



# **Lancang-Mekong Cooperation Special Fund**

## **PROJECT COMPLETION REPORT**

**Project Title**

**Transboundary Cooperation Mechanism on Adaptation to Climate  
Change and Hydropower Development Project**

**Implementing Agency:**

**Mekong Institute – Agriculture Development and Commercialization**

**Department**

**6 December 2019**

**PROJECT DETAILS**

<b>LMC Member Country:</b>	<b>Thailand</b>
<b>Project Title:</b>	<b>Transboundary Cooperation Mechanism on Adaptation to Climate Change and Hydropower Development Project</b>
<b>Project Approved Year:</b>	<b>2017</b>
<b>Proponent (ministerial level):</b>	<b>Office of the National Water Resources Thailand (ONWR)</b>
<b>Implementing Agency:</b>	<b>Mekong Institute</b>
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<b>Approved Budget:</b>	<b>USD 389,500.00</b>
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### **Project Description**

There is a growing body of climate-related evidence for the Lancang-Mekong Basin that present similar overall trends on the impacts of climate change (Eastham et al., 2008; International Centre for Environmental Management (ICEM), 2009; TKK and SEA START RC, 2009; ICEM, 2013). Overall future climates for the region will become slightly warmer, with a longer dry season covering a large area of the basin. Daily maximum and minimum temperatures will be higher with temperature increases varying considerably between parts of the basin (1.5-4.5 °C) but are projected to be higher in the cooler northern catchments. Annual precipitation is projected to increase between 3-14%, predominantly from higher intensity rainfall events during the monsoons. This will contribute to greater seasonal variation in rainfall.

The presence of large water storage structures associated with hydropower development provides an opportunity to build resilience to the impacts of future climate change across the basin. Analysis undertaken by recent studies (Adamson 2009; Cochrane et al. 2014; Räsänen et al. 2017) shows a clear trend of flow fluctuation within weekdays and at the weekend. It is this daily fluctuation that has raised concerns among riparian communities in northern Thailand and Lao PDR particularly for those communities setting fishing gear along the banks and for boatmen.

Seeking opportunities to enhance cooperation in managing these fluctuations provides an opportunity for relevant government agencies, researchers and dam operators to come together and explore options to manage these changes. Further, climate change and consequences associated with extreme events offers opportunities to jointly develop early drought warning systems and adaptation options to manage such events. It is also important to raise the awareness of the public especially concerned communities on these issues for better understanding of both the positive and negative changes and opportunities to support their livelihoods in the long-term.

The proposed project goals are to improve joint evidence-based information collection, analysis, sharing and decision making required to enhance communications on related issues and forge greater collaboration and information exchange through a regional platform in the region.

**Project Objectives**

- Enhanced communications among concerned agencies and stakeholders on water level/flow risks for normal, extreme and emergency conditions.
- Effective regional platform among Chinese and other Mekong country experts on technical solutions to reduce the risks from flow level fluctuations and climate change.
- Improved understanding of the public on (positive and negative) impacts from hydropower development and their possible roles in reducing the risks from flow level fluctuations and climate change uncertainties.
- Increased awareness of the public including concerned communities in the project areas on the positive and negative changes and opportunities to support their livelihoods in the long-term.

## PROJECT REPORT

### 1. Progress in Implementation

- MOU signed on October 11, 2018 between Ministry of Natural Resources and Environment (Former Project's Proponent Agency), Embassy of the People's Republic of China, and Mekong Institute in Sukosol Hotel, Bangkok
- Project inception meeting held in Radisson Blu Hotel on November 30, 2018. Attended by 2 representatives from People's Republic of China, 4 representatives from Lao PDR and 22 from Thailand (including MI and technical experts).
- Arranged scoping visits with contact persons in PR China, Lao PDR and Thailand. Scoping visit in Thailand was completed on December 11-18, 2018. Scoping visit in Lao PDR was organized on February 13 - 15, 2019 in Vientiane and the one in PR China was organized on February 19 - 23, 2019 in Beijing and Wuhan.
- 1<sup>st</sup> National Consultation in Thailand – May 2, 2019 in Bangkok
- 1<sup>st</sup> Regional Consultation in Bangkok – June 28, 2019
- National Consultation in Lao PDR – July 19, 2019 in Vientiane
- Experts Meeting – August 5, 2019 in Bangkok
- 2nd Regional Consultation – August 6, 2019 in Bangkok
- Finalized the strategy papers and policy brief on communication and data sharing on Transboundary Water Cooperation among Lancang-Mekong Countries on water flow fluctuations and adaptation to climate uncertainties – September 30, 2019.
- Final Project Report
- Dissemination and outreach: project factsheet, video production (to be completed by mid-December 2019)

### 2. Highlights from Project Activities

#### 2.1. Highlights of the Inception Meeting: Nov 30, 2018 (Proceedings: See Annex A)

Based on the feedback from participants at the inception meeting held on Nov 30, 2018 in Bangkok, support for the project among representatives from all three countries was very encouraging. The guidance and feedback on project implementation provided by the experts and representatives from the three countries indicated high level of commitment in the project. As of December 2018, the project is being implemented as scheduled. Proceedings and reports of inception meeting and scoping visits in Thailand were completed as planned.

- Participants shared the concerns regarding water flow and level fluctuations and acknowledged the potential role hydropower and dams play in adaptation of climate change and climate uncertainties. This is evident from several instances where communication among some Lancang-Mekong Countries averted crisis due to prolonged dry spell and subsequent

inter-governmental communication and cooperation addressed water shortage issues.

- The participants in the Inception Meeting also shared concerns and issues in relation to information sharing by hydrological stations among LM countries in the area of shipping and navigation, among others.
- It also surfaced that communities along the LM also need to be aware of the roles of hydropower in climate change adaptation.
- Increased cooperation in data sharing on transboundary water flow fluctuations and level will further strengthen the role of hydropower in adaptation to climate uncertainties.

#### **2.2. Highlights of the Scoping Meeting in Thailand: Dec 11-18, 2018 (Proceedings: See Annex B)**

- Additional information and verification of project implementation, diagram of data sharing, structure of line agencies administrating water level/flow data and involving in the internal data sharing process steps, the data flow among the concerned agencies, operational routines in data sharing processes, adding missing steps and agencies in data sharing processes
- Information on data sharing with Marine Department (or similar agencies) in the LM countries for trade and shipping facilitation
- Technical requirements for data sharing was also shared in the scoping visit/meeting

#### **2.3. Highlights of the Scoping Meeting in Lao PDR: February 13-15, 2019 (Proceedings: See Annex C)**

- The main goal of the project should be to present a more balanced view of hydropower projects including its pros and cons, its role in addressing climate change impacts instead of the current situation in which the public discourse and discussions in many platforms has been on negative impacts of hydropower projects. This will help improve public understanding and highlight new opportunities from and ongoing efforts of the government in managing hydropower dam projects to reduce the risks and support the livelihoods of local communities.
- There is a need to incorporate stakeholders' inputs and local needs into future management and development of hydropower projects, particularly those that are based on scientific evidence and knowledge for practical solutions or best practices.
- Lao PDR and Thailand's Ministries of Natural Resources and Environment (MONRE) recently signed the MoU on Natural Resources and Environment Cooperation. Based on the MOU, the Department of Water Resources in each country developed a Plan of Action for 2018 - 2021 under this bilateral cooperation. Lao PDR-Thailand MONRE MOU focused on identifying areas for pilot initiatives in Champasak, Luangprabang, Xayaburi, and Savannakhet to help strengthen collaboration and mutual learning on the transboundary river cooperation and management.
- Instead of creating a new regional platform, the project should focus on how to enhance existing ones to make it more sustainable in the long-term.

#### **2.4. Highlights of the Scoping Meeting in China: March 6-9 , 2019 (Proceedings: See Annex D)**

China has adopted terms and definitions related to drought and flood according to the WMO's

definitions for several projects / study. In general, Lao PDR has a very high rainfall rate, so severe drought distribution does not occur. Considering the first drought conditions assessed by the project, it might be explained that the SPI and SRI are sensitive for the analysis.

The LMC is the main funder for the LMWRCC but seeks to diversify to other funding sources in the coming years. LMWRCC engages other experts through their networks with national and international organizations to support many projects and suggested the project team revisit the purpose of data sharing in the MLC because not all hydro-met data types are necessarily shared among riparian countries due to restrictions in national legal systems.

The project team was also advised to engage with CSOs and international organizations in the project.

#### **2.5. Highlights of the National Consultation in Thailand – May 2, 2019 (Proceedings: See Annex E)**

- Needs to ensure that the selected local communities would be a good representative group for the project - should be listed as one recommendation for future study/activity
- Best practices for hydropower operations to reduce the risks from each of three countries should be included in the working paper
- Provide information whether China uses the same regulations and procedures in another shared basin or not, and information on the following:
  1. geographical advances where the main water operators such as China and Lao PDR are located in the headwaters; Thailand cannot regulate the water flows
  2. location map of hydropower projects with types of hydropower functions (storage or run-off river) and key monitoring stations
  3. analysis of seasonal period (wet and dry) instead of annual water discharge, and relative change from baseline
  4. focus on extreme indices for climate projection
  5. results from the MRC's Council study
  6. positive and negative impacts of hydropower projects
  7. focus on the most relevant monitoring hydrological stations in Thailand and Lao PDR including Chiang Saen, Luang Prabang, Chiang Khan and Khong Chiam and exclude the analysis of Stung Treng station as Cambodia is not the main focus in the first year of the project.
- For other regional initiatives such as LMI, Mekong-Japan, Mekong-Korea and similar initiatives, the focus could be on how to best make use of these platforms to fill the gaps in the key regional platforms such as capacity-building and discussions on technological solutions for certain issues.

#### **2.6. Highlights of the 1<sup>st</sup> Regional Consultation Meeting – Bangkok, June 28, 2019 (Proceedings: See Annex G)**

The participants from all five MLC countries and MRCS found that in general the recommendations made by the project team are sound, reasonable, practical and will further build on ongoing efforts already initiated by existing regional platforms, e.g. MRC and MLC. Some countries suggested the

project team broaden the scope of the recommendation, to focus not only on the hydropower projects but also other water infrastructure projects, e.g. recommendations for integrating hydropower projects and other type of water storages (e.g. irrigation dams) in climate change adaptation. In order to address the extreme events well, water infrastructure in the tributaries should also play a role.

To make a concrete plan on how to implement these recommendations in practice through different regional platforms, there is a need for follow-up discussions among the agencies concerned with these regional platforms and with respective countries considering the regional, bilateral and national agreements. The MLC countries have different interests, constraints and capacities and thus it is important to take these into account for possible collaboration and support for implementation of project recommendations in the future.

### **2.7. Highlights of the National Consultation in Lao PDR – July 19, 2019 (Proceedings: See Annex F)**

The key findings and recommendations presented by the project team were strongly supported with constructive comments from the national experts from Lao PDR. Advice was provided on how the current recommendations can be enhanced in the preparation of the next draft of three project papers. While all recommendations made by the project seems to be feasible in general, to implement them in practice would need further studies to understand better, e.g. socioeconomic conditions of participating countries, their needs, interests, constraints and capacity. While the idea is good to use hydropower projects to help reduce risks from extreme events and rapid water fluctuations, this can only be achieved if all relevant parties can find mutual agreement including hydropower project developer, clients/users of the hydropower, and the agencies of related sectors from all countries concerned. Relevant agreements, policies and other legal documents at the national and regional levels should be considered. The project team was also asked to consider water infrastructures that are not only hydropower projects in the mainstream but also other types such as irrigation dams and other water infrastructures in the tributaries to reduce the risks from extreme events and water fluctuations. This would need further studies.

### **2.8. Highlights of the 2nd Regional Consultation Meeting – Bangkok, August 6, 2019 (Proceedings: See Annex H)**

The principal objectives of the one-day regional consultation were to validate project outputs with focus on regional context, to refine project recommendations in line with the regional situation and needs for enhancing data-sharing mechanism, role of hydropower dams to reduce the risks related to extreme events and water fluctuations, and regional platforms for transboundary cooperation on these issues and to seek recommendations for the project's next phases.

The participants from all six MLC countries in general agreed with the three (3) output papers and recommendations resulting from the assessments carried out under the project. Several recommendations needed further discussions among and actions by the relevant countries and agencies associated with MLC, MRC and Joint Committee for the Coordination of Commercial Navigation (JCCCN) mechanisms on the ways to implement them in practice. Five countries

(Cambodia, China, Myanmar, Thailand and Vietnam) expressed their opinion that all recommendations made by the project team are feasible. Thailand prefers to use the word “possible” rather than “feasible” because some recommendations will need further investigation before they can be concluded as feasible for implementation.

For Lao PDR, all project recommendations seem to be feasible, except for three recommendations below (from Project Working No. 1) that would need internal discussions before they could provide formal responses.

- Improve accuracy and efficiency of the regional flood and drought monitoring and warning systems through enhancing data-sharing on hydro-meteorological observations and outflow releases from the large hydropower projects on the Mekong mainstream and tributaries
- Develop joint operational guidelines for the cascade hydropower projects on the Lancang-Mekong mainstream and main tributaries to minimize downstream transboundary impacts from extreme floods, droughts and rapid water level fluctuations
- Increase engagement of hydropower companies with responsible business practices and using local knowledge of communities of downstream countries to minimize transboundary impacts and help maximize the benefits of hydropower development and operation.

The participants were requested to send their additional comments or suggestions, if any, to the project team by August 13, 2019. The project team updated the project papers by end of August 2019. Comments received from Lao PDR experts and from ONWR, Thailand were as follows:

Comments from experts from Lao PDR were in reference to:

- Pages 9-13 of the draft: The real uses and reliability of the data received from these telemetering stations are also in question. These are largely due to the lack of sufficient resources for further development and operation and maintenance of existing stations, especially after the decentralization plan of the MRC member countries to fully hand-over the responsibility for river monitoring activities to the MRC member countries from 2030 onwards
- On Routine Data Sharing (pages 21-23 of the draft):
  - The Lao National Mekong Committee Secretariat (LNMCS) and the Department of Meteorology and Hydrology (DMH) regularly get access to collected data from the MRCS Server using the **HydMet software** and the DMH used for daily flood forecasting operations. Under the PDIES, the Lao side has agreed to provide hydrological data from 12 HYCOS stations to the MRCS and other LMB countries. The LNMCS usually deposits the data as validated by the DMH to the MRC Server under the Procedures for Data and Information Exchange and Sharing (PDIES) and Primary Custodians.
  - As a key important step, there are internally-defined procedures and processes that apply data control measures for data analysis. In this step, DMH takes approximately 1-2 days to ensure the quality of the data before communicating the data to other agencies. Technically, DMH uses observation data in situ and **water level and discharge data** shared by China in the validation of quantitative analysis of the

forecast at the national scale.

- In an emergency condition, after completing the quality check, the DMH prepare an assessment situation report and send it to the **MONRE and the Prime Minister's Office (PMO)** with a cover letter requesting them to review the warning information. The PMO normally takes prompt action to release an official letter to the respective ministries and provincial offices instructing them to take immediate actions to respond to the emergency.
- This center, once established, will also collect and manage various types of data related to hydropower management. And studies have been carried out since 2018 and are expected to be completed by 2019.
- The Ministry of Energy and Mines recently assigned the Department of Energy Policy and Planning (DEPP) to undertake a feasibility study on establishing a Coordination and Monitoring Center (CMC) for connecting with the other database centers (e.g. NCC, DMH, MRC, LaoWIS, etc.), collecting, storing and disseminating energy-related data, including hydro-meteorological data to other agencies. This center will serve as the national data hub for different agencies to access information. The government is in the process of securing funds to establish this center.

The representative from Office of the National Water Resources of Thailand as the current project proponent agency informed the participants about follow-up activities after the end of August 2019 as follows:

- Three final papers and their recommendations will be submitted to the JWG and Ministerial Meeting in late 2019 if an agreement is reached by all member countries.
- Two video clips of the project will be prepared and disseminated to the MLC member countries and the public.
- Summary of project findings in the form of project briefs will be translated into 6 languages and shared with the MLC member countries.
- Thailand will continue seeking the funds to implement two follow-up projects under the MLC Water Resources Cooperation Area 2 (IWRM and CC adaptation) and would like to invite relevant countries to cooperate in the future:
  - Project 1: Combination of project “Pilot application of transboundary cooperation mechanism to improve the communications on water level/flow risks in China, Lao PDR and Thailand” and project “Development of mobile application for awareness-raising and adaptation to climate change in China, Lao PDR and Thailand.”
  - Project 2: Climate change and flooding adaptation strategy for cultural heritage preservation.

## **2.9 Findings based on the Project Working Papers (No.1 and No.2) and Policy Brief: (See Annex I, J and K)**

### **2.9.1 Findings based on Project Working Paper No.1 (See Annex I)**

2.9.1.1 Mekong-Lancang's climate has varied between wetter and drier periods, and since

- the beginning of the 20th Century, the basin has undergone a wetter period from the 1920s to the 1950s, and a drier period from the 1970s to 2000s.
- 2.9.1.2 The number of extremely dry years has also increased during the recent decades, along with some extremely wet years, which suggests an increase in inter-annual climate variability.
  - 2.9.1.3 Research evidence shows variations in historical rainfall trends: annual rainfall has slightly increased during the recent decades, while extreme rainfall events have increased in some areas and decreased in other areas. However, a limited number of rainfall stations were analysed inside the Mekong-Lancang River Basin and more research is needed for further accurate and comprehensive trend analysis.
  - 2.9.1.4 The influence of El Niño – Southern Oscillation (ENSO) on the climate and hydrology of the Mekong-Lancang Basin has increased since the late 1970s. This has contributed to occurrence of severe floods and droughts.
  - 2.9.1.5 For annual air temperature there is an agreement across all climate scenarios that temperatures will increase over the entire Mekong-Lancang River Basin, and the increase will be higher in the Lancang River Basin.
  - 2.9.1.6 Studies on changes in extreme rainfall under future climate are limited, but there is strong indication towards an increase extreme rainfall in Thailand.
  - 2.9.1.7 The observed annual river flows in the Lancang River Basin have decreased over the period 1960–2017, particularly after 2008. The mean annual river flows at Yunjinghong have decreased 6% during 1987-2014 and 27% during 2008-2014 compared to 1980–1986.
  - 2.9.1.8 In the Mekong River Basin, the likelihood of extreme floods has increased, while the probability of average flood has decreased during the second half of the 20th century.
  - 2.9.1.9 The occurrence of severe droughts has increased since the 1950s. An analysis of tree-ring derived PDSI shows that the frequency and severity of extremely dry years has increased in the Mekong River Basin since the 1950s.
  - 2.9.1.10 According to a Mekong Basin-wide assessment, it is not yet clear how climate change would affect hydropower energy generation. A study (MRC, 2017a) estimated changes in hydropower energy production in the Mekong River Basin under climate change in 2021-2040 and 2051-2070 compared to climate in 1985-2008.
  - 2.9.1.11 Major changes in hydrological regime of the Mekong mainstream were observed since 2011. Two studies (Li et al., 2017; Räsänen et al., 2017) analyzed the observed river flow changes in the Mekong mainstream over the period 1960-2014. The dry season flows at Chiang Saen were found to increase and wet season flows decrease in 2011, and these changes became more pronounced in 2014.
  - 2.9.1.12 A study by the Department of Water Resources (DWR), Thailand in 2016 (DWR, 2016) also indicated the risk areas from the impact of the water level fluctuations in the Mekong River. The study showed that the stretch between Chiang Saen and Loei has the highest risk, where rapid changes in water levels caused negative impacts on the local livelihoods along the riverbank, such as riverbank garden and fisheries.
  - 2.9.1.13 Dams and reservoirs can mitigate or alleviate floods, and the flood alleviation

capacity varies from reservoir to reservoir, which is exemplified by an analysis of 44 cases in Europe (EUCOLD, 2010). The analysis found that the dams reduced flood peaks with varying capacity from 12 to 100% and on average by 54%. The target of flood alleviation can be to store the floodwaters completely, modify the flood to have slower rise rate and lower peak level or to de-synchronize the flood peak with flood peaks from other tributaries.

- 2.9.1.14 In the Mekong Region, a major challenge in mitigating floods through reservoirs is that run-off generated by the rainfall events are difficult to predict, and that the amount of run-off that the rainfall events produce can be excessive. Therefore, in the Mekong River region the situation for flood management is considerably different than in regions where major floods are caused by spring snowmelt, and the amount of flood waters can be relatively well known in advance from snowpack measurements. This brings a larger element of unpredictability to flood management in the Mekong Region, which should be integrated in the flood management policies of reservoirs, and flood management strategies in general.
- 2.9.1.15 In 2017, Thailand was hit by ten tropical storms resulting in heavy rain and flood across the country. The amount of rainfall was 25% higher than the average and the northeastern region of Thailand was the most severely flooded. Floods occurred mainly during one month of October 2017 and affected 20 provinces (HII, 2017). During the floods, it was observed that large dams and reservoirs alleviated floods.
- 2.9.1.16 An analysis of river flows of the Mekong found that hydropower reservoirs in the Lancang Basin have reduced annual high flows (Li et al., 2017). The study compared flows from 1960-1991 to flows from 2010-2014 and analysed changes in multiple flow indicators. The hydropower reservoirs were found to reduce annual maximum flows (from 1 to 7 day maximum) by 34-40% at Chiang Saen after the construction of hydropower dams during the period 2010-2014 compared to period 1960-1991. These reductions are most likely a result of hydropower operations without specific flood management operations; Moreover, no individual extreme flood events were analyzed in the study.
- 2.9.1.17 A screening of existing and planned hydropower reservoirs in the Mekong River Basin finds highly varying capacities for flood control (Ketelsen et al., 2014). The study screened 67 reservoirs in the lower Mekong Basin for flood control and flood related risk. The study developed a Flood Index for reservoirs that incorporates the capacity of the reservoir to control floods, flood occurrence, and downstream flood impact potential. Based on the screening they found that, reservoirs are mainly built for hydropower production and not for flood management, the existing hydropower designs often have poor capacity to control floods, and some of the largest reservoirs have the smallest capacity to control floods.
- 2.9.1.18 A case study of the Nam Theun 2 hydropower project found that even large hydropower reservoirs can have many challenges in controlling extreme floods (Ward et al., 2013). The study looked at the flood history and flood situation in 2002 in Nam Theun-Nam Kading catchment in Laos and found that even large reservoirs, such as Nam Theun 2 with reservoir storage of 3.53 km<sup>3</sup>, can have challenges in

mitigating extreme floods.

## **2.9.2 Findings based on Project Working Papers No.2 (See Annex J)**

- 2.9.2.1 One of the most long-standing challenges with the Mekong-HYCOS tele-monitoring stations relate to the inadequacy of the monitoring networks, outdated techniques and ageing equipment, lack of regular budget for operating and maintaining the networks and data management and distribution systems, disintegration of data management and collection, and insufficient number of operational staff.
- 2.9.2.2 Since 2008, the historical data was not published in any form due to a lack of financial resources to support the cost of data-collection and data handling. At present, hydro-meteorological data including water level, discharge, rainfall and sediment are only provided on a case-by-case for specific studies as agreed to by the MRC member countries.
- 2.9.2.3 In practice, data on water and other issues has been provided to the JCCCN mechanism on an ad hoc basis to date. The 9th JCCCN meeting in August 2010, Agenda Item 8 (8.1) addressed the issues of collection and exchange of data on water levels in preventing shipping accidents, and to improve navigation safety on the Lancang-Mekong River (Joint Committee on Coordination of Commercial Navigation on the Lancang-Mekong River (JCCCN) 2014). However, the JCCCN mechanism was not closely involved in data-sharing in practice.
- 2.9.2.4 The MLC mechanism has had a primary focus on five areas of regional cooperation: connectivity, industrial capacity, cross-border economy, agriculture and poverty reduction and water resources management. The Joint Working Group (JWG) on Water Resources established in 2017 has a role in cooperating on water-related resources as one of the key priority areas.
- 2.9.2.5 Although there is a long history of hydro-meteorological data-sharing in the Mekong countries, there are a number of key challenges that have persisted. Some issues are associated with the inconsistency in data formatting across member countries, fragmentation of water-related institutions and lack of coordination among line agencies, different levels of technical capacity and skills in hydrometeorology among countries, and the maintenance and operation costs for the existing monitoring stations especially for increasing tributary coverage and to fill the gaps in the existing monitoring stations.
- 2.9.2.6 Recognizing these challenges, China agreed to provide data on water levels and rainfall from its monitoring stations directly to the other five MLC countries without passing through the MRC Secretariat. Each year, China will provide near real-time data during the flood season from 1st June – 31st October from the Jinghong and Manan stations and emergency data services. China's proposal on provision of hydrological data was endorsed by the other countries at the 2nd Meeting of Joint Working Group (JWG) on Water Resources under the Mekong-Lancang Cooperation (LMC) in Chiang Rai, Thailand on 1 March 2018.
- 2.9.2.7 Under this proposal, the content of data-sharing and information exchange agreement

has conformity with prior practice between the MRC member countries. The government of China through the Ministry of Water Resources will install, and cover for the financial costs for operation of, an automatic system at Jinghong and Manan stations for data-collection and transmission to other MLC countries through e-mail and FTP. This cooperation for hydrological data provision from two stations has materialized into the 5-year MoU on “the Provision of Hydrological Information of the Lancang River in Flood Season by China to the other five member countries” signed by all member countries of the MLC in June 2019.

- 2.9.2.8 For emergency data service under MLC mechanism, China has from time to time shared data with the MLC countries based on China’s goodwill, and on an ad hoc basis, during emergency situations such as droughts or for maintenance of water levels in the Jinghong dam. Since 2016 until the present (31st August 2019), China has shared data 12 times with the MLC members as notifications of emergency conditions. China sent an e-mail with a cover letter to the focal person of MLC countries and with a copy to the MRC Secretariat providing the water release data from the Jinghong hydropower project.
- 2.9.2.9 There is no clear separation of data-sharing practices under extreme events from the normal, routine operational data-sharing and emergency notifications.
- 2.9.2.10 Many existing data-sharing practices are being implemented under different mechanisms while the practical process within each country is different. The terms used to describe the various steps are specified in detail for common understanding below. Given the complexity in real practice, the existing data-sharing practices can lead to a lack of clarity and precision within discussions about enhancing data-sharing among the countries.
- 2.9.2.11 Towards water data-sharing agreement among all six Mekong-Lancang countries, there is only one formal agreement (signed in June 2019) to operationalize the sharing of data and exchanging of information specifically during the flood season. There has not been any formal agreement around data-sharing in other seasons, particularly in the dry season or even year-round given the climate change context.
- 2.9.2.12 Need for common understanding on the definitions relevant to different water risks and communication
- 2.9.2.13 Need for simple but practical guidelines and steps for enhancing data-sharing among the MLC countries under different conditions
- 2.9.2.14 Strengthening the links between MLC, MRC, the national weather services of the countries, and international weather organizations
- 2.9.2.15 Need for better integration of the operational support system of drought monitoring, forecasting and mitigation into the water data sharing practice, as well as other major hazards in the region
- 2.9.2.16 Given the continuing expansion of water infrastructure projects in the Mekong-Lancang basin, the MLC countries should focus on monitoring and reporting the changes in water situations in the entire basin. There is a need for effective data sharing across the basin at the mainstream and tributary levels to improve the accuracy and efficiency of the regional monitoring system for floods and

droughts as well as for other hazards.

2.9.2.17 Although data sharing within the countries has been in practice for several years, documentation on the current practice is rather limited. Through the consultations with the experts from different agencies in the country, it is found that there is some inconsistency in information related to data sharing processes, concerned agencies and sharing timeliness. During emergency situation, data sharing and actions to respond to situations in several countries are largely managed manually by a few key personnel without automatic back-up systems.

2.9.2.18 Although several government departments and their sub-ordinates are data users, the shared data is commonly used only when it is needed and not recorded for future use. Considering this gap, the data users may wish to compile and create their own database of observation data for internal and future use.

2.9.2.19 Several agencies are in charge of water-related data that are important for water resources management during normal, extreme and emergency situations. However, coordination and data sharing remain a major challenge, especially if these agencies come under different ministries or do not have a higher authority that can facilitate this exchange.

## **2.10 Highlights of the Policy Brief (See Annex K)**

2.10.1 Cooperation between the relevant parties is already occurring through a range of existing platforms and, based on desk reviews and interviews with key actors in bilateral and regional cooperation, in general the extent of cooperation between downstream and upstream riparian states is on a positive trajectory with all parties seeing benefits in deeper collaboration.

2.10.2 Several existing initiatives are already identifying opportunities and taking steps to enhance cooperation including on data sharing. In interviews, officials emphasized that efforts to improve arrangements around climate change adaptation, hydropower management and data-sharing should not duplicate but rather build on existing processes.

2.10.3 Based on the findings (presented in Project Working Papers number 1 and 2) and guided by the three countries (China, Lao PDR and Thailand) jointly implementing this planned multi-year project, the focus in this first phase has been on cooperation platforms for the Mekong-Lancang that have a formal agreement or commitment and includes China.

2.10.4 The Project Team has made recommendations in line with the Mekong-Lancang Cooperation (MLC)'s 2018 Phnom Penh Declaration and Five-year Plan of Action and the Five-year Action Plan of the MLC's Water Resources Cooperation 2018-2022, the mandates of the Mekong River Commission (MRC) and the Joint Committee for the Coordination of Commercial Navigation (JCCCN).

## Project Achievements

The project made significant achievements in fostering an open forum for improving collaboration and cooperation on transboundary water resources in the Mekong-Lancang region. It has brought together MLC country representatives to identify mechanisms and record interests at policy level in further strengthening roles of hydropower and large water storage projects to contribute to climate adaptation strategies for the region and still register strong economic development in the long run.

All three project objectives were achieved through direct engagement with the national experts from China, Lao PDR and Thailand as part of the technical support team (in the joint assessments to produce the three project papers) and intensive formal and informal consultations with the key agencies in the six MLC countries.

The findings and recommendations of the project as highlighted in the three main project papers (Working Papers No. 1, 2 and Policy Brief) received a positive response from the six MLC countries. Most of the MLC countries thought that all recommendations made by the project are feasible to implement in practice (with some follow-up activities and support), while Lao PDR viewed all recommendations as feasible except for some that needed further discussions among the key agencies within their country first.

To explore the possibility of implementing the recommended actions, ONWR as the project proponent is planning to present the project findings and recommendations to the 1st MLC Ministerial Meeting that will be held in December 2019.

## Key Recommendations and proposed next steps

The key recommendations coming out of the project are:

### **1. Climate change impacts on water resources in the Mekong-Lancang River Basin: The role of hydropower projects in minimizing associated uncertainty and risks**

Recommendation 1: Improve the accuracy and efficiency of the regional flood and drought monitoring and early warning systems for extreme events through enhancing hydro-meteorological observation networks and utilizing high-resolution satellite data.

Recommendation 2: Integrate sustainable hydropower development into national climate change adaptation and disaster management strategies.

Recommendation 3: Develop education and public awareness-raising program on climate change, its impacts, and the role of hydropower in adaptation measures to minimize risks to vulnerable communities.

Recommendation 4: Conduct joint basin-wide studies through the MLC and MRC or bilateral cooperation on the following topics: i) Evaluation of the capacity of existing and proposed hydropower projects in mitigating extreme floods and providing drought relief, and

downstream transboundary benefits from flood and drought relief, including the capacity of hydropower projects and dam safety for adapting to climate change uncertainty, ii) Management of rapid water level fluctuations and other hydrological climate risks iii) Mechanism for data sharing during emergency situations related to extreme floods, droughts and rapid water level fluctuations and iv) Extreme events, transboundary socioeconomic impacts, and regional and national disaster risk management.

Recommendation 5: Develop joint operational guidelines/procedures based on national and international standards among the MLC members for the operations of the cascade of hydropower projects on the Mekong-Lancang mainstream and main tributaries.

Recommendation 6: Support, promote and increase the engagement of hydropower sector on responsible business practices and integrating the use of the local knowledge of downstream communities in measures to deal with river water level fluctuations.

Recommendation 7: Formulate a long-term regional capacity-building program involving job training, and workshops and forums for exchange of information and perspectives on regional climate risks and adaptation measures.

## **2. Enhancing data-sharing mechanism in the Mekong-Lancang River Basin: Opportunities and challenges:**

Recommendation 1: Establish an Expert Group (EG) or Advisory Group (AG) with the coordination and technical support of LMWRCC composed of a small group of national experts from each participating MLC country with potential partnership with other organizations such as universities, international organizations, research institutes/networks, non-government agencies in the home country as well as the experts from other transboundary rivers.

Recommendation 2: The EG/AG carries out as a priority a “Joint Needs Assessment” in the MLC countries that includes identifying issues such as the minimum requirement for data to be shared in addressing floods, droughts and other unusual flow situations including water level fluctuations, and to be supported by a 5-year action plan.

Recommendation 3: The EG/AG uses the outputs of the Joint Needs Assessment as the foundation for designing and implementing further steps such as developing common practical guidance and outlining the practical steps for data-sharing, formulation of common definitions, and a capacity-building program.

Recommendation 4: The EG/AG prioritizes hydrological data monitoring activities to develop sharing and exchange systems in the region to fit with real needs and available resources.

Recommendation 5: The EG/AG acts as a working committee for organizing regular annual

workshops to monitor ongoing work related to sharing information, exchanging new knowledge, and learning about success stories on data sharing and other topics related to data.

Recommendation 6: The EG/AG designs and implements a long-term capacity-building program related to data-sharing at different levels viz. national, sub-national and local for each MLC country. Since it will take time until the EG/AG can be established and for the other six medium-term measures to be under taken, the JWG should consider two priority short-term measures to manage any emergency situations:

Recommendation 7: Establish communication protocols using apps such as WeChat as a hotline group of 4-5 persons per country from the six member countries for ease of initial informal communications.

Recommendation 8: As the co-lead of MLC Water Resources Cooperation Area 2 (IWRM and Climate Change Adaptation) and Area 6 (Transboundary River Cooperation and Information Sharing), Thailand and Vietnam to develop joint concept notes and oversee the implementation of future joint studies related to the needs assessment on data/information sharing and immediate responses for emergency situations.

### **3. Policy Brief: Platforms for cooperation in the Mekong-Lancang River Basin – enhancing data sharing, joint studies and other means of collaboration**

Recommendation 1 – Integrate hydropower development and management into climate change adaptation strategies and vice versa. Thailand, as project proponent, could present a policy paper to the JWG on MLC Water Resources Cooperation outlining the need for an integrated regional approach, summarizing agreed recommendations from this Project to use in discussions with key national ministries. An action plan to be taken up under MLC and MRC or jointly could then be developed and formal communication protocols for emergency situations established.

Recommendation 2 – Mobilize experts under the MLC Water Resources Cooperation to build on existing MRC expert groups to (a) develop common definitions, joint needs assessments and practical guidelines for data sharing; and (b) develop data sharing arrangements and communication protocols as part of a response action plan for flood releases and flood storage from reservoirs.

Recommendation 3 – Build Capacity and Partnerships by having LMWRCC and MRCS jointly assess capacity needs associated with hydropower for climate change adaptation and hydrological data sharing, and develop a capacity building program building on each platform’s niche, knowledge base and partners.

Recommendation 4 – Task LWMRCC and MRCS to identify issues they will jointly address

based on the MoU between them.

Recommendation 5 – Improve communication on water levels for enhanced transboundary cooperation by including navigation-related data sharing under ‘transboundary river cooperation and information sharing’ in the MLC’s Five-year Action Plan for water resources cooperation.

### 3. Problems and Challenges

The project faced a few challenges during project implementation, as follows:

- The national consultation in China was not organized due to hosting issues
- Contacting or reaching out to national experts was among the key challenges faced
- Some experts and participants faced administrative issues with travel documentations and internal administrative approval process

These challenges can be resolved in future projects by:

- Working with local partners in P.R China in organizing in-country events
- Coordinating with national representatives and contact point for the JWG
- Consistent follow-up with contact person/s

Despite these challenges, the project has made significant achievements in creating common understanding and opportunities for dialogues on water data and information sharing, role of hydropower projects in reducing the risks from climate change, and regional cooperation platforms related issues. However, to keep the momentum of cooperation and dialogue going among the MLC member countries, follow-up activities are needed after the completion of this project.

#### 4. Financial Analysis

To ensure efficient use of project funds, all activities were carefully planned under each Work Package and corresponding budgets were allocated for each activity. However, the budget allocated in some activities was underestimated resulting in higher actual expenses. It was made sure, however, that the total expenses of the project did not exceed the project funds received.

The table below shows the financial report of the project.

Budget Line Item	Project Activity	Budget	Actual	Balance
WP 1	Project management and coordination	18,300	20,504	(2,204)
WP 2	Regional platform for collaboration and stakeholder consultations	222,023	196,145	25,878
WP 3	Assessment for identifying the mechanism(s) to enhance the communications (information sharing) of water level/flow risks for normal, extreme and emergency conditions (Objective 1)	42,984	47,366	(4,382)
WP 4	Assessment on climate change impacts, the roles that hydropower projects could play in adaptation and mitigation to impacts of extreme events and risk from flow level fluctuations, and review and analysis of existing regional research-policy platforms to enhance transboundary cooperation on these issues (Objective 2 & Objective 3)	45,394	60,360	(14,966)
WP 5	Reporting and outreach	21,850	29,717	(7,867)
		<b>350,550</b>	<b>354,091</b>	<b>(3,541)</b>
	Management Fee 10%	38,950	35,409	3,541
	<b>Total</b>	<b>389,500</b>	<b>389,500</b>	<b>(0)</b>