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Water Cooperation Priorities in the Lancang-Mekong River Basin Based on Cooperative Events Since the Mekong River Commission Establishment

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Abstract: The Lancang-Mekong River has attracted much attention from researchers, but the cooperation on water issues in this river basin has been limited, even after the establishment of the Mekong River Commission (MRC). Cooperation on water resources has been determined as one of the key priority areas in the Lancang-Mekong Cooperation Mechanism, but there are no details of targets. In order to establish the priorities of water cooperation under the mechanism, we adopted nine categories to classify the objectives of 87 water cooperation events based on the 'Lancang-Mekong Water Cooperative Events Database' from 1995 to 2015. Based on the occurrence of cooperative events, cooperative objectives, cooperative scales, and approaches to cooperation, we conducted statistical, correlation, and text analyses. Our analyses indicated the following results: under the impact of economic conditions inside and outside the river basin, full cooperation appeared more difficult than bilateral and multilateral cooperation. Each of the partners adopted different preferences for cooperation targets. Cooperation with more definite objectives was easier to establish than cooperation with broader and more complex objectives. The potential objectives for water cooperation were navigation, hydropower, joint management, data sharing, flood control and water use. Because hydropower development is controversial, and because water cooperation is avoided by most existing regional cooperation mechanisms due to its complexity, we suggest the following priority areas for water cooperation in the Lancang-Mekong River Basin. 1) Navigation and flood control/drought relief are attractive objectives for all the riparian countries across the whole watershed. 2) Data sharing should be a priority for cooperation in the watershed due to its laying the foundation for the equitable and reasonable utilization of transboundary waters. 3) Hydropower is an objective best implemented mainly through bilateral cooperation, and on tributaries.

Keywords: water cooperation; objective; cooperative scale; the Lancang-Mekong River; riparian country; Mekong River Commission

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1 Introduction

According to the United Nations, the world's 286 international rivers cover 151 countries, 90% of the global population, and around 60% of the world's available fresh water (UNEP, 2016). About two-thirds of the international rivers lack cooperative management frameworks, over 150 international rivers display serious problems, and many of them are located in Asia, Africa, and Latin America, where they may contribute to transboundary disputes (Stefano et al., 2012). Nevertheless, cooperation is much more prevalent than conflict in the

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management of international rivers (Wolf et al., 2003). International rivers are becoming examples of inter-state conflict resolution and regional cooperation. Cooperation is the best method to resolve the problems with these river systems (Eidem et al., 2012; UN-Water, 2015). Management of shared natural resources will enhance dialogue and build trust among states (The Hague Institute for Global Justice, 2016). The implementation of integrated water resources management (IWRM) can promote regional integration through the sustainable and equitable use of international rivers (Global Water Partnership, 2012; United Nations Economic Commission for Europe, 2014).

The Lancang-Mekong River is one of the most important international rivers in Asia, connecting six riparian countries from source to ocean estuary: China, Myanmar, Laos, Thailand, Cambodia, and Vietnam. In the Lancang-Mekong River Basin, water issues have been of great concern for many years, particularly since the 1991 Paris Peace Accords (formally called 'Agreements on a Comprehensive Political Settlement of the Cambodia Conflict'). Since the beginning of the period of peace in Southeast Asia, regional cooperation has quickly developed in the Lancang-Mekong River Basin. The Mekong River Commission (MRC), which was founded in 1995 by four riparian countries along the Lower Mekong (Laos, Thailand, Cambodia and Vietnam), is the only inter-governmental organisation and regional advisory body that acts as a facilitator and jointly manages the shared water resources and sustainable development of the Mekong River, while minimizing the potentially harmful effects on the people and the environment in the Lower Mekong Basin. The Lancang-Mekong Cooperation Mechanism (LMC) is an initiative started by China and established by the end of 2015. This was the first sub-regional cooperation initiated by the riparian countries themselves. Based on the critical importance of water resources in the watershed, water cooperation has been identified as the flagship of the five priority areas for cooperation in the LMC (Wang, 2015), the five areas being connectivity, production capacity, cross-border economic cooperation, water resources, agriculture and poverty reduction. Implementation of cooperation in these five areas should be actively developed (Ministry of Foreign Affairs, People's Republic of China, 2018).

The Lancang-Mekong River has attracted the world's attention once more (Yu, 2015; Biba, 2016; Son, 2017). Nevertheless, even since the establishment of the MRC, water cooperation among the riparian countries were limited, and detailed water cooperation objectives in the LMC remain unaddressed. This paper aims to establish the priorities for water cooperation, based on an analysis of the characteristics of historical water cooperation, such as cooperative targets, cooperative status, and involvement of the six riparian countries.

2 Data and Methods

We constructed a database of cooperative events related to water resources in the Lancang-Mekong River Basin from 1995 to 2015 based on the records of Oregon State University's International Water Events Database from 1948–2008 (https://transboundarywaters.science.oregonstate.edu/) and information from the following websites. 1) the Mekong River Commission (http://www.mrcmekong.org/); 2) the Association of Southeast Asian Nations (ASEAN) (http://asean.org/); 3) China-ASEAN yearbooks from 2004 to 2015 (Lü and Shen, 2015); and Chinese government portals, as follows: 4) the Ministry of Foreign Affairs (https://www.fmprc.gov.cn/web/); 5) the People's Government of Yunnan Province (http://www.yn.gov.cn/); 6) the National Development and Reform Commission (http://www.ndrc.gov.cn/); and 7) Guangxi Government (http://www.gxzf.gov.cn/). The 'Lancang-Mekong Water Cooperative Events Database' contains information on primary issues, date of occurrence, countries involved/participants, cooperative status, and major details of the events, which include 87 water cooperative events among the six riparian countries (Table 1).

Based on this information, and according to the objectives and contents of the events, the cooperative events were placed into nine categories: navigation, fishery, joint management, comprehensive development, hydropower, water use, flood control/drought relief, data sharing, and environmental conservation. We also classified cooperative events according to three approaches based on the number of cooperating participants: 1) lateral cooperation between any two of the six riparian countries; 2) multilateral cooperation between three or more of the six countries, whether members of MRC, or MRC and its dialogue partners (Myanmar, China); and 3) full cooperation involving all six countries. According to

Table 1 Basic information of the 'Lancang-Mekong Water Cooperative Events Database', the cooperative status, and the scales

Objective	Participants	Contents	Occurrence Date	Cooperation	
				Status	Scale
Fishery	China/Laos	Joint action on stocking of juvenile fish in watercourses	2015	Practice	7
Date sharing	China/MRC	Sharing river level data with MRC during the flood season each year	2002	Agreement	6
Joint management	MRC members	Sharing interests in the use of the Mekong; regulation on supervision of water use	2003	Agreement	6
Hydropower	Vietnam/Laos	MOU on electricity cooperation for construction of the Se Kong Plant and sale of power	1996	MOU	5
Navigation	China, Myanmar, Laos, Thailand	Joint declaration on security cooperation for law enforcement on the Mekong River	2011	Declaration	5
Flood control/ drought relief	MRC members	Agreement for the newly established early flood warning system	2008	Consensus	4
Water use	MRC members	Eight projects to study agricultural productivity and water use efficiency	2004	Research	3
Environmental conservation	MRC members	Meeting on environmental and ecological water resource programs	2008	Discussion	2
Comprehensive development	Laos/Thailand	Cooperation in tourism promotion, joint use, energy, irrigation and industry	1997	Willingness	1

Notes: The scales show the different levels of the cooperative events currently in practice. The value of 'Willingness' is 1, the lowest cooperative level, which means that cooperation has just been initiated. The value of 'Discussion' is 2 and indicates that parties are trying to establish common targets. The value of 'Research' is 3, a higher level than 'Discussion', and occurs when parties are working toward some common targets through joint research. Level 4 is for 'Consensus', a medium level, and indicates that parties are cooperating to reach some common targets. The level of 'Declaration' and/or 'Memorandum of Understanding' ('MOU') is 5, and occurs when parties negotiate a draft inter-governmental non-binding agreement. The value for 'Agreement' is 6 and indicates that parties have adopted a formal inter-governmental agreement. A value of 7 for 'Practice' means that the relevant agreements are implemented.

the number of cooperative events, the major targets of water cooperation, and the cooperative approaches, we can determine trends of water cooperation variation in the river basin, as well as the major targets for cooperation among the different riparian countries and the MRC from 1995 to 2015.

Based on the modeling by Wolf et al. (2003) and Yorth (2014), we graded the events according to their stage of cooperative development, using a seven-point scale that reflects the higher/lower possibilities of successful cooperation (Table 1). For example, initial cooperation implemented through 'Willingness' and 'Discussion' are lower-ranked scales that occur during a period of searching for any common points of interest among the riparian countries. Partners reach medium scales of cooperation through 'Research' and 'Consensus' after they agree on some common issues on which to coordinate and communicate. Higher scales from 'Memorandum of Understanding (MOU) / Declaration' to 'Agreement' and 'Practice' refer to the transitions from planning to reaching an agreement, and eventually joint implementation. The entire process represents the development of increasingly closer relationships and collaboration.

3 Results

3.1 Variations in water cooperation from 1995 to 2015

From 1995 to 2015, the number of cooperative events varied, with more cooperation in 1995, 1996, 2001, 2006 and 2014, and less cooperation in 1998, 1999, 2003 and 2009 (Fig. 1). We can compare these data with some significant regional and global economic and political incidents that occurred during these years. For example, the 'Asian Financial Crisis' from the summer of 1997 to early 1999; the 'Global Financial Crisis' from 2006 to 2010; and the unstable political situation in Thailand since 2010. Less regional cooperation occurred during times of political and economic instability. In other words, regional cooperation was disrupted and even halted by these incidents, partly due to the MRC's limited capacity, economic dependence, and sensitivity to external political and economic events (Feng et al., 2000; Guen-Murray et al., 2017).

3.2 Cooperation focused on a few objectives

Of the 87 cooperative events and nine objectives among the six riparian countries in the 1995–2015 period, over

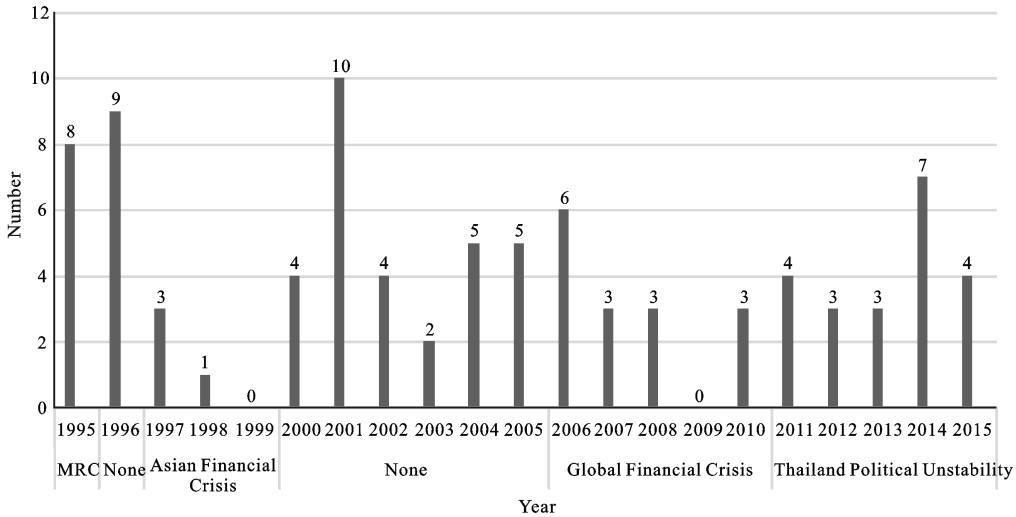

Fig. 1 Cooperative events in the Lancang-Mekong River Basin and major incidents in 1995–2015

75% were focused on four objectives: hydropower, joint management, navigation and flood control/drought relief (Fig. 2). Moreover, events with two objectives - hydropower and joint management - accounted for over 50% of the total and were the key objectives of regional cooperation. Fishery appeared as the newest cooperative area in 2015, and water use was the single objective with the shortest time span (2004–2008).

The number of events involving full cooperation was significantly less than the numbers of events involving bilateral and multilateral cooperation (Table 2). This suggests that full cooperation was much more difficult to achieve than bilateral or multilateral cooperation in this large and complex watershed, and that cooperation occurred largely in different sub-regions of the river basin. Of the limited number of events encompassing full cooperation, the objectives were focused on joint management, comprehensive development, environmental conservation, and flood control. Of the four, joint management ranked slightly higher in frequency.

Multilateral cooperation had the highest frequency (42 events and 48% of the total), focusing principally on five objectives: joint management, navigation, flood control, water use, and data sharing. The major objectives were joint management (involving the MRC members) and navigation implementation (involving the four upstream and midstream countries). The number of cooperative events among the MRC members was 32, while the MRC as a partner participated in all of the events involving all six countries. This provides evidence that the MRC contributed important initiatives to water cooperation in the whole basin, including not only joint management but also flood control, water use, and data sharing.

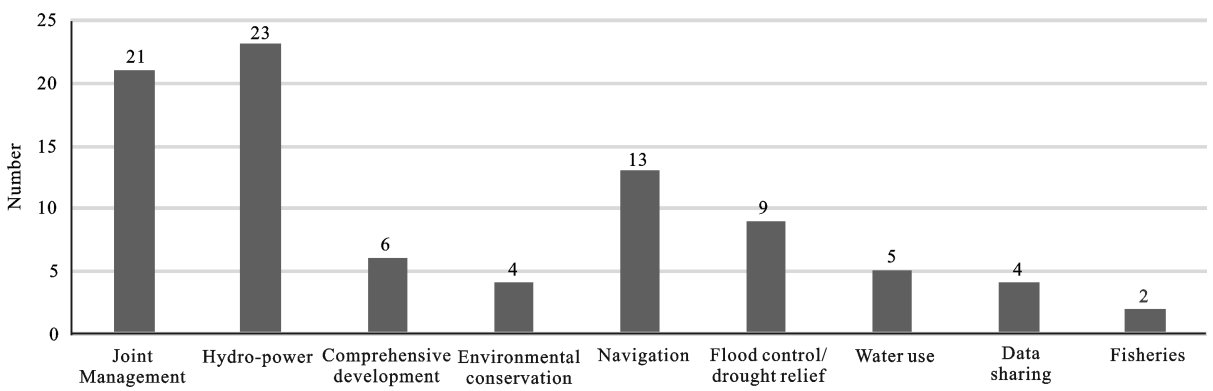

Fig. 2 Frequency of cooperative objectives in the Lancang-Mekong River Basin in 1995–2015

Table 2 The numbers of objectives according to the different approaches to cooperation among the partners

Participant	Approach	Joint management	Hydropower	Comprehensive development	Environmental conservation	Navigation	Flood control/ drought relief	Water use	Data sharing	Fishery
MRC	Multilateral	17	0	0	1	0	6	4	4	0
	Full	4	1	3	3	1	3	0	0	0
China	Bilateral	0	17	1	0	2	0	0	0	2
	Multilateral	0	0	0	0	10	0	0	3	0
	Full	4	1	3	3	1	3	0	0	0
Myanmar	Bilateral	0	0	0	0	1	0	0	0	0
	Multilateral	0	0	0	0	10	0	0	0	0
	Full	4	1	3	3	1	3	0	0	0
Laos	Bilateral	0	12	2	0	0	0	0	0	2
	Multilateral	0	0	0	0	10	0	0	0	0
Thailand	Bilateral	0	8	2	0	1	0	0	0	0
	Multilateral	0	0	0	0	9	0	0	0	0
Cambodia	Bilateral	0	4	0	0	0	0	1	0	0
Vietnam	Bilateral	0	3	1	0	0	0	1	0	0
All	Bilateral	0	22	3	0	2	0	1	0	2
	Multilateral	17	0	0	1	10	6	4	4	0
	Full	4	1	3	3	1	3	0	0	0

All fishery events occurred through bilateral cooperation, with a relatively small number of collaborative partners. Similarly, 96% of hydropower events and 50% of comprehensive development events were implemented by bilateral cooperation. Chinese involvement in regional cooperation occurred principally through bilateral cooperation. Table 2 indicates that China has been an active collaborator with other riparian countries.

Analyzing the frequencies of objectives by the different approaches, it appears that three objectives—hydropower, joint management and navigation—were largely implemented through bilateral and multilateral approaches. It is possible that hydropower projects are easier to negotiate and construct through bilateral cooperation, whereas joint management, navigation, flood control/drought relief, water use, and data sharing are better negotiated through multilateral cooperation.

The above analysis shows that the four objectives of hydropower, joint management, navigation, and flood control/drought relief are currently the major cooperative objectives in the Lancang-Mekong River Basin. Among them, all of the riparian countries and the MRC have addressed hydropower development principally through bilateral cooperation. Navigation cooperation has adopted all three approaches, while cooperation on joint management and flood control has occurred mainly through multilateral and full cooperation.

3.3 Common objectives among the riparian countries

Of the 87 cooperative events among the riparian countries and the MRC, China and the MRC participated in 50 and 47 events, respectively. Myanmar and Laos were each involved in 26, Thailand participated in 20, while Cambodia and Vietnam exhibited less cooperation (Table 2). This suggests that the numbers of water cooperation events involving the riparian countries decreased from upstream to downstream. Evidently, in regional cooperation, China and the MRC were the most active. Laos and Thailand cooperated with both upstream and downstream countries, while Cambodia and Vietnam were only minimally involved in the events, except those organized by the MRC.

Regarding the cooperative objectives selected by each partner, the MRC focused primarily on the two objectives of joint management and flood control/drought relief with a secondary focus on water use, data sharing, and environmental conservation, while much less attention was paid to hydropower and navigation. China participated in eight of the nine cooperative objectives, water use being the exception, but collaborated mostly on hydropower and navigation. Laos and Thailand showed

a similar high preference for hydropower and navigation. Myanmar focused largely on navigation, but was also interested in joint management and flood control/drought relief. Cambodia and Vietnam focused narrowly on hydropower and had little interest in water use.

These results illustrate the obvious differences in cooperative preferences among the riparian countries and the MRC. The common objectives with higher frequencies among the partners were hydropower, comprehensive development, and navigation. Considering the four MRC members as a unit, the most popular common objectives among China, Myanmar and MRC members centered on the four objectives of joint management, environmental conservation, comprehensive development, and flood control/drought relief.

Through multilateral cooperation, the MRC members mainly collaborated on joint management and the three objectives of flood control/drought relief, water use, and data sharing. The four countries located on the upper and midstream reaches (China, Myanmar, Laos and Thailand) actively collaborated on navigation. Through bilateral cooperation, five countries (China, Laos, Thailand, Cambodia and Vietnam) collaborated on the development of hydropower with their partners. Four countries (China, Laos, Thailand and Vietnam) tried to cooperate on comprehensive development, and China cooperated with Laos to conserve fishery resources in 2015. Full cooperation was the preferred approach to joint management, flood control/drought relief, comprehensive development, and environmental conservation.

These data indicate that downstream countries are engaged in fewer cooperative activities than upstream countries, assuming that the MRC is treated as an independent partner. Considering the different preferences for objectives among the riparian countries and the MRC, the objectives of joint management, navigation, hydropower, environmental conservation, comprehensive development, and flood control/drought relief could be possible common goals for future collaboration.

3.4 Cooperative objectives at higher levels of development

The proportion of events at the higher cooperative scales (MOU/Declartion, Agreement and Practice) increased overall from 1995 to 2015 (Fig. 3). Specifically, the proportion of events at the higher scales in 2006–2015 was larger than that for the preceding period of 1995–2005, suggesting that regional cooperation on water in the Lancang-Mekong River Basin has steadily developed and is gaining acceptance.

Cooperative scales among the objectives had significant differences. For instance, 69% of the events for hydropower, 45% of the events for navigation, and 100% of those for fishery occurred at the scales of MOU/Delcartion, Agreement and Practice. However, 78% of the events for flood control/drought relief, 58% of the events for joint management, 67% of the events for comprehensive development, and 60% of the events for water use occurred at the scales of Willingness, Discussion and Research (Fig. 4). This implies that cooperation with more precise objectives (hydropower,

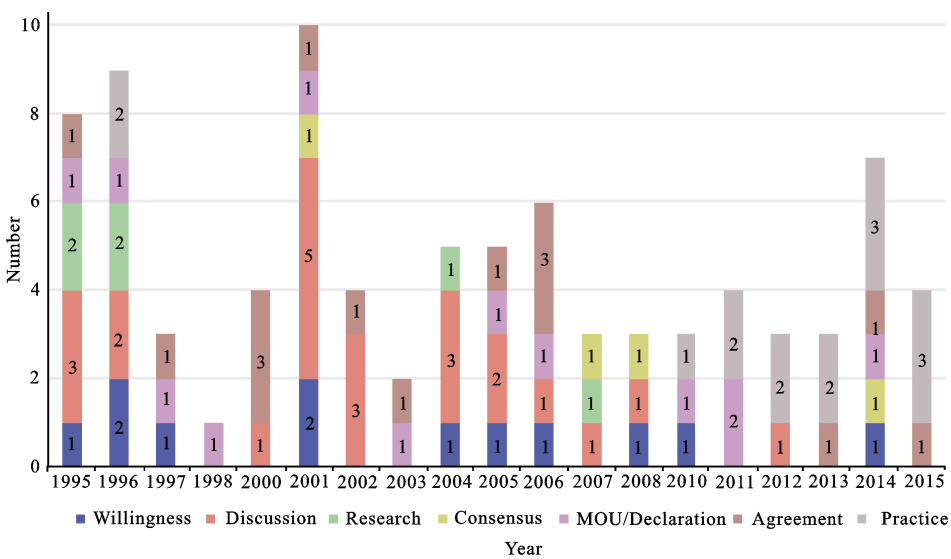

Fig. 3 Cooperative events at different levels of cooperation in the Lancang-Mekong River Basin during 1995–2015

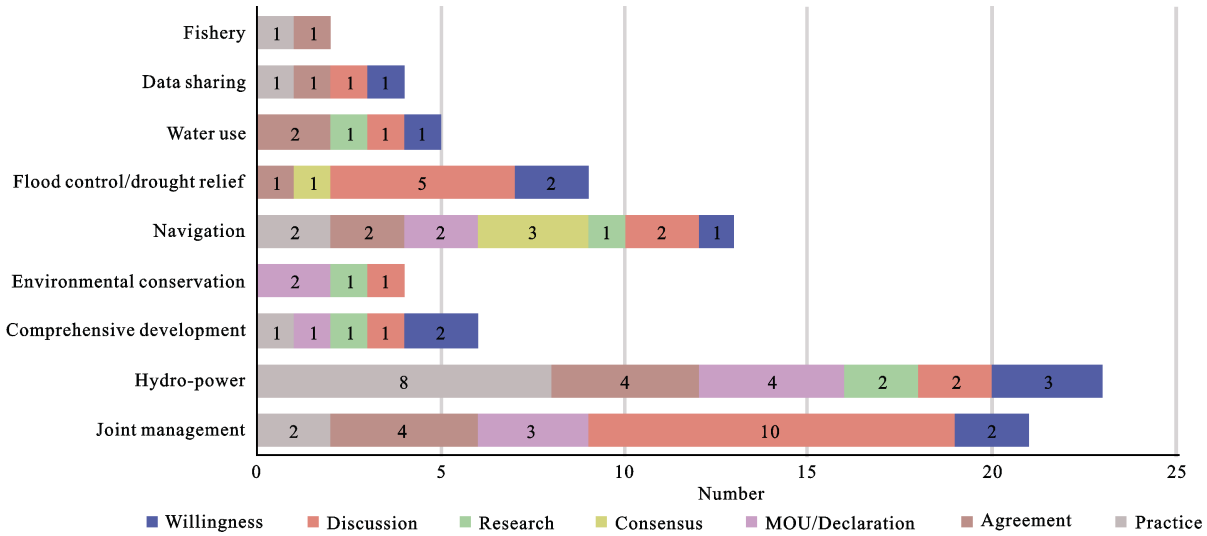

Fig. 4 Distribution of the objectives at different levels of cooperation in the Lancang-Mekong River Basin

navigation, and fishery) was easier to establish than cooperation with broader and more complex objectives (water use, comprehensive development, and joint management).

Some objectives with a higher status of cooperation could become targets for increased collaboration in the Lancang-Mekong River Basin during coming years, due to their richer experience of regional cooperation and current level of development: specifically, navigation, hydropower, joint management, flood control, and water use.

4 Discussion

Water resources utilization has multiple objectives and values while its development can have a wide influence both nationally and internationally. The development of transboundary waters is usually given more attention and even cause disputes among riparian countries due to its cross-border impacts. In the Lancang-Mekong River Basin, the above analysis indicates that several targets have become popular objectives for cooperation, such as hydropower, navigation, flood control, and joint management. Following this analysis, we conducted a review of the literature on water and regional cooperation in the river basin in order to establish the possibility of these objectives becoming common cooperation targets. The review utilized information mainly from the academic sector and official sources in consideration of scientific objectivity and its authoritative nature. However, the review showed that hydropower is the only key issue related to water discussed by scientists, while regional cooperation covering the river basin is a concern among governments and international organizations. Hence, the following discussion focuses on these issues.

4.1 Hydropower impacts

4.1.1 Impacts of water discharge

On the one hand, the Lancang-Jiang cascade in China altered significantly the Lower Mekong's hydrological regime (Rasanen et al., 2012), the operation of the dams changing the spatial and temporal distribution of water discharge (Lauri et al., 2012). On the other hand, compelling evidence does not exist to show that the 2008 flood that occurred in the lower Mekong Basin countries, or the droughts in 1992–1993, 1996–1997, and 2003–2004, were caused by water withdrawal or storage by the dams, while the lower downstream water levels during the above years were mainly due to decreased rainfall (Campbell, 2007; MRC, 2008; Lu et al., 2014), caused mainly by climate change (Hoanh et al., 2010; Kingston et al., 2011).

4.1.2 Impacts on sediment

The flux of the sediment to the lower stream decreased by 50% after the completion of the Manwan Dam in 1993 (Lu and Siew, 2006; Kummu and Varis, 2007; Fu et al., 2008; Wang et al., 2011). Sediment load would be halved again if all the 12 dams planned along the mainstream of the Lower Mekong were constructed (ICEM,

2010; MRC, 2010). However, great uncertainty surrounds all these forecasts on sediment loading due to factors such as the available data, the accuracy of sediment models, the change in land use patterns in the watershed, and global warming, among other factors (Thorne et al., 2011).

4.1.3 Impacts on fisheries

Fishery resources may be adversely affected by activities in the Lancang-Mekong River Basin, especially in the Tonle Sap Lake in Cambodia and the Mekong Delta in Vietnam (Friend and Blake, 2009; Baird, 2011; Stone, 2011; Ziv et al., 2012). Interventions could possibly affect the ecosystem integrity of the Mekong River (Halls and Kshatriya, 2009) and threaten the economic, nutritional, and social benefits and services (Dugan, 2010; Bruce, 2013). Dams on the Lancang River created a serious threat for migratory fish living in the upstream reaches (Roset et al., 2007; Kang et al., 2009), but created a relatively small threat for the fish inhabiting the middle and lower reaches of the Mekong, as fewer migrate to upstream reaches (Ferguson et al., 2011). If the 11 dams planned were built on schedule on the mainstream of the Lower Mekong, the fish habitats and their migration and breeding cycles could be irreparably altered and possibly destroyed, thereby reducing productivity and greatly impacting biodiversity (Roberts, 2004; Baran and Ratner, 2007). Fishery impacts caused by hydropower developments might outweigh the economic benefits derived from hydropower (Baran and Myschowoda, 2009).

4.1.4 Impacts on livelihoods as a result of resettlement

Hydropower projects have led to a significant decline in the agricultural income of the resettled households. This is due to a number of factors, including a reduction in arable land and forest resources, inadequate land compensation, and the low productivity of agricultural replacement land; these in turn have led to a decline in food security (Zhang et al., 2013; Ioannides and Tilt, 2017). As a result, households may have to alter their livelihood strategies and activities to adapt to the changes caused by dam construction.

The above analysis and the literature show that hydropower is one of the principal objectives in water cooperation and an important type of water use in the Lancang-Mekong River Basin, though it has broad and uncertain implications for runoff, sediment, fisheries, the environment, and local people's livelihoods. If hydropower were to remain an important target for development for the whole watershed, especially on the mainstream of the river, it would be a likely source of disputes among the riparian countries. On the other hand, if it ceases to be a cooperative objective, the enthusiasm of the riparian countries for cooperation would be affected, and the shortage of energy to support social and economic development would be likely to continue.

4.2 Regional cooperation: targets and differences

Since 1991, international cooperation covering the Lancang-Mekong River Basin has increased through countries and organizations inside and outside the region. As shown in Table 3, cooperative efforts have been encouraged by the following organizations, programs, and initiatives: the Greater Mekong Sub-region (GMS); the Quadrangle/Quadripartite Economic Cooperation Zone (QECZ) (also known as the 'Golden Quadrangle'); the Mekong River Commission (MRC); the ASEAN-Mekong Basin Development Cooperation program (AMBDC); the Cambodi-Laos-Vietnam-Development Triangle (CLV-DT); the Ayeyawady/Irrawaddy-Chao Phraya- Mekong Economic Cooperation Strategy (ACMECS); the Mekong-Ganga Cooperation program (MGC); the ASEAN-China Free Trade Area (ACFTA); ASEAN Plus Three (APT); the Mekong River Law Enforcement and Security Cooperation Mechanism; the Lancang-Mekong Cooperation Mechanism (LMC); the Mekong-Japan Cooperation; and the Lower Mekong Initiative.

With the establishment of regional stability, a series of cooperation mechanisms has been established and, principally promoted or supported by outsiders, regional cooperation has increased. Within these regional or sub-regional cooperation mechanisms, several priority areas have been identified, including: transportation and communication; trade and investment; tourism; energy; agriculture; and, frequently, environmental/ecological conservation and disaster management. These priorities are additional to the targets of the MRC and the LMC covering issues directly or indirectly related to water utilization and development.

Based on the above situation, Ratner (2003) considered that the six riparian countries along the Lancang-Mekong River had enjoyed rapid regional economic growth and benefited from the opportunities presented by cooperation, but also faced risks from river development activities. Moreover, differences in the

Table 3 Regional cooperation and priority areas in the Lancang-Mekong River Basin

Regional cooperation mechanism	Date	Participant	Priority areas for cooperation
GMS [1]	1992	Asian Development Bank, China, Myanmar, Laos, Thailand, Cambodia, Vietnam	Transportation, energy, communication, environment, agriculture, human resource development, tourism, trade facilitation and investment
QECZ [2]	1993	China, Myanmar, Laos, Thailand	Navigation, hydropower development, tourism, transportation, environment, trade and investment, substitute planting
MRC [3]	1995	Laos, Thailand, Cambodia, Vietnam	Water resource management, sustainable hydropower, flood management, freedom of navigation, agriculture, fisheries sustainability, ecosystem conservation
AMBDC [4]	1996	Association of Southeastern Asian Nations (ASEAN), China	Human resource development
ASEAN Plus Three [5]	1997	ASEAN, China, Japan, Republic of Korea	Economic cooperation, financial and monetary cooperation, agriculture and forestry, energy, tourism, environment, science and technology, poverty eradication, disaster management
CLV-DT [6]	1999	Laos, Cambodia, Vietnam	Traffic, energy, trade and investment, tourism, training, safety and regional stability
MGC [7]	2000	India, Myanmar, Laos, Thailand, Cambodia, Vietnam	Tourism, culture, education, transport and communications
ACFTA [8]	2002	ASEAN, China	Tariff elimination and normalization of procedures for services, investment and customs
ACMECS [9]	2003	Myanmar, Cambodia, Laos, Thailand	Trade and investment facilitation, agriculture, industry and energy, transport linkages, tourism, human resource development, public health, environment
Mekong-Japan Cooperation [10]	2009	Japan, Myanmar, Laos, Thailand, Cambodia, Vietnam	Connectivity, coordinated development, human security and environmental sustainability (disaster management, water management, sustainable management and development of the Mekong River, including impacts by mainstream hydropower projects)
Lower Mekong Initiative [11]	2009	USA, Myanmar, Laos, Thailand, Cambodia, Vietnam	Agriculture, connectivity, education, energy security, environment and water, public health
Mekong River Law Enforcement and Security Cooperation [12]	2011	China, Myanmar, Laos, Thailand	Channel safety maintenance, combating transnational criminal activities such as terrorism, drug trafficking, and illegal immigration
LMC [13]	2015	China, Myanmar, Laos, Thailand, Cambodia, Vietnam	Connectivity, production capacity, cross-border economic cooperation, water resources, agriculture and poverty reduction

Notes: (1) Greater Mekong Subregion Secretariat, 2018. (2) Xu et al., 2006. (3) Mekong River Commission, 2017. (4) ASEAN Economic Community, 1996. (5) ASEAN Secretariat, 2017. (6) Cambodia-Laos-Vietnam Development Triangle Portal, 2016. (7) Government of India, 2017. (8) ASEAN Secretariat, 2002. (9) Thailand International Cooperation Agency, 2013. (10) Ministry of Foreign Affairs of Japan, 2009. (11) Lower Mekong Initiative, 2017. (12) Xinhua, 2015. (13) Ministry of Foreign Affairs, the People's Republic of China, 2016.

preferences and targets prioritized by the various donors, together with the absence of overall guidelines and coordination, has led to competition among the countries involved and restricted the depth of cooperation (Ho, 2013).

Our analysis indicates that infrastructure construction and economic development have remained the key issues in the basin for many years, whereas water resource, the core issue of the river basin, has been ignored or avoided due to its complexity. The insiders (each of the riparian countries and even the MRC) have insufficient capacity to facilitate regional cooperation effectively, while the outsiders wish to raise their roles in the region and to benefit from regional development. Water is the lifeblood of the six riparian countries, but it is only since 2015 with the establishment of the LMC that the management and development of this resource has been given adequate attention.

5 Conclusions

Under the Belt and Road Initiative, the LMC, the common creation of the six riparian countries, marks the beginning of a new era for enhanced cooperation within the whole Lancang-Mekong watershed. Water cooperation is the overarching goal of the LMC, and its priorities should be determined as soon as possible.

This paper has sought to establish the priorities for water cooperation in the Lancang-Mekong River Basin over the coming years, based on an analysis of the characteristics of major water cooperative objectives since the establishment of the MRC, the academic views on the impacts of hydropower development, and the lack of attention to water-related issues in existing regional cooperation mechanisms. The priorities for water-related cooperation, we suggest, should be as follows.

Hydropower development, both on the mainstream and in the whole basin, will not be one of the future priorities due to its highly controversial impacts. However, on tributaries, it could be a priority through bilateral cooperation. Navigation and flood control/drought relief will be priorities for further cooperation over the entire watershed, based on the higher frequency of past events, the rich experience of the different approaches, and the developmental level at different scales of cooperation. Data sharing is one priority that should be enhanced in the watershed, because it lays the foundation for further water cooperation and sustainable development, and already occurs among most of the riparian states.

The three objectives of environmental conservation, water use, and joint management should be promoted step by step as priorities, as there is only a weak basis for cooperation in these areas. Detailed targets for each of them need to be determined one by one, because they are the preconditions to realizing the equitable and reasonable utilization of transboundary waters.

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