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Modified Transboundary Water Interaction Nexus (TWINS): Xayaburi Dam Case Study

Richard Grünwald [1,*], Wenling Wang [1,2,*] and Yan Feng [1,2,*]

[1] Institute of International River and Eco-Security/Asian International Rivers Center, Yunnan University, Kunming 650091, China
[2] Yunnan Key Lab of International Rivers and Transboundary Eco-Security, Kunming 650091, China
* Correspondence: grunwaldrichard@ynu.edu.cn (R.G.); wangwl@ynu.edu.cn (W.W.); fengyan@ynu.edu.cn (Y.F.)

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Abstract: The Mekong River comprises six riparian states and supports the livelihood of more than 65 million people. Although the rapid joint river development enlarges the pie of benefits, it also deepens existing conflict of interests and motivating downstream countries to use more power to get better control over shared waters. The purpose of the article is to operationalize a new Transboundary Water Interaction Nexus (TWINS) and interpret interchange of cooperation and conflict between Laos, Thailand, Cambodia, and Vietnam about the Xayaburi hydropower dam in the last 19 years (2000–2019). Our results show that (1) there is significant disparity between the official and public attitude towards the Xayaburi dam, (2) since 2013, the debates about the Xayaburi dam issue has been substituted by other mainstream hydropower dams, (3) the Xayaburi dam indicates that hydropower dams are one of the national priorities that will be pursued at all cost, (4) Laos gained confidence and significant political leverage on downstream countries since the groundbreaking ceremony of the Xayaburi dam in November 2012, (5) failure of the Mekong River Commission's Procedure of Notification and Prior Consultations (PNPCA) with the Xayauri dam motivated downstream countries to redesign the institutional arrangements and stakeholder consultations.

Keywords: Mekong River; TWINS framework; water cooperation; water conflict; hydropolitics; Xayaburi dam; Laos; Southeast Asia

1. Introduction

The Xayaburi dam is historically the first hydropower dam in the Lower Mekong River Basin that formally underwent the Procedure of Notification and Prior Consultations (PNPCA). The PNPCA is one of the cooperation mechanisms backed by the Mekong River Commission (MRC), which regulates joint river development on the mainstream and prescribes regular consultation about certain water–issues that may harm other riparian states. The PNPCA is also an example of good water governance where states are nominally equal and collectively solve various conflicts of interest by negotiations in an accountable, equitable, and sustainable manner. However, since April 2011, when the PNPCA with the Xayaburi formally ended, and November 2012, when Laos unilaterally continued construction of the Xayaburi dam, there has been the question of how this issue influences the dynamics of transboundary water interaction in the Mekong River Basin. The Mekong River Basin is an important international river in Southeast Asia that passes through six riparian states—China, Myanmar, Laos, Thailand, Cambodia, and Vietnam. Despite that riparian states faced many territorial disputes and civil conflicts during the Cold War era, the transboundary water cooperation in the Mekong River Basin has historically been considered as one of the most successful and long-lasting peaceful cooperation of all time [1]. The Mekong River Basin also provides significant hydropower potential, which may satisfy

the growing demand for electricity and serve as a new source of income for developing countries, particularly Laos and Cambodia. Currently, most of the hydropower dams are located in upstream countries such as China and Laos [2]. Although Laos is still far from fulfilling its dream to become the "battery of Southeast Asia" [3], there are many investors who have the capacity to build hydropower dams and lift Laos out of poverty. However, rapid joint river development along with increasing water consumption and climate change possess substantial pressure on the sustainability of agriculture, fishery, and environment, which are vital sectors for downstream countries. Riparian states, therefore, stand before the *conflict and cooperation paradox* [4], where joint hydropower development deepen existing conflict of interest, distorting transboundary water governance but simultaneously attracting more investments from foreign donors and boost regional economies with a cheap source of energy.

To find out the answers, we revised the Transboundary Water Interaction Nexus (TWINS) and re–examined the history of the Xayaburi dam. The TWINS Framework represents a theoretical–methodological tool for understanding and illustrating the evolution of cooperation and conflict over interstate water–related issues [5]. To date, most of the attention has been paid to international water treaties [5–7], which allowed scientists and water experts to interpret the interstate relations on a bilateral level. On the other hand, there is a very limited number of studies that are able to grasp complex hydropolitical contexts and compete with a lack of primary data [8–12]. Thus, our research aims to (i) explore cooperation and conflict over the Xayaburi dam with both state- and non-state actors and (ii) consider the Xayaburi dam in a broader political context. It also fills some information gaps, presents other water–related events on the sideline of the Xayaburi dam, and tests the strength of the new theoretical framework. The structure of this paper is divided into a few sections. In Section 1, we present the re-designed TWINS Framework and introduce the methodology of this instrumental case study focusing on the interstate relations between Laos, Thailand, Cambodia, and Vietnam over the Xayaburi dam. In Section 2, we show our calculations about the cooperation and conflict intensity of water-related events with references to the Xayaburi dam in the last two decades (2000–2019). Section 3 is left for the discussion about key findings, general trends in transboundary water interaction, and interpretation of Laos–Thailand, Laos–Cambodia, and Laos–Vietnam relations. This section also briefly introduces several challenges and addresses the existing limits of the presented study. The last part of the text summarizes the conclusions from the research.

2. Materials and Methods

2.1. Critical Hydropolitics and Actors

The presented research conceptualizes the co-evolution of cooperation and conflict from a critical hydropolitical perspective [13–15]. The main difference from traditional hydropolitical theories lies in: (1) analyzing cooperation and conflict simultaneously; (2) including both state and non-state actors into analysis without prioritizing a state-centrist view; and (3) incorporating other indicators, particularly power, adaptive water governance and benefit-sharing mechanisms that may influence transboundary water interaction [16–18]. Drawing on Prats' Governmental Model [19] and Putnam's Two-level Game Theory [20], three types of actors can be identified, which are involved in changing dynamics in transboundary water interaction and have an impact both at the domestic and international level of water governance. Firstly, there are *strategic actors,* who have sufficient power to trigger a conflict of interest, initiate deeper cooperation among states and influence the outcomes during the decision-making process. Secondly, there are *relevant actors,* who have sufficient resources and assets to act on their own but their capacities are limited by their mandate given by strategic actors [21]. Thirdly, there are *secondary actors,* who have limited impact on the decision-making process but they may provide some assistance in transboundary water management. Although each actor possesses certain degree of power, for purposes of the case study, we will focus primarily on strategic actors (various ministries, governmental agencies, policy-makers), relevant actors (regional cooperation

organizations), and secondary actors (construction companies, consultation agencies, courts of justice, financial institutions, Non-Governmental Organizations (NGOs), and foreign donors).

2.2. Transboundary Water Interaction Nexus (TWINS)—Data Collection and Interpretation

To identify the dynamics of the transboundary water interaction over the Xayaburi dam, we adapted the TWINS Framework [5,7,22], which highlights different intensities of cooperation and conflict based on various milestones in interstate relations. These milestones are represented by international water events that can be defined as any action or subset of actions that may challenge, confirm, or stimulate access of various actors to international shared waters [23]. Each water–related event exhibits different characters of cooperation and conflict. Until now, only a few authors reconsidered the original TWINS Framework [8–12,24]. The main challenges of the existing TWINS Framework include (1) analysis of interstate relations merely on bilateral basis, (2) brief consideration of non-state actors [5,21], (3) simplified visualization of cooperation and conflict limited to several milestones and incomplete historical records, (4) subjective- and outcome-oriented distinction between winners and losers in ensuring national water security, (5) narrow interpretation of interchanging cooperation and conflict based on international agreements, or (6) evaluation of interstate relations without taking on account the wider political context [5–7].

To overcome these challenges, we propose several changes in the TWINS theoretical framework. Firstly, we merged the data from International Water Event Database (IWED) with the Lancang–Mekong Water Cooperation Database (LMWCD) [25,26] to get rough contours of interstate relations. Secondly, we conducted a content analysis of official documents, secondary literature, and public media related to the Xayaburi dam between 2000–2019. The content analysis has been divided into three stages—(i) the preliminary study, which probed the connection between the Xayaburi dam, cooperation, and conflict, (ii) the intermediate study, which broadened the context of the connection between the Xayaburi dam, water governance, water diplomacy, and water management, and (iii) the advanced study, which linked the Xayaburi dam with particular strategic and relevant actors. The Xayaburi–related events were then implemented into the Lancang–Mekong Cooperation and Conflict Database (LMCCD) designed by the authors, which consist of the compendium of water-related events in the Lancang–Mekong River Basin. Collected data about the Xayaburi dam were then subsequently verified by double-checking the content with official documents and other English-written media sources. By comparing the general trends with official speech acts (the official websites of various ministries, assistant companies, and NGOs) and media preferably publishing in riparian countries (notably from Bangkok Post, Cambodia Daily, Khmer Times, the Nation, Phnom Penh Post, Radio Free Asia, Tranh Nien News, Tuoi Tre News, and Vientiane Times), we listed and framed diverse interpretations into the LMCCD in chronological order. The events that have not been confirmed have been excluded from the presented analysis.

Thirdly, we revised the theory of securitization [27–29] and drew on existing knowledge about cooperation and conflict [26–32]. To improve the existing TWINS Framework, we outlined the basic parameters and showed some examples of each intensity of cooperation and conflict. After that, we created a 6 × 6 TWINS Framework that (i) adjusts the dichotomous and subjective assessment of cooperation and conflict [11,33,34], (ii) studies the evolution of interstate relations without providing alternatives for strategic and relevant actors [35], and (iii) explores various trends in transboundary water governance on the sideline of the Xayaburi dam. Although the presented typology of cooperation and conflict ease the classification of water–related events that may emerge both at intrastate and interstate level, we assumed that there are more intensities of cooperation and conflict upon which we could examine the dynamics of the transboundary water interaction. Additionally, the number of observed actors has been significantly reduced according to the most referred actors associated with the Xayaburi dam. The selection as well as polishing of the data has been made in our previous studies dedicated to hydropolitics in the Mekong River Basin and a series of interviews that we have conducted with multi–stakeholders in the last few years [10,26]. Despite these measures, we realize

that without further literature review, field investigations, and constructive feedback from both natural and social sciences, we can only present a new TWINS Framework as an alternative guideline on how to interpret very specific issues in the transboundary water interaction rather than paradigm theory. We hope applying this concept on other case studies will enlarge the scope of the LMCCD and incorporate more aspects into the analysis.

2.3. Adapted TWINS Framework—Six Levels of Cooperation Intensity

The horizontal axis (x) indicates six levels of cooperation:

- *Silent cooperation* (+1) is the lowest level of cooperation, where water issues are vaguely acknowledged, joint actions limited, and willingness of strategic actors to establish further cooperation remains shallow [26]. This cooperation can be found between local communities that keep their businesses without strict regulations or when relevant actors show determination to invest without requiring any significant institutional effort and mobilizing other material assets from strategic actors [36]. It may also represent administrative and other procedural actions such as the confirmation or notification between governmental institutions that must be done.
- *Exploratory cooperation* (+2) is the second type of cooperation where strategic actors reach a consensus to undertake certain joint actions as a matter of necessity [37] but they lack shared goals and knowledge about the water issues. At this point, strategic actors delegate the responsibility for pioneering the future path for water cooperation on other actors, particularly the relevant actors as a result of low technical capacity, political incapability, or lack of funds to develop its own international watershed. This type of cooperation oriented on feasibility, impact, and other preparatory studies is generally considered a first step towards building mutual trust, undertaking joint research and formulating common goals to more effectively spend material assets [25,33].
- *Strategic cooperation* (+3) is the third type of cooperation where strategic actors undertake joint actions and identify shared goals but disagree on how to reach these goals [5]. There are several signs of deepening cooperation, particularly in terms of organizing various intergovernmental forums, summits, and other meetings with various stakeholders to re-consider existing water cooperation [14,17,38]. These semi-official encounters serve as a platform for discussing technical, administrative, and legal details before ministerial and other supreme representatives will make a final decision.
- *Accountable cooperation* (+4) is a situation in which strategic actors agree upon the same procedures but still prefer to cooperate on a legally non-binding basis that is more flexible for cross-sectorial coordination. Ministerial meetings are becoming frequent and strategic actors are more willing to support non-economic cooperation, including flood and drought management, environmental protection, and law enforcement [39]. Strategic actors may then establish a water commission to facilitate transboundary and adaptive water governance [5], share hydrological data or set the guidelines for environmental protection. While some reforms may help to achieve various national priorities, states do not existentially depend on these measures, which is why they keep these visions in the realm of guidelines and consents.
- *Affinitive cooperation* (+5) synchronizes state policies and formally re-assure existing cooperation on legally binding agreements [26]. Strategic actors are also more willing to promote data sharing mechanisms, reconsidering controversial water projects, or adopt new legislation for further coordination in transboundary water governance [13]. This level is represented by leader meetings, summits, and other prominent regional events and various actions of goodwill such as sharing hydrological data or a leader's assurance of investments in certain sectors.
- *Intuitive cooperation* (+6) describes the full entanglement of political agendas beyond the river [30]. Privileges and responsibilities for sustainable river development are blurring, international agreements overcome initial expectations, and strategic actors are willing to adopt binding agreements both at an international and domestic level without demanding reciprocity [5,40].

For example, strategic actors design a new code of conduct for secondary actors to involve them in transboundary water management or decide to release more water for free without demanding to cover associated costs in downstream countries.

2.4. Adapted TWINS Framework—Six Levels of Conflict Intensity

The vertical axis (y) describes six levels of conflict:

- *Non-politicized conflict* (−1) is the lowest level of conflict where strategic actors have virtually no conflict of interests over shared waters. At this stage, strategic actors do not put in the effort in conflict resolution of local peace protests or occasional acts of crimes between secondary actors in the borderland areas because they have a low impact on transboundary water governance and do not require any retaliatory actions from strategic actors [5,7,8]. Water issues are perceived as a natural cause without any political connotation [6] and any non–violent confrontation is mostly solved on a local level.
- *De-politicized conflict* (−2) describes a process in which strategic actors are intentionally obscuring the character of the politics [28,41] and are marginalizing certain water issues to avoid further political friction. Although conflicts are primarily driven by secondary actors who criticize local authorities for not addressing their concerns [23], conflict resolutions are made in a purely technical manner and rarely overcome the fixed threshold for public discussion [28,29]. For example, secondary actors may peacefully send letters of concern, create petitions, and invoke other protest actions against planned dams or decisions of strategic and relevant actors. These actions are usually uncoordinated, outcome-oriented and based on uncertainty, but at the same time, they can be ceased by political guarantees and other forms of a state's assurance.
- *Re-politicized conflict* (−3) represents disputes that periodically recur as a result of incapability of strategic actors to find plausible solutions. Water issues come under scrutiny from both politicians and the public [27], which produce a growing number of civil protests demanding any kind of change within existing political discourse [29,42], which may undermine trust in science and strategic actors. For example, secondary actors may force local authorities to reconsider their development plans or demonstrate against foreign construction companies that displace local communities with appropriate compensation. These actions are well-coordinated, process-oriented, and usually based on independent scientific evidence that feeds fears about existing water disputes.
- *Politicized conflict* (−4) demonstrates a process in which strategic actors put water issues into broader political agenda for further considerations [6,26,28]. Water issues and even non-water issues become medialized and interpreted in desirable ways to justify certain stakeholders' interests [6,17,43,44]. At this point, strategic actors experience public outcries, official verbal attacks, tacit threats, and other warnings, including domestic trials with various secondary and relevant actors to solve the conflict of interests. While water disputes are still under the control of finding a compromise through an official letter of concern and other inquiries that may address the state's concerns, the actual solutions are becoming more symbolic and politically acceptable rather than structural.
- *Securitized conflict* (−5) is a situation in which strategic actors perceive water-related issues as an existential threat [26], undertake certain emergency measures to ensure their control over shared waters [7], or face civil unrests, public riots, and other forms of direct confrontation that require retaliatory actions. Although strategic actors may break existing agreements, consolidate water disputes through the international arbitration, or undertake military training in the borderland areas within the basin, justification and legitimization of national aims still do not require any violent means [5].
- *Violent conflict* (−6) is the highest intensity of conflict, where strategic actors use any form of physical force to get control over specific territories within the basin [6] or coercive other

actors to act in certain ways [7]. Strategic actors openly demonstrate mutual hostilities, lack of communication, and violent encounters both at the international and domestic levels. Such actions may include blocking the river flow, bursting water dams or destroying bridges to get control over the strategic chokepoints.

3. Results

3.1. Water Cooperation and Conflict Event Analysis

Based on the content analysis of more than 1440 English-written official documents, policy reports, research papers, and newspaper articles during 2000–2019, we selected 267 water–related events that were associated with the Xayaburi dam (Table 1) with more than one reference. Additionally, some of these events (60) possessed both cooperation and conflict intensity due to their dichotomous character, which is why the total number of cooperation and conflict is higher than the actual number of events (see Discussion). Our results show that despite that the cooperation events (185) prevailed over the conflict events (153), the conflict intensity was slightly higher (−2, 96) than the cooperation (+2, 66). Surprisingly, there were no historical records about the Xayaburi dam between 2000 to 2006, except one event in 2001, which has been excluded from the analysis in order to not deviate the research results.

Table 1. TWINS analysis—cooperation and conflict intensity over the Xayaburi dam.

Time	Cooperation								Conflict							
	1	**2**	**3**	**4**	**5**	**6**	**Ratio**	**Total**	**−1**	**−2**	**−3**	**−4**	**−5**	**−6**	**Ratio**	**Total**
2007	1	4	5	0	0	0	2.55	9	1	0	0	0	0	0	−1.00	1
2008	0	2	6	0	0	0	2.75	8	0	0	0	0	0	0	N/A	0
2009	0	22	12	0	0	0	2.35	34	0	0	1	0	0	0	−3.00	1
2010	4	4	11	3	0	0	2.59	22	0	2	4	1	0	0	−2.85	7
2011	5	14	8	4	5	0	2.72	36	2	5	17	10	2	0	−3.13	36
2012	7	14	2	1	3	0	2.22	27	2	8	10	13	7	0	−3.37	40
2013	3	8	2	0	1	0	2.14	14	1	3	6	6	1	0	−3.17	17
2014	1	5	1	1	2	0	2.8	10	1	3	9	5	1	0	−3.10	19
2015	3	0	1	0	0	0	1.5	4	0	0	0	4	2	0	−4.33	6
2016	0	1	2	1	0	0	3	4	0	0	2	1	1	0	−3.75	4
2017	0	2	0	2	0	0	3	4	0	3	0	1	0	0	−2.50	4
2018	0	0	1	1	2	0	4.25	4	0	1	1	0	0	0	−2.50	2
2019	2	4	1	2	1	0	2.66	10	4	2	5	3	2	0	−2.81	16
Total	**26**	**80**	**52**	**15**	**14**	**0**	**2.66**	**185**	**10**	**27**	**55**	**44**	**16**	**0**	**−2.96**	**153**

3.2. Contours of the Transboundary Water Interaction

After the data collection, we divided the illustration of the evolution of cooperation and conflict over the Xayaburi dam into two parts. In the first illustration (Figure 1), we present rough contours of the transboundary interaction between the Lower Mekong River Basin States (also called the "LMB states") such as Laos, Thailand, Cambodia, and Vietnam. Although China and Myanmar were also to some extent involved in negotiations, we did not observe any significant impact of these countries on the Xayaburi dam. Although it appears that the most successful collaboration emerged between 2017 to 2018, the majority of events (170 from 267) have been recorded between 2011 to 2014. On the other hand, a decreasing number of events related to the Xayaburi dam can be observed since 2014, which may indicate losing interest in this issue among LMB states. Additionally, since 2019, a gradual escalation of conflict intensity can be identified between LMB states, when the Xayaburi dam became commercially operational.

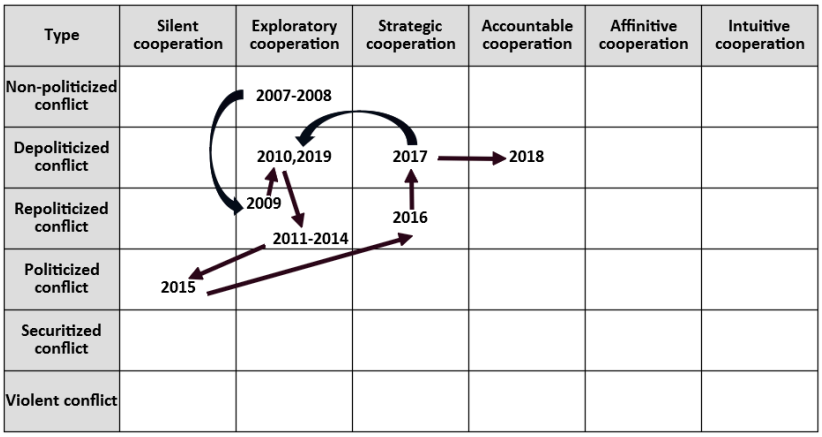


Figure 1. TWINS analysis–overall interstate relations.

3.3. Evolution of the Transboundary Interaction

The second illustration (Figure 2) shows the evolution of the interstate relations between (i) Laos and Thailand, (ii) Laos and Cambodia, and (iii) Laos and Vietnam. By comparing the general trends with official speech acts and media feedback on recorded events, we found that (1) there is a significant disparity between official and public attitude towards the Xayaburi dam, (2) the debates about the Xayaburi dam issue has been substituted by other mainstream hydropower dams, particularly Don Sahong, Pak Beng, Luang Prabang, Sambor, or Stung Treng since 2013, (3) the Xayaburi dam issue confirmed that hydropower dams are one of Laos' national priorities that will be pursued at all cost, (4) the Laos government gained confidence and significant political leverage on downstream countries since groundbreaking ceremony of Xayaburi dam in November 2012, (5) failure of PNPCA process with the Xayaburi dam motivated LMB states to redesign the institutional arrangements and organize more consultations with multi–stakeholders.

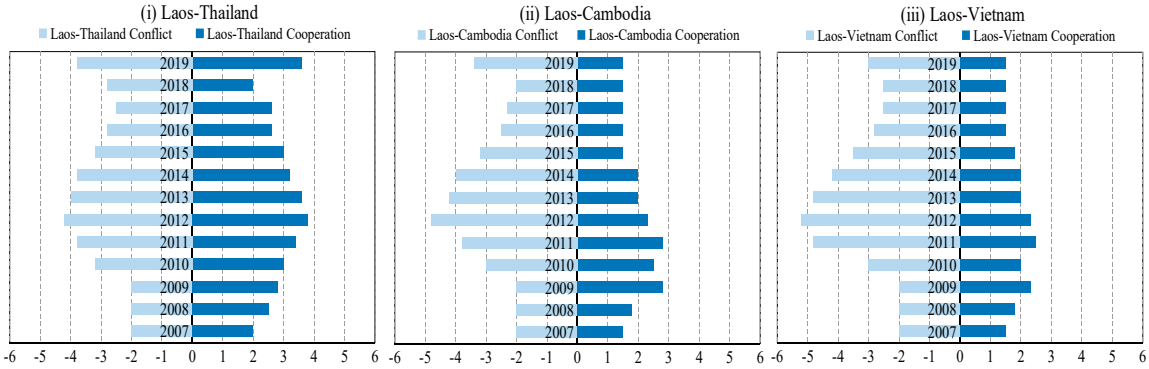


Figure 2. TWINS analysis—the evolution of the interstate relations. **(i)** Laos-Thailand, **(ii)** Laos-Cambodia, **(iii)** Laos-Vietnam.

4. Discussion

4.1. General Overview and Limits of the Study

This study presents the first application of the re-conceptualized TWINS Framework and explores in detail the evolution of interstate relations between Laos, Thailand, Cambodia, and Vietnam over the Xayaburi dam. Compared to other data analyses based on software algorithms, the content analysis of official and secondary documents was time-consuming and required to manually read all accessible official speech acts and newspaper articles to comprehend the complex connections between riparian states and indirect connotations to the Xayaburi dam. Based on the consultation with researchers from Tsinghua University, who made similar research on examining cooperation and conflict in the Mekong

River Basin, at least 60,000 sources can be identified related to transboundary water interaction in the Mekong sub-region [45]. Although such a number of articles seem tremendous, there are many articles with only one reference to the Xayaburi dam and duplicate articles. In fact, the actual sources may have different headlines, authors, or publication dates, but the content remains similar or identical. Additionally, instead of considering the sentiment analysis that is suitable for analyzing high numbers of articles with specific keywords or discursive analysis, which may help to study the hidden meaning between the lines, we believe that without primary data, the sentiment analysis does not reach its full potential and discursive analysis may be almost impossible due to the high number of articles.

Thus, we have chosen the process tracing analysis, which focuses both on processes and outcomes from various water-related events and expanding the scope of the LMCCD with new data that may ultimately overcome the lack of primary data in the future. By doing so, we already recorded almost 1500 different events, including those related to the Xayaburi dam that helps us to observe little nuances in interstate relations. However, the LMCCD still represents a little fraction of the total number of historical events in the last two decades. We estimate that there can be thousands of various forums, workshops, and other meetings at different levels of state as well as other events influencing the transboundary water interaction such as natural disasters, political incidents, protests, official statements, independent reports, critical studies, and other events that impact the state's agenda and public opinion, which must be recorded.

During the research, we faced several obstacles. Firstly, the study only focused on interstate relations on the sideline of construction, completion, and operation of the Xayaburi dam. The interstate relations between riparian states are in practice more entangled and will require additional time for content analysis of various water–related events in different sectors. Secondly, there is an issue of power dispositions and power exercise. In one of our previous works [46], we tried to grasp the power asymmetry by modifying the Framework of Hydro-hegemony (FHH), which compares four pillars of power represented by 28 parameters. However, our efforts bounced on fuzzy boundaries between incentives and consequences (i.e., both process and outcome are relevant for identifying cooperation and conflict triggers), and questionable interpretation of the power play between states (i.e., disproportionally weaker states may have stronger leverage on powerful states by using skillful water diplomacy), which will need more comprehensive feedback from multi-stakeholders. Thirdly, the presented study requires a series of verification, particularly in terms of (i) double-checking the information, (ii) decoding the language jargon that may prescribe other subjective interpretation of the event, and (iii) proofing the timeline of referred events. The main problem also represents micro-events such as local protests, round-tables, regional stakeholder meetings, research conferences, local projects, and other events that may not be recorded in English-written official and public sources. Despite that these micro-events might not have a strong influence on the transboundary water interaction, we believe that these events might help us to identify new incentives and clarify the involvement of other non-state actors that we did not previously consider.

Fourthly, although we already draw from the IWED and the LMWCD databases, and added other water–related events with references to the Xayaburi dam, some of the referred sources are no longer available (either due to changing of the web addresses, authors permissions, or other reasons), and the number of events significantly varies during different periods of time, which may influence the assessment of cooperation and conflict. This is why the TWINS illustration of overall interstate relations (Table 1) in several years, particularly between 2007–2008 and 2015–2018 may still be quite misleading. Fifthly, to innovate the existing research, we applied the feature of duality (so-called "dual event phenomenon"), where one event may consist of both cooperation and conflict intensity. For example, releasing a comprehensive report can be considered as an outcome from exploratory or technical cooperation (+2,+3), but at the same time as a process in which particular document highlights certain concerns or stimulate the dynamics of political discussion that resonates both in state's political agenda and public media (−2,−3,−4,−5). Finally, the new TWINS Framework with six intensities of cooperation and conflict serves as a theoretical tool to grasp the complexity of hydropolitical relations

rather than an ultimate interpretation of interstate relations over the Xayaburi dam. Our goal is, therefore, to provide an alternative to mainstream studies analyzing the Xayaburi dam [47–50] and open the discussion about evaluating intensities of cooperation and conflict.

4.2. Laos–Thailand Relations

Laos–Thailand relations belong to one of the most peculiar. At the official level, it was the Electricity Generating Authority of Thailand (EGAT) along with various secondary actors, notably the construction companies (e.g., Andritz AG (Andritz), Ch. Karnchang (CK) and Xayaburi Power Company Limited (XPCL)), Thailand's banks (Bangkok Bank, Kasikorn Bank, Krung Thai Bank, and Siam Commercial Bank), and consultation companies (Compagnie Nationale du Rhône (CNR), Pöyry Company) that helped to ensure the construction of the Xayaburi dam since 2007. On the other hand, there is a strong opposition against the Xayaburi dam led by Thailand's civil society, grassroots organizations, and NGOs both at a domestic (e.g., Assembly of Poor (AoP), Mekong Conservation Network in the North (MCNN) or Siemenpuu) and international level (e.g., International Rivers (IR), World Wild Fund (WWF), International Union for Conservation Nature (IUCN)), which pointed out several irregularities before and during the construction. The public outcry has been mainly fed by (1) a feasibility study of 12 mainstream hydropower dams designed by the Mekong River Commission (MRC) in cooperation with the International Centre for Environmental Management (ICEM) conducted between 2009–2010 [51], (2) the MRC Council Study, which has been elaborated on since December 2011 [52], and (3) various investigations of the construction site, which confirmed that Laos already started with construction preparations [50,53–55]. To calm down the public outcry and secure the construction of the Xayaburi dam, the Laos government provided several political guarantees to not start construction before examining potential impacts on downstream countries and promised to find appropriate solutions to build an eco-friendly dam [50,56,57]. Additionally, the Laos government hired several assistant companies, particularly Pöyry Company, CRN, and Andritz for conducting various technical reports and designing effective mitigation measures for the Xayaburi dam. However, some of these studies, particularly the Pöyry Compliance Report (also called the "Pöyry Report"), published in August 2011 [58], proved that the purpose of these assistant companies is not to discuss when the construction of the Xayaburi dam will or will not commence, but when the construction may legally start. In fact, this study has been repeatedly criticized not just for denying the ICEM study results, but also for focusing on 10 km behind the dam, underestimating the socio–ecological impacts, and putting faith in experimental fish passages and fish-friendly turbines tested outside of the Asian region [58–61].

After a series of public protests at the Laotian Embassy in Bangkok [62,63], the local NGOs along with local villagers in June 2012 came up with a different tactic and began to file several lawsuits on the EGAT, the XPCL, and other stakeholders, including assistant companies such as Pöyry or Andritz [64,65]. The lawsuits were submitted to the Thailand Administration Court (TNC), the Thailand Supreme Administration Court (TSAC), the Finnish National Contact Point (FNCP), and the Austrian National Contact Point (ANCP), and mainly aimed to raise allegations such as the legality of the Power Purchase Agreement (PPA) between EGAT and XPCL, the lawful ending of the MRC PNPCA process or the involvement of Pöyry and other stakeholders that did not act in good faith. Although all these allegations focused on the legal responsibility of secondary actors for actual decisions of the Laos government, toothless laws on the MRC PNPCA process with the Xayaburi dam, and limited mandate of court of justice, these actions led the FNCP to set a precedent for other hydropower dams; all transnational companies since then are obliged to follow the OECD guidelines and deeply consider the potential impacts by providing their services [66]. However, such results also represent the media victory for Pöyry and other stakeholders on how to justify their future actions rather than an opportunity to learn and develop a better approach in providing their services. Since 2013, most of the discussion about the Xayaburi dam has been overshadowed by the planned construction of other Laotian hydropower dams, such as Don Sahong, Pak Beng, or Luang Prabang, which were also

submitted under the MRC PNPCA process. During these negotiations, the Thailand government, as well as other downstream countries, demanded further information about promised design changes and additional studies related to dam safety and sustainability. In September 2018, the MRC published the "Review of the Design Changes Made for the Xayaburi Hydropower Project," which summarized existing concerns about the Xayaburi dam, particularly in terms of the water velocity that may affect fish migration and water sediment transportation, the absence of seismic analysis, and the credibility of shared data by the Laos government [67].

Another deterioration of Laos–Thailand relations can be traced back to abnormal droughts in January 2019, which were associated with filling the reservoir behind the Xayaburi dam, beginning a trial run of seven electricity generators planned on 17–29 July 2019, and scheduling maintenance of the Jinghong hydropower dam in China between 5–19 July 2019 [68,69]. Although both Laos and China released the water according to schedule, a new wave of protests against the Xayaburi dam and other mainstream dams rapidly arose [70–73]. Moreover, while Thailand's state officials might feel they have control over the Xayaburi dam through Thailand's banks, XPCL, and EGAT, the dam represents a specter of the past that politically cleaves Thai society and encouraged the Laos government to pursue hydropower development without legal consequences. To dissolve the public outrage from the Thai public, the Laos government and other state representatives made several media statements highlighting the total volume of funds that were invested into the design changes that should mitigate the potential socio-ecological impacts of the Xayaburi dam on downstream countries [73,74]. However, the promised design changes of the Xayaburi dam by the Laos government, as well as the effectiveness of these mitigation measures, are highly uncertain. To sum up, the Laos–Thailand relations on the sideline of the Xayaburi dam in the long-term have oscillated between strategic (+3) and accountable cooperation (+4) due to strong support of Thai state officials. On the other hand, the conflict intensity still remains high (−3,−4) as a result of the active involvement of Thai civil society and their connections with downstream countries as well as foreign donors. The Xayaburi dam case also provides an interesting example of the unintended consequences where Thailand's effort to secure the construction of the dam at all cost politically divided Thailand's society and voluntarily transferred more power into the hands of the Laos government in exchange for achieving Thailand's national energy security but at the expense of the river sustainability.

4.3. Laos–Cambodian Relations

Both Laos and Cambodia have a lot in common. Their history is connected to former Indochina, they have the economic status of the poorest countries in the Mekong Sub–region, and share an intense lust for any foreign direct investments to lift their countries out of poverty. Hydropower and other infrastructure development are openly welcomed by state officials led by the current Hun Sen's regime even though some opposition can be identified from Cambodian civil society. The main source of worry represents the sustainability of the Mekong River and the Tonle Sap Lake, which both present the backbone for the Cambodian economy and food security. Since 2009, the Cambodian government has actively participated in various meetings under the MRC PNPCA process with the Xayaburi dam to discuss the potential impacts and suitable adaptation procedures if the dam will be accepted [56]. Such pragmatism has also been seen in April 2011 during the MRC Special Joint Committee Meeting in Vientiane, where Cambodia, along with Vietnam, demanded Laos to respect the ICEM Report conclusions, such as extending time for further studies, more consultation with local stakeholders, re–designing the Xayaburi dam, and considering a 10–year moratorium to investigate the potential impact of mainstream hydropower dams [75]. Although the Laotian government disagreed with any delays for the construction of the Xayaburi dam, later on, it agreed to conduct another Environmental Impact Assessment study (EIA). Soon after the meeting, the Prime Ministers of Cambodia and Vietnam met bilaterally in Phnom Penh to discuss future economic collaboration and a joint approach towards the Xayaburi dam [76]. However, after releasing the Pöyry Report in August 2011, both Cambodia and Vietnam questioned the conclusions from the report. At the 18th MRC Council Meeting in Siem

Reap in December 2011, the Laotian government, under strong pressure from LMB states, agreed to conduct the MRC Council Study that will prosecute sustainable development of the mainstream dams and temporally suspend the construction of the Xayaburi dam [77,78]. However, since the end of the MRC PNPCA process with the Xayaburi dam, the Laos government has faced strong political distrust, particularly from the Cambodian public, which did not understand and fully comprehend the technical jargon about potential impacts on ecology and livelihood without translations from English into the Khmer language during various regional stakeholder meetings.

The Laos–Cambodian relations then became frosty. In April 2012, the Permanent Vice-Chairman of Cambodia's National Mekong Committee, Sin Niny, stated that "there must be a discussion before Laos can proceed with the construction of the Xayaburi dam [but] If Laos decided unilaterally, then according to law, Cambodia can file a complaint to an international court" [79]. Although the Laotian government occasionally responded to such warnings, letters of concerns, and public protests [50,80,81], Laos' Vice Minister for Energy and Mines, during the Europe Summit in Vientiane in November 2012, announced that that the Xayaburi dam's groundbreaking opening ceremony will take place on 7th November 2012 (two days after the announcement). Because all of the LMB state officials attended the ceremony, the Laotian government considered this event as a token of silent consent with the construction of the Xayaburi dam [50]. However, the Cambodian state's official approach towards the Xayaburi dam started to change since 2013 for various reasons. Firstly, the Cambodian government started to hold public meetings about the Lower Sesan II hydropower project that similarly, like the Xayaburi dam, slowly became a symbol of Hun Sen's upcoming era of prosperity, where there is no place for critique and where some citizens should sacrifice their livelihood for the greater good of the state [82]. Secondly, the Cambodian government began to become more tolerant of the public discussion about hydropower development, especially when the Cambodian public did not question other aspects of Cambodian domestic policy issues or when Cambodian public transferred its public resentment and responsibility for the sustainability of the river on the upstream countries, particularly China and Laos. Thirdly, since the MRC PNPCA process with the Xayaburi dam formally ended in April 2011, the Cambodian government, instead of negotiating about ad hoc design changes of the Xayaburi dam, put more effort to discuss other ongoing hydropower dams in Laos, particularly the Don Sahong dam located on the borders between Laos and Cambodia. In fact, the Don Sahong dam presents a similar or even greater impact on the Cambodian economy, particularly in terms of fishery and agriculture, which is why Cambodia also questioned Don Sahong's issue during the consultation about the Xayaburi dam [81–84].

Until 2019, most of the critique on account of the Xayaburi dam was presented during various official meetings, regional forums, and summits, especially in terms of (i) lack of transparency, (ii) information shortage, and (iii) limited willingness from the Laotian government to address technical concerns into dam design changes [84–86]. Currently, Cambodia follows a similar trend to the one in Thailand, where state officials vehemently marginalize potential socio–ecological impacts of hydropower development, while the civil society is looking for more allies to oppose and eventually re-consider construction of mainstream hydropower dams. Additionally, several research reports can be identified debating about the other renewable sources of energy (RWS), particularly solar energy, which might have less negative impact on the local environments and communities living within the basin; however, until today, no accountable response from Hun Sen's administration has come on this issue [86–89]. Cambodian society is also very sensitive to technical safety of hydropower dams, seismic activity in the Golden Triangle, and effective early warning systems due to several incidents such as the water release without notification from the Yalli Falls dam in September 2005, the collapse of the Stung Atay dam in December 2012, or the burst of the Xe–Pian Xe–Namnoy dam in August 2018. To sum up, despite Laos and Cambodia's experienced series of exploratory (+2) and silent cooperation (+1), the conflict intensity becomes much lower when the Cambodian government began to re-frame its national priorities and became more focused on other Laotian hydropower dams from 2013 onwards, particularly the Don Sahong dam. Additionally, it seems that Hun Sen's administration encourages

the Laotian government to keep promoting the hydropower sector and rapid economic development in Laos regardless of the consequences for Vietnam or own citizens.

4.4. Laos–Vietnam Relations

The Xayaburi dam issue started to appear in the Vietnam state and public discourse since 2009. For Vietnam, the most concern presents the sustainability of the Mekong Delta, which is the vital point of Vietnam's food and economic security. The Mekong Delta is also an important gateway to the South China Sea and the most environmentally vulnerable hotspot, particularly to saltwater intrusion due to the reduction of water sediments and the decline of the fishery as a result of hydropower development and sand mining within the Mekong River Basin. During the consultative meetings between Vietnam and Laos at the beginning of 2011, the governmental–related agencies, NGOs, and local communities, such as Save the Mekong Coalition (SMC), Vietnam River Network (VRN), the Vietnam Union of Science and Technology Association (VUSTA), and the People's Aid Coordinating Committee (PACCOM), pointed out the information gaps and errors in existing research studies shared by the Laotian government about the Xayaburi dam and raised concerns about potential impacts on the Mekong Delta [56]. These concerns were also officially submitted through the Vietnam National Mekong Committee (VNMC) to MRC Secretariat [86] and reiterated during the MRC Special Joint Committee Meeting in April 2011, where Vietnam, along with Cambodia, demanded to halt construction of the Xayaburi dam until more studies could clarify the potential impacts on the downstream countries [74].

Laos, as one of the closest allies of Vietnam in the Mekong Sub–region, did not want to risk their friendship and decided to temporally suspend the dam construction. Because both Vietnam and Cambodia did not trust political guarantees from the Laotian government due to previous investigations and experience with Laos, the Vietnamese government decided to closely collaborate with Cambodia in order to put more pressure on Laos [75,90]. Compared to Cambodia or Thailand, Vietnam in late 2011 began to be more critical to Laotian national interests and actively tried to find out alternatives on how to fund the research on protecting the Mekong River and the Mekong Delta. However, since a leaked letter from Laotian Government to CK in June 2011 [57], the Pöyry Report in August 2011 [58], and the groundbreaking ceremony, it became clear that the Laotian government will not hesitate to push the construction of the Xayaburi dam at all cost. Additionally, besides dominant river basin organizations such as the MRC, the Greater Mekong River Basin (GMS), or the ASEAN Mekong Basin Development Cooperation (AMBDC), the Vietnamese government actively mobilized its more distant allies, particularly the USA [91–93] and Japan [49,93,94], to mediate the transboundary water management in the Mekong River Basin through newly established organizations such as the Japan–Mekong Cooperation (JMC) or the Lower-Mekong Initiative (LMI).

Since 2012, Vietnam intensified its pressure on Laos on various regional forums, summits, and meetings, regardless of the scope of such events. For example, Vietnam's president, Truong Tan Sang, at the 24th APEC 2012 CEO Summit in Vladivostok in September 2012, warned about the actual impacts of hydropower development on the mainstream, which may serve as a hotspot for regional conflicts in future [50]. In September 2013, participants on the PACCOM one-day workshop discussed potential steps on how to deal with the Xayaburi dam. Their conclusions were to (i) suspend the Xayaburi dam, (ii) cancel the power purchase agreement (PPA) between EGAT and XPCL, or (iii) force Thai banks to reconsider their risk assessment and stop funding the construction of the Xayaburi dam. These straightforward solutions, supported by the Vietnamese government, demonstrated how both state officials and civil society were determined to stop the Xayaburi dam and protect the Mekong Delta [84]. After the workshop, around 40 NGOs from LMB states issued the "Declaration of Solidarity," which demanded to halt the construction of the Xayaburi dam and repeated the ICEM recommendations [84,95]. Additionally, at the 19th MRC Council Meeting in Luang Prabang in January 2013, Vietnam's Deputy Minister of Natural Resources and Environment, Nguyen Thai Lai, sharply responded to the Laotian Minister of Energy and Mines, Viraphonh Viravong, about the construction with the Xayaburi dam [96]. This political statement surprised the Laotian government, because,

since the groundbreaking ceremony in November 2012, Vietnam had not displayed such a hostile attitude. Until the end of 2015, the Vietnamese government tried to submit an official protest [97,98], publish various policy papers, and proposed several alternatives on how to stop the construction of the Xayaburi dam. However, these actions did not bring any accountable response and only deepened the political disparities between both countries.

Since 2016, an actual change can be seen in Vietnam's foreign policy attitude towards the Xayaburi dam. Firstly, the Vietnamese government became more concerned not just about other ongoing Laotian hydropower dams, but also by hydropower development in Cambodia. Ironically, Vietnam, like Thailand, highly supported the Cambodian hydropower sector in the past, especially the Lower Sesan II and Sambor dams, which were designed to sell the majority of electricity to Vietnam. Secondly, despite Laotian ambitions to become a regional superpower by selling cheap electricity to other nations, the Vietnamese government slowly accepts the ongoing geopolitical change and starts to be more tolerant towards Laotian plans in order to keep some influence in this region. In fact, since the Laotian government no longer considers Vietnam as a decisive nation as it was in former Indochina, the Vietnamese government realizes that it is still better to recall on their historical friendship rather than on historical obedience, which will ultimately lead them to lose one of their closest allies in Southeast Asia and leave Laos to other main investors, particularly to China and Thailand. To sum up, Laos–Vietnam relations experienced significant turnovers in the intensity of both cooperation (+1 to +3) and conflict (−2 to −5). The rationale of such changes lies in Vietnam's unwillingness to accept the changing balance of power in Southeast Asia and re-configure its relations with Laos in a more pragmatic way. In fact, during the "unfortunate concurrence" of the Jinghong dam maintenance and the Xayaburi dam trial operational test, most of the media sources reflected Thailand's public outcry and Thailand's state official statements, while Vietnam's state official point of view remained almost silent on this issue.

5. Conclusions

The presented paper demonstrated the evolution of interstate relations between Laos, Thailand, Cambodia, and Vietnam between 2000 to 2019, and showed current dilemmas over the Xayaburi dam. By using the new TWINS Framework, we identified five major challenges between LMB states. Firstly, there is a significant gap between political agenda and public opinion with the Xayaburi dam issue that flows from the fear of uncertain future and political distrust in technical design changes. Secondly, despite strong media publicity of the Xayaburi dam as a first hydropower project, which went through the MRC PNPCA process, the Xayaburi dam since 2013 has been substituted by other mainstream dams such as Don Sahong, Pak Beng, Luang Prabang, Pak Lay, Lower Sesan II, or Sambor. Thirdly, the Xayaburi dam highlighted the hidden meaning of the Mekong spirit of cooperation where transboundary water cooperation is built not on mutual understanding and practical affinity, but rather on enlarging the pie of economic benefits and promoting countries development. Fourthly, securitization of the Xayaburi dam created a double-edge situation in which the Laotian government successfully pushed its political boundaries for tolerating its own hydropower development, but at the same time broke the only existing mechanism, the MRC PNPCA Framework, that may institutionally prevent unregulated hydropower development within the basin. Finally, the failure of the MRC PNPCA process with the Xayaburi dam motivated LMB states to mobilize its bargaining and ideational power, and involve multi–stakeholders more in the decision-making process.

To conclude, the Xayaburi dam case represents an illustrative example how the hydropower development stimulates both cooperation and conflict. In the beginning, the Xayaburi dam was considered as a test for the MRC PNPCA process in which multi–stakeholders will promote the future reciprocity and facilitate further dialogue among states. During the ground–breaking ceremony, it showed the determination of Laos and Thailand to build the dam at all cost and regardless of the potential socio-environmental impacts on downstream countries. However, before and after completion, it appears that the Xayaburi dam is just a precursor to future transboundary water governance.

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