

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

Requesting country:	<i>Myanmar</i>
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Request title:	Promoting data for climate change, drought and flood management in Myanmar
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Contact information:		
<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>		
	National Designated Entity	Request Applicant
Contact person:	<i>U Min Maw</i>	<i>Mr. Joern Kristensen</i>
Position:	<i>Director, Pollution Control Division</i>	<i>Executive Director</i>
Organization:	<i>Environmental Conservation. Department, Ministry of Natural resources and Environmental Conservation</i>	<i>Myanmar Institute for Integrated Development (MIID)</i>
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Technology Needs Assessment (TNA):
<i>{Select one of the three boxes below:}</i>
<input type="checkbox"/> <i>The requesting country has conducted a TNA</i>
<input type="checkbox"/> <i>The requesting country is currently conducting a TNA</i>
<input type="checkbox"/> <i>The requesting country has never conducted a TNA</i>
There is no TNA available for Myanmar, but the CTCN assistance will provide some of the tools and information assisting the development of a TNA.
<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>

CTCN Request Incubator Programme:
<i>{Please indicate if this request was developed with assistance from the Request Incubator}</i>

Programme:}

- Yes*
 No

Geographical focus:

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

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

The request will focus on Myanmar only.

{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:

The CTCN assistance is requested for improved information in relation to the development of climate resilient solutions for the key sectors in Myanmar. More specifically, what is needed is improved and additional data and information, and how it can be applied in relation to climate change, drought and flood assessments in Myanmar. The request is relevant for a number of different sectors in Myanmar:

Water sector

- Correct and timely information and data is essential for any water related assessment and the CTCN support would improve the ability to assess water resource related issues including management of floods and droughts within the country.

Agricultural sector

- Validated and corrected climate forecasts for the coming weeks and seasons would provide a basis for improved water management, increase the water management efficiency, reduce losses, increase crop yields and allow for more appropriate planting times and crop cycles.

Industrial sector

- Near real time data and information providing updated drought and flood related indicators would increase the preparedness within the industrial sector for these events.

Educational and research sector

- The proposed request is aimed at technical stakeholders within Myanmar, but could also be adopted by the research and educational sector for further enhancements.

The national stakeholders involved in the proposed CTCN assistance would be responsible for the outreach and dissemination to the relevant sectors, through a workshop at the end of the proposed period.

{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}

Problem statement (up to one page):

Myanmar's National Adaptation Program of Action (NAPA) states there is an urgent need for Myanmar's communities and economic sectors to adapt to climate change and variability (UNEP, 2012). The Department of Meteorology and Hydrology has indicated that Myanmar's climate is changing, with some observable trends over the last six decades. These include an increase in mean temperature, an increase in overall rainfall in most areas with a declining trend in some areas, late onset and early termination of the south-west monsoon. The effects of climate change on the natural environment in Myanmar present security concerns for the nation's people. Increased temperatures, variable precipitation extremes, rising sea levels, droughts, floods, and powerful storms will have severe impacts on all aspects of life. Deforestation, loss of biodiversity, energy shortages, and public health issues will all become more prevalent, but the most significant impacts could be on people's livelihoods through changes to the agricultural sector (Slagle, 2012).

According to the United Nations, Myanmar is one of the world's least developed countries and relies heavily on the agricultural sector for income, survival, and economic growth - With 75% of the rural population relying on the agriculture, livestock and fisheries sectors for their livelihoods, climatic changes will have a disproportionately negative impact within the country (UNEP, 2012). Indeed. Some climate modeling projections show a loss of agricultural production of more than 25 percent (Slagle, 2012).

The agricultural and water sectors are some of the main areas in need of adaptation technology and approaches to deal with the impacts of climate change. In relation to the proposed request for CTCN

assistance, the specific difficulties and gaps in relation to climate change is briefly described for these sectors.

Agriculture sector: Agriculture is the primary source of employment and the largest single sector of the economy (UNEP, 2012). Agriculture and crops in Myanmar are strongly affected by rainfall as crop cultivation is mostly rain-fed so any changes to the climate will have serious impacts on the productivity. Agricultural losses would have negative consequences on the economy as well as result in human suffering and a higher dependency on foreign assistance in Myanmar. The required technology and processes for improving the ability to implement climate resilient adaptation measures for the agriculture sector relies to a high degree on the available data and information. In relation to the current request the focus will be on data availability through real time updated satellite based data, drought and flood indices coupled with seasonal and long term forecast of climate data.

Water sector: Land degradation, overutilization and unfavorable agricultural practices in Myanmar are already diminishing water supplies for domestic, agricultural and industrial use, and this is being further magnified by climate change (UNEP, 2012). In some parts of the country water scarcity already prevails due to periods of drought, while in other areas fresh water is threatened by flooding (Slagle, 2012). One of the key adaptation technologies relates to the availability of data and information aiming at continuously monitoring the climate and the impact on the water sector (UNEP 2012). In relation to the current request the focus will be on seasonal and long term forecast and how to incorporate this into climate resilient solutions across the water sector.

The proposed request for CTCN support will include technologies to improve the data and information base which is being used to make decisions on climate adaptation as well as to facilitate climate resilient measures within the agriculture and water sector in Myanmar.

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

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

National adaptation programmes of action (NAPAs) for Myanmar (UNEP 2012)

National Adaptation Programmes of Action (NAPAs) for Myanmar is used to identify and communicate priority activities to address urgent and immediate adaptation needs in the country. Priority Adaptation Projects as well as sectors were selected/prioritised using participatory discussions and analyses including expert opinion as well as community and cultural/traditional knowledge. Sectors in which Priority Adaptation Projects should be implemented are:

1. Agriculture, Early Warning Systems and Forest (First Priority Level Sectors)
2. Public Health and Water Resources (Second Priority Level Sectors)
3. Coastal Zone (Third Priority Level Sector)
4. Energy and Industry, and Biodiversity (Fourth Priority Level Sectors).

The proposed CTCN assistance is aligned with the NAPA as it aims at providing the information base needed to successfully implement the adaptation measures in the agriculture and water resource sector.

National climate change strategy

The Myanmar National Climate Change Strategy, Action Plan and Policy are currently under development and is expected to be formulated during 2016 and scheduled for approval during the second half of 2016. The formulation process will consult thematic working groups at the national level to design actions needed to fight climate change in all relevant sectors, at regional level to ensure that the perspective of the most vulnerable areas are reflected in the strategy, and at local level so that community-centered solutions are devised (UNEP, 2015).

MIID is currently implementing the Myanmar component of the multi country *Rural Livelihoods and Climate Change Adaptation in the Himalayas* project, funded by the European Union through ICIMOD. This pilot project, located in six ethnic minority villages in the highlands of Shan State aim to develop strategies to assist communities most vulnerable to adapt to climate change. Government counterpart is Department of Forest under Ministry of Natural Resources and Environmental Conservation (MONREC). Results of this project will feed into the Myanmar National Climate Change Strategy.

The process to prepare the national climate change strategy is being led by the Myanmar Climate Change Alliance Programme (MCCA) which is funded by the European Union and executed by the United Nations Human Settlements Programme (UN-Habitat) and United Nations Environment Programme (UNEP).

Flood & Drought Management Tools

One of the current initiatives focusing on both flood and drought events within a changing climate is the Global Environment Facility (GEF) funded Flood & Drought Management Tools ([link](#)), which implemented by UNEP, with the International Water Association (IWA) and DHI as the executing agencies. The project is improving the ability of land, water and urban area managers to better prepare for water related risks by integrating information on flood and drought events into planning and analysis processes. This includes the development of a decision assistance system containing tools with a scientifically sound approach to address climate change, floods and droughts within planning The project is ongoing (2014 to 2018) and involves many stakeholders in the region but not yet in Myanmar. There have been representatives from Myanmar who have taken part in project events such as the Permanent Secretary for the Ministry of Science and Technology at the Flood and Drought Symposium on November 23rd, 2015. Being a global project it will be able to provide some outcomes and tools to be further refined and validated in Myanmar.

Need for CTCN technical assistance

The previous projects highlight the need for improved data and information technology for near real time and reliable information across Myanmar. The CTCN assistance would enable transfer and capacity building of relevant technologies to key organizations within the water and agriculture sector in Myanmar in relation to an improved information basis for assessments related to climate change, drought and flood management. The proposed technologies will be used during a later development of a TNA.

{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.}

Assistance requested (up to one page):

The request for CTCN assistance is based on a need for updated, accessible and available climate, drought and flood related data for Myanmar. The proposed technologies aim at providing the information base needed for improving the ability for climate change adaptation within Myanmar.

The objective of the request CTCN assistance is to facilitate transfer and capacity building for climate change adaptation focusing on the information base for climate resilient solutions. The proposed support will use existing knowledge and capacity and further develop and validate these for application to local issues within Myanmar. Synergies with ongoing projects in Myanmar and the ASEAN region will be identified to benefit the proposed CTCN support.

It is anticipated that specific focus will be given to the following:

Data and information availability: Data and information is the basis of any climate related study or intervention, and the quality and availability of the data is what controls the uncertainty and usability of the outcome. Some of the requirements for data and information made available for climate related issues to be addressed by the CTCN assistance will be:

- Availability for all relevant organizations and stakeholders (preferably through a web solution);
- Spatially distributed data;
- Near real time data which is essential for evaluation of the current status related to climate, drought or flood;
- Reliable forecast for the coming weeks and season; and
- Validation and adjustment of the data according to available ground observations.

Drought and flood management: Near real time data supporting drought and flood management to be made available through a web based data site. This would provide a sound basis for future projects in Myanmar.

Climate forecast: reliable climate forecast for the coming weeks to season is essential for water management and crop related planning, and should be used to further improve the efficiency within the water and agriculture sector.

Climate projection: available results from the latest climate models (eg. CORDEX results) is essential for climate change adaptation, and the CTCN assistance will enable access and use of these data for relevant stakeholders.

Validation and testing: It is anticipated that many of the climate, drought and flood related data will be based on satellite data, as limited ground data is available. There will be a need for validation and testing of these data in Myanmar with respect to the available ground data. This component requires the selection of a validation site, collection of data and a scientific based comparison between the satellite based and existing data.

Dissemination and capacity building: The dissemination and capacity building is a key component, and specific focus will be on embedding the workflow and the data into existing practices and formats used in Myanmar.

A general **work plan** for the technology request would contain the following activities:

1. Inception workshop

- a. Consultation and information workshop with relevant national stakeholders in Myanmar
- b. Identification of current and past initiatives relevant for this CTCN assistance for enabling collaboration and leveraging of results.

2. Technology development

- a. Adjustment and further development of the existing methods based on the outcomes from the inception workshop

3. Technology validation

- a. Validation of the data and information at a site within Myanmar. The validation would

be done in close collaboration with the main applicant, the international partners and local stakeholders.

- b. Capacity building and training, including transfer of methods and technologies

4. **Technology outreach**

- a. Regional workshop with relevant regional organisations
- b. Outreach and dissemination of the transferred technologies within the region

{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.}

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

The CTCN assistance will be valuable for the establishment of reliably and timely data and information for Myanmar used for climate change assessments, drought and flood management. The CTCN outcomes will also be essential for the development of a TNA for Myanmar by providing some of the required information.

Medium term impacts (1 to 3 years): The outcomes of the CTCN assistance will be embedded and used in projects and studies related to climate change and variability including the implementation of the National Climate Change Strategy, Action Plan and Policy, as the outcomes related to climate forecast and change will be required for these studies. The CTCN assistance would improve the access to the latest available climate models, ensuring up-to-date climate projections are available to stakeholders. On the seasonal scale information related to rainfall forecast of the coming season and indicators related to the current drought risk would be available.

Long term impacts (one to several decades): The CTCN assistance would be a step towards increased use of more advanced technologies and enhanced knowledge for climate related studies as the available data will be a required driver for planning and adaptation within the water and agriculture sector in Myanmar.

The overall contribution of the CTCN assistance would be the establishment of data and information needed for any assessment of climate change related impacts in Myanmar.

{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.}

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

Post assistance plans include actions that may support and increase the ownership of the outcomes, the scaling up of the technologies and deployment in the region outside of Myanmar. Some of the immediate actions can include:

- The outcome of the CTCN assistance will be valuable for the future development of a TNA for

Myanmar;

- The CTCN assistance will provide a valuable platform for future projects as it will establish near real time data and information for Myanmar related to climate change, drought and flood management ;
- The main capacity and knowledge of the transferred technology would be placed within the main applicant, who will actively facilitate the outcomes of this CTCN assistance to be embedded in future projects related to climate change within the country and region;
- The CTCN assistance will be used to strengthen the linkage to regional organisations and institutes to pursue further collaboration on climate change adaptation in the region; and
- Evaluate funding options through regional partnerships and donors for post response interventions.

{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).}

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 providing 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 assistance the implementation of the assistance
<i>Myanmar Institute for Integrated Development (MIID)</i>	<i>Main applicant and assisting the CTCN contractor in the implementation of the CTCN assistance technology. In addition, the MIID will provide technical assistance in:</i> <ol style="list-style-type: none"> <i>1. Requirements for needs assessment</i> <i>2. QA and review of the proposed technologies</i> <i>3. Review of the validation report</i> <i>4. Host for the national and regional workshops</i>
<i>Department of Meteorology and Hydrology, Ministry of Transport and Communication</i>	<i>Provides meteorological information since they collect, process, archive and analyse meteorological data</i>
<i>National Water Resources Committee (NWRC)</i>	<i>APEX body that transforms the segregated pattern of piece-wise and often overlapping water resources development and management by various government departments and line agencies into one consolidated coordination mechanism that oversees, monitors, directs and supports all water related activities leading to inclusive water governance.</i>
<i>Directorate of Water Resources and Improvement of River Systems - Ministry of Transport and Communication</i>	<i>Responsible for monitoring and managing Myanmar's rivers, including for transport.</i>
<i>Ministry of Agriculture, Livestock and</i>	<i>Responsible for irrigation and ground water development</i>

Irrigation	<i>in rural areas</i>
Ayeyarwady Integrated River Basin Management Project funded by World Bank loan	<i>The project aims to strengthen the government's ability to sustainably manage the Ayeyarwady River by developing water resources management institutions and enabling informed decisions about future investments in developing the river.</i>
Ministry of Education	<i>Responsible for higher education institutes, including universities</i>
Ministry of Natural Resources and Environmental Conservation	<i>Responsible for forestry and mining sector as well as general environmental management in conjunction with development activities</i>
National Search and Rescue Committee	<i>Committee recently established by new government to coordinate assistance during natural disasters</i>

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

The proposed CTCN support is aligned with the key strategy components within the national climate change strategy and with the national priorities within Myanmar.

Myanmar ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1994 and the Kyoto Protocol (as a non-Annex I country) in 2003. It submitted its first initial national communication to the UNFCCC in December 2012 (Nachmany et al., 2015). Myanmar's National Adaptation Programme of Action (NAPA, UNEP 2012) highlights the need for prioritized adaptation measures towards the agriculture and water resource sector in Myanmar. For the agriculture sector one of the prioritized are related to early warning systems and improved data and information knowledge of the future climate related events. This will be clearly addressed in the proposed CTCN assistance.

To date, no specific climate change legislation has been passed; however the Myanmar National Climate Change Strategy, Action Plan and Policy are currently under development throughout 2016 , and the technical assistance requested will align with the priorities outlined by liaising with the Myanmar Climate Change Alliance (MCCA). There are also a variety of national strategies and plans either solely or in part refer to climate change mitigation or adaptation measures (Nachmany et al., 2015).

The National Environmental Conservation Committee (NECC) guides national activities to tackle climate change-related problems. The committee develops climate change-related policies and any corresponding programmes of action, including the NAPA. The NECC has worked with the Environmental Conservation Department as one of six sub-departments of the Ministry of Natural Resources and Environmental Conservation (MONREC). The Environmental Conservation Department is responsible for all national environmental policy. Climate change is considered one of the eight most critical issues by MONREC, which monitors and evaluate the effectiveness and efficiency of government policies and programmes (Nachmany et al., 2015). The CTCN support will ensure to liaise with the NECC and MONREC so the data and information generated on climate change is reflected in the relevant policies and programmes.

The precautionary principle has been highlighted in the 2011 National Biodiversity Strategy and Action Plan as a way to increase the potential for adaptation (Nachmany et al., 2015). Increasing availability and accessibility of data on climate change from the CTCN support can help inform pathways to adaptation approaches. Although, it should be noted that due to resource constraints, there

has been limited implementation of adaptation projects.

National Sustainable Development Strategy 2009 published by the then Ministry of Forestry includes climate change under 'Environmental quality management and enhancement', a sub-category under Sustainable management of natural resources. The NSDS indicates that the government needs to improve its participation in the global efforts to mitigate climate change (within 10 years) (Nachmany et al., 2015). This can be partially done by understanding the climate challenges the country faces through improved access to climate data which the CTCN support will provide.

{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.).}

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

Since 2014, NWRC has organized annual World Water Day Celebrations in Myanmar with two main objectives. The first objective is to increase efficiency of water sector performance for poverty alleviation and sustainable development in Myanmar and the second is connect and cooperate with the international world water community. Discussions during the 2016 WWD had a strong focus on access to hydro-informatics including climate data to better prepare and plan for the expected increased development of water resources in basins across the country. For example, under the World Bank project - Ayeyarwady Integrated River Basin Management Project, there will be improvement of hydro-meteorological observation and warning systems to help to protect weather-vulnerable communities, as well as establishment of a Hydro-informatics Centre. In the meantime, there are a number of initiatives under developments to collect and access water and land data including a Myanmar Water Portal and OneMap. However, none of these specifically provide easy to access climate information.

{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.)}

Expected timeframe:

The expected time frame is 12 months.

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

Background documents:

- Slagle, John T, 2012, Climate change in Myanmar: impacts and adaptation
- UNEP, 2012, Myanmar's National Adaptation Programme of Action (NAPA) to Climate Change
- UNEP, 2015. Myanmar Climate Change Alliance Press Release (001/PRESS-MCCA/PC-2015).
- Michal Nachmany, Sam Fankhauser, Jana Davidová, Nick Kingsmill, Tucker Landesman, Hitomi Roppongi, Philip Schleifer, Joana Setzer, Amelia Sharman, C. Stolle Singleton, Jayaraj Sundaresan and Terry Townshend, 2015, Climate Change Legislation in Myanmar an Excerpt from the 2015 Global Climate Legislation Study A Review of Climate Change Legislation in 99 Countries. Grantham Institute, London School of Economics.

{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.}

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 assist CTCN efforts to measure the success and effects of the assistance provided, including its short, medium and long-term impacts in the country.

Signature:

NDE name: *U Min Maw, Director, Pollution Control Division, Environmental Conservation Department, Ministry of Natural resources and Environmental Conservation*

Date: 30 MAY 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