Challenges to Transboundary Water Governance in the Mekong River Basin

Field Research in Yunnan Province, China, and Mekong Delta, Vietnam, January 16-27, 2018

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Introduction

Water is a finite and irreplaceable resource, and the sustainable use and development of river systems plays a critical role in reducing poverty and hunger in developing countries across the world. Yet there is an inherent tradeoff between water provision and development. Effluent from industry in urban centers pollutes downstream rivers and aquifers; land use change from development in both urban and rural areas exacerbates soil erosion and contributes to the sedimentation of rivers and reservoirs; deforestation leads to the degradation and desertification of crucial watersheds; and hydroelectric development alters the flow and temperature of rivers, negatively impacting downstream fisheries and the accessibility of clean water.[1] The governments of developing countries must face the challenge of balancing energy needs, industrialization, flood protection, and water access along their water sources. Beyond environmental considerations, however, the politics of water resource management are equally fraught. River basins, as complex, shared transnational areas often governed by asymmetrical or competing political, economic, and cultural goals and values, face substantial challenges in reaching a state of equilibrium, coordination, and sustainable management among stakeholders.

The Mekong River, one of the world's great riverine systems, is no exception. Transnational efforts to address the politics of water resource management have significantly increased over the past several decades, yet an array of challenges from all levels of engagement has dampened the success of transboundary governance efforts, accelerating damage to the environment and decreasing trust between important state and non-state actors.

To examine these challenges, our research group conducted 10 days of field research in China and Vietnam in January 2018, conducting interviews and convening meetings with policymakers, scientists, NGOs and other stakeholders arrayed around all sides of these issues in order to understand the drivers of conflict in the Mekong River Basin (MRB) region.

This research paper identifies and examines **four clear decision areas** facing stakeholders across the length and breadth of the Mekong River Basin. The first of these is **sovereign rights and equitable use**; how riparian states' leaders view and act toward the shared stewardship of basin resources, the tensions between economic development and cooperation, and the institutional strengths and weaknesses of current and proposed governance mechanisms. Our second theme revolves around **domestic governance structures**; the differing and shared interests and goals of actors and institutions in the river basin regarding water governance, the factors affecting formulation of domestic policy, and the tension between local and central priorities. The third dynamic addresses **river development and sustainability**; the tension between economic incentives and environmental integrity, various methods of knowledge production, and competing views of risk, benefit, and loss in hydropower development discourse. The final theme we examine is **climate change and development**; the interests and roles of policymakers,

[1] WWAP (United Nations World Water Assessment Programme). 2015. *The United Nations World Water Development Report 2015: Water for a Sustainable World.* Paris, UNESCO.

firms, scientists, and NGOs in climate adaptation and mitigation, their engagement with the realities of climate change, and the outlook for a more resilient basin.

Ultimately, to overcome challenges in the Greater Mekong Region and to make progress toward consensus on these four themes, gaps among the numerous stakeholders will need to be addressed in order to secure stronger subnational, national, and multinational coordination.

Sovereign Rights and Equitable Use

Regional Coordination Mechanisms in the Mekong River Basin

The Greater Mekong Region is a typical example of economic integration preceding institutional integration. Similar to Europe, the Greater Mekong Region states share the commonalities of deep and profound economic, historic and cultural ties together with a desire, fueled by the past trauma of wars, to turn the battlefields into a common marketplace. While cross-border, transnational trade and economic cooperation burgeoned, a clear deficiency in the region became evident: the lack of a strong Regional Coordination Mechanism (RCM) for water management has limited the ability of the Greater Mekong states to utilize the river for hydropower, agriculture, and other purposes in an equitable and environmentally sound manner.

Existing Regional Coordination Mechanisms

Among others, the Greater Mekong Sub-region (GMS) Economics Cooperation Program, the Mekong River Commission (MRC), and the Lancang-Mekong Cooperation (LMC) are the three most notable regional coordination mechanism that have sprung up since the early 1990s.

- *Greater Mekong Sub-region (GMS*): GMS was initiated by the Asian Development Bank (ADB) and launched in 1992, with the purpose of enhancing cooperation among the six GMS counties, which includes China, Myanmar, Laos, Thailand, Cambodia and Vietnam.[2]
- *Mekong River Commission (MRC):* The signing of the Mekong Agreement in 1995 created the MRC, an intergovernmental organization which provides a unique platform for its four member countries (Thailand, Vietnam, Laos, Cambodia) to tackle challenges connected to water resources management in a joint manner. The mandate of the MRC is to "promote and coordinate sustainable management and development of water and related resources for the countries' mutual benefit and the people's well-being".[3]
- *Lancang-Mekong Cooperation (LMC):* Likely to be part of the Maritime Silk Road Initiative of Belt-and-Road Initiative, on 12 November 2015, China launched the LMC. The purpose of LMC, as stated by in its mission statement, is to create a new sub-regional cooperation mechanism tailored by the six counties according to their common needs. Its members include China, Myanmar, Laos, Thailand, Cambodia, and Vietnam.

[2] Greater Mekong Subregion Secretariat. "About the Greater Mekong Subregion." Regional Cooperation and Operations Coordination Division, Southeast Asia Department, Asian Development Bank, Accessed March 30, 2018. https://greatermekong.org/about

[3] "About MRC." Mekong River Commission. Accessed March 30, 2018. http://www.mrcmekong.org/about-mrc/

MRC: The Dysfunctional Regional Coordination Mechanism

Since 2015, the Lower Mekong Region has been going through an extreme drought period characterized by reduced flow in rivers and less than average precipitation. The drought has tested pre-existing regional water governance mechanisms like the MRC. Meanwhile, development plans for building more hydropower dams along the Mekong river are causing increasing concern among environmentalists and local activist groups.[4] However, the MRC, the institutional body that is tasked with overseeing project development plans has been unsuccessful in exerting true authority over the project approval process, due to limited power to impose restrictions or bans on large-scale, potentially harmful infrastructure projects.

Pham Tuan Phan, chief executive of the MRC Secretariat, acknowledged the power gap of MRC in an interview, saying "It's…a regional river basin organization where the member countries discuss their needs, concerns and challenges in good faith, following a clear set of rules and agreement".[5] The dysfunction of the regional coordination mechanism became evident when a dam project that was widely criticized during the planning stage still went ahead. Xayaburi hydropower dam, the biggest hydropower dam that has been proposed in Southeast Asia, is currently under construction in the town of Pak Beng in northern Laos. The 1,230-megawatt facility would export most of its energy from Laos to Thailand.[6] According to the agreement, member countries were required to hold a prior public consultation process before the construction of any mainstream project. Though a unanimous consensus needs to be reached before proceeding with the project, the requirement is not legally binding and therefore the consultation process becomes merely a standard procedure on paper. To make it worse, it was reported that MRC is losing its financial support, with member countries and other agencies cutting their funding for the next five years by half - from US$115 million in 2011-2015 to US$53 million for 2016-2020.

LMC: A New Player in the Mekong River Basin

While the MRC has been criticized for not being able to address the upstream-downstream equity problems, China is pushing for a greater role in regional governance through the newly established Lancang-Mekong Cooperation, which aims to narrow the gaps and promote development among its six member countries. So far, the LMC has been utilized as a platform for economic development and prosperity, as well as regional poverty reduction. According to the interview with the LMC in Beijing, the LMC is a new mechanism for comprehensive

[4] International Rivers. 2017. "A Dangerous Trajectory for the Mekong River: Update on the Status of Mekong Mainstream Dams." Berkley: International Rivers. Accessed March 29, 2018. https://www.internationalrivers.org/resources/a-dangerous-trajectory-for-the-mekong-river-16502

[5] Pichayada Promchertchoo: Regulatory shortcomings open the way to more Mekong dams, 23 Nov 2016, Channel Newsasia https://www.channelnewsasia.com/news/asiapacific/regulatory-shortcomings-open-the-way-to-more-mekong-dams-7688028

[6] Ibid.

strategic partnership of economic cooperation, and can acts as an outlet for Chinese experience, technology and capital, pushing for industrialization in sectors such as infrastructure development in the Mekong region. The slogan "Benefitting Mekong countries and stimulating joint development in the sub-region"[7] is a phrase repeatedly used in the official LMC documents in explaining the purpose of the mechanism. However, the questions as to whether this young organization will do a better job than the MRC in reflecting the views of communities and individuals negatively impacted by development along the Mekong river remains unanswered.

A New Beginning on the Mekong?

The LMC is a new, untested mechanism for cooperation in the region. Nonetheless, there is some reason for optimism. As noted by Stephanie Jensen-Cormier of International Rivers, an international non-governmental organization dedicated to protecting river basins from irresponsible construction of dams, Chinese rhetoric towards the LMC demonstrates a desire to take on a greater role in sub-regional water governance. Chinese Premier Li Keqiang's speech at the second meeting of the LMC is evidence to this point, during which Li discussed at length responsible development of the Mekong River and the need to conserve water resources.[8] Moreover, the presence of many Chinese hydropower companies in Southeast Asia, most of which are state-owned, illustrates the possibility for the Chinese government to have a large impact on the way hydropower is developed in the Mekong. Through effective information sharing and dedicated environmental consideration, the LMC could be an effective way to bring about sustainable development of the Mekong River Basin.

However, over the course of numerous meetings with stakeholders in China and Vietnam, it became evident that Chinese optimism for the ability of the LMC to improve water resource management was balanced by Vietnamese skepticism that the LMC would be significantly different from the MRC outside of the inclusion of China and Myanmar. The following table summarizes the structure of the MRC, the limits to its effectiveness, potential methods for improvement, and an assessment of whether the LMC has addressed these outstanding issues.

[7] Fei Liena, Lu Juan, Mao Pengfei: Spotlight: Lancang-Mekong Cooperation boosts development of China-ASEAN community of shared future, 2018-01-10, Xinhua News, http://www.xinhuanet.com/english/2018-01/10/c_136884750.htm

[8] Li Keqiang, "Speech by Li Keqiang at the second Lancang-Mekong Cooperation Leaders' Meeting" (speech, Phnom Penh, Cambodia, January 10, 2018), China Plus, http://chinaplus.cri.cn/news/politics/11/20180112/77120_all.html.

Table 1: MRC Effectiveness vs. LMC Potential

Purpose of MRC	**Outcomes/Reality**	**What needs to be improved?**	**Can LMC fulfill the gap?**[9]
Coordinate planning across Mekong River Basin	Without the involvement of China and Myanmar, the commission was unable to negotiate and coordinate with upstream countries.	Need to bring include all Mekong River Basin countries as members	Yes, all 6 relevant countries are members
Water resources management	MRC is aligned with environmental ministries of its member countries, which are generally weak in power. Environmental interests are often overrun by economic interests	Associate the mechanism with stronger ministries in each country: for example, Ministry of Finance or Ministry of Energy	No, the LMC still relies on corresponding with the environmental ministries, so power struggle issues continue to exist
Dam development and construction management	No veto power means dam construction can carry on without any obstacles	Need to require a joint approval of environmental impact assessment	No, the LMC also lacks veto power.
Prevent environmental degradation, enhance environmental protection	No binding targets	Need to set binding targets related to the goals of the ministry	Possibly, depending on how LMC structures their goals.
Platform for dialogue	Dialogue is state-to state only. Local community and civil society participation is not mandated.	Set up channels allowing track II diplomacy, looping in non-state actors, civil society, and environmental pressure groups	People to people exchange mechanism established, but still weak

Centralized Rule and Local Governance

Chinese Domestic Actors and Interests

Every level of the Chinese government has interests in water governance along the Mekong River. The central government sets broad goals and guidelines for all subordinate governments to follow. Economic growth is the single most important priority of the Chinese government, and fulfilling China's energy needs is essential in making its economic goals are met. Environmental protection is gaining prominence as pollution issues have increased public outcry and civil unrest. The central government sees hydropower development as an integral component of China's shift away from coal towards cleaner energy sources.[10] Hydropower also helps fuel

[9] Information extracted from "Five-Year Plan of Action on Lancang-Mekong Cooperation (2018-2022)", The State Council of People's Republic of China, Jan 11,2018, http://english.gov.cn/news/international_exchanges/2018/01/11/content_281476009777104.htm

[10] Walker, Beth. "China's Shift from Coal to Hydro Comes at a Heavy Price." 中外对话 China Dialogue. July 27, 2015. Accessed April 01, 2018. https://chinadialogue.net/article/show/single/en/8093-China-s-shift-from-coal-to-hydro-comes-at-a-heavy-price.

China's "Go West" strategy to economically develop its poorer western regions such as Xizang (Tibet) and Yunnan through which the Mekong flows.

Provincial-level governments interpret central government goals and guidelines, but are often given autonomy on how to achieve those goals. For the Yunnan provincial government, hydropower provides much needed government revenue and increased power generation to a growing economy. The provincial government has built nearly fifty hydropower stations throughout Yunnan. Ecotourism, however, is also an economic driver of the region. The government therefore remains cognizant of the need to balance economic growth concerns with environmental preservation and protection.

Dam construction and hydropower development is dominated by Chinese State-owned Enterprises (SOE's). While scores of SOE's have been winded down, reorganized, or merged over the past decade, Xi Jinping has stressed their national importance and has given clear indications that they will continue to help drive China's economy.[11] The largest SOEs wield vast power as their directors hold ministerial rank within the government. Moreover, by employing such vast workforces, any proposed changes to SOE's must take into account the social costs of unemployment. Sinohydro, China's most influential hydropower company, employ over 130,000 people.[12]

Lastly, Chinese civil society groups play an important, but often limited, role in acting as a countervailing force to the interests of industry and relentless economic growth. NGOs, particularly foreign ones, are carefully monitored by the government, but have had success in stopping or altering previous hydropower projects. The Nu River dam was cancelled after NGOs and local citizens amassed public support for the preservation cultural heritage sights that would have been destroyed if the dam were built.[13] Similarly minority groups in Yunnan found success in preserving Tiger Leaping Gorge from hydropower development.

Policy Formulation and Implementation

The institutions that are responsible for China's domestic water governance are fragmented horizontally across multiple ministries and vertically from the provincial down to the village level. The overlapping responsibilities and goals of these institutions are the primary obstacle to successful policy implementation.

The Ministry of Water Resources (MWR) is the most powerful national-level body directly related to water management issues. The ministry leads the design and implementation of the State Council's water plans, manages hydropower projects, and monitors water quantity and use efficiency. The MWR is sometimes at odds with the Ministry of Environmental Protection (MEP) which overseas pollution control and prevention. River Basin Management Commissions (RBMC) were developed to manage the cross-boundary nature of river governance, but have

[11] Kroeber, Arthur R. "Xi Jinping's Ambitious Agenda for Economic Reform in China." Brookings, Brookings, 28 July 2016, www.brookings.edu/opinions/xi-jinpings-ambitious-agenda-for-economic-reform-in-china/.
[12] Sinohydro's Company Website. https://eng.sinohydro.com.
[13] Mertha, Andrew. China's Water Warriors: Citizen Action and Policy Change. Ithaca, NY: Cornell University Press, 2011.

thus far lacked the power to enforce regulations over the will of local governments.[14] The challenge of coordinating between the various bodies domestically further emphasizes the monumental task of coordinating water governance with China at the international level.

Additionally, water governance highlights the rural-urban divide in Chinese policymaking. Multiple NGOs spoke to the difficulty in overcoming China's urban bias in policy making. Ma Jun highlighted that, though rural communities are beginning to be prioritized, urban concerns have taken precedence over rural concerns.[15] Greenpeace also noted that as urban Chinese do not deal with water pollution as much as air pollution, for example, the issue has not taken hold in the same manner.[16]

Vietnamese Domestic Actors and Interests

Like China, each level of government in Vietnam has a vested interest in water resource management. This is particularly true with regard to the Mekong River, which flows through southern Vietnam as it reaches the South China Sea. The goals of the central government in the Mekong Delta region center around economic growth, as the region is responsible for over 50% of the country's rice production and 60% of its aquaculture.[17] As a result, the central government is very much focused on how productive the Delta region can be to spur domestic economic growth, encouraging rice cultivation and fishery practices that are not necessarily conducive to climate change adaptation and mitigation. The central government is powerful because it controls the purse strings for development money in the region, particularly in provinces that have a budget deficit.

There are 13 provinces in the Mekong Delta, and only one of them has a surplus budget, Can Tho province.[18] While there is central-local government fragmentation in Vietnam, as in China, one of the biggest issues in the Mekong Delta is the lack of inter-provincial cooperation on water governance. There is considerable institutional fragmentation at the provincial level, resulting in overlapping responsibilities and inefficient policy execution. In the local government structure, the Department of Natural Resources and Environment is in charge of enforcing environmental regulation.[19] In Can Tho, local officials indicated that compared with policymakers in Hanoi or Ho Chi Minh, the local government officials have a better grasp of the effects of climate change in the delta because of their proximity to the problem.

The most important non-governmental actor in the Delta region is business, both large-scale industry and smaller-scale farmers and fishers. Large-scale industry exacerbates the water management issues in the Delta provinces, because Vietnam lacks the proper incentive structures to force productive water resource management. For example, there is no charge for surface or

[14] Te Boekhorst, Dorri GJ, Toine Smits, Yu Xiubo, Li Lifeng, Lei Gang, and Zhang Chen. "Implementing integrated river basin management in China." Water Policy Entrepreneurs: A Research Companion to Water Transitions Around the Globe (2009): 99.
[15] Comments made by Ma Jun, Institute of Public and Environment Affairs. January 16, 2018.
[16] Comments made by Li Shuo, Greenpeace. January 16, 2018.
[17] Comments made by faculty at Fulbright University Vietnam. January 22, 2018.
[18] Comments made by faculty at Fulbright University Vietnam. January 22, 2018.
[19] Comments made by faculty at Fulbright University Vietnam. January 22, 2018.

groundwater usage, so there is little incentive to consume water efficiently.[20] Moreover, because there are only land-use rights in Vietnam and no property rights, industries and businesses are more willing to exploit the land they work on.

Civil society is not currently a robust part of the water management and climate change debate in Vietnam. The central government controls much of the flow of information regarding the environment in the Delta, and there is usually very little information in newspapers detailing what other countries (i.e. China) are doing to affect the Mekong River. For those that are involved in raising environmental awareness, their main platform is Facebook.[21]

Policy Formulation and Implementation

A chief policy challenge that both the central and provincial Vietnamese governments face is the tension between exploiting natural resources for economic growth and instituting climate change adaptation mechanisms. This tension forms a critical obstacle to successful policy formulation and implementation across all levels of government.

In addition to these divergent policy goals, the bureaucratic mechanisms are not set up to facilitate cooperation. The central government holds power because it can dictate national level policy goals while also controlling the funds required to facilitate development-related investment throughout the country. But it is the provincial governments that can actually carry out environmentally-related policies. Provinces can carry out policies within their jurisdiction, as the provincial government of Can Tho does, but cooperation among the provinces is still limited. These bureaucratic and structural hurdles prevent larger-scale climate and water resource management policies from gaining traction in the Delta region.

Attitudes Towards Water Governance

Leaderships' views toward the Lancang/Mekong River as a space for protection, exploitation, or transformation vary from country to country and from sector to sector within China and Vietnam. Our diverse agenda exposed us to a wide range of government, nonprofit, and research entities– each revealing, to varying degrees, their attitudes toward the river. With different attitudes come different actions committed by each government and in-state actors that help to explain the complex governance structures described in the previous section.

In China, the government views the Lancang as a resource to exploit via hydropower and as a tool to bolster government legitimacy through large-scale infrastructure projects. Consequently, the actions Chinese actors take often prioritize projects that will boost GDP and government legitimacy over environmental considerations. Instead of joining the long-standing Mekong River Commission (MRC), China has opted to be an observer in the MRC and, instead, formed the Lancang-Mekong Cooperation (LMC) to protect its interests (mainly, aggressive hydropower projects), which are at odds with the MRC. The China-ASEAN Environmental Cooperation Center, while a more recent endeavor of the Ministry of Environmental Protection, has hopeful

[20] Comments made by Vietnam Pangasius Association. January 23, 2018.
[21] Comments made by Vietnam Pangasius Association. January 23, 2018.

policy objectives but seems to have minimal influence on environmental policy in China. Staff admitted that the Center was established for "political" reasons, alluding to the notion that environmental concerns may not be of top priority for the Chinese government, but rather, uses the Center to produce the misleading image that environmental protection is at the forefront of developmental policies.[22]

Nonprofits in China take a more progressive stance toward environmental protection, yet, have developed specific mechanisms to work in the given policy atmosphere. The Global Environmental Institute (GEI) helps support the government "do what they are doing, but better." The organization recognizes that GDP is a top concern for China, so it works *with* the government rather than *against* it to facilitate high level, bilateral agreements and improve low-carbon policymaking while simultaneously working to meet GDP goals. Greenpeace, International Rivers, and the Institute of Public & Environmental Affairs (IPE) also play roles as information sharers and conversation starters by sharing resources and bringing together environmental groups (GreenPeace), by informing hydropower companies about the ecological effects their projects have on humans (International Rivers), and by centralizing government data through an accessible phone application to increase civil society's environmental engagement (IPE). Overall, politics rather than science seem to significantly influence attitudes and actions toward the Lancang River in China.

In Vietnam, attitudes toward the Mekong River are noticeably different than those held in China. Although the government still views the River as a crucial resource for revenue generation through agricultural production and fish farming, it has acknowledged the detrimental effects of environmental mismanagement (mainly blaming problems on upriver states) more so than China. Nonetheless, the Vietnamese government has failed to produce effective inter-provincial cooperation on water governance, has yet to initiate permits or charges for pumping water, and has failed to prevent illegal extraction of sand – all contributing to the environmental problems seen throughout the Delta. Compared to China, research entities in Vietnam appear to be a lot more independent of government influence and produce scientific and proactive policy recommendations to combat environmental degradation. Fulbright University's Lower Mekong Public Policy Initiative highlighted specific techniques to address these issues, like scaling back triple rice cropping, putting a price on water, reengineering flood control, and creating an interprovincial linkage in managing water. Can Tho University's Dragon Institute introduced promising agricultural techniques to collect rainwater, reduce phosphorus and improve soil filtration. Citizen science, where the general public assists in measuring and documenting the impacts of climate change in the Delta, is another point of emphasis for local researchers.

Other actors in Vietnam, such as the delta ecologist Nguyen Huu Thien and the Pangasius Association, candidly presented very specific challenges as well as possible solutions to the environmental problems the Delta is experiencing. Dr. Huu Thien attributed development errors as the number one problem in the region and emphasized the importance of working in a diplomatic manner with the Vietnamese government since environmental demonstrations are quickly shut down and Facebook activity is limited. The Pangasius Association, as expected,

[22] Comments made by staff at China-ASEAN ECC, January 17, 2018.

disapproved of dam development upriver as it negatively impacts the health and productivity of the Pangasius industry and, if the 11 proposed dams are built, will cost Vietnam an estimated $135 million/year due to sediment loss. Overall, science plays a larger role than politics in influencing attitudes and actions toward the Mekong River in Vietnam.

Attitudes toward the correct usage of water resources vary widely in the Mekong River Basin. Although leadership in Vietnam has taken a more clear, pro-environmental attitude toward the Lancang/Mekong River, both China and Vietnam have many opportunities to improve their development policies along the River to ensure future sustainability and economic prosperity within the region.

Basin Development and Sustainability

Challenges to Rivers in Development

Imperatives of economic development have prevailed over environmental concerns in the Mekong River Basin. Basin countries include two upper-middle income countries – China and Thailand – and four lower-middle income countries – Vietnam, Cambodia, Laos, and Myanmar.[23] However, these lower-middle income countries are projected by the Asian Development Bank to achieve an average growth rate of 7.2 percent in 2018, making them some of the fastest-growing economies in the world.[24] This astonishing development should be touted as an achievement, as it has the potential to bring thousands out of poverty in these countries and bring benefits to the global economy through greater competition. Nonetheless, following previous patterns of industrialization that occurred in the United Kingdom, United States, and, more recently, China, this economic development also has the potential to have drastic impacts on the local environment.

The developing economies in the Mekong River Basin bring with them a rising demand for energy that is primarily met by coal and hydroelectric generation. Laos, the least developed country in the Mekong River Basin, but one that contains the largest portion of the Basin's area, intends to capitalize on these water resources as a main component of their development.[25] Through the construction of over 72 new dams, including 9 large dams on the Mekong mainstream, Laos, which once styled itself "the Jewel of the Mekong", is positioning itself to become the "battery of Southeast Asia," selling power produced from these dams to neighboring China, Thailand, and Vietnam.[26] Upriver, China continues to construct dams on their portion of

[23] Classifications determined from World Bank Lending Groups. "World Bank Country and Lending Groups," accessed March 30, 2018, World Bank, https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.
[24] "Southeast Asia: Economy," 2017, Asian Development Bank, https://www.adb.org/data/southeast-asia-economy.
[25] "Mekong Basin," 2016, AQUASTAT website, Food and Agriculture Organization of the United Nations (FAO), http://www.fao.org/nr/water/aquastat/basins/mekong/index.stm.
[26] Maureen Harris, "Laos," accessed January 8, 2018, International Rivers, https://www.internationalrivers.org/campaigns/laos.

the Mekong, called the Lancang River, with over 20 additional "megadams" planned or already under construction.[27] These dams could have large environmental impacts downstream.

During the course of our research, many of our meetings focused on hydroelectric development along the Mekong River, particularly in the three regions of the Upper Mekong Basin which are located within China. In 2016, China added 11.76 GW of new capacity, including 3.7 GW of pumped storage, bringing its total installed hydropower capacity to 330 GW, or over a quarter of the world's total.[28] China has already constructed six operational dams along the Mekong, with at least fifteen additional dams expected to be completed within the next decade.[29] The negative environmental impact of these developments has been well documented. For instance, the Lancang Basin is the source of roughly half of the sedimentation deposited in the Lower Mekong, and hydropower dams have been observed to capture between 53% to a staggering 94% of sedimentation, increasing downstream riverbank erosion, reducing the flow of nutrients into floodplain areas, altering the chemical base of downstream ecosystems, and accelerating the seawater intrusion and ensuing salinization of the Mekong River Delta, with disastrous effects on agriculture and biodiversity that are only likely to accumulate and grow in the coming decades.[30]

The impact of upstream hydropower development in the Mekong River Delta in Vietnam is further compounded by climate change and additional factors such as water pricing practices in the country. Separating the closely interrelated effects of hydropower development, changes in sedimentation patterns, sea level rise, and economic development is difficult, as all factors are closely related in such a complex ecosystem. For instance, estuarine mangroves, which play a critical role in protecting sediment erosion into the river and the sea through their complex root, stem, and canopy system, are harmed not only by sea level rise and changes in sedimentation patterns due to upstream hydropower development, but also by loss of habitat as local fish farming operations expand—a necessary expansion, as the salinized soil is no longer suitable for rice cultivation.[31] Despite a 2010 strategic environmental assessment by the Mekong River Commission that found planned hydropower development along the lower Mekong River basin would result in a loss of between 550,000 to 880,000 tons of wild fish due to the disruption of fish migration patterns, the governments of Cambodia, Lao PDR, Thailand, and Vietnam have continued planning more than 88 hydropower dams to be constructed by 2030.[32] Nonetheless, despite similar expansionary plans throughout the region, actors along the Lancang/Mekong have unique attitudes and have acted in non-unitary fashions.

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[27] Peter Bosshard, "Mekong/Lancang River," accessed March 30, 2018, International Rivers, https://www.internationalrivers.org/campaigns/mekong-lancang-river.

[28] International Hydropower Association. (2017). Hydropower Status Report 2017. International Hydropower Association. Retrieved from https://www.hydropower.org/sites/default/files/publications-docs/2017%20Hydropower%20Status%20Report.pdf

[29] Fan, H., He, D., and Wang, H. (2015). Environmental consequences of damming the mainstream Lancang-Mekong River: A review. *Earth-Science Reviews*, *146*, 77-91.

[30] Bosshard, P. and Mang, G. (6 May 2015). The challenges of climate change. *World Rivers Review, 30*(1), 6-7.

[31] Truong, S. H., Ye, Q., and Stive, M. (2017). Estuarine mangrove squeeze in the Mekong Delta, Vietnam. *Journal of Coastal Research, 33*(4), 747-763.

[32] Pittock, J. (2014). Devil's bargain? Hydropower vs. food trade-offs in the Mekong Basin. *International Rivers, 29*(4), 3-14.

Upstream Engineering and Downstream Realities

As a result of the "Going Out" strategy, Chinese investors and engineering firms have led the effort to harness the Mekong and its tributaries. Chinese companies, acting as financiers, regulators, contractors, and investors, are involved in more than 50 large-scale (any project with a capacity of 50 megawatts or higher) planned or ongoing hydropower development projects on either the mainstream or tributaries of the Mekong River Basin (MRB).[33] The central governments of poorer countries such as Cambodia and Laos have seized upon the financial resources and technical expertise of Chinese firms to push their vision of development, focusing on the benefits that hydropower offers not only to its own citizens, but to the wider region through the sale of electricity.

This new phase of development on the Mekong is contentious, as a variety of local, national, and international stakeholders array themselves around competing visions of development, environmental management, and pathways for economic growth. Our field research revealed the complexity and diversity of opinion between groups on different sides of this issue, and illuminated the important role development discourse and knowledge production plays in shaping the future of the Mekong basin.

Public-Private Partnerships Drive Hydropower Development

The financing of most current hydropower development projects in the Mekong River Basin assumes the form of a "Build-Operate-Transfer" (BOT) arrangement, in which a private entity receives a concession from the public sector to construct, own, and collect revenues from the project for a fixed period of time.[34] Chinese involvement in BOT arrangements in the MRB runs deep: state-owned enterprises such as Sinohydro and China Southern Power Grid Company as well as privately-held companies like Hanergy are involved in construction of hydropower stations, and Chinese state-run financial institutions such as the Export-Import Bank of China and China Development Bank are supporting hydropower projects throughout the region. The risk factors affecting hydropower development are diverse, and firms are therefore intent on both minimizing operational, political, and technical risk, while governments are anxious to see the project completed with a minimum of delay or opposition from local stakeholders.

Disputed Costs and Benefits of Hydropower in the MRB

As mentioned elsewhere, a substantial body of research shows that hydropower development in the Upper Mekong Basin has already had serious effects on the volume, timing, and variability of sediment and nutrient flows into the Lower Mekong Basin, especially its upper reaches in Laos and Cambodia, which in turn affects the economic livelihood, food security, and prospects

[33] "An analysis of China's investment in the hydropower sector in the Greater Mekong Sub-Region" Urban, F., Nordensvärd, J., Khatri, D. et al. *Environ Dev Sustain* (2013) 15: 301. Accessed March 25, 2018, available at https://doi.org/10.1007/s10668-012-9415-z

[34] Comments made by Stephanie Jensen-Cormier, International Rivers. January 17, 2018.

for development of the approximately 60 million inhabitants of the Lower Mekong Basin who depend heavily on the river for their main source of nutrition and income.[35] Less quantifiable but no less impactful, perhaps, are the societal and cultural effects that hydropower development has on the local communities near project sites. Resettlement, loss of work opportunities, and the disappearance of important religious sites are all by-products of the construction of power stations and reservoirs.[36] In the face of these claims, however, hydropower development proceeds, largely because of the strong push by central governments and outside investors to capitalize on the promise of steady electricity and opportunities for increased industrial capacity and revenue from electricity sales.

Contested Methods of Knowledge Production

A key point of contention between advocates and opponents of hydropower development along the MRB has been the process by which the potential environmental and social impacts of large projects are catalogued and measured. As mentioned above, hydropower developers and their financial backers are anxious to avoid stranded capital, and therefore seek to reduce friction between stakeholders by demonstrating their compliance with national and international environmental standards. These actors have traditionally relied on a modernist, scientific approach to justify their claims, perhaps best exemplified by the Environmental Impact Assessment (EIA) process, which aims to capture and quantify in discrete terms the environmental and economic costs and benefits associated with the proposed project.[37] Opponents of hydropower, however, see EIAs as, at best, incapable of encompassing the array of ecological, environmental, and societal effects that dams can cause to communities, and, at worst, as symbolic of the corrupt ties between central governments and private investors. Along the length of the MRB, domestic and international non-governmental organizations have employed a variety of tactics to delay or in some cases cancel planned hydropower development, or sought to encourage more transparency from investors about their environmental and social management strategies.

Field Perspectives

The FEST trip to China and Vietnam provided the group with a unique opportunity to discuss with local experts the key issues outlined above. A major takeaway is that many experts have divergent perspectives on the downstream impacts of major upstream projects. Over the course of the trip, we met with diverse stakeholders including Chinese academics, international NGO staff, and Vietnamese environmental consultants. In Yunnan Province, near the headwaters of the Mekong River, researchers at Yunnan University are doubtful that current projects negatively

[35] "An analysis of China's investment in the hydropower sector in the Greater Mekong Sub-Region" Urban, F., Nordensvärd, J., Khatri, D. et al. *Environ Dev Sustain* (2013) 15: 302. Accessed March 25, 2018, available at https://doi.org/10.1007/s10668-012-9415-z

[36] Comments made by Stephanie Jensen-Cormier, International Rivers. January 17, 2018.

[37] Kakonen, Mira, and Hirsch, Philip. "The Anti-Politics of Mekong Knowledge Production", *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods, and Governance*, Earthscan from Routledge, 2015. (335)

impact downstream ecology and communities. Firstly, they cite the significant improvements made to the Environmental Impact Assessment (EIA) process over recent years, specifically stressing that the Assessment process has been enshrined in national law as the first step of infrastructure projects.

The purpose of the EIA and related hydrological models is to consider the impacts of dam projects on the environment as well as downstream communities. In the estimation of Yunnan researchers, EIAs are sufficiently rigorous and capture all the major issues. Secondly, researchers suggested that a lack of data on downstream impacts means the jury is out on the precise impacts of dam development. However, this point raises an apparent contradiction: if the EIA process is rigorous enough to draw a firm conclusion that environmental impacts are negligible, how can there be the additional claim of insufficient data preventing a firm conclusion on downstream impacts from being reached?

In addition to meeting with researchers from Yunnan University, we discussed the specific issue of the EIA process with International Rivers, an multinational NGO, in Beijing. A key takeaway from our discussion was that EIAs need to consider not just direct environmental impacts but also the socioeconomic impacts to livelihoods as well as gender and local cultural values. Therefore, while the Chinese academic community contends that EIAs are sufficient, the NGO community sees room for improvement. International Rivers indicated that benchmarking and project assessment strategies were effective at eliciting positive responses from Chinese hydropower firms, and that they had seen changes in institutional behavior from their "name and shame" tactics.[38] Concern about the efficacy of EIAs was echoed by a Vietnamese ecologist with whom we met in Can Tho, in the Mekong Delta region. His primary concern is reduced sediment flows and subsidence. As the flow of the Mekong decreases due to upstream development, farmers in the Vietnamese Mekong delta resort to groundwater pumping to meet their water needs. This shrinks the aquifer below the delta, in turn causing the ground level to drop. Over time, this could significantly increase the risk of salt water encroachment and catastrophic flooding in the delta region. The ecologist also stressed the need for more cooperation from upstream countries in order to ensure more accurate data throughout the wet and dry seasons and improve planning mechanisms.

Over the course of our meetings with experts in both China and Vietnam, the downstream consequences of upstream engineering emerged as a major topic. Our discussion showed that there is still significant disagreement between experts as to the precise nature of downstream impacts, the severity of these impacts, as well as the best way to mitigate negative impacts in light of the anticipated effects of climate change in the Mekong River Basin.

Climate Change and Development

Climate change is only one of many challenges facing the Mekong River, but its impact is significant, particularly in the Lower Mekong Basin of Vietnam, Cambodia, Laos and Thailand.

[38]Comments made by Stephanie Jensen-Cormier, International Rivers. January 17, 2018.

While the agricultural sector has declined in relative importance in Vietnam over the past several years (from 22.7% in 2000 to 18.1% by 2014), agricultural commodities — including rice, fish, and tea — are still major exports.[39] Rice production relies on seasonal climatic conditions, including the complex interactions of two monsoon rain systems from May to September, fresh water from the Mekong River, and sediment-rich seasonal flooding — all three of which have changed in part due to the effects of climate change.[40] [41]

These impacts are in conjunction with the myriad effects from upstream river structures that topple the delicate balance between fresh and saline water in the Mekong and its tributaries, as well the sharp reduction in nutrient-rich sediment transfer from upstream to downstream parts of the river.[42] Over the past twenty years, the Lower Mekong Basin has experienced increasingly intense and frequent floods, droughts, sea level rise, saline intrusion, and changes to water runoff.[43] Droughts in 2004-2005, for example, damaged over 104,000 ha of rice throughout the Mekong River Delta.[44] More critically for Vietnam, increased salinity associated with sea level rise will severely impact rice paddies, curtailing their production ability.[45]

The Lower Mekong Basin is also a large inland fishery, producing 2 million metric tons of fish a year as well as other aquatic animals in wild capture alone.[46] In terms of cultivated fish, the region exports large quantities of the fresh to brackish-water fish pangasius, a type of catfish (sometimes labeled 'Basa fish' in various overseas markets). The inward shift of saline water -- predicted in one study to be about 70-80 km, almost 63% of the Mekong Delta — will shrink the pangasius farming area by almost 11%.[47] Droughts and upstream hydropower reducing water flow may also contribute to the rising salinity in the Mekong River's two critical tributaries for pangasius cultivation, the Hau and Tien Rivers.[48] Chilly out-of-season rains during the dry season can also lower the mortality rates of immature pangasius, as would increased salinity itself.[49] [50]

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[39] Cosslett, Tuyet L., and Patrick D. Cosslett. *Sustainable Development of Rice and Water Resources in Mainland Southeast Asia and Mekong River Basin*. Singapore: Springer Singapore, 2018. Accessed March 28, 2018. Available at https://link.springer.com/content/pdf/10.1007%2F978-981-10-5613-0.pdf. (27)

[40] Ibid.

[41] Earle, Anton. *Transboundary Water Management and the Climate Change Debate*. London: Routledge, Taylor & Francis Group, Earthscan from Routledge, 2015. Accessed March 29, 2018. Available at https://ebookcentral.proquest.com/lib/jhu/reader.action?docID=3569020&query=&ppg=84. (71)

[42] Ives, Mike. "In Mekong Delta, Rice Boom Has Steep Environmental Cost." Yale E360. July 11, 2013. Accessed March 29, 2018. https://e360.yale.edu/features/in_mekong_delta_rice_boom_has_steep_environmental_cost.

[43] Cosslett, Tuyet L., and Patrick D. Cosslett. *Sustainable Development of Rice and Water Resources in Mainland Southeast Asia and Mekong River Basin*. Singapore: Springer Singapore, 2018. Accessed March 28, 2018. Available at https://link.springer.com/content/pdf/10.1007%2F978-981-10-5613-0.pdf. (27)

[44] Ibid.

[45] Ibid.

[46] Ibid.

[47] Trieu, T.T.N. & Phong. "The impact of climate change on salinity intrusion and Pangasius (Pangasianodon Hypophthalmus) farming in the Mekong Delta, Vietnam" *N.T. Aquacult Int* (2015) 23: 523. (524) Available at https://doi.org/10.1007/s10499-014-9833-z.

[48] Ibid.

[49] Comments made by Mr. Hi, pangasius farmer in Vietnam. January 24th 2018.

[50] Trieu 533.

As climate impacts in the Lower Mekong Basin are predicted to be severe, and given the large number of people supported by the basin and its water resources, overall community resilience are also a key concern of policy-makers.[51] The Lower Mekong Basin's slow shift from resilient subsistence agriculture to intensive and vulnerable commercial rice monoculture — compelled by the Vietnamese government's "Rice First" policy — has reduced the ability of their agricultural system to bounce back from climate shocks, especially as commercial rice farmers make the transition from two rice harvests a year, to a more resource-depleting three rice harvests annually.[52] [53] These high yields themselves are indebted to a complex series of dikes and irrigation structures throughout the Lower Mekong Basin, which are part of the overall transformation of the delta propelled by hydropower, climate change, and these local structures.[54]

Finally, climate change has had an impact on populated areas in the Mekong River Delta outside of the damage to agriculture. For example, Can Tho, the "Western Capital" of Vietnam, is vulnerable to coastal flooding, disease outbreak, drought/water insecurity, rainfall flooding, sea level rise, and coastal erosion -- all challenges that threaten productivity and human security.[55] Flooding poses a particularly tricky challenge, as adaptation to flooding must be balanced with the beneficial nature of moderate flooding in many rural parts of the Mekong River Delta, where floods deposit 150 million tonnes of fertile sediment, bring fish, purify water, kill pests, and wash farm residuals.[56]

Despite the great need to do so, the effective capacity of the Vietnamese and Chinese states to enact effective policies designed to improve climate change resilience, adaptation, and mitigation has been limited by interest group conflict and, at least until recently, a consistent prioritization of economic concerns over environmental concerns in both nations. Although both political systems are characterized by strong state capacity to address issues that the center prioritizes, consistent conflict between factions that benefit directly from (hydropower) development and groups that lobby on behalf of ecological concerns has produced central indecision, which has in turn led to half-hearted and inconsistent climate change mitigation policies being pursued in both China and Vietnam over the course of the last decade.

Within China, the general context of slowing economic growth, which is perceived to have a detrimental effect on regime legitimacy, is occurring at the same time as severe environmental degradation, which the center also fears could reduce the popular legitimacy of China's political system. Solving one of these problems often entails worsening the other, thus the central leadership has faced a dilemma in recent years. Despite recent policy developments suggesting that the government may give increases emphasis on ecological concerns in the coming years,

[51] Earle, Anton 72.
[52] Ibid.
[53] Comments made by faculty at Fulbright University. January 22nd 2018.
[54] Ives, Mike. "In Mekong Delta, Rice Boom Has Steep Environmental Cost." Yale E360. July 11, 2013. Accessed March 29, 2018.
[55] "Can Tho." 100 Resilient Cities. Accessed March 30, 2018. https://www.100resilientcities.org/cities/can-tho/.
[56] Danh, Vo Thanh, and Shahbaz Mushtaq. "Living with Floods: An Evaluation of the Resettlement Program of the Mekong Delta of Vietnam." *Advances in Global Change Research Environmental Change and Agricultural Sustainability in the Mekong Delta*, 2011, 181-204. doi:10.1007/978-94-007-0934-8_11. (12)

even at the expense of economic growth (for example, Xi Jinping's recent emphasis on "high-quality growth" and "the three great battles," [one of which is protecting the environment], and the recent creation of the Ministry of Ecological Environment), China's typical choice has been to prioritize development whenever it is threatened, no matter the effect on China's environment or the global climate. Vietnam has experienced similar interest group conflict, yet based on our experience talking to stakeholders on the ground, this primarily led to an inter-provincial "race to the bottom" in which provinces compete to design environmental policies that are business friendly, yet as a result very few jurisdictions do anything meaningful to prevent over-exploitation of groundwater resources.[57] In sum, the institutional setting of at least two of the states along the Mekong River, specifically the two nations visited on our fact-finding mission, has likely exacerbated the challenges of climate change resilience, adaptation, and mitigation both domestically and across the region.

Conclusions

The Mekong River tensions that our group observed during this trip reflect the conflicting interests and influences of myriad stakeholders – scientists, NGOs, public activists, state economic managers, state regulators, energy companies, and banks – suggesting the need for several policy prescriptions tailored to differing concerns. All policy prescriptions come with trade-offs, requiring efficient discussion about a complex combination of competing and conflicting approaches to reach an agreement during negotiations among the countries and other stakeholders. Because of each regional actor's differing objectives and approaches, the greatest issues inhibiting regional coordination and cooperation remain whether any feasible plan can at least partially accommodate all actors in these six very different countries, and moreover whether there are any viable means to incentivize coordination and cooperation at an effective scale.

If countries along the Mekong River are to develop in a sustainable and equitable fashion, large improvements must be made in governance at the subnational, national, and multinational levels. In theory, an ideal means to address Mekong River issues would be a well-defined, agreed-upon, and effective forum for the negotiation of tradeoffs among the competing Mekong states. A precondition for this ideal is that each state appropriately represent the balance of diverse interests of their own many domestic entities. Thus, the ideal is no doubt challenging at both the state and international levels.

However, states' behaviors already appear to reflect an implicit preference for such a forum, demonstrating some degree of agreement on an ideal path forward. The Mekong River Commission (MRC), despite its value in, for example, data collection, is criticized precisely because it has failed to function as an effective forum for the negotiation of trade-offs. China proposed the Lancang-Mekong Cooperation (LMC) mechanism to serve as such a forum. The LMC has been met with skepticism from other states regarding its credibility, transparency, and efficiency - in short, whether it could be rationally agreed upon by all parties, and so truly

[57] Comments made by delta ecologist Nguyen Huu Thien and the scholars from Fulbright University's Lower Mekong Public Policy Initiative. January 22nd, January 24th 2018.

effective. Although no rational observer should not expect the reality to proceed smoothly, given the extraordinary challenges entailed, implicit agreement on the ideal is a starting point.

The likely reality is that state-level outcomes will depend on how effectively each actor can articulate their interests; of particular note is the evolution of civil society in each riparian state as the region continues to develop. However, since the effects of dam construction are rarely contained within borders, governance and the protection of affected communities becomes very difficult. Strengthening cooperation and supervision mechanisms between engineers, developers, and community-level actors to ensure dam development occurs in the most environmentally and socially responsible manner possible is the first priority. Secondly, environmental impact assessments must be further developed to more holistically consider both the environmental *and* social impacts of upstream projects. Future research should focus on a comparative study of approaches to performing EIAs within the Mekong River basin and how the various existing regional mechanisms could support consistency in this process.

Maintaining the critical ecological functions of the Mekong River Basin as well as sharing the benefits and losses of hydropower development equitably will occupy much of the debate in the MRB for the foreseeable future. Therefore, the greatest need for energy governance is at the multinational level, a plane at which results are notoriously difficult to attain. The region-level outcomes will depend largely on whether either ASEAN countries or China can establish a meaningful coordination and decision-making process. ASEAN's efforts have historically failed, and China's LMC seems unlikely to face fewer challenges, both from domestic constraints and regional skepticism. China's historical reluctance to take part in MRC coordination is seen as a key factor in the MRC's ineffectiveness, adding to problems of perception.

Furthermore, if a meaningful process were realized, implementation and enforcement of the decisions reached would demand a much higher level of coordination among the states along the Mekong river, and impose significant constraints on the sovereignty of each state. Sovereignty has been a paramount interest for Asian countries since the colonialism of the 19th and 20th centuries; it will not be easy to overcome such a fundamental concern. Adding to the uncertainty around cooperation is the regional history of engagement by external states, who have long provided technical expertise, project funding, and education to the work of many Mekong states and institutions through both official and non-governmental channels, leading to perceptions of bias and undue influence from basin states such as China, the *de facto* regional superpower. As our interviews with Chinese stakeholders indicated, external actors' continued involvement in the MRB is another potential stumbling block for future cooperation in the region.

Finally, the expected impacts of climate change will also need to be addressed by all riparian states in the MRB if transboundary governance is to be successful. Given the increased likelihood of flooding throughout the Lower Mekong Basin, as well flooding from severe storms (exacerbated by the decimation of coastline mangrove forests), developing adequate flood management in the Lower Mekong Basin has taken on a new urgency. For greater resilience to flooding in urban areas, then, policymakers may want to mimic the "amphibious ecology" of the rural delta, where many residents seek to shape the human environment to the flood through stilted houses, boat ownership, and temporary footbridges during floods, as opposed to seeking

to control flooding with landscape-altering structures.[58] Local urban design that "anticipates and accommodates" flooding may boost urban resilience in a scenario where the alternative might be a flood that overwhelms the capacity of a flood-control structure.

We close by returning to the key question of regional coordination. One potentially feasible plan could include both the establishment of a regional mechanism led by the regional swing players, rather than China, and the requirement for each state to publish clear, publicly accessible agendas that enable all parties to more clearly assess other states' perspectives and logic, and establish a standardized, transparent basis for negotiation and further interest articulation. Such efforts could be enabled by strengthening the already- existent intra-state communication channels, which we observed throughout our research trip. Additionally, alternate, innovative models of project financing whereby LMB states such as Vietnam and Thailand, two of the more financially stable states in the region, take a more active role in investing in and guiding the development of upstream hydropower development, should also be explored, in order to build new channels for coordination and cooperation. The fundamental elements for a more constructive future likely already exist. The future of Mekong coordination and cooperation depends on how they are built upon, by whom, and with what degree of openness and transparency among the key states and stakeholders.

[58] Liao, Kuei-Hsien, Tuan Anh Le, and Kien Van Nguyen. "Urban Design Principles for Flood Resilience: Learning from the Ecological Wisdom of Living with Floods in the Vietnamese Mekong Delta." *Landscape and Urban Planning* 155 (2016): 69-78. doi:10.1016/j.landurbplan.2016.01.014. (72 - 74)