Platforms for cooperation in the Mekong-Lancang River Basin – enhancing data sharing, joint studies and collaboration

Project Policy Brief

EXECUTIVE SUMMARY

Policy challenge

There is a growing body of scientific evidence that shows that extreme climate-related events in the Lancang-Mekong River Basin are increasing in both frequency and intensity and pose large uncertainties for the future of river flows. The presence of large water storage structures associated with hydropower development in the basin provides an opportunity to build resilience to the impacts of climate change. But this is only provided other enabling factors are met, for instance, having large enough storage with adaptive flood and drought strategies, and if the reservoirs are not affected by changing rainfall patterns.

An analysis of daily water level data at the four northernmost hydrological monitoring stations of the Lower Mekong Basin conducted by this project shows a significant increase in river level fluctuations in the upper part of the Lower Mekong Basin during 2014-2017 compared to fluctuations in the period before the expansion in hydropower development in the region (1960-1990). However, the fluctuations could also be caused by heavy rainfall downstream of the dams and needs further investigation. This situation is likely to be exacerbated by more extreme weather events related to climate change. The management of hydropower dams and other water infrastructure on the mainstream and tributaries of the Lancang-Mekong River while providing opportunities for flood control, drought relief and navigation could also amplify the risks of adverse consequences such as flooding and erosion as well as impacts of the livelihoods of downstream communities. Reducing the risks and realising the benefits of reservoir management requires improved cooperation between upstream and downstream countries that could be enhanced by greater data and information sharing and timely communication about planned and actual water releases.

Objective of the study and this policy brief: For the reasons mentioned above, Thailand proposed the "Transboundary cooperation mechanism on adaptation to climate change and hydropower development projects" to identify how regional platforms in the Mekong-Lancang basin could be enhanced to address technical solutions, and improve communication and collaboration among the riparian countries.

Overall findings: 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. 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.

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. 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).

Analysis of other international river basins suggests data and information sharing is not always the first step to building more comprehensive cooperation. Other mechanisms may be needed first or in parallel and include joint studies, research, technical exchanges and other mutually beneficial projects. Incorporating data and information exchange mechanisms within water treaties is not a guarantee that the Parties will in fact exchange data and information. Agreements without specific types of data and information could lead to weaker exchanges but in some cases this ambiguity leaves channels open for more specific data needs in the future.

Existing regional mechanisms for cooperation: With the plethora of existing mechanisms for Mekong cooperation, countries would be well served by better articulating their strategies for engaging with each other through the various existing and evolving platforms.

Integration of MRC information monitoring and data management systems and National Information Systems being developed under the MLC could also enhance the capacity for sharing data and information among all parties. This could be supported by projects examining the impacts of water fluctuations during routine hydropower management and how these might be addressed through coordinated tributary and mainstream releases and early warning systems. Engagement on data sharing with energy sector operators will be important. Project-specific engagement might help build trust and support for more enduring data sharing over time.

SWOT analyses on MRC, MLC/LMC, JCCCN underscore the strong commitment to regional cooperation by all riparian countries. Having both MRC and MLC/LMC need not be seen as diffused or duplicative. Having two regional cooperation platforms for the Mekong with their own distinct and complimentary approaches can be a source of strength for the region.

Recommendations: The paper *"Climate change impacts on water resources in the Mekong River Basin – The role of hydropower projects in minimizing associated uncertainty and risks"* (Working Paper number 1) suggests that climate change uncertainties call for a range of adaptation strategies, the key being an enhanced role of hydropower projects in adapting to risks from climate change and water level fluctuations. At the policy level this can be done by integrating hydropower development and management into national and regional climate change adaptation, disaster management and flood and drought strategies and vice versa, integrating climate change adaptation into the water-food-energy nexus.

Working paper number 2 "*Data sharing mechanism in the Mekong-Lancang Region: Opportunities and Challenges"* focuses entirely on MLC as the platform that includes China and highlights that policy responses on the need for improved data sharing in regards to water fluctuations in the upper part of the lower Mekong must incorporate China's views on the matter. To ensure there will be a joint body to oversee and regularly monitor and report on the progress of data-sharing practices in the region, the key implementation tool recommended is to establish an expert group or advisory group on data and information that would assess needs, design further practical common guidelines and steps for data sharing and capacity building.

This policy brief makes five recommendations as summarized below.

Recommendation 1 – Project proponent (Thailand) to present to the JWG on MLC/LMC Water Resources at the Ministerial level, a brief policy paper on the need for an integrated and regional approach summarizing agreed recommendations from this Project to use for discussions with key national ministries involved in hydropower development and management and climate change adaptation to develop an action plan for the recommendations. These recommendations should clearly specify actions to be taken up under MLC and MRC or jointly. Communication protocols with complimentary technical inputs in emergency situations also need to be formally established.

Recommendation 2 –The JWG on MLC/LMC Water Resources to a) build on existing expert groups in the MRC to develop common definitions, joint needs assessments and practical guidelines for data sharing, b) task MLC experts to develop data sharing arrangements and communication protocols as part of a response action plan for flood releases and flood storage from reservoirs, which is being pursued by MRC.

Recommendation 3 –The JWG on MLC/LMC Water Resources Cooperation and MRC through the LMWRCC and MRCS to jointly assess capacity needs associated with hydropower for climate change adaptation and hydrological data sharing and develop a capacity building program that takes advantage of each platform's niche, knowledge base and partners.

Recommendation 4 –LMWRCC (for MLC) and MRCS to identify issues based on their MoU to be signed within 2019 that will be jointly addressed where certain issues can be discussed in the annual forums or associated events. A forum could be organized co-hosted by LMWRCC and MRCS bringing experts who would not normally be included in the MRC's Dialogue Meetings, which are targeted at decision-makers.

Recommendation 5 – Thailand as Project proponent and Viet Nam as country lead for transboundary river cooperation and information sharing to jointly propose the inclusion of navigation-related data sharing into the MLC's Five-year Action Plan "area of cooperation" on transboundary river cooperation and information sharing.

A summary of recommendations from Project Working Paper 1 (climate change impacts and the role of hydropower projects) and 2 (enhancing data-sharing mechanisms) are included in **Annex 1.**

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Part I Introduction

1.1 Policy Challenge

1. Climate change is expected to substantially change the flow regime of the Mekong-Lancang Basin's rivers, particularly due to impacts on the timing, intensity and duration of precipitation. These changes may be evident at multi-year, annual, seasonal and daily time scales and will interact with changes in flow due to the operation of reservoirs for hydropower production.

2. Rapid fluctuations in flow, including due to extreme weather events, can have negative impacts on downstream communities, flooding traditional riverbank gardens and other low-lying areas and damaging productive assets including fishing gear, boats, pumps and other machinery. Unnatural and climate change-induced altered flows also affect birds and other animals nesting on riverbanks. In particular, the rapid development of hydropower storage reservoirs on the mainstream and tributaries and their power generation presents both risks and opportunities for local communities in dealing with the impacts of climate change and associated extreme events.

3. The management of hydropower reservoirs has the potential to exacerbate natural water level fluctuations, but could also enhance flood control, help mitigate droughts and improve navigation. The challenge for policy makers is to identify and implement measures that mitigate the negative while leveraging the positive aspects made possible by the greater control that can be exerted by regulating river flows.

4. Mitigating the risks and realizing the opportunities requires cooperation among all parties, especially between upstream parties in control of operations and downstream parties affected by the changes in water levels. While there is much cooperation already occurring on water resource management within the Mekong-Lancang Basin, the scale of the anticipated climate change impacts means that cooperation to support improved operational decisions for dam management, and better capacity for planning and adaptation downstream in response to those decisions will need to be enhanced.

5. This policy brief examines the existing regional mechanisms for cooperation and their potential role in enhancing dam reservoir management to address climate change uncertainties and subsequent water flow fluctuations and improving data sharing from reservoir management to allow sufficient time for analysis and communication to end users. This could be used to help identify the most appropriate regional cooperation platform(s), the enabling factors for their success in relation to climate and operational impacts on water levels, and the mechanisms that could be used to enhance cooperation in managing and responding to changes in water levels over time. This will also help facilitate national implementation of the 2030 Agenda for Sustainable Development, particularly of the Sustainable Development Goals (SDG) number 6 "Clean Water and Sanitation" and number 7 "Affordable and Clean Energy", which are closely interlinked with goal 13 on "Climate Action".

1.2 Background

6. The Mekong-Lancang River rises in the Tibetan Plateau of China and after traveling through six countries over approximately 5,000 km, discharges into the South China Sea through the Mekong Delta. The Mekong-Lancang River Basin is exposed to water-based disasters. Within the Mekong Basin over the period from 1970 to 2012 there have been over 300 floods and storm surges (MRC, 2015). In China's Yunnan Province, the frequency of droughts has increased with unprecedented and continuous below-average rainfall over the period 2009 to 2011 while severe drought was felt across the Mekong-Lancang Basin from October 2012 to April 2013, and again in 2016. These events have resulted in significant declines in agricultural output and associated livelihood impacts.

7. There is a growing body of climate-related evidence for the Mekong-Lancang Basin that indicate that overall the region will become slightly warmer, with a longer dry season covering a larger area of the basin (Eastham et al., 2008; International Centre for Environmental Management (ICEM), 2009; TKK and SEA START RC, 2009; ICEM, 2013). 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 predicted impacts of climate change will likely coalesce to produce more variable precipitation and extreme events (i.e. floods and drought) across the basin.

8. Building on the topography of the area the Lancang flows through in China, a cascade of ten hydropower reservoirs have been commissioned on the mainstream of the middle and lower reaches of the river, mostly for the purposes of hydropower generation. In the Lower Mekong River Basin, hydropower development has mostly been confined to the tributaries, although 11 mainstream dams are in various stages of planning and development.

9. The development of these large water storage structures provide important contributions to the development agendas of countries in the basin through the provision of electricity to drive economic growth; the storage of flood water and subsequent release during low flows with positive implications in addressing extreme events associated with floods and drought; and opportunities for irrigation thereby ensuring food production.

10. Analysis undertaken by recent studies (Adamson 2009; Cochrane *et al.* 2014; Räsänen *et al.* 2017) shows a clear trend of daily flow fluctuations. It is this daily fluctuation that has raised concerns among riparian communities in northern Thailand and Lao PDR particularly for those communities cultivating or setting fishing gear along the banks and for boat people. Enhancing cooperation in managing these fluctuations provides an opportunity to build resilience to the impacts of future climate change across the basin. This is evidenced by the role that China played in providing supplemental emergency water from its cascades in the Lancang River to the Mekong River by increasing water discharges from China's Jinghong reservoir to address drought conditions in the Mekong Basin between March to May 2016 (MRC and MWR China, 2016).

11. The above example exemplifies the growing collaboration between China and countries in the Mekong Basin that holds significant positive benefits in the transboundary and basin-wide management of water resources and addressing the challenges associated with extreme events. Further, the need for greater bilateral cooperation between countries over issues of common interest provides opportunities for joint activities, initiatives and the emergence of collaboration platforms that facilitate the exchange of information.

Part II Enhancing cooperation through data sharing, joint studies and other mechanisms: lessons from other international river basins

12. Data sharing and information exchange in transboundary river basins helps to build trust and provides a common basis for cooperative action among riparian states. It has a strong basis in international law including in relation to the 1997 United Nations Convention on Law of the Non-Navigational Uses of International Watercourses and as affirmed in various other international agreements (Paisley and Henshaw, 2013). As identified by Paisley and Henshaw (2013): "absent such sharing and exchange, it becomes extremely difficult for basin states and institutions to manage water uses, formulate basin-wide policies, or take steps to minimize floods, droughts and pollution" and (Eckstein 2010) "adequate and effective data and information sharing and exchange is one of the key principles behind an emerging good governance framework for shared river basins".

13. Data and information sharing is also often understood as the starting point for deeper and more comprehensive cooperation regarding shared resources (Chenoweth and Feitelson, 2001). This is because data sharing provides a common basis for cooperation with a shared understanding of physical realities that can be further developed through joint studies, research and discussion of management options.

14. The International Network of Basin Organisations (INBO) identifies Information and Communication Systems (including tools and protocols) as key indicators of successful management in transboundary basins. Hooper (2006) identifies 'information and data sharing procedures' and 'regular communication' as mechanisms for improving coordination, and 'evidence of sharing of data' and 'information exchange' as general performance indicators for effective river basin management.

15. While the value of data and information sharing in effective transboundary river management is clear, it is not necessarily the case that ongoing mechanisms for data sharing and information exchange will necessarily be established up-front. Initially the exchange of data and information might occur through *ad-hoc* and project-based avenues in order to build trust between the parties for more enduring arrangements. Of course, the availability of common information is a necessary starting point for joint modelling and studies and as a basis for planned measures and the harmonization of monitoring approaches (UNECE, 2018).

16. Chenoweth and Feitelson (2001) identify the factors that promote data and information exchange as being "(i) the presence of compatible needs, (ii) absence of legacies of mistrust, (iii)

increasing water resources stress, (iv) perceptions that cooperation is of mutual benefit, (v) external pressure and funding, (vi) comparable levels of institutional capacity, (vii) popular and political concern about water resources management, and (viii) functional formal or informal cooperative arrangements". Groups whose members have heterogeneous interests are less likely to successfully solve collective action problems (Libecap, 1995; Agrawal, 2002).

17. Identifying common interests is therefore critical, although ultimately, implementing water resources data and information exchange depends upon the political will and agency of states to use the existing institutional environment for the mutual benefit of their riparian neighbours (Gerlak et al., 2011). Often there is a deficit of trust that must be overcome, particularly in relation to how data will be used (Timmerman, 2004). Therefore, mechanisms that help build trust and demonstrate good faith are to be encouraged. Mechanisms that have helped to build trust elsewhere include joint projects, studies, research, technical exchange, technology transfer, and capacity building activities.

18. In cases where there is a distinct and pronounced lack of confidence to begin with, as well as extreme water stress, building confidence between the parties through processes other than data and information exchange in the short-term may lead to better outcomes (Chenoweth and Feitelson, 2001). Importantly, data exchange is not an end in itself, but is necessary as a support to decision making. In this regard there is no one-size-fits-all approach, with a wide range of flexibility being shown in approaches around the world.

Part III Existing Regional Platforms

3.1 Current Cooperation Efforts

19. There are a range of existing regional platforms for cooperation within the Mekong-Lancang Basin. These include the only river basin organisation, the Mekong River Commission (MRC), the relatively new Mekong-Lancang Cooperation or Lancang-Mekong Cooperation (MLC/LMC) initiative, several third-party supported regional cooperation initiatives (i.e. the Lower Mekong Initiative, Mekong-Japan, and Mekong-Republic of Korea), and existing regional and global institutions that include areas of focus related to water resources management (i.e. ASEAN, ADB's Greater Mekong Sub-region economic cooperation program, and different arms of the World Bank Group including the World Bank itself and the International Finance Corporation). There is also an existing mechanism for cooperation specifically on navigation, the Joint Committee on Coordination of Commercial Navigation (JCCCN).

20. The **Mekong River Commission** has as its legal basis the 1995 Mekong Agreement, with the purpose of facilitating the sustainable development, management and conservation of the water and water-related resources of the Mekong Basin. Its Members are the four Lower Mekong Basin countries, Cambodia, Lao PDR, Thailand and Viet Nam, with Myanmar and China as dialogue partners.

21. The MRC has several mechanisms in place to facilitate cooperation between upstream and downstream riparian states. Dialogue partners participate in MRC governance meetings and there are regular visits and exchanges of information between the MRC, its Member Countries

and China in particular. The MRC also has existing mechanisms for data sharing and exchange with China through its extensive hydrological monitoring network. The sharing of hydrological data by China has been occurring since 2002 although despite efforts from the MRC to establish year-round data sharing arrangements, is still limited to the flood season and otherwise case-specific transfers. China has previously indicated an interest in sharing dry season data during extreme drought years but remains to be convinced of the need for ongoing data transmission throughout the year.

22. One of the gaps in the current MRC approach to enhancing cooperation is that no formal working group arrangements exist under the dialogue partner mechanism to identify and agree on cooperation and joint efforts. Nevertheless, there is a strong positive trend on MRC engagement with China. Chinese delegations to the annual MRC Dialogue Partners meeting continue to include relevant line agencies and institutions. China, for the first time, has agreed to the inclusion of a section on the Upper Mekong Basin in the next State of the Basin Report. Joint research between MRC, China and the International Water Management Institute, i.e. the Joint Observation and Evaluation of the Emergency Water Supplement from China and its effect of easing the drought situation in the Mekong Basin in 2016 was also a step towards strengthened cooperation. In addition, technical exchange between MRC and China has been institutionalized in the form of a regular "Joint Technical Symposium" and there is a history of personnel exchanges between China and the MRC through the Junior Riparian Professional program. Technical workshops have been held on sediment control and managing river dams.

23. The **Mekong-Lancang Cooperation (MLC/LMC)** Initiative is an intergovernmental initiative established in 2015 by the six riparian countries and water resources is one of five MLC priority areas. At present there is no official international secretariat although coordination units have been established in each country and there is a Joint Working Group (JWG) on Water Resources in which all the parties participate. MLC is establishing mechanisms for data sharing and exchange, including though National Information Systems and National Technical Working Groups to facilitate data integration and information sharing on water resources at the national level and exchange and cooperation with MLC focal points and the Joint Working Group. The MLC is also working on joint research, model development and studies on water quantity and quality. Its five-year action plan on water resources cooperation includes amongst other things a focus on transboundary river cooperation and information sharing (including hydrological data). It anticipates achieving cooperation through policy dialogues, joint studies, capacity building and joint projects.

24. To support the joint working groups, technical centres have been established in China. These are the Lancang-Mekong Water Resources Cooperation Center (LMWRCC), which will be set up to serve as the Secretariat for the JWG for Water Resources Cooperation, and the Lancang-Mekong Environmental Cooperation Center (LLMECC). Further centers in other fields such as Agriculture, are envisaged. The MLC has established a Special Fund in order to support projects that contribute to the objectives of the initiative and a first batch of projects under the fund were approved in early 2017.

25. In addition to the intergovernmental platforms of the MRC and MLC, several multilateral organisations focus on cooperation in the Mekong Region. These include ASEAN, with its overarching remit in relation to economic development and ensuring peace and security, and international finance organisations including the World Bank and the Asian Development Bank.

Each of these entities also cooperates with the MRC and the MLC across a range of areas although their data and information sharing mechanisms are mostly limited to project-based arrangements.

26. The **World Bank** has been working closely with the MRC and LMB countries on the implementation of the Mekong Integrated Water Resources Management Project (M-IWRMP). The M-IWRMP is a cross-cutting project that has promoted IWRM practices of coordinated planning and management of water resources with the application of MRC procedural rules on water use planning, data sharing and flow monitoring since 2010 and a focus on enhancing transboundary dialogues.

27. The **Asian Development Bank (ADB)** has also worked closely with MRC on flood management and mitigation in the past including co-funding the MRC Flood Management and Mitigation Program and contributed to the GMS flagship program on flood control and water resources management. MRC and ASEAN's work help identify priority funding needs for ADB and other development partners. Of particular relevance is financing for the next ten-year Water Operational Framework 2021-2030, which is in the initial stages of formulation.

28. The **Association of South East Asian Nations (ASEAN)** has working groups on Water Resources Management and Climate Change; China is a dialogue partner of ASEAN where both parties agreed to cooperate on a range of issues including Mekong Basin Development, energy, environment and disaster management. The ASEAN Agreement on Disaster Management and Emergency seeks to provide mechanisms to reduce the loss of life and assets due to disasters. However, it is not necessarily involved in water level fluctuations where the impacts are not disasters. ASEAN's strategic action plan on water resources management includes climate change and extreme events as one of four key issues.

29. The **Joint Committee on the Coordination of Commercial Navigation (JCCCN)** coordinates implementation of the agreement on commercial navigation on the Mekong-Lancang River among the governments of China, Lao PDR, Myanmar and Thailand. The agreement identifies data exchange as an explicit matter for cooperation amongst parties under Article 21, although clearly the focus of this is in relation to navigation safety and so it does not address other sectors and broader impacts directly. From the latest JCCCN meeting in late February 2019 the parties further discussed implementation of Article 21 item "(f) for the purpose of safe and smooth navigation, especially in dry season, to cooperate to a possible extent in the provision of water flow and the relevant data".

3.2 Opportunities to enhance cooperation

30. In considering opportunities to enhance cooperation on reservoir management in the context of climate change, it is important to recognise that multiple parties are already engaged in efforts to enhance cooperation between upstream states and the Lower Mekong Basin countries, including through improved data sharing arrangements.

31. For instance, the MRC considers the sharing of data in the dry season, information on Chinese dam operations, and a mechanism for warning downstream communities of significant changes to daily dam operations as the key areas of future cooperation. Opportunities to achieve this

might include arrangements with China as a dialogue partner to the MRC or by MRC Member Countries working with China through their participation in the MLC. One advantage of the MLC platform is its working group arrangement. As of June 2019, MLC countries are nominating the types of expert groups that would be set up to provide technical knowledge and intellectual support for the implementation of the Five-year Action Plan. MRC is also building up its capacity in this area through the establishment of Expert Groups to support achievement of its strategic objectives, notwithstanding that China and Myanmar are not members of these Expert Groups. However, the MRC Joint Committee approved (in April 2019) to invite the LMWRCC as an observer to the Expert Group on Strategy and Partnership. The MRC already has in place good systems for data collection, transfer and management through its Mekong-HYCOS network, but the MLC is also working to improve data integration, management and sharing through its establishment of National Information Systems including data centres in each country.

32. The Mid-Term review report of the MRC's Strategic Plan 2016-2020 identified a strong need for greater focus on operational implementation, beyond scenario assessment and planning, and further engagement of China on data sharing, flood forecasting and drought mitigation. The greater focus on operational implementation is agreed by the MRC members and is reflected in the updated Sustainable Hydropower Strategy and will also be reflected in the updated Basin Development Strategy (BDS). China has agreed to consider engaging more in the updating of the BDS this year. The MRCS has been granted observer status to the JWG for Water Resources Cooperation. The MOU between MRCS and LMWRCC should be finalized this year.

33. The MRC has updated its Cooperation Strategy and Plan with China and Myanmar for the period 2017-2020. One element that will need to be clarified in its engagement with China on data sharing and a mechanism to provide downstream warning of changes to daily operations, is what constitutes a significant change in daily water levels requiring notification.

34. Building on the study examining the effect of water releases during the extreme drought of 2016, the six riparian countries agreed, during the 20th MRC Dialogue Meeting, to conduct a joint assessment to examine the links between floods and droughts with the Lancang cascade reservoirs. This is a joint effort between the China Institute of Water Resources and Hydropower Research (IWHR), the International Water Management Institute (IWMI), Lancang-Mekong Water Resources Cooperation Center (LMWRCC), Mekong River Commission Secretariat (MRCS), and the National Mekong Committees of each country.

35. The study includes a comparative analysis of droughts considering the operation of dams (i.e. Xiaowan Dam in 2012-13 compared to 2009-10 when it was not yet in operation) and involves the collection of hydro-meteorological data recorded during four extreme events. Studies such as these can help demonstrate the benefits to all parties of greater cooperation in data and information sharing and there would be value in building on this work to jointly undertake a comparative analysis of the scale of daily water level fluctuations both before and after dam operations and the impacts of this on downstream communities. The 2016 study noted the important role of tributary dams in drought relief as well as the mainstream dams and thus information exchange and cooperative action is a multi-party issue.

36. Under the LMC framework, China has started providing the same hydrological information in the flood season to all five other members of the LMC as well as to MRCS through a copy of that communication. Moreover, China also has a formal arrangement to provide advance notice to

LMC members, (with a copy to MRCS) of any releases from Jinghong dam that are supplementary to the prevailing reservoir operating regime. MRC members have voiced support for MRC's cooperation with China through the JWG on Water Resources and the LMWRCC. From MRC's side a new channel for cooperation is the MRC Expert Group on Strategy and Partnership, whose role includes developing and reinforcing cooperation with partners and stakeholders.

37. The Mid-Term review of the MRC's Strategic Plan 2016-2020 also proposed that to advance cooperation with LMC, the MRC should: 1) Institutionalize relations with the MLC JWG on Water Resources by reciprocating the invitation to MRCS to join the JWG's regional meetings as an observer by the JWG's designated representative or Secretariat joining the Dialogue Partner meeting as an observer, 2) seek MLC funding for NIP joint projects; 3) Focus on building relationships, including data sharing, with modelling and information (data) centres in member countries in order for MRCS to access hydrological data from China.

38. **IFC** can bring opportunities to engage the private sector in data sharing and cooperation, including potentially dam developers and operators. The mid-term review of the MRC's strategic plan identified that data sharing from dam developers is one of the key missing pieces in the Mekong hydrological monitoring network.

39. The **World Bank** support to joint bilateral projects is coming to an end and a new relationship is being considered. There is a knowledge base and experience from implementing the M-IWRMP on which to build, in particular, through efforts to enhance regional water resources management and strengthen transboundary dialogue. Funding and technical assistance from the World Bank and others such as IFC and ADB, might usefully be targeted at improving data integration and harmonisation of systems and supporting engagement on water level fluctuations from more routine reservoir management, beyond the extreme event analysis that the six countries have already agreed to examine.

40. Other Mekong regional initiatives that do not include China such as the Lower Mekong Initiative (LMI), Mekong-Japan, Mekong-Korea and similar programs with a larger scope than water resources could be utilized to fill the gaps in capacity building.

41. The organizational structures for MLC/LMC and MRC are provided in **Annex 2.**

Part IV: SWOT Analysis and Policy Recommendations

4.1 SWOT Analysis

42. Below is a SWOT Analysis of the MRC, MLC and JCCCN in relation to their potential role in enhanced cooperation on water level/flow risks from climate change and reservoir management. The **Strengths and Weaknesses** of these regional bodies relate to their status as platforms for cooperation and the mechanisms within their control while the **Opportunities and Threats** (or risks) arise from external factors beyond the direct influence of the platforms themselves. Considering this SWOT analysis policy recommendations are then made drawing on this project's accompanying studies: "Climate change impacts on water resources in the Mekong River Basin – The role of hydropower projects in minimizing associated uncertainty and risks" (Working Paper number 1) and "Data sharing mechanism in the Mekong-Lancang Region: Opportunities and Challenges" *(Working Paper number 2).*

43. **MRC strengths** include: a legal basis for cooperation; a secretariat with well-established operational arrangements, cooperation protocols and procedures for water use and management as well as regular high-level dialogues; a high level of commitment from members; long history of cooperation including year-round data exchanges; broad stakeholder familiarity with MRC's work and participation in MRC's annual regional stakeholder forums; and an extensive knowledge base and network of hydrological monitoring stations.

44. **MRC weaknesses** include: limited to the lower Mekong Basin countries; country participation focused on developing strategies and plans but with limited joint basin management; difficulty reaching agreement on data exchange under PDIES due to lack of agreements documenting exactly what should be provided by whom and when; lengthy formal protocol arrangements; Dialogue Meetings with China and Myanmar have mostly been operated for exchanging reports rather than developing and agreeing further collaboration or joint initiatives.

45. **Opportunities under MRC framework**: clear statements from China at ministerial-level meeting to continue cooperating as a Dialogue Partner and at summit level on the importance of MLC not duplicating MRC's work; efforts to enhance synergies with other regional processes such as ASEAN, ADB/GMS allow for close cooperation with other development partners.

46. **Threats/risks from utilizing MRC**: MRC is transitioning from being largely development partner-funded to self-financed by member countries. Economic downturns could put MRC at risk of not being prioritized, especially if decision-makers do not see the value-added of regional cooperation. Implementing agencies put domestic goals above perceived additional efforts required to contribute to regional cooperation demands. There is a perception that without China as a member, efforts made on basin-wide development and management is limited and can put off other development partners.

47. **MLC/LMC strengths** include: a high level of commitment from all Mekong riparian countries; is part of the broader but globally and regionally significant Belt and Road Initiative and highly

relevant to each party's development trajectory; links water resources to other development sectors; an agreed multi-year action plan with simple but flexible organizational and institutional arrangements; led by China which has extensive experience in water resources development and management, each area of cooperation is driven by a committed country "lead" and "co-lead".

48. **MLC/LMC weaknesses**: established for only three years and, thus, still finding its footing and focus; is project-based; project approach without an enduring architecture is more susceptible to disruption; the LMWRCC plays a facilitative role for all parties but staffed by only Chinese nationals; limited sharing of real time and data beyond wet season levels and rainfall for flood forecasting; public participation and stakeholder involvement is still limited.

49. **Opportunities for cooperating via MLC/LMC**: gaps in basin-wide development and management could be addressed with a nimble project approach as the platform builds its foundation and explores setting basin-wide standards; the four "modalities of cooperation"(policy dialogues, joint studies, capacity building and joint projects) allows for a flexible yet concrete approach.

50. **Threats or risks to utilizing MLC/LMC**: limited data sharing could be the cause of tensions or an opportunity for big breakthroughs with any lack of progress potentially undermining mutual trust in upstream-downstream relations; the relationship between MLC/LMC and MRC is still being defined, thus raising risks around duplication of efforts and leading to uncertainties about long-term planning and management of the basin and where development partners, relevant institutions and stakeholders should invest.

51. The **JCCCN's strengths** include: only regional platform for cooperating on commercial navigation on the Mekong; has legal basis for cooperation, long history (since 2000); with common rules and cooperation mechanisms; specific articles on exchange of information on navigation channels relating to navigation safety and water flow data provision. **Weaknesses**: responsible government agencies for JCCCN not directly involved in water cooperation platforms such as MLC and MRC leading to slow progress discussing water data and information exchanges; lack of permanent body/Secretariat exacerbates this weakness. **Opportunities**: importance of safe and efficient navigation to trade in the upper part of the lower Mekong underscores the need for timely communication on water level fluctuations: **Threats**: since the end of MRC's Navigation Programme due to lack of donor interest MRC's work on waterborne transport on the Mekong has diminished.

4.2 Recommendations and policy implications

52. The SWOT analyses on MRC and MLC/LMC above underscore the strong commitments to regional cooperation by all riparian countries. Having two such regional platforms for the Mekong need not be seen as diffused or duplicative as some fear. Having two regional cooperation platforms for the Mekong with their own distinct and complimentary approaches can be a source of strength for the region. Both platforms also make efforts to support the 2030 UN Agenda for Sustainable Development. MRC in particular show clear links how its outputs and outcomes contribute to the Sustainable Development Goals including number 6 "Clean Water

and Sanitation" and number 7 "Affordable and Clean Energy", which are closely interlinked with goal 13 on "Climate Action".

53. The section below looks at recommendations from the two technical papers for this project and recommends further action to the Project proponent.

54. The paper "Climate change impacts on water resources in the Mekong River Basin – The role of hydropower projects in minimizing associated uncertainty and risks" (paper number 1 in this series of three) suggests that the occurrence of extreme climate events has increased in the Mekong River Basin and they are likely to continue to increase under future uncertainties related to climate change. The future of river flows and water resources has large uncertainties. These uncertainties call for a range of adaptation strategies, one of which is the potential role of hydropower projects in usefully adapting to risks from climate change and water level fluctuations.

55. Recommendations from the Climate Change and Hydropower paper include a mix of policy approaches targeted to MRC and MLC/LMC while paper number 2 "Data sharing mechanism in the Mekong-Lancang Region: Opportunities and Challenges" focuses entirely on MLC as the platform includes China, and policy responses to the need for improved data sharing in regards to water fluctuations in the upper part of the lower Mekong must incorporate China's views on the matter. The recommendations focus on establishing an expert group for data and information sharing to support the JWG on water resources cooperation in implementing its policy decisions. "Expert input" including development of a network of advisory groups is one of the implementation arrangements for the MLC's Five-year Action Plan on Lancang-Mekong Water Resources Cooperation (2018-2022).

56. ***Integrating hydropower development and management into climate change adaptation strategies and vice versa:*** The recommended policy of integrating sustainable hydropower development and management into MRC's climate change adaptation and sustainable hydropower strategies, and vice versa, integrating climate change adaptation into the water-food-energy nexus, will require going through the organization's traditionally lengthy consultation process to reach consensus. Due to differences with country perspectives, the issue of hydropower development needs to be delicately handled. As the MRC mid-term review observed, MRC has "to find new ways of making progress on highly sensitive and political decisions, and that the MRCS alone may not have the capacity to facilitate the 'water diplomacy' processes required". Nevertheless, due to basin-wide implications MRC is putting efforts to being closely involved in developing and monitoring implementation of Hydropower Cascade Joint Operating Rules for the Basin. On the other hand, opening up another avenue in the MLC/LMC JWG on Water Resources Cooperation by working through a dedicated advisory group to integrate climate change and the role of hydropower will shift the angle from the politics of water infrastructure development to a more technical discussion on standards of reservoir management. Projects being implemented by China with LMC Special Funds include assessments of current hydropower management with the aim of setting regional standards (mainly for dam safety and ensuring "green" development purposes) and can consider including operation standards for climate change adaptation. The drought situation during the 2019 monsoon season was worsened by required dam maintenance and testing resulting in even lower water levels. This highlights the importance of timely communication between the Mekong-Lancang countries and integration of hydropower management and climate change

adaptation measures. In what was deemed an emergency situation, diplomatic channels were opened to hold JWG-level discussions.

Recommendation 1 *– Project proponent (Thailand) to present to the JWG on MLC/LMC Water Resources a brief policy paper on the need for an integrated and regional approach summarizing agreed recommendations* from this Project to use for discussions with key national ministries involved in hydropower development and management, climate change adaptation, and flood and drought management to develop an action plan for the recommendations clearly specifying actions to be taken up under MLC and MRC or jointly. For MLC/LMC, if the timing of the Ministerial Level meeting allows, Thailand should seek for endorsement at the Ministerial level first. This would allow a quick endorsement by MRC's Joint Committee and Council in late 2019. The next phases of this Project could be put up for JWG approval in early 2020. Communication protocols with complimentary technical inputs in emergency situations need to be formally established.*

**The list of recommendations from paper number 1 and 2 are provided in Annex 1.*

57. ***Mobilizing expert groups under MLC***: Recommendations from the two technical papers recommend follow up actions on this Project on MLC/LMC establishing advisory or expert groups on data sharing, on flood and drought management, on hydropower and energy security, and on IWRM and climate change adaptation. The JWG on MLC/LMC Water Resources Cooperation is accepting country nominations of experts and scholars from relevant disciplines to establish a network of experts to provide technical knowledge and intellectual support. Working Paper 2 in effect prioritizes a specific policy problem and addressing the key issues through the MLC framework. On the other hand, the MRC's new operational arrangement (since 2016) focuses on its core functions, not sector-specific matters, and has established four Expert Groups and will be setting sub-groups for key sectors. To mitigate uncertainties about long-term planning and management of the basin and where relevant institutions and stakeholders should invest, the MLC should make strategic use of MRC as observer to the JWG and the LMWRCC observer to the MRC's Expert Group on Strategy and Partnership to align actions around developing common definitions, joint needs assessments and developing practical guidelines for data sharing.

Recommendation 2 *–The JWG on MLC/LMC Water Resources to a) build on existing expert groups in the MRC to develop common definitions, joint needs assessments and developing practical guidelines for data sharing*, *b) task MLC advisory and expert group(s) to develop data sharing arrangements and communication protocols as part of a response action plan for flood releases and flood storage from reservoirs, which is being pursued by MRC.*

58. ***Building Capacity and Partnerships***: Both papers advocate developing long-term capacity building, on the job training and exchange programs to address skills, knowledge and technical gaps needed to tackle the use of hydropower for climate change adaptation and hydrological data sharing. MRC and MLC both have cooperation modalities and policies that support advancing capacity through improvement in institutions, knowledge sharing, training and joint studies. Partnering with other institutions such as CSOs, academia and other RBOs is also a familiar approach for both regional platforms. Cooperation between universities among the six riparian countries is another avenue. Including a robust partnership program with the private

sector for technical and knowledge sharing is still underdeveloped. Efforts by MRC through its Expert Group on Strategy and Partnership to coordinate and lead Mekong-related regional cooperation frameworks to create strategic collaboration and joint technical work began in August 2019. Regular meetings will be held and MLC/LMC is one of the partners with the LMWRCC providing comprehensive support to the JWG to implement its five-year action plan (2018-2022).

Recommendation 3 *–The JWG on MLC/LMC Water Resources Cooperation and MRC through the LMWRCC and MRCS to jointly assess capacity needs associated with hydropower for climate change adaptation and hydrological data sharing and develop a capacity building program that takes advantage of each platform's niche, knowledge base and partners.*

59. ***One Basin, Two Platforms***: MRC organizes its annual Regional Stakeholder Forum each year focusing mainly on the platform's key products and processes such as developing the basin master plan or Mekong IWRM transboundary projects. MLC organized its first Lancang-Mekong Water Resources Cooperation Forum in 2018, which was welcomed by development partners as a sign of eventual greater public participation and stakeholder involvement in MLC water resources cooperation. Based on discussions with Chinese experts, MLC sees that its focus for water resources cooperation is on applying a multi-level/multi-lateral approach to improve the capacity of MLC countries to deal with floods, droughts and water utilization. MRC is seen as having its own advantages, particularly with processes such as the Procedures for Notification, Prior Consultation and Agreement (PNPCA) to prevent possible conflicts that may be brought on by water infrastructure development projects.

Recommendation 4 *– Based on the MoU between LMWRCC (for MLC) and MRC to be signed within 2019, the two regional platforms to identify issues that will be jointly addressed and specific issues that can be discussed in annual forums or associated events. Consider organizing a forum that both could co-host bringing experts who would not normally be included in the MRC's Dialogue Meetings, which are targeted at decision-makers.*

60. ***Improving communication on water levels for enhanced transboundary cooperation***: As one of the only water user groups with an intergovernmental agreement, JCCCN is now the only regional platform in the Mekong that addresses navigation issues with the level of attention it deserves. Since 2016 MRC resources allocated to waterborne transport were significantly reduced both in terms of staffing and funding. Although a range of initiatives are being undertaken and relationships maintained with responsible authorities, MRC's scope for influencing outcomes is limited with the current scale of activities. Under the MLC water resources cooperation framework, information and data sharing for navigation has not been part of the discussion yet.

Recommendation 5 *– Thailand as Project proponent and Viet Nam as country lead for transboundary river cooperation and information sharing to jointly propose to the MLC/LMC JWG on water resources cooperation the inclusion of navigation-related data sharing into the MLC's Five-year Action Plan "area of cooperation" on transboundary river cooperation and information sharing*.

List of key agencies consulted

The project team is very grateful to the experts from the following agencies who greatly contributed to the project consultation processes and provided useful information and suggestions.

Cambodia

- Department of Planning and International Cooperation, Ministry of Water Resources and Meteorology (MOWRAM)
- Office of Water Quality Analysis, Department of Hydrology and River Works, MOWRAM

China:

- Lancang-Mekong Water Resources Cooperation Centre (LMWRCC), China
- Department of International Cooperation, Science and Technology, Ministry of Water Resources (MWR)
- Changjiang River Water Commission, MWR
- Changjiang Institute of Survey, Planning, Design, & Research, MWR, China
- Changjiang Hydrology Bureau, MWR, China
- Nanjing Hydraulic Research Institute, MWR, China
- Changjiang River Scientific Research Institute, MWR

Lao PDR

- Lao National Mekong Committee Secretariat (LNMCS), MoNRE, Lao PDR
- Department of Water Resources (DWR), MoNRE, Lao PDR
- Department of Meteorology and Hydrology (DMH), MoNRE, Lao PDR
- Department of Energy Policy and Planning (DEPP), MEM, Lao PDR
- Department of Energy Management (DEM), MEM, Lao PDR
- Department of Energy Business (DEB), MEM, Lao PDR
- Department of Waterways (DoW), Ministry of Public Works and Transport (MPWT), Lao PDR

Myanmar

- Directorate of Water Resources and Improvement of River Systems (DWIR)
- Environmental Conservation Department (ECD)
- Department of Hydropower Implementation, Ministry of Electricity and Energy

Thailand

- Thai National Mekong Committee Secretariat (TNMCS)
- Office of the National Water Resources (ONWR), Thailand
- Bureau of International River Basin Management, Department of Water Resources (DWR),
- Bureau of International River Basin Management, DWR
- Bureau of Research, Development and Hydrology, DWR
- Water Crisis Prevention Center, DWR
- Electricity Generating Authority of Thailand (EGAT)
- Department of International Economic, MOFA
- Office of Natural Resources and Environment Policy and Planning (ONEP)
- Thai Metrological Department (TMD)
- Office of Permanent Secretary, Ministry of Energy (MOE)

- Marine Department (MD)
- Department of Disaster Prevention and Mitigation (DDPM), Ministry of Interior (MOI)
- Hydro Informatics Institute (HII)

Vietnam

- Vietnam National Mekong Committee Secretariat
- Institute of Water Resources Planning, Ministry of Agriculture and Rural Development

Others

- MRC Secretariat (MRCS), Lao PDR
- MRC Regional Flood Management and Mitigation Centre (MRC RFMMC), Cambodia
- Australia Department of Foreign Affairs and Trade (DFAT)
- International Finance Corporation's (IFC) hydropower advisory program in Asia
- World Bank (WB)
- IHE Delft Institute for Water Education

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ANNEX 1: Summary of recommendations from Working Papers No 1 and No 2

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, the Five-year Action Plan of the MLC's Water Resources Cooperation 2018-2022, and the mandates of the Mekong River Commission (MRC).

Recommendations from Working Paper Number 1: *Climate change impacts on water resources in the Mekong 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 the extreme events through enhancing data sharing, such as the daily dry season flows and daily water releases from large hydropower projects on the Mekong-Lancang mainstream and tributaries, through existing regional mechanism such as Mekong-Lancang Cooperation (MLC), Mekong River Commission (MRC) and Joint Committee on Coordination of Commercial Navigation (JCCCN). Also, enhance hydro-meteorological observation networks and forecasting systems on the Mekong-Lancang mainstream and tributaries, and utilize high-resolution satellite data, to improve monitoring and early warning.
Recommendation 2: Integrate sustainable hydropower development into climate change adaptation strategy and disaster management strategy, including flood and drought management programmes at the national and regional levels. Also, integrate climate change adaptation measures into the water-food-energy nexus and sustainable hydropower planning and development to promote the appropriate design and multipurpose uses of hydropower projects for managing extreme floods and droughts.
Recommendation 3: Develop education and public awareness-raising programmes on climate change, its impacts, and the role of hydropower in adaptation measures to minimize risks to vulnerable communities. These efforts can be integrated into the Five-year Action Plan on Lancang-Mekong Water Resources Cooperation (2018-2022) in the areas of IWRM and climate change adaptation and MRC Mekong Climate Change Adaptation Strategy and Action Plan (2021-2025) and national adaption strategy and action plans to enhance the capacity of communities to adapt and address current and potential impacts of climate change at the grassroots level.
Recommendation 4: Conduct basin-wide joint studies through the MLC and MRC or bilateral cooperation on the following topics: • Evaluation of the capacity of existing and proposed hydropower projects in mitigating extreme floods and providing drought relief, and associated downstream transboundary benefits from flood and drought relief, including the capacity of hydropower projects and dam safety for adapting to climate change uncertainty • Management of rapid water level fluctuations and associated causes • Mechanism for data sharing during emergency situations related to extreme floods, droughts and rapid water level fluctuations • Extreme events, their transboundary socioeconomic impacts, and disaster risk management
Recommendation 5: Develop joint operational guidelines/procedures based on national and international standards among the MLC members for the cascade of hydropower projects on the Mekong-Lancang mainstream and main tributaries for climate change adaptation and minimizing downstream transboundary impacts from extreme floods, droughts and rapid water level fluctuations through mainstreaming this recommendation into Five-year Action Plan on Lancang-Mekong Water Resources Cooperation (2018-2022) in the areas of IWRM and climate change adaptation and sustainable hydropower development and energy security and national policy on hydropower and water resources management.
Recommendation 6: Support, promote and increase engagement of hydropower sector with responsible business practices and use of local knowledge of downstream communities to seek sustainable solutions for minimizing transboundary impacts and maximizing the benefits of hydropower development and operation through the existing regional mechanism such as MLC and MRC and the existing mechanisms at national level.
Recommendation 7: Formulate a long-term regional capacity-building programme involving job training, and exchange workshops and forums into Five-year Action Plan on Lancang-Mekong Water Resources Cooperation (2018-2022) in the areas of IWRM and climate change adaptation and sustainable hydropower development and energy security and Mekong Climate Change Adaptation Strategy and Action Plan (2021-2025) to share good practices and lesson learned on using hydropower projects on managing climate risks (flood and drought management) and water level fluctuations, and on dam safety.

Recommendations from Working Paper Number 2: *Data sharing mechanism in the Mekong-Lancang Region: Opportunities and Challenges – specifically for the MLC JWG for water resources cooperation*

Climate change has underscored the need for dry season, if not year-round, water data sharing among the six Mekong-Lancang countries in addition to only formal agreement so far that is limited to the wet season. Furthermore, data sharing and communication protocols need to be put in place in case of emergency when, given short notice, only key government agencies would be required to take immediate action. The recommendations below are aimed to mainly inform the high-level decision makers and the JWG on Water Resources Cooperation of MLC on the opportunities to further enhance water data sharing mechanism in the region. Designation an advisory or expert group is the key approach the project team proposes to ensure there will be a joint body to oversee, regularly monitor and report on the progress of data sharing practices in the region and to support long-term efforts in enhancing data sharing in the future.

Medium-term measures:
Recommendation 1: Establish an Expert Group (EG) or Advisory Group (AG) on data and information sharing composed of a small group of national experts from each participating MLC country. Where needed, the EG/AG can partner with other organizations such as universities, international organizations, research institutes/networks, non-government agencies in the home country and even other experts from other transboundary rivers to support related activities for enhancing data-sharing. The EG/AG will directly report to the JWG on Water Resources Cooperation.
Recommendation 2: Along with the LMWRCC coordination and technical support, the EG/AG needs to carry out as a priority a "Joint Needs Assessment" in the MLC countries. This task 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 with the coordination and technical support of LMWRCC 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 entrusted by the JWG with the coordination and technical support of the LMWRCC shall act as a working committee for organizing regular annual workshops.
Recommendation 5: The EG/AG with the coordination and technical support of LMWRCC to design and implement a long-term capacity-building programme related to data for different levels (e.g. national, sub-national and local) for each MLC country.
Recommendation 6: EG/AG with the coordination and technical support of LMWRCC to design and implement a long-term capacity-building programme related to data for different levels (e.g. national, sub-national and local) for each MLC country.
Short-term measures
Recommendation 7: The LMWRCC to provide the coordination and technical support to the JWG members for Water Resources Cooperation in establishing the communication protocols as a hotline group with complimentary technical inputs for data/information sharing among the MLC members during emergency situations as soon as possible. In the interest of time, and for ease of initial informal communications, it is advised to make use of available social media such as WeChat for sharing data and exchanging information among the country's focal points, particularly during emergency situations. The group may consist of at least 4-5 persons per country from the six MLC member countries, in which the JWG-WR of each country nominates dedicated persons to be involved in the hotline group.
Recommendation 8: Thailand and Vietnam as the leads and China as the co-lead of MLC Water Resources Cooperation Area 2 (Integrated Water Resources Management (IWRM) and Climate Change Adaptation) and Area 6 (Transboundary River Cooperation and Information Sharing) with the coordination support of the LMWRCC to develop 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. The funding for these studies might be sought from Lancang-Mekong Cooperation (LMC) Special Fund and/or national and international funding mechanisms. The experts to be engaged in these studies can be drawn within MLC countries or internationally as needed. If the EG/AG on data and information sharing can be established quickly

and in full, they may oversee these tasks from the beginning.

ANNEX 2: Organizational structures for MLC/LMC and MRC

Mekong-Lancang/Lancang-Mekong Cooperation: Water Resources

The Mekong-Lancang/Lancang-Mekong cooperation is a sub-regional cooperation platform jointly initiated and developed by Cambodia, China, Lao PDR, Myanmar, Thailand and Viet Nam. In March 2016 the LMC mechanism was formally launched at the first LMC Leader's Meeting in Sanya, China.

The platform is grounded on three cooperation pillars and five key priority areas coined the "3+5 Cooperation Framework". The "3" are political and security issues; economic and sustainable development; and social, cultural and people-to-people exchanges. The "5" priorities are connectivity, production capacity, cross-border economic cooperation, water resources, agriculture and poverty reduction. Regular meetings are held by its leaders', foreign ministers, senior officials' (SOM), and joint working groups (JWGs) for each of the priority areas.

The JWG for water resources cooperation is composed of water administration ministries, foreign affairs ministries and other relevant agencies. The JWG agreed on a "Five-year Action Plan" for 2018-2022 with six "areas of cooperation", namely, water resources and green development, IWRM and climate change adaptation, water sector production capacity cooperation, rural areas, water conservancy and livelihood improvement, sustainable hydropower development and energy security, transboundary river cooperation and information sharing. A seventh is for coordination. Each area has a country lead and co-lead.

The Lancang-Mekong Water Resources Cooperation Center (LMWRCC) was established in Beijing in 2017 and serves as a platform for members to strengthen comprehensive cooperation and acts as the secretariat providing support to the JWG on various activities such as technical exchanges, capacity building and cooperative projects.

Lead ministries of each member country's JWG recommend a list of domestic experts and scholars with prominent knowledge and experience on water resources and related disciplines. LMWRCC will consolidate the lists to establish a network of experts, who will provide technical, knowledge and intellectual support for the implementation of the Five-year Action Plan and long-term development of Lancang-Mekong water resources cooperation. Implementation arrangements also includes advisory groups (AG) to provide expert inputs.

Implementation of the Five-year Action Plan is funded by member contributions and funding support from other national and regional organizations, international development partners and business partners.

Figure 1 *below provides an overview of the MLC/LMC platform.*

Figure 1 Overview of the MLC/LMC platform (Chandrapanya, 2019)

Mekong River Commission (MRC)

MRC is an intergovernmental organization established in 1995 by the signing of the Mekong Agreement. Environment and water ministers of Cambodia, Lao PDR, Thailand and Viet Nam are MRC Council Members who meet once a year to review and make strategic decisions on the management and development of water and related resources within the framework of the 1995 Mekong Agreement.

The MRC Joint Committee comprises senior officials at no less than Head of Department level of the four countries and supported by national line/implementing agencies. The committee reports to the Council and meets twice a year. Each member sets up a National Mekong Committee (NMC), which is supported by a National Mekong Committee Secretariat (NMCS).

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The MRC Secretariat (MRCS), managed by a Chief Executive Officer, is the operational arm of the organisation and performs technical and administrative functions. It works closely with the NMCSs and other government agencies to facilitate regional meetings of the members and provides technical advice on joint planning, coordination and cooperation. The People's Republic of China and the Union of Myanmar engage as Dialogue Partners and formally meet MRC once a year at the ministerial level.

There are four Expert Groups (EGs) that provide guidance and inputs based on both regional and national perspectives, experiences, and good practice to the implementation of the MRC's five-year Strategic Plans, National Indicative Plans and annual work plans. EGs ensure that MRC products and services respond to the needs of members, support the use and uptake of MRC products and services in national planning and decision-making; monitor implementation and support the gradual shift to national implementation of MRC work plans in line with a high level of decentralisation and a leaner MRCS by 2030.

The MRC is funded through contributions from the four Member Countries and development partners (country governments, development banks, and international organisations).

Figure 2 *below provides an overview of the MRC platform.*

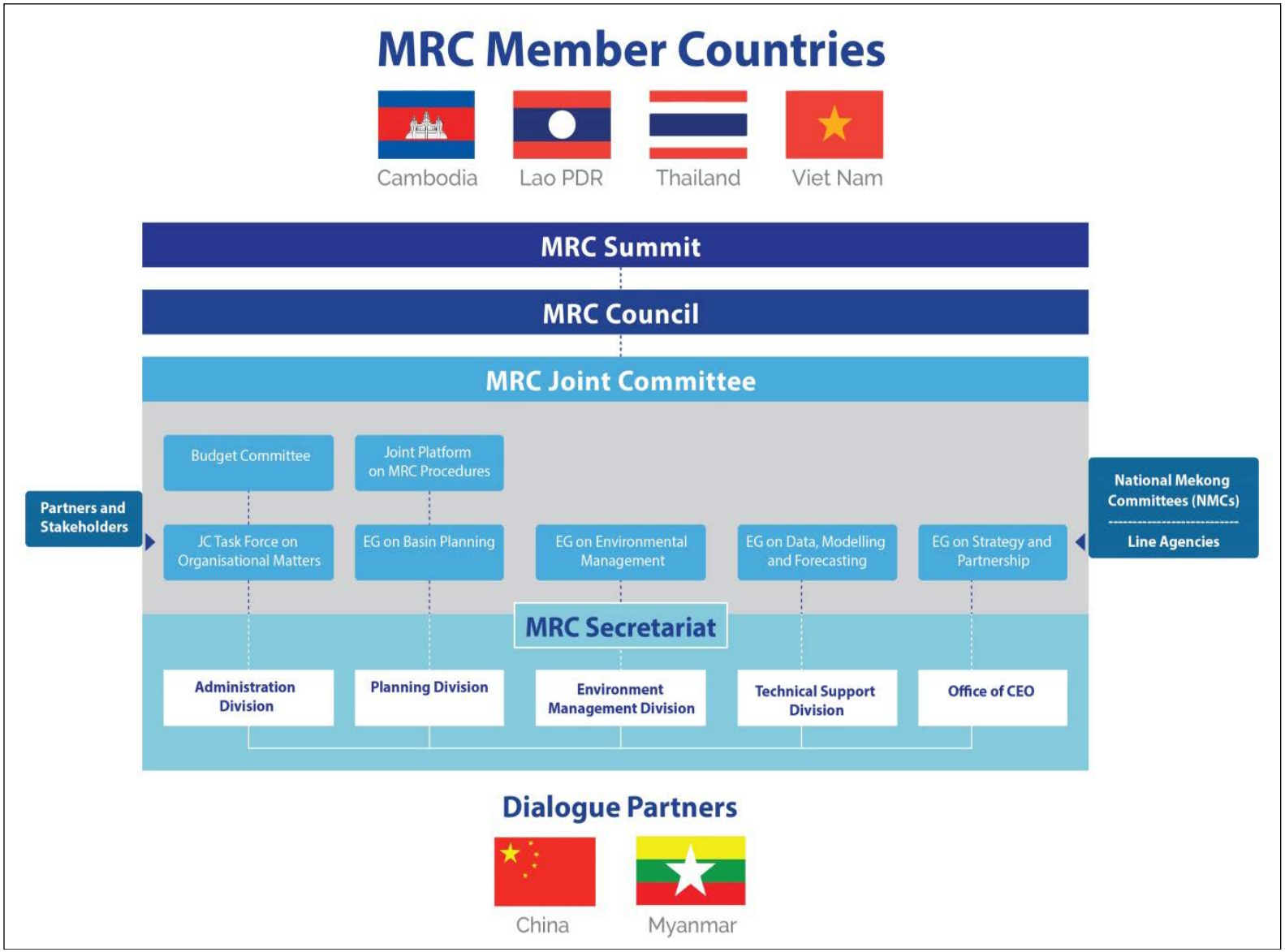

Figure 2 Overview of MRC platform (Source: Mekong River Commission Secretariat)