2050. The report is the product of a two-year collaborative study by the Asian Development Bank (ADB), the Japan International Cooperation Agency (JICA) and the World Bank.

The report finds that costs from major flooding events on infrastructure and the economy could run into the billions of dollars, with urban poor populations likely to be the hardest hit. It concludes that all three cities need to take **targeted, city-specific and innovative** approaches to meet these challenges. Bangkok has populations close to 10 million. It is the capital cities and center of national and regional economic growth contributing substantially to the GDP of Thailand. As a coastal megacity, Bangkok faces increased climate-related risks such as rising sea levels and an increased frequency of extreme weather events. While commendable measures to counteract flooding have already been taken, much more needs to be done, the report argues.

For Bangkok to address future climate related risks, sound urban environmental management is crucial. Land subsidence due to groundwater pumping, dumping of solid waste into city canals and waterways, clogged drainage systems, and deforestation in the upper watershed all contribute to urban flooding. Better management of these urban environmental issues will help manage future climate-related impacts.

Given the damage costs associated with climate change, the report also recommends that governments of coastal megacities undertake proactive measures to address climate risks as an integral part of urban planning. This includes **developing strategic urban adaptation frameworks** for managing climate risks, **strengthening institutional capacity for adaptation and implementing measures** such as land use planning and zoning and warning systems to help reduce urban vulnerability.

In Bangkok, flooding is caused by land subsidence and increased rainfall in the large watershed that drains through the city. Therefore, measures to control groundwater pumping, improve flood forecasting and information, raise dikes and invest in pump station capacity, are needed. The threat from sea level rise and storm surges are found to be less dramatic, but still warrant investment in coastal zone protection and land use planning that takes a long-term perspective on these factors.
The report's findings include the key messages) Better management of urban environment and infrastructure will help manage potential climate-related impacts in coastal cities; ii) Climate-related risks should be considered as an integral part of city and regional planning; and iii) Targeted city-specific solutions, combining infrastructure investment, zoning, and ecosystem-based strategies are required.

Growing of Bangkok population making it more dense residential area in the central area which is the business hub of Bangkok and the country. While the drainage system still limits the drainage capacity at certain level together with land subsidence and climate change cause more often and challenge for drainage system management. To improve Bangkok drainage system, it can be done through upgrade of physical drainage system and its management. Based on latter option the drainage system management require technology to predict rain fall and finding the best drainage practice in advance. Effective flood forecasting and warning system is a need for the uses in planning for water management. With better rainfall forecasting from new radar technology, the precise forecasting of drainage situation will be achieve. And can be coped with a situation that will occur in the future. Forecasting information will be used to support the decision maker to handle the flooding problem to make Bangkok a city of non-flooding.

Considering the challenges mentioned above, actions are required to alleviate and adapt to the changing future. The actions requested to CTCN will be technical assistance and capacity building in urban water drainage and flooding, particularly with emphasis on early warning of flooding in a densely populated part of the city. The proposed activities includes a technology transfer and training program to help with early warning of flood. This will benefit the daily life, reduce traffic disturbances and decrease the risks for being exposed to contaminated floodwater, being a mixture of sewage and rainwater.

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.}

BMA have over the past several years upgraded the drainage facilities. This includes rehabilitation of the major klongs/canals, retrofitting pump and gate stations and installing SCADA systems. The city wide monitoring system is currently being upgraded and access to rainfall radars enhances the overview. The city has also established some, but not yet extensive, modelling competences, to understand the drainage system and the dynamics in greater details. The emerging technology, linking monitoring systems and models – and providing short term forecasts for drainage and flood patterns, are a natural next step for BMA. The challenge though, is to secure the required backup and acknowledgement from the city to implement these emerging technologies. This is where support from CTCN will be instrumental, to advance and secure transfer of technology and the parallel knowledge transfer and training that will secure ownership within BMA.

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.}

BMA is a huge organization with a wide range of services and responsibilities. The water service divisions are foremost service providers of water and drainage services. Although BMA includes separate focus and staff expertise within IT, Innovation and Research, the threshold to introduce new technology and simultaneously advance staff competences requires support and interaction with international experts and competence centers. Whereas BMA staff have in-depth understanding of the drainage system, the data monitoring system and the operational aspects, the organization is relatively short of the most recent technology within operational forecast and warning systems. Hence, there is a need to facilitate capacity and knowledge transfer from international experts to the professional BMA staff. The benefits of combining technology transfer, knowledge and capacity building and deploying it on BMA's drainage network secure a focused effort and sustainable ownership. This activity is a request for technical assistance/transfer and capacity building in advanced urban storm water management, applied to the complex and challenging drainage network of Bangkok. BMA request support to help and assist with the following activities:

- Capacity building and technical assistance supporting the technological platform to be applied
- Training in use of advanced 2D hydrodynamic urban flood model
- Evaluation of critical areas where special emphasis are needed, like hospitals and critical transport junctions

Specific activities to be conducted include:

- Identification of relevant data sources for the flood forecast system (SCADA, rain radar, gauges)
- Refinement of existing model of the demonstration area
- Linking data collection system and model environment
- Configuration of Information and Operational system
- Dissemination workshop

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.}

The activity will enhance the skills and competences within BMA. The focus on use of advanced technology, like data collection, processing, modeling and forecast – will contribute to general advancements of the staff competences. The benefits for the city dwellers will be early warnings of the often very rapidly generated floods, allowing for better caretaking of properties in the exposed areas. The system will also allow to better regulation of traffic, a regulation that today is based only on traffic density. This will potentially benefit the hundreds of thousands commuters travelling in the city day and night. Advance knowledge of flood prone areas will also allow evacuation and reduce health risks for particular vulnerable people.

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).}

Following the Technical assistance, BMA staff will have increased and enhanced their skill base. This will allow BMA to more effectively manage the existing system and evaluate the value and consequences of upgrades and application of advanced methods and technologies on a larger scale. It is also likely that BMA will be able to inspire other Thai cities – by sharing information and knowledge in formal and informal forums. To support the sustainability BMA suggest a prolonged review and support phase, where the international partners continue to have a marginal role for

extended period of 3 years after the completion and inauguration of the urban flood early warning system.

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.}

Stakeholder	Role to support the implementation of the assistance
Bangkok Metropolitan Administration	Main counterpart and primary beneficiary
The Thai Meteorological Department	BMA partner
Hydro and Agro Informatics Institute, Ministry of Science and Technology	BMA partner

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.).}

Office of Natural Resources and Environmental Policy and Planning (ONEPP) has recently published "Thailand Master Plan for Climate Change 2015-2050 (in Thai)". Water management for flood and drought is the first one from six adaptation measures. Development of weather forecast and early warning with longer lead time and reliability is proposed for risk management. Practical standard and implementation code for people based on flood/weather conditions should be defined.

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.)}

The relationships between BMA, AIT and DHI goes more than 20 years back. Located in Bangkok, AIT have supported BMA with several Master, PhD and Postdoc projects, addressing the challenges in the city. With the new emerging technologies, BMA sees the potential of applying these within the city. Hence BMA and AIT have discussed how to enhance the competences and skills within BMA and the CTCN support program have been identified as a very relevant framework. The needs and activity description has been formulated by BMA and AIT, and the request have been communicated to the NDE. BMA, AIT and DHI have discussed the potential and benefits at a recent meeting, where the emphasis was on capacity building and training.

Expected timeframe:

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

The activity is expected to be carried out over a 12months period. It is essential to have full attention from all partners during the wet season. In addition to the CTCN supported project implementation period, a 2 years follow up period will be useful to secure long-term sustainability.

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.}

Climate Risks and Adaptation in Asian Coastal Megacities

http://documents.worldbank.org/curated/en/2010/09/12886839/climate-risks-adaptation-asian-coastal-megacities-synthesis-report

Thailand Technology Needs Assessments Report for Climate Change : Adaptation (2012)
http://tiwrm.haii.or.th/sharewater_download/ALLreports/ThailandTNAadaptation.pdf

Thailand Climate Change Master Plan 2012-2050 (in Thai) Draft
http://dbccc.onep.go.th/newweb/index.php?option=com_k2&view=item&id=34:&Itemid=29&lang=en

Thailand Climate Change Master Plan 2012-2050 (in Thai) Final
http://tiwrm.haii.or.th/sharewater_download/ALLreports/ThailandMasterPlanForClimateChangeInThailand-ONEPP2015.pdf

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: Dr. Surachai Sathitkunarat

Date: Jan 28, 2016

Signature:

THE COMPLETED FORM SHALL BE SENT TO THE 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