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Master's Thesis

2024 **Lía Rodríguez Álvarez**

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Chinese securitization of the main water sources in South and Southeast Asia: Brahmaputra and Mekong comparation

Master's thesis

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In Prague on July 30, 2024 Lía Rodríguez Álvarez

References

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Abstract

Water is the main source of life on our planet, yet it is becoming scarce for reasons as simple as climate change, pollution or its uneven distribution. This research analyzes the two major transboundary rivers that originate in the Tibetan plateau and flow through South and Southeast Asia, and how the race for regional geopolitical power will be the result of tensions for their domination. This research will be theoretically based on water securitization, as well as geopolitically based on geoeconomic and critical geopolitical theories. Firstly, the context of both the Brahmaputra and Mekong basins and the importance China sees in them will be introduced, as well as what the Chinese domestic causality is. Secondly, it will investigate the relationships that China maintains with all the downstream countries involved, what their cooperative tactics are, and whether there are points of conflict, as in the case of Sino-Indian territorial disputes and how these affect them. Finally, a comparison is made between the two basins on hydraulic mission, economic, environmental and social issues in order to understand whether securitization leads to cooperative or conflicting relationships. The results indicate that a comparison between the two basins is quite complicated due to the limited information on the Brahmaputra side, which is more sensitive to Chinese effects as it involves territorial disputes, just as China considers hydrological or hydropower station information as secret or as a national matter. On the other hand, it is more than evident the more open relationship with the Mekong states either by economic superiority or by the lack of conflicts between them, therefore they see in China an opportunity for development.

Abstrakt

Voda je hlavním zdrojem života na naší planetě, přesto je jí stále méně, ať už z důvodu změny klimatu, znečištění nebo nerovnoměrného rozložení. Tento výzkum analyzuje dvě

hlavní přeshraniční řeky, které pramení na Tibetské náhorní plošině a protékají jižní a jihovýchodní Asií, a to, jak bude závod o regionální geopolitickou moc výsledkem napětí o jejich ovládnutí. Tento výzkum bude teoreticky založen na sekuritizaci vody a geopoliticky na geoekonomických a kritických geopolitických teoriích. Nejprve bude představen kontext povodí Brahmaputry i Mekongu a význam, který v nich Čína spatřuje, a také to, jaká je čínská domácí kauzalita. Za druhé bude zkoumáno, jaké vztahy Čína udržuje se všemi zúčastněnými zeměmi na dolním toku, jaká je jejich taktika spolupráce a zda existují konfliktní body, jako v případě čínsko-indických územních sporů, a jak je ovlivňují. Nakonec je provedeno srovnání obou povodí v oblasti hydraulického poslání, ekonomických, environmentálních a sociálních otázek s cílem pochopit, zda sekuritizace vede ke kooperativním nebo konfliktním vztahům. Výsledky ukazují, že srovnání obou povodí je poměrně komplikované kvůli omezenému množství informací na straně Brahmaputry, která je citlivější na čínské vlivy, protože se jedná o územní spory, stejně jako Čína považuje hydrologické informace nebo informace o hydroelektrárnách za tajné nebo za národní záležitost. Na druhou stranu je více než zřejmý otevřenější vztah se státy Mekongu, ať už z důvodu ekonomické převahy, nebo absence konfliktů mezi nimi, proto vidí v Číně příležitost k rozvoji.

Keywords

Water, China, conflict, hydropower, India, Mekong.

Klíčová slova

Voda, Čína, konflikt, vodní energie, Indie, Mekong.

Title

Chinese securitization of the main water sources in South and Southeast Asia: Brahmaputra and Mekong comparation.

Název práce

Čínská sekuritizace hlavních zdrojů vody v jižní a jihovýchodní Asii: Srovnání Brahmaputry a Mekongu.

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Chapter I: Introduction

1.1. Definition of the topic.

At the 2016 Davos forum, it was noted that water is one of the most urgent threats to the global economy, and it is projected that by 2030 around 700 million people could be displaced by water scarcity. Currently, millions of people lack access to drinking water, which places this so-called "blue gold" at the top of the resource chain. States will go to great lengths to obtain it, not only to provide security and prosperity for their populations, but also to reinforce the vision that others have of it, since possessing this precious resource means development and power over others.

The largest reserves of fresh water on the planet are the two poles, Antarctic, and Arctic; however, it is important to point out a third area: the Himalayan Mountain range. This mountain range contains enough freshwater to be the source of the main rivers of the Asian continent. Consequently, its vital and essential need for survival is not exempt of conflict. On the contrary, dominating this region is a privileged position for the People's Republic of China (PRC) as it has an advantageous location over the downstream states: the Tibetan plateau. Tibet is the hydraulic epicenter for the control of the lives of millions of people, both domestically and in the rest of the continent.

The PRC is carrying out securitization processes on its domestic and transboundary rivers due to its water situation suffocated by a growing population and middle class, groundwater and surface water pollution, as well as climate change. This has led China to take measures and strategies that do not please all its neighbors when it comes to the Brahmaputra and Mekong River basins in particular. In this thesis, these two basins will be studied and compared. Its plans for these rivers only add to the uncertainty and fear of

the downstream riparian states, which, whether allies, enemies, or vassals, stand to lose in the face of any misfortune.

It is interesting to study two basins, with similarities, but above all differences in the way China and the rest of the states involved relate to each other. On the one hand, the Brahmaputra basin offers the clash between the two most populous countries in the world, engaged in a race to position themselves as the regional hegemon. This river flows through disputed territories, entrenched in time and which are the key to understanding water resources as a double-edged sword, essential for life as well as for the power games that are summed up in sovereignty. We cannot forget Bangladesh, which makes up this tense puzzle as a wild card state for China, which has little to say on the matter, and which suffers the most from Sino-Indian rivalry.

On the other hand, the Mekong River basin presents a very diverse situation as it flows through several countries that are more aligned with China, either because of similarities in their political regimes or in the search for business and investment opportunities. It is curious how these countries have set up a basin control and regulation body, which shows that the level of relations between all of them is somewhat more cooperative.

Therefore, the aim of this thesis will be to explain China as a hydro-hegemon (Chellaney, 2023), what it is doing and why, starting from the basis that it is securitizing the rivers, external and internal factors will be analyzed to arrive at the comparison of these two complex basins, Brahmaputra and Mekong. It is important to mention that the author has already worked on the topic previously as her bachelor's thesis, the purpose of this one is to update the previous one and go deeper at a geopolitical and geoeconomic level.

1.2. State of art.

In the last two decades, many geopoliticians and academics have been concerned about the repercussions that the actions of States may have on freshwater. We can find studies of all kinds, from analyses of the region, the power games between China and India as the main powers in the area, etc. to the repercussions of this situation on the most marginalized populations, which in the end are the ones that suffer the most from the consequences.

Brahama Chellaney, from an Indian point of view, shows us how China is destroying the environment and how this has repercussions in India. Through a more realist perspective, he sees that future wars will be fought over water; thus, he adopts the discourse that China is a malevolent hegemonic force and blames it for all evils, making India look like a pawn in the Chinese game.

In relation to the latter, it is worth noting that Brahma Chellaney is the one who coined the term debt trap in 2017 and defined it as "the situation in which a creditor state or institution grants projects or loans to a borrower state, usually on bad political and economic terms, with the aim of increasing the former's political leverage." Chellaney (2023) appeals that China acts under what he calls "debt-based coercion" and notes that almost all Chinese loans granted in the last decade include a broad confidentiality clause that obliges the borrowing country not to disclose the terms of the loan. Thus, these conditions would give China wide latitude to cancel loans or accelerate repayment if it disagrees with a borrower's policies (Chellaney, 2023). In other words, the heavier the debt burden on the borrower, the greater China's own leverage becomes (Chellaney, 2021).

However, some authors such as Deborah Brautigam or Meg Rithmire do not agree with the term. According to them, one could say that this trap is a myth since China did not

cause the previous internal problems, although it aggravated them afterwards. There are also middle-income countries with debts to China. Therefore, given the controversy that this produces, it seems that China is trying to show that the BRI "is not a debt trap, but a foot to benefit the people; it is not a geopolitical tool, but an opportunity for common development" (Mark, 2021), so said the Chinese Foreign Minister Wang Yi in 2019; it makes him question whether China is turning from "debt diplomacy" to "donation" (Carmody, Zajontz & Reboredo, 2022). What is clear is that the use of economic aid, or the questioned "debt trap," is shaped by the asymmetric relationship and power differentials (Kaplan 2021).

On the other hand, in contrast to Chellaney, we can find Amelie Huber or Mabel D. Gergan, who argue that a war as such in the region is nonsense. They reason that militarization is already taking place and is one of the main causes of environmental degradation, both on the part of China and India. They do not see water as a source of conflict, but rather the unsustainability of hydropower generation; as well as reflecting on how the construction areas of these infrastructures affect marginalized communities who have no choice but to accept the situation.

Shashank Joshi, defense editor at The Economist, notes that tensions over the border dispute between China and India, and the shared security dilemma has hardened the stance of both. He also notes the increased assertiveness of both states, as well as the "anti-China" stance of the Indian media.

On the other hand, we come across the studies by Hongzhou Zhang and Mingjiang Li, which answer questions such as what the key factors are affecting China's transboundary water policies and their implementation, or how to explain the variations of Chinese policies between sub-regions (Zhang & Li, 2018). That is, they focus on the political and practical framework of Chinese transboundary water policies.

In line with the previous two authors, Zhifei Li and Fengshi Wu focus on understanding the Chinese domestic water crisis, what patterns the country follows in terms of transboundary river policies and how it has incorporated them into its geopolitical strategies, in addition to what accounts for China's low participation in global freshwater governance.

Critical geopolitics scholar John Agnew (2010) paraphrases China historian Prasenjit Duara (1997) when he points out that the geopolitics of China can no longer "innocently" be Western-style geopolitics or the geopolitics of the "real" China represented by Chinese intellectual history's conception of China's "place" in the world. Rather, it "must attend to the politics of narratives, be they the rhetorical schemes we deploy for our own understanding or those of the historical actors who give us the world" (Duara, 1997; Agnew 2010). For their part, threading with Duara and Agnew, scholars such as Aaron Wolf, Christian Bréthaut or Fatine Ezbakhe study hydropolitical discourse and draw on empirical evidence mainly from the study watersheds in question. They establish that hydropolitical interactions studied from the discursive prism refer to political actions that are generated and legitimized in an institutional context, as well as how they evolve within that context.

Williams (2020) found that infrastructure-oriented development discourses, with an emphasis on command and control of the river, formed the basis for cooperation in the basin (Wolf et.al., 2021). Vij et al. (2020) also analyzed the power interaction between Bangladesh and India around the Brahmaputra River and concluded that India's passive (or no) participation in Brahmaputra Dialogue meetings stemmed from internal security and securitization narratives (Wolf et.al., 2021).

1.3. Research questions.

- What are the water securitization procedures employed by China in relation to the rivers in question?
- How does China's water vision/water strategy affect relations with the other downstream states?
- What are the main variables to consider when comparing the two scenarios?
- What is the main difference between the two scenarios without considering the historical value of the territories through which these two rivers flow?
- What economic factors come into consideration when dealing with the Brahmaputra River: favorable or unfavorable for India and/or Bangladesh?
- What is the main factor of poor Sino-Indian cooperation amid territorial, economic or security conflict, for both?
- What is the historical relationship between the Mekong states and China? What is the main factor that has led them to "cooperation" with China?

1.4. Research objectives.

- Being able to compare both basins considering their complexities and how different Chinese aptitude is regarding the case studies.
- To be able to compare economically both basins, always taking into account the complexity in finding information related to hydropower.
- Understand how China benefits from its relationship with both basins.

1.5. Hypothesis.

On the basis that we already know that the flow of these rivers, as well as the relations between the riparian states, cause tensions, especially in the case of the Brahmaputra, the hypothesis put forward is the following: "China makes control over the freshwater

deposits coming from the Himalayas a central element of its strategy to position itself as a regional and international power, through processes of water securitization, influencing the economic and development relations of the downstream riparian states".

1.6. Theoretical framework.

Natural resources are a constant source of tension, so much so that States decide to securitize them to have greater control over them, either out of fear or to demonstrate their power. It is important to note that, generally, this fear does not arise from the threat, in this case the lack of a limited resource, but from the consequences of the threat at the level of institutional action. That is to say, we have two vectors, the political elites or state institutions and public opinion, where the latter is the one who is afraid of losing their freedoms or fundamental rights due to the decision of the governing institutions to securitize them; as well as having the power to generate pressure and revoke those decisions towards a de-securitization.

However, there are cases where the State acts without considering public opinion, and it is the citizens who accept this fear, not of the institutions, but of the projected threat. This acceptance carries behind it a strong cultural, thought, and conditioning domination by the State over the population showing the danger and consequences of non-securitization.

In the global water debates, future relations between the different States with key water resources are addressed on the basis of two discursive streams[1]:

The first school observes that water will be the main cause of armed or violent conflict between states, given the increasing scarcity and securitization of water. They define 'securitization' as the growing perception that decreasing water availability represents an

[1] The two discursive streams are divided into two schools, which have been classified by the academics' place of origin. The first school refers to those of European origin, while the second school refers to those from the United States.

existential threat to states and, therefore, validates political relations that go beyond the established rules of peaceful coexistence within the international community (Leb, 2009).

The second school, not necessarily opposed to the previous one, is that which emphasizes the catalytic qualities of water to incite cooperation and, thus, de-securitization among states. Those who make this argument rely on historical data showing a small number of inter-state armed conflicts over this resource compared to more than 3,600 international water agreements made over time (Leb, 2009). These have been based on empirical evidence and are at the forefront of the debate. Within this school we can highlight relevant authors such as Wolf or Hamner.

If one observes and considers the international effort in the increased creation of the aforementioned treaties on water, the argument of the second school is confirmed, as they go down the path of increasing cooperation on transboundary water resources. However, it is important to highlight two factors, the geographical implications, and the political implications. The former refer to the ease of greater cooperation in terms of water quality rather than quantity. The latter reflect the bureaucratic framework, i.e. declarations, treaties or action programs, as well as agreement with international law as a tool for establishing the regulatory framework. The latter mainly to provide stability between the states concerned, which is subject to politics.

Some approaches, such as those of the Copenhagen School of Security Studies (CoS), have shown that security dynamics are of enormous significance and, consequently, characterizing a particular issue as a security issue affects the way it is dealt with at the national and international level (Buzan, Waever & Wilde, 1998). It is worth noting that the line separating traditional and non-traditional security issues is increasingly blurred; thus, environmental problems may become subject to securitization, legitimizing the

adoption of extraordinary measures under the pretext of their transcendence: they are life and death (Buzan, Waever & Wilde, 1998).

Along these lines, the dominant view states that the effects of securitization on water are problematic since there is a tendency to resort to political solutions of a military nature, although not necessarily, and centered on the State, on sovereignty, which impedes development (Deconinck, 2009), as well as a pooling for better management. The clear example on the management of the Greater Himalayan watersheds is presented by China and its regional neighbors, with a wide diversity of political, social and economic conditions, the former being characterized by its "sinocentric" rhetoric (Xie & Warner, 2021).

As CoS argues in the hand of Ole Waever, security does not refer to something "real or external" but focuses on security as a "political choice"; just as politicization turns an issue into the domain of national politics, while securitization elevates an issue above "normal" politics to a national security issue of extreme urgency (Xie & Warner, 2021). When it comes to analyzing the application of securitization beyond the liberal democracies of the West it is quite complicated since, in authoritarian states it presents as a difficult task to talk about security (securitizing or de-securitizing) and to separate from that process the values of the state (Wilkinson, 2007), identifying the regime as its subject reference. Also as Holbraad and Pederson point out, states that emerge from some revolution assume that both state and social interests are the same (Holbraad & Pederson, 2012), being, in this case, the Chinese with a realist and unity approach in its international relations (Vuori, 2008).

Fischhendler, for his part, identifies three mechanisms of water securitization: structural, institutional and linguistic (Fischhendler, 2015; Vivekanandan, 2024). Structural mechanisms refer to tangible infrastructures designed to protect water systems as well as

access to and use of water. The possibility that these systems might be attacked and endanger the state's water security leads to the creation of protective installations, such as security zones and early warning systems. This includes placing water control stations alongside military equipment to protect the facilities (Fischhendler, 2015; Vivekanandan, 2024). Institutional mechanisms involve the participation of high-ranking military officers and those responsible for defense and foreign affairs in watershed management authorities, particularly in their decision-making bodies (Vivekanandan, 2024). Lastly, the linguistic mechanisms involve framing strategies that present the threat of water scarcity as imminent. Generally, these threats are described as existential and require urgent intervention by the state.

In the context of water securitization, in terms of international relations theorists, realists see in its securitization an increase in their power position, and consequently, their national security is rewarded (Leb, 2009). In contrast, neoliberal scholars seek that de-securitization of water based on cooperation, with the implementation of regimes, agreements, transparency and international law (Leb, 2009). In relation to the latter, it is essential to highlight that the first organized experiences of cooperation in the world and institutionalization of international life revolve around river resources, with the Central Commission for the Navigation of the Rhine, created in 1815 at the Congress of Vienna, the oldest on the planet, standing out (Central Commission for the Navigation of the Rhine, n.d.).

It is convenient to link the securitization of water resources with the discipline of geopolitics because geopolitics is a writing of geographical meanings and the politics of states (Ó Tuathail, 1999), therefore, politics of power (Ó Tuathail, 1999). More specifically, it is interesting to associate it with critical geopolitics because it seeks to contextualize geopolitical figures and disentangle textual strategies (Ó Tuathail, 1999),

visual images (especially maps), and political performance (economic and political practices) to combine them to produce geopolitical imaginaries that inform foreign policies and induce change as different parties adjust to new or evolving imaginaries (Agnew, 2001; Agnew, 2010).

According to John Agnew, world politics was not invented until it was possible to see the world (in the imagination) as a whole and to set goals. The expression "world politics" conveys a sense of geographic scale outside of specific states or localities, where certain actors (states or others) carry out certain activities with the aim of exerting power over others and increasing the power, whether political, economic or moral, of those who carry them out (Agnew, 2003). These activities will respond to a specific set of geographic assumptions about where it will be best to act and why. According to Agnew, this whole process will provide the geographical framework where political elites and society generally operate in the pursuit of their own interests and identity.

In relation to the importance of place in critical geopolitics, this does not derive from any special "location" or resource "wealth" but is a historical social construction (Agnew and Corbridge 1995) shaped in the modern geopolitical imagination. It could be considered to have been that of the political elites of the great powers, states or empires capable of imposing themselves and their ideals on the rest of the world. It is then about the capacity to design the political-economic agenda of others.

In line with securitization and critical geopolitics it is interesting to briefly explain the concept of the hydro-political discourse, which will substantially reveal "who gets how much water, how and why" (Zeitoun & Warner, 2006). Wolf et. al. (2021) analyze the discourses of hydropolitics under the premise of the "meta" discourses that structure the basin reality and the reproduction of power. That is, they conceive discourses as a tool to

explore the power relations that underpin transboundary water relations, these being the "filter" to determine how meaning-making processes flow (Wolf et. al., 2021).

It is interesting how Foucault (1976) introduced the notion of the "regime of truth" reflecting on the nexus between knowledge and power. He indicates that "each society has its regime of truth, if general politics of truth" referring to the following: 1. "the types of discourse that [society] accepts and makes function as true"; 2. "the mechanisms and instances that make it possible to distinguish true statements from false ones"; 3. "the means by which each [discourse] is sanctioned"; 4. "the techniques and procedures to which value is attached in the acquisition of truth"; and 5. "the status of those in charge of saying what counts as true" (Foucault, 1976; Wolf et. al., 2021). Therefore, discourses are intrinsically political and the hydropolitical interactions studied from the discursive prism refer to the political actions that are generated and legitimized in an institutional context, as well as how they evolve within that context.

In accordance with the aforementioned, "countries increasingly tend to consider trade issues through the prisms of national security and foreign policy", thus Antto Vihma began his article Geoeconomic Analysis and the Limits of Critical Geopolitics: A New Engagement with Edward Luttwak (2018). It is paramount to refer to the concept of geoeconomics which, assumes one of the fundamental pillars in geopolitics, as well as will lay the foundation for this research given that China is usually described as the world leader in geoeconomics (Blackwill & Harris, 2016).

Geo-economic theory is not well developed, so authors such as Vihma focus on a review of the strategic geo-economic framework established by E. Luttwak, which is considered to have much to contribute and inspire academia, in addition to the views of critical geopolitics. Luttwak formulates in relative terms that the domestic factors driving geoeconomic behavior vary by country and that, the propensity of states to act

geoeconomically can change, even more than their propensity to act geopolitically. That is, domestic politics influences the performance of states internationally based on certain factors such as culturality, among others. Likewise, Luttwak stresses that the role of domestic ideologies and politics determine the adoption of geo-economic behavior.

Luttwakian economic relations and strategic logic can be applied to the current international structural landscape. Baracuhy exemplifies the multipolar structure of the system by stating that the new geoeconomic power poles such as China, India or Brazil, do not align with the main geopolitical power pole, US, from the point of view of security or diplomatic commitments, therefore, economic interdependence no longer conforms to security arrangements. Likewise, Luttwak highlights that the role of domestic ideologies and politics determine the adoption of geo-economic behavior.

Vihma (2018) lays out a number of interrelated reasons confecting the shift in global politics: 1. the rise of China and its consequent shifts in global economic power, especially with its increasing economic and political influence; 2. the return of neo-Malthusian anxieties, i.e., resource scarcity emphasizes security of supply issues as well as zero-sum thinking, especially given the rapid population and industrial-urban growth of the stronger Asian economies; 3. the weakening of the liberal argument after the 2008 crises have highlighted the link between economics and security; 4. recent conflicts that were thought to be forgotten; 5. the influence of multipolarity on economic negotiations; and 6. the rise of the state-capitalist development model. In the case of this research, the first two will be those with relevance to both the Mekong and Brahmaputra basins.

Blackwill and Harris (2016) expose that geoeconomics is re-emerging as a privileged form of geopolitical combat for some of the world's most powerful states and shaping the outcomes of the world's most important strategic challenges. Thus, Wigell and Vihma (2016) argue that the success of a geo-economic operation will not lead to a similar type

of acute threat perception; on the contrary, that perception will disappear as some domestic political actors begin to worry about the vulnerabilities created by the geo-economic operation, while others, particularly those benefiting from "carrots" will downplay and depoliticize the threat.

It is worth noting the highly controversial concept of “debt trap”. The term was coined by Indian scholar Brahma Chellaney in 2017, which defines the situation in which a creditor state or institution grants projects or loans to a borrower state, usually under bad political and economic conditions, with the aim of increasing the former's political influence (Ajnoti, 2022).

1.7. Methodology.

A methodology based mainly on qualitative research will be used, with quantitative contributions to support the reflections and contributions. Therefore, the nature of the information will be based on primary sources (official reports, international treaties) and secondary sources (review articles on research carried out by other authors). Thus, the most consulted sources are the websites and documents of the Mekong River Commission, the World Bank or Taylor & Francis.

Three case studies will be carried out. First, a contextual overview of the two basins, Brahmaputra and Mekong, will be made, to be completed with the Chinese domestic hydrological context. Secondly, the Chinese cooperative or conflictual relations with both basins will be investigated. And finally, a comparison between the two basins in hydraulic mission, economic, environmental and social matters will be carried out, which is already introduced by the previous cases.

Finally, it is important to mention that certain difficulties have been encountered related to the nature of the information. That is, information on some issues is scarce or unreliable,

especially official sources from PRC or Indian institutions. Nevertheless, it has been interpreted objectively by contrasting it with the context and other data. In addition, it has also been difficult to access some of the official sources mentioned, since the security of the different devices used did not allow access, or simply because of the security of the country in question. It should be noted that, on very brief occasions, it has been possible to access, but interruptedly. Another obstacle encountered during the investigation was not finding certain documents translated into English, and therefore they had to be translated by other means, which did not provide a coherent translation.

On the other hand, the information found and provided by the Mekong River Commission has been very helpful, however, at one point during the research until now their website has become unusable due to an "undergoing major upgrade". Therefore, this has also been a further hindrance.

On the other hand, when it comes to certain hydraulic missions in different countries, the nature of the information obtained varies. That is, some can be found in official documents, while others are provided by secondary sources such as articles or news.

Chapter II. The Water Tower of Asia.

2.1. Geographical context of the Himalayas.

The Himalayan range, comprising the highest points on the planet, is also an essential source of life for the region and the global population. The Himalayan mountains are the source of natural resources of particular importance, such as the source of the main rivers that flow into the entire continent, except for western Asia (from Iran to the west) and the Caucasus. The Hindu Kush-Himalayas (HKH), Pamir, Karakoram and Tian Shan Mountain ranges are the center of the Himalayan range and are called "the water tower of Asia". This is because, if we consider that in the HKH alone there are 54,000 glaciers (2019 data), they contain the highest concentration of freshwater in the form of ice and snow in the world after the two poles; thus being the generating machine of the main rivers of the continent (Engelke & Michel, 2019): the Mekong, the Indus, the Amu Darya, the Brahmaputra, the Irrawaddy, the Yellow, the Yangtze or the Salween.

It should also be noted that the Mekong, Salween, Yellow and Yangtze rivers originate on the Tibetan plateau and are therefore not considered by many geographers to be entirely Himalayan, although the first two flow southward through the mountain range. However, the water tower also refers to the Tibet Autonomous Region (TAR) since the source of these transboundary rivers as well as the mountain ranges mentioned are located in this region, which is of special importance. The TAR, in addition to being the highest altitude and largest plateau in the world, is a truly strategic area controlled by the PRC and contains the largest amount of surface water in Asia and, consequently, in the world.

It is essential to present the geographical panorama of these rivers, i.e., where specifically each one originates and through which countries they flow, in order to achieve a better

understanding of the geopolitical dynamics of the region. To do so, we will go through the different areas:

Central Asia. The mountains belonging to the Tian Shan are the source of the Syr Darya and Ili rivers. However, the former is the result of the union of two rivers, the Naryn and Kara Darya, flowing through Kyrgyzstan, Tajikistan, Uzbekistan and, finally, Kazakhstan where it flows into the Aral Sea; the latter flows through Kazakhstan to Lake Balkhash. On the other hand, another important river is the Amu Darya, which rises in the Pamir Mountain range and flows through Afghanistan, Tajikistan, Turkmenistan and Uzbekistan to end its course in the Aral Sea, which no longer exist due to water diversion to irrigate cotton farms.

South Asia. The transboundary rivers in this area are based on two main river systems, the Ganges-Brahmaputra-Meghna, and the Indus, in addition to their numerous aquifers. The Brahmaputra (called the Yarlung Tsangpo in China) is the highest altitude river in the world; it originates in the Kailash Mountains Mountain range, in the glacier near Mount Kailash. This place is very sacred to Hindus and Buddhists and has come to be called the holiest mountain in the world. This river flows through the TAR until it crosses the border into the Indian regions of Arunachal Pradesh and Assam, and finally flows together with the Ganges and the Meghna into Bangladesh, specifically, into the Ganges delta. The Indus also rises in the Kailash Mountains and flows through Tibet until it crosses into the Ladakh district of Jammu and Kashmir. Finally, it flows through Pakistan until it empties into the Arabian Sea near the city of Karachi.

Southeast Asia. In this area we find the Irrawaddy, Salween, and Mekong rivers. The first is the longest river in Myanmar and is formed from the Mali and N'Mai rivers, the latter originating in the eastern Himalayas. The Salween originates in the Tibetan plateau and through the Chinese province of Yunnan crosses into Myanmar forming the border

with Thailand; and finally flows into the Gulf of Martaban in the Andaman Sea. Finally, the Mekong also originates in the TAR and is positioned as the eighth longest river in the world. It flows through China, Myanmar, Laos, Thailand, Cambodia, and Vietnam, emptying into the Gulf of Thailand in the South China Sea.

East Asia. In this area the main rivers are the Yellow and Yangtze, which originate in the Tibetan plateau and flow throughout the PRC until they flow, respectively, into the Bohai Sea and the East China Sea, near Shanghai. It should be noted that the Yangtze River is the third longest river in the world and the Yellow River is the sixth longest.

Therefore, from the Tibetan plateau and mountains flow rivers that flow through numerous states and conflict zones, or disputed borders such as the Indus through Jammu-Kashmir or the Brahmaputra through Arunachal Pradesh. This means that this water tower becomes a key instrument of geopolitical competition over the Asian Himalayas.

2.2. Climate context of the water tower.

In the HKH, snow and glacier melt contribute substantially to river and groundwater flows, although the magnitude of their contribution varies with scale and by river basin (Nepal, Steiner, Allen, et.al., 2023). The Tibetan Plateau and Himalayan ranges have a major influence on the climates of the region's states, comprising monsoon winds that draw moist air from the Indian and Pacific Oceans and bring rain to South, East and Southeast Asia (Australia Tibet Council, 2015). The cryosphere regulates river runoff by releasing water between April and October, mainly in the form of snowmelt between April and June, and glacier melt between June and October, which also recharges aquifers (Nepal, Steiner, Allen, et.al., 2023).

Glaciers are considered indicators of climate change (Hock et al., 2019; Jackson, Azam, Baral, et al., 2023), with changes in their mass clearly reflecting their response to

temperature variations as well as snowfall and other meteorological conditions (Hock et al., 2019; Jackson, Azam, Baral, et al., 2023). Their contribution to flow varies across the extent of the HKH, being most significant in western areas (Indus, Amu Darya) and less pronounced in eastern areas (Ganges, Brahmaputra) (Lutz et al., 2014; Jackson, Azam, Baral, et al., 2023). During droughts, glaciers play a crucial role in maintaining streamflow (Pritchard, 2019; Jackson, Azam, Baral, et al., 2023), accounting for most of the cryospheric contribution to flows in all basins, and this contribution is expected to continue to decline over the next century (Jackson, Azam, Baral, et al., 2023).

High altitude water resources, derived from snowmelt or precipitation, are essential for agriculture in mountainous regions, water supply and recharge of aquifers and springs. It is estimated that about 129 million farmers in the Indus, Ganges and Brahmaputra basins depend on water from glacial melt and snowmelt for irrigation of their crops (Nepal, Steiner, Allen, et.al., 2023). Especially in the dry and warm months before the onset of monsoon rains, the availability of this water flow is crucial for crop irrigation.

In all regions of the HKH, the average temperature is experiencing a significant increase, with an observed mean trend of +0.28 °C per decade (ranging from +0.15 °C per decade to +0.34 °C per decade in different basins) over the period 1951-2020 (Jackson, Azam, Baral, et.al., 2023). The largest trends are recorded in the Tibetan Plateau, Amu Darya and Brahmaputra basins, as well as in the headwaters of the Mekong and Yangtze basins (reaching up to +0.66 °C per decade in some parts of these basins) (Jackson, Azam, Baral, et.al., 2023).

Thus, the glacier mass balance shows an increasingly negative trend, with loss rates increasing from -0.17 water equivalent meters per hectare per year between 2000 and 2009 to -0.28 water equivalent meters per hectare per year between 2010 and 2019, indicating an acceleration in mass loss (Jackson, Azam, Baral, et.al., 2023). The most

unfavorable mass balances are observed in the eastern part of the HKH. There is a high probability that snow cover will experience accelerated loss at different levels of global warming in the HKH, including the Tibetan Plateau. Snow cover extent is projected to decrease by 1% to 26% for an average temperature increase of 1.1°C to 4°C (Jackson, Azam, Baral, et.al., 2023).

It is important to note that drivers can be differentiated according to their climate change (CC) or non-climate change (non-CC). For example, the rapid retreat of glacier ice is due to rising temperatures, a climate change driver. Whereas, seismic activity or road construction are factors clearly not related to climate change (Wester, Chaudhary, Maharjan, et.al., 2023).

With a changing climate and increased exposure of livelihoods and infrastructure, the mountain hazard landscape has become more dangerous. A range of slowly evolving (e.g., sedimentation and erosion) and rapidly evolving (e.g., flash floods) hazards are occurring in the same watersheds and, in many cases, simultaneously and often cascading as well (Wester, Chaudhary, Maharjan, et.al., 2023). Along these lines, the risk of heavy precipitation that can cause floods and landslides (Fowler et al., 2021; Jackson, Azam, Baral, et.al., 2023) is influenced by both the average intensity of precipitation (average precipitation on wet days) and the frequency of rainfall (frequency of wet days).

The connection of ecology with the geopolitics of the area is very strong, mainly between the relationship of water supply and its increasing demand, the poor governance over water in the HKH, and the challenging geopolitical dynamics of the HKH and water. The first nexus refers to the fact that both surface and groundwater sources are under stress throughout the mainland, and climate change will reduce their supply, as well as these supplies are often polluted. On the other hand, demand with a growing population and economy, especially from China, India and Pakistan, translates into increased demand for

freshwater, whether for agriculture, industry, energy production or domestic use. The effects of this demand result in an overuse of surface water resources, mainly from rivers and lakes.

The second nexus emphasizes the lack of multilateral governance over these transboundary rivers. There are some robust treaties and institutions on transboundary rivers and basins, such as the Mekong River Commission. However, there is no regional agreement on aquifers. Finally, the third nexus, at the geopolitical level, the dynamics have a high potential to fuel some freshwater insecurities on the continent, which are fueled by tensions over supply, demand and weak governance. It is an area composed of rivalries between continental powers, as well as countries in less powerful positions, such as China and India over Aruchanal Pradesh or Pakistan and India over Jammu-Kashmir. As mentioned above, climate change is also contributing to increasing tensions. Some of the exposed rivers are truly dependent on glacial water such as the Indus, Brahmaputra and Ganges, much more so than for example the Mekong or the Salween which are more dependent on the monsoons.

On the other hand, given the altitude at which these rivers originate and the courses through which they flow down to their mouth at the sea, they experience a considerable drop that is very attractive for the construction of hydroelectric dams. This is the key reason why in this area there are more dams, and plans for future dams, than in the rest of the planet.

2.3. Economic and social importance of water: agriculture, energy, population, and industry.

The increase in freshwater demand is mainly due to three reasons: agriculture, energy production and population growth. In this sense, some experts such as Engelke & Michel

(2019) divide the concept of "water use" between consumption and abstraction. That is, for consumption, water is withdrawn from its source, be it a river, a lake or an aquifer, but is not returned, such as for agriculture; whereas extraction, as for energy production, is returned. It should be noted that, with water abstraction, it is often not a neutral exchange because it is taken from a source and is often returned in a more degraded state (Engelke & Michel, 2019).

Considering that the Asian continent is the most populated in the world, it is understandable that it is the one that demands the most water and invests the most in agriculture to feed more than 4 billion people, in addition to the fact that it includes the two countries with the largest demographics: China and India. The increase in its demand is also due to the increase in the standard of living, the population with better salaries consumes products with more calories and also meat products, which require the most water per person to produce them (Food and Agriculture Organization of the United Nations -FAO-, 2018). Therefore, there is talk of food security, where there is an attempt to satiate with food the wealthiest societies as well as the poorest ones.

The Asian continent breaks all records in terms of agricultural land area, irrigation capacity, with land equipped for irrigation and the ratio of irrigated land to cropland. According to FAO (2020), between 2007-2016 Asia comprised the largest area of agricultural land on the planet at 34%; the largest area of land equipped for irrigation at 70% of the world total and over cropland at 40%; however, in terms of per capita availability it was the lowest at 0.13 hectares per capita compared to Oceania's 1.21 hectares. The Indo-Gangetic plain comprising Pakistan, India, Nepal and Bangladesh stands out, since this plain is nourished by the water tower and its groundwater, and it is important to point out that most of its population are farmers. Northern China, on the other hand, is a very dry area, which depends on intensive irrigation systems, usually

from groundwater, in order to produce food. China is the country with the highest percentage of agricultural land, while India has the largest area of arable land in the world[2], making it the two states with the largest irrigated cultivated area (FAO, 2020).

Energy production is the second most water-intensive sector (Engelke & Michel, 2019), and speaking in terms of extraction, in the world after agriculture. To obtain energy, it is necessary to be a water holder, from coal mines to nuclear power plants. This energy production emphasizes water supply as, thermal power plants compete for local water supplies with other water users, and under severe water stress, may be forced to shut down due to lack of cooling water or because the water is already too hot to serve as an efficient coolant (Engelke & Michel, 2019). This circumstance is related to climate change and its consequent temperature rise in surface waters, both rivers and lakes.

On the other hand, the Asian continent is a pioneer in the construction of hydroelectric dams. It is the geographical area with the most dams on the planet, due to the great hydroelectric potential of the high gorges of the Himalayan mountains. A clear example is the Three Gorges Dam built on the Yangtze River in the Chinese province of Hubei, with the capacity to generate 22.5 gigawatts (GW), which happens to be less than 5% of the power that the HKH can offer (Engelke & Michel, 2019).

Many countries have begun to realize the true energy potential of these mountain ranges and do not want to be left behind. China is the country that has invested the most in the construction of dams on practically all the rivers running through South and Southeast Asia. Today, however, the PRC continues to build this type of infrastructure, each time

[2] It is important to note that some authors do not consider India as the country with the most arable land, but the United States. However, this research focuses on data collected from international organizations in order not to be biased.

with better technology and foresight, as well as with more future plans. Overall, these actions are the cause of tensions with its neighboring countries.

In recent decades, the Asian population, specifically in the region we are discussing, has increased considerably. There are currently 4,176 million (United Nations Population Fund -UNFPA-, 2023) citizens in the Asia-Pacific area. Compared to 2015, the area had almost three and a half billion people, so this increase is demonstrated by UNFPA data, where the average annual growth rate, between 2015 and 2020, is positioned at 0.9%.

The increase in the continent's population is resulting in a rural exodus. The search for opportunities in large cities is increasing their density. The United Nations Department of Economic and Social Affairs (UNDESA) on population dynamics has carried out an exhaustive research work (UNFPA, 2021) on the urbanization trend as the years progress until reaching a forecast for the year 2030, in accordance with the 2030 Agenda. This study has been framed between 1970 and 2030, where a huge change with the current reality is observed throughout the planet.

Focusing on South and East Asia, the leap between 1970 and 2018 is really significant, however, the 2018 forecast is even more shocking considering the current context when related to climate change, conflicts over natural resources, technological innovation, migration or population growth. In 2018, according to the UNDESA on population dynamics, this area was hardly urbanized, however, it does have certain densely populated areas corresponding to larger urban centers, such as provincial capitals or more massified cities. However, in the coming years, the urban trend will grow exponentially.

According to the UNDESA on population dynamics, by 2030, cities in India, China or Pakistan are expected to be home to between 1 and more than 10 million people. By 2030, South and East Asia will climb the urbanization rankings, as well as the population

density of their cities, creating new overcrowded urban centers. Considering that India and China are currently the most populous countries on the planet with 1,428.6 million (UNFPA,2023) and 1,425.7 million (UNFPA,2023), respectively, the demand for goods and services will skyrocket. This brings us to what concerns us, water. This movement towards cities implies a greater demand for fresh water, both for domestic consumption and for food production and urban industry.

It should be noted that Asian cities include water sanitation problems and water-related natural disaster problems. On the one hand, the quality of water in these cities is deplorable and constitutes a serious problem for consumption, since sanitation systems, as well as the concern of industries for their waste, are scarce. The pollution of groundwater and surface water is one of the greatest challenges facing urbanization. On the other hand, the natural disasters they suffer, in addition to being enhanced by climate change, deforestation and the use of certain lands have changed the natural pattern of the course of some rivers, leading to a high risk of flooding, both in river and coastal river mouth areas.

Lastly, industrialization is extremely relevant water issues related to economy and society. Water-based pollution resulting from industrialization in the studied basins has led to the emergence of polluted waterscapes[3], highlighting significant deficiencies in planning, infrastructure, and governance. These polluted waterscapes also underscore the influence of development in determining access to water resources and control over them (Flaminio et al., 2022; Snowsill et.al., 2024). Industrialization, notably linked to metal and chemical pollution, results from discharging untreated industrial effluents from point sources into waterways (Buschmann et al., 2008; Devi and Yadav, 2018; Jewel et al., 2020; Snowsill

[3] "Waterscapes" as spaces with a physical reality, but whose material transformations are generally linked to broader socio-political and economic dynamics that take place over a long-time span (Flaminio et. al., 2022; Snowsill et.al., 2024).

et.al., 2024). This discharge is associated with per fluorinated compounds, leading to concerns about human health risks, including cancers, skin damage, cardiovascular diseases, and neurological disorders (Ajmal et al., 1984; Corsolini et al., 2012; Sharma et al., 2016; Srivastava et al., 2017; Snowsill et.al., 2024). The extensive use of agrochemicals and antibiotics in the region to support industrial food production also contributes significantly to diffuse contamination and nutrient overload.

Water infrastructure projects, such as dams for hydropower, irrigation, flood control, and water supply, are rooted in social, political, and economic power relations (Käkönen and Nygren, 2022; Snowsill et.al., 2024). These structures exacerbate pollution concentrations in the basins, transforming rivers into volatile environments (Käkönen and Nygren, 2022; Snowsill et.al., 2024). This transformation has critical implications for food security, water access, and the lives of people in these spaces (Eyler et al., 2022; Snowsill et.al., 2024). The uneven distribution of the impacts of these pollution-intensifying infrastructures is a consequence of socio-political power imbalances in upstream-downstream relations (Snowsill et.al., 2024).

2.4. Chinese causality: water security.

The Tibetan plateau is the source of the main rivers of South and Southeast Asia, and is controlled by the PRC, which enjoys a strategically beneficial status as opposed to its regional neighbors. In order to understand Chinese behavior in the regional and international arenas, it is important to delve deeper and clarify the motivations and drawbacks it faces. That is, what is happening within its borders to make its water security so threatened.

Over the past two decades, China has grown rapidly to become the world's second largest economic power, raising the living standards of its population. However, there are certain

sectors in which it is still struggling, with difficulty, to develop more quickly and effectively. One of these is water security. Asia is expected to look towards cities, increasing its population and demand for resources, so China's most urban areas will increase exponentially[4]. The consequences will be increased use of freshwater for agriculture, energy and domestic consumption. According to UN Water (2023), 72% of all freshwater withdrawals are used by agriculture, 16% by industries, and 12% by municipalities. If we take into account the data provided and the number of citizens that China has, the amount of water withdrawn raises the percentages and, with them, the concerns.

Currently, the PRC is facing significant water stress caused by industrial pollution, population increase and climate change, which modifies precipitation and temperature patterns. It is worth noting that, in order to catalogue such water stress, UN Water (2023) states that the territory has to withdraw 25% or more of all its renewable freshwater resources.

Being the second most populous country on the planet, and growing, does not make it easy for government institutions to provide access to safe drinking water to all its citizens. If we look at the graph below, in 2000 more than 200 million people were drinking water from untreated sources; and after two decades, the number has dropped to less than 30

[4] The growing trend towards urbanization and the concentration of people in large cities is not exceptional as it is related to the stages of development. According to the World Bank (2020), the urban population will tend to double, with 7 out of 10 people living in cities. However, the accelerated pace and magnitude of urbanization generates serious challenges such as the provision of resources, affordable housing, well-connected transportation systems, as well as other types of infrastructure, basic services and employment, especially for those people living in informal urban settlements in search of opportunities. On the other hand, conflicts displace too many people, 60% of whom (World Bank, 2020) are forced to move to cities. For its part, the construction of new urban areas puts pressure on land use patterns and natural resources, thus producing 70% of greenhouse gas emissions (World Bank, 2020). As a consequence, climate change exposes cities to climate disasters, especially those on the coast with storm surges and rising sea levels. As stated by the World Bank, 20% of the population lives in the136 largest coastal cities in the world; and where 90% of urban sprawl in developing countries is located in the most at-risk areas, being informal and unplanned settlements.
(2020) Urban Development. World Bank. https://www.worldbank.org/en/topic/urbandevelopment/overview

million people thanks to the country's development. But it is still a high number and a challenge for the government.

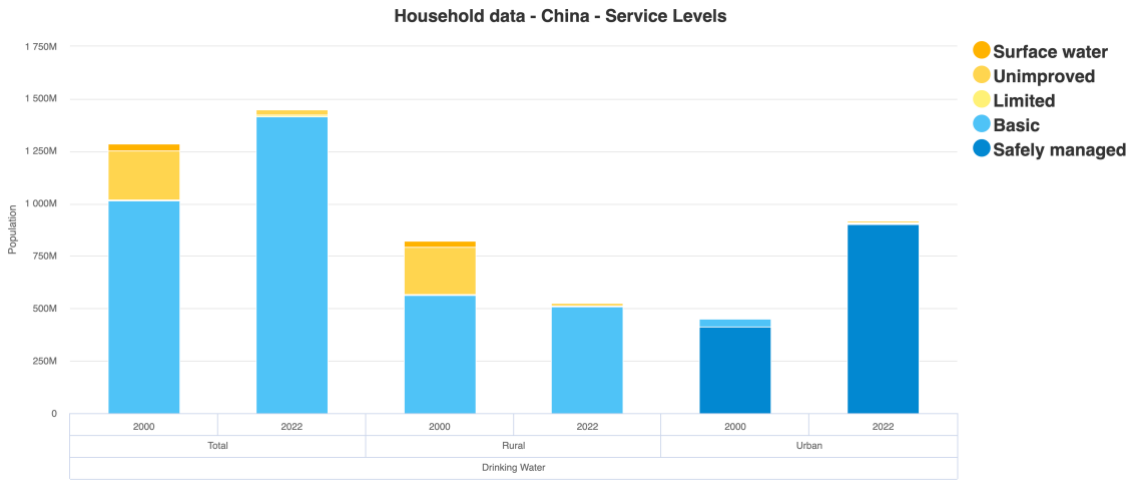

Figure 1. Access to drinking water in rural and urban China, 2000 and 2022. Source: WHO/UNICEF Joint Monitoring Programme (JMP)

Industrial pollution has posed a major challenge to water supply, as well as rapid urbanization that, according to the Chinese government, total water use increased by 8.8% between 2000 and 2015, and wastewater emissions increased by more than 50% (China Statistical Yearbook, 2019). Despite the exponential Chinese development, waste management infrastructures still favor the shortage of drinking water and even, the population of some cities has to boil and filter the water because of its poor treatment (China Power Team, 2020).

Poor wastewater management favors the appearance of diseases caused by water pollution, such as diarrhea or cancer. It is very interesting to highlight how it has affected cancer, since in 2013 the Chinese MEE pointed out that there were more than 247 "cancer villages" (Ministry of Ecology and Environment of the PRC -MEE-, 2013), so named, due to the high percentage of citizens suffering from it. By 2018 there were already more

than 450 villages (Mediavilla González, 2017), all of them dependent on rivers such as the Huai or the Hai, among the most polluted in the country, and on the banks of factories that dispose of chemical waste, among others, into them.

It is very important to underline that the lack of waste management infrastructures has meant the pollution of surface and groundwater, which implies that numerous cities, such as Beijing, have committed to reduce water pollution that causes relevant permanent damage to both citizen health and the environment. Given that 80% of the water used by the country comes from the surface, the Chinese MEE reported in 2018 that 6.9% (MEE, 2019) of the water in Chinese river basins was above grade V, i.e. too polluted and unusable; as well as 18.9% categorized between grades IV and V which is equivalent for only agricultural or industrial use, but not for human consumption (MEE, 2019).

To understand the above, the Chinese MEE has created a system for categorizing surface water quality into five grades. Grade I encompasses all water from natural springs and national nature reserves; Grade II refers to water that is suitable for use in drinking water sources and sustaining marine life; Grade III encompasses Grade II plus recreational swimming; Grade IV is suitable for industrial and recreational use, but without direct human contact; Grade V is suitable only for irrigation and landscaping; and finally, water beyond Grade V is not suitable for any use.

On the other hand, according to the Chinese MEE in 2018, 15.5% of groundwater was suitable for any use. However, the remaining 70.7% was clean enough for agricultural and industrial use, but could only be drunk after passing proper treatment (MEE, 2018; China Power Team, 2020). Just like surface water, the MEE created the quality system in five grades: grades I and II suitable for drinking; grade III suitable for drinking, irrigation and industrial uses; grade IV suitable for irrigation and industrial uses; and grade V not suitable for any use.

According to 2018 World Bank data, about 6% of the world's renewable freshwater resources are held by mainland China. Even so, its water security is diminished by potential shortages accentuated by climate change and urbanization. For water scarcity to be proven, the United Nations states that there must be less than 1,000 m3 of available freshwater per person in the area concerned, with "absolute scarcity" in an area containing less than 500 m3 of water per person (UN Water, n.d.). In other words, it is the point at which the aggregate impact of all users affects water supply or water quality under existing institutional arrangements to the extent that demand from all sectors cannot be fully met (UN Water, n.d.).

In addition, it should be noted that this water scarcity is also measured in terms of water stress, a concept defined above. Consequently, according to 2019 data from the World Resources Institute (WRI) China ranks 52nd (Kuzma, Saccoccia & Chertock, 2023) with medium-high water stress (20-40%).

The major disadvantage it faces is that water resources are not evenly distributed throughout the national territory. Most of the population resides in the 15 northern provinces, 9 of which suffer from absolute scarcity (including Shandong, Inner Mongolia, Hebei, Beijing, Tianjin or Xinjiang) (China Power Team, 2020). The largest amount of water resources in the country are located in the Tibetan Plateau and southern provinces and therefore suffer the least from shortages and freshwater stress. However, it should be emphasized that the climate of the various regions plays a crucial role, as there is hardly any rainfall in the north and northeast compared to the rest.

In addition, with climate change, the rainfall pattern is changing and, consequently, the glaciers of the Himalayas are melting at a faster rate, causing an imbalance in river water levels, which, in the long term, will lead to a decrease in the flow. As a result, floods, droughts and other extreme weather changes will become more frequent, affecting the

lives of millions of citizens in China and other countries, such as those in the Mekong and Brahmaputra basins as a result of Chinese dam construction, which will be discussed in the following chapters.

According to UNDESA predictions on population dynamics (2018 data), it is projected that by 2050 approximately 80% of the country's population will live in cities. This substantial change will cause many urban areas to feel water scarcity more closely, and those that currently suffer from it will be severely endangered. In response to all of the above challenges, in 2012 China's State Council launched the countrywide water management targets known as the "Three Red Lines" (World Bank, 2018):

1. Limit annual national water use to 700 m3.
2. Reduce water use to 40 m3 per US$1,600 of industrial value added and increase irrigation efficiency to 60%.
3. 95% of the water main function area must meet water quality standards, and all drinking water sources must meet national standards.

On the other hand, in the face of pollution from agriculture, in January 2020 the Chinese MEE announced a five-year plan (2021-2025) to restrict agricultural activities in the vicinity of major rivers in order to restore wetlands and ecosystems (Xu & Stanway, 2020). The plan involves the establishment of "ecological protection red lines" to strike a balance between maximizing agricultural production and river protection.

As reported by the MEE in January 2020, there was already an active campaign for the restoration of the Yangtze River, one of the most important rivers for the country, as it provides approximately 40% of China's population. The problem is that for decades it has been harassed by land reclamation, water detour and toxic waste dumping. So extensive work was already underway in relocating chemical plants, also demolishing certain dams,

restoring wetlands, and as well as imposing bans on agriculture and fishing in ecologically sensitive areas (Xu & Stanway, 2020).

Having taken this review of the challenges facing the PRC, it is clearer to understand why it needs every drop of water that comes out of the region's main water source: the Tibetan plateau. Tensions are heightened by Chinese plans to build dams for hydroelectric power generation, as well as to control the flow of rivers to divert their water to drier national areas or unusable polluted water. In addition, certain infrastructures generate insecurity because of their location, i.e. either because of their unstable geographical context (location and seismology) or because of religious beliefs, especially of Tibetans and Hindus who are so connected to nature.

The new Chinese hydroelectric infrastructures go from China itself, to Laos and South America as part of the Belt and Road Initiative (BRI) launched in 2013. In doing so, China strategically creates ties with various countries as a deterrent in the future if unfavorable developments against it occur. It also uses this tool as a BRI to publicize its advanced technology and specialization in the sector and national development. In other words, as a demonstration and image to the outside world, to make itself present in such a dynamic world. In short, China's power lies not only in its position as an upstream coastal state, but also in its significant economic and demographic power that gives it an advantage over its regional neighbors.

Chapter III. The dynamics of water securitization developed by the PRC.

3.1. Chinese securitization dynamics.

In the late 1980s, the discourse on water wars began to emerge. Recently, China's infrastructure development to manage water in transboundary rivers has been interpreted as a geopolitical strategy (Sharma, 2020; Xie & Warner, 2021). From this perspective, the Himalayan basins could become embroiled in the China-India conflict due to their ambitions.

In the case of the PRC, the regime is the primary reference point, concerned about a potential attack on its legitimacy, and to a lesser extent, about the quantity and quality of water, with the added pursuit of economic benefit. On one hand, the central Chinese government seeks to fulfill its economic interests while floods and droughts pose a threat to human security. It is worth highlighting China's water governance vision, which includes activities ranging from the exploitation of water resources for hydroelectric power generation, the creation of river navigation infrastructure, to other lucrative ventures. On the other hand, improving the quantity and quality of water is essential to ensure the human security of the Chinese population, hence the government's ongoing efforts since the creation of the "Three Red Lines" document.

However, China fears a greater threat on the international level: the military. Its exploitation of river resources has raised concerns among its riparian neighbors, especially India. These tensions put it in the spotlight, foreseeing that, in the event of a critical scarcity, its incursions into international rivers could trigger military conflicts, whether over water or territory (Xie & Warner, 2021). The Chinese government monopolizes how to address water management policies, both theoretically and

practically, focusing on regime security. However, the PRC's legal framework has undergone rapid changes regarding the scope of laws and the incorporation of public participation (Xie & Xu, 2021), although with quite limited access.

The existing Chinese institutional framework has focused on addressing threats and challenges related to water supply management. This is a national security priority specified in official documents that reflect both the vision of the CCP and the government as a whole regarding water security. Concerning China's water security agenda for its transboundary rivers, it has incorporated political tools to promote river management. However, the implementation of Integrated Water Resources Management (IWRM) is very limited, especially at local levels. Internationally, the Chinese government has attempted to transfer national policy to the management of international river basins, requiring water resource management that advocates for the needs and interests of upstream and downstream riparian states. Nevertheless, practically implementing such initiatives poses a challenge.

Additionally, it is important to consider two slightly different perceptions regarding freshwater security concerns. On one hand, the Chinese discourse on environmental security views ecological threats similarly to Western Europe, where environmental security represents a separate threat category (Boas, 2014), as a low-profile policy. On the other hand, when examining its balance of power with its neighbors, both the Chinese government and its securitizing actors tend to link regular policy with more traditional security concerns, such as territory and sovereignty (Xie & Warner, 2021).

3.2. Cooperation and China's conflicts with riparian states.

Interactions in transboundary waters are inherently political and are influenced by the broader sociopolitical context of the states sharing these river basins (Vij, Warner & Barua,

2020). Some scholars, such as Barua, Warner, and Zeitoun, emphasize the power of geography, which provides a significant advantage by allowing the manipulation of the course and flow of rivers. In 1992, Dr. Warner stated that upstream states tend to use water to gain more power, while downstream states use power to secure more water (Warner, 1992). In this sense, states like China and India compete for hegemony over the Brahmaputra River, while others, such as those belonging to the Mekong River Commission (MRC), use their power to maximize the water they receive and form alliances to prevent adverse futures, such as water scarcity.

Cooperation among riparian states is essential to create organizations, negotiation processes, and preventive plans, as well as to identify advantages and disadvantages that allow for joint benefits. These efforts are crucial for maintaining harmony in river basins and ensuring equitable access to water for all populations.

Since the proclamation of the PRC, it has shown a tendency to act bilaterally or even unilaterally, such as when it refused to become a member of the MRC established in 1997. Although China expressed some appreciation for the vision of the United Nations Secretary-General, Ban Ki-Moon, who stated that water is central to the well-being of both humans and the planet (Li & Wu, 2016), it voted against and refused to ratify international treaties such as the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UN Water, UNDESA, 2024) and the 1997 United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses (UN Water, UNDESA, 2024), thus avoiding compliance with international law.

3.2.1. Cooperation on the Yarlung Tsangpo-Brahmaputra River.

In the last two decades, China has endeavored to address Indian concerns regarding the Brahmaputra, particularly issues such as floods that could be mitigated through access to Chinese information, and potential Chinese activities along the river. These concerns stem from massive floods in June 2000 in Assam and Arunachal Pradesh, resulting in 30 deaths and displacing thousands of people (IFRC, 2000; OCHA, 2000). This event marked the beginning of cooperative efforts between China and India on the Brahmaputra.

In April 2002, the Ministry of Water Resources of the People's Republic of China (MWR) signed a cooperation agreement with India to share hydrological data from three river monitoring stations during the wet and flood seasons, from June 1 to October 15 each year (MWR of PRC, 2015). To solidify this cooperative spirit, a Memorandum of Understanding (MoU) titled "MoU on Provision of Hydrological Information on Brahmaputra River during Flood Season" was enacted and subsequently renewed in 2008.

Another MoU was negotiated in 2005, expanding the information exchange to the Sutlej River in northwest India, which was renewed in 2010. In November of the following year, during a visit by Chinese President Hu Jintao to India, an expert group mechanism was agreed upon to discuss hydrological data, emergency response measures, and other issues related to transboundary rivers (MWR of PRC, 2015).

To enhance commitment and cooperation, China extended the data exchange period from May 15 to October 15 in October 2013 through the adoption of a new MoU (MWR of PRC, 2015). The following year, during the visit of Indian Vice President Hamid Ansari to China, the "Implementation Plan: Provision of Hydrological Information on Yarlung Tsangpo/Brahmaputra River during Flood Season by China to India" was signed

(Ministry of External Affairs of India, 2014). Although the current implementation of this plan is not entirely clear, it is noteworthy for several reasons:

- It precisely details the nature of the information to be shared, the mechanisms for exchange, and aspects related to emergency management (as outlined in the 2006 Joint Declaration).
- It introduces data exchange outside the flood season, marking the first public declaration on this matter.
- It specifies the conditions and methods of payment India must follow for data provision, approximately 850,000 RMB in USD (conversion dependent on the exchange rate at the time of payment), scheduled for late April each year during the plan's validity period.
- It requires India to report on the use of shared information for flood forecasting and mitigation, and to provide information from its hydrological station near the China-India border, including name, latitude, altitude, and type of observed data.
- It facilitates the exchange of experts for studies, promoting reciprocity between the two countries.
- Finally, this plan replaces the 2013 MoU, consolidating the bilateral framework for transboundary water management.

Mutual distrust forms the bedrock of Sino-Indian relations and actions, deeply rooted in historical factors, particularly border disputes. China attempts to assuage Indian concerns through rhetoric and media statements, such as asserting that hydroelectric infrastructure development along the Brahmaputra will not impact river flow post-border, nor will it retain or divert water. However, an escalating trust deficit persists, as official Chinese assurances fail to reassure both the Indian government and civil society, who harbor profound skepticism despite acknowledging these declarations. India's official stance is

encapsulated in "trust, but verify," especially following recent border conflicts and China's announcement of the Fourteenth Five-Year Plan (2021-2025).

It is crucial to clarify that Arunachal Pradesh, under New Delhi's control, is one of the two disputed regions along the Sino-Indian border, the other being Aksai Chin in western India, controlled by Beijing since the mid-20th century. China argues for sovereignty over Arunachal Pradesh as part of the Tibetan region, similar to its claim over Aksai Chin, rejecting the 1914 treaty that ceded this area to India.

China perceives a challenge in India's plans, facilitated by the Indian Ministry of Water Resources, to construct hydroelectric infrastructure in Arunachal Pradesh. These projects aim to control floods, enhance electricity production, and bolster water security, thereby bolstering India's claim over this Tibetan province and reducing China's prospects of reclaiming it. Moreover, New Delhi is intensifying efforts to assert control over the region by increasing military presence and encouraging migration from other parts of India to foster a stronger sense of belonging (Samaranayake, Limaye & Wuthnow, 2016). Consequently, China has taken proactive measures to impede India's financing for dam construction, influencing institutions like the Asian Development Bank, and seeking leadership roles in organizations such as the Asian Infrastructure Investment Bank (Samaranayake, Limaye & Wuthnow, 2016).

Recent controversies include the 2017 Doklam standoff, the 2020 Ladakh confrontation and the 2022 Tawang clash. The Doklam incident erupted when Chinese army engineers attempted to build a road (within Indian territory) as part of the Belt and Road Initiative to link the Tibetan Plateau with Doklam, a disputed area claimed by both China and Bhutan (supported by India). In coordination with Bhutanese authorities, Indian troops intervened, halting construction and triggering a standoff between the two powers. The region holds strategic significance; Chinese control would sever the "chicken's neck," the

narrow Siliguri Corridor, isolating Arunachal Pradesh from the rest of India and enhancing China's prospects to reclaim Southern Tibet, posing critical security concerns.

Following weeks of negotiations, Delhi and Beijing agreed to withdraw troops to their original positions, with China abandoning its plans. However, in 2017, China openly used water as a tool of coercive diplomacy by unilaterally suspending hydrological data flows to India, in breach of bilateral agreements. This action undermined downstream flood early warning systems, resulting in preventable deaths in Assam (Chellaney, 2021). China only restored data sharing post the 2018 Wuhan Summit, held after the Doklam standoff and the August 2017 disengagement agreement.

Since then, it appears that China continues to quietly deploy troops and construct new infrastructure in the area to gain an advantage, albeit slowly. Notably, Bhutan is the only country in the region that does not have formal diplomatic relations with China (Thinley, 2021), also has no formal cooperation on the river, is backed by India, and has expressed a desire not to be caught up in Sino-Indian disputes. However, China's territorial claim and Bhutan's dependence on India have involved it in the conflict, aiming to maintain stability and peace along the border (Qi, 2021).

Regarding the Ladakh confrontation in May 2020, it specifically took place in the Galwan Valley, where Chinese and Indian forces accused each other of trespassing into their respective control zones. From the Chinese perspective, Indian soldiers were constructing roads and other infrastructure in an area they consider part of China. From the Indian viewpoint, they accuse the Chinese army of occupying areas beyond their territory, setting up camps, digging trenches, and moving heavy equipment several kilometers into what they consider Indian territory. Clarifying who is right and what actually transpired is complex, as each side presents its version of events. What is clear is that there was a clash resulting in casualties on both sides, weakening Sino-Indian bilateral relations to date.

Chinese Foreign Minister Wang Yi and Indian Foreign Minister S. Jaishankar met in September 2020 in Moscow during a Shanghai Cooperation Organization Foreign Ministers' meeting. They engaged in constructive discussions to set aside their differences and clarify the situation in Ladakh. According to a statement from the Chinese Ministry of Foreign Affairs, both agreed that "the key is to adhere to the strategic consensus reached by the leaders of the two countries, that China and India are not competitors but cooperation partners, not threats to each other but opportunities for development" (Ministry of Foreign Affairs of PRC, 2020). They also emphasized the urgency of resolving border disputes and promoting dialogue. As a result of this meeting, they reached consensus on five points to improve the situation, including commitments to prevent differences from escalating into disputes and to maintain communication channels. One year later, in July 2021, both Foreign Ministers met again in Tajikistan to discuss the progress of troop withdrawals and the evolution of the conflict, maintaining a similar line of dialogue as the previous meeting.

On December 9, 2022, Chinese and Indian troops clashed at their disputed Himalayan border, the most significant conflict since the June 2020 Galwan Valley incident (Adlakha, 2022). The skirmish occurred in the Tawang sector of Arunachal Pradesh, with minor injuries reported on both sides. Indian media reported at least six Indian soldiers injured, while Chinese media did not specify injuries but highlighted differing accounts of the clash's location. China's Foreign Ministry described the border situation as stable and emphasized ongoing diplomatic and military dialogue. Chinese reports suggested three reasons for the conflict (Adlakha, 2022): reactions to an anticipated U.S. visit, India's infrastructure expansion along the border, and perceived threats from India's improved logistics capabilities, particularly the Sela tunnel project. The clash involved around 250-300 Chinese and 400 Indian troops, with significant injuries to six Indian soldiers.

Apart from these controversies, it is important to highlight that in the remote Himalayas, China is developing and expanding numerous villages along its contested border with India. These villages, which often include military and dual-use infrastructure, serve as strategic tools for China to assert and defend its territorial claims (Jun & Hart, 2024). Commercial satellite images reveal China's rapid and substantial progress on these villages despite the challenging conditions. From 2018 to 2022, 624 villages were reportedly constructed in the region, with ongoing work on additional villages (Jun & Hart, 2024). Many of these are concentrated along the eastern sector of the LAC, Arunachal Pradesh. Additionally, China is building new roads and potential small security outposts between these scattered villages.

It could be said that the security agendas of both countries are incompatible. Initially, China's agenda was focused primarily on managing humanitarian disasters but has evolved to include managing water resources for broader economic benefits. Meanwhile, India's agenda has progressed from disaster management to broader concerns such as water availability. However, for Delhi and Beijing, water resource management is considered a matter of environmental security and sovereignty, especially since the river is located in a disputed territorial area. China perceives that India's securitization framework is fueled by nationalist sentiments, reinforcing its conviction in the legitimacy of its securitizing actions, as evidenced in the previously mentioned Doklam incident.

Regarding Bangladesh, it is crucial to highlight its complex relationship with water, which proves both a blessing and a curse for the country. From June to October, abundant rainfall leads to floods, while the rest of the year sees droughts (International Rivers). Unlike India, Bangladesh's dealings with China are devoid of controversies, likely due to the absence of shared borders. Cooperation focuses on China sharing information on the Brahmaputra River's status and Chinese assistance in improving water management,

flood control, and personnel training. In 2007, China and Bangladesh inked a MoU concerning technical collaboration in water management. The agreement outlines that the nations will partner on dam construction, design, and methodologies to control watercourses in sections of the Brahmaputra River. Additionally, the MoU includes provisions for joint research on the river's watercourses and sediment transport (AidData, n.d.; Yasuda, Aich, Hill, Huntjens & Swain, 2017). Following this MoU, in 2015, they signed a MoU for exchanging precipitation data from Chinese catchment areas to aid flood prevention (Siddiqe, 2015; Yasuda, Aich, Hill, Huntjens & Swain, 2017; Samaranayake, Limaye & Wuthnow, 2016).

China is by far Bangladesh's principal partner (ICEX, 2022), strategically advantageous for expanding its Belt and Road Initiative (BRI) and countering any Indian influence favorably. For these reasons, China sees no issue in keeping its partner satisfied through data exchanges and activities such as river dredging. Notably, China also offers economic options and military equipment to Bangladesh.

Conversely, Indo-Bangladeshi relations are not particularly strong due to internal policy differences and polarization between "pro-India" and "anti-India" factions, heightened by uncertainties over Indian water policies. Bangladesh perceives India as a significant hydrological threat, given their shared full border, while China is not viewed similarly but rather as a counterbalance to India's power.

Despite concerns over upstream Chinese hydroelectric infrastructures affecting Bangladesh, Chinese assurances of non-harm, similar to those extended to India, have fostered positive diplomatic relations between China and Bangladesh. China opts for bilateral relations with Bangladesh, mirroring its approach with India, which it considers more effective than Bangladesh's preference for a multilateral approach. Although the closest organization in terms of membership and relevance for Brahmaputra River

management is the Bangladesh-China-India-Myanmar Forum for Regional Cooperation (BCIM), the lack of a formal multilateral structure among riparian states limits effective cooperation beyond MoUs.

Interestingly, documents from China's Ministry of Water Resources on cooperation with neighbors have not been updated since 2015-2016, a period when Sino-Indian relations appeared to be improving before controversies arose in 2017. However, Chinese Ministry of Foreign Affairs statements on meetings between Chinese and Indian ministers often carry a propagandistic tone.

As noted by Brahma Chellaney, "China knows its troops cannot fight and decisively win against India's battle-hardened army on a force-on-force basis," as demonstrated in clashes in the Galwan Valley (Chellaney, 2021). Therefore, China employs asymmetric warfare techniques to target India's vulnerabilities, echoing Sun Tzu's principle: "All warfare is based on deception" (Chellaney, 2021). Despite attempts to mask the reality, evidence suggests that "cooperative" Sino-Indian relations continue to be marked by historically ingrained geopolitical and territorial competition, as well as economic gain, hindering the trust-building necessary for genuine and effective cooperation.

3.2.2. Cooperation on the Lancang-Mekong River.

China views sharing the LMR (Lower Mekong River) as inherently tied to regional geopolitical competition, given its passage through six countries. However, Beijing appears committed to fostering good neighborly diplomacy with the primary goal of maintaining a peaceful periphery conducive to its economic growth and political stability (Xie & Warner, 2021). Consequently, China has initiated several projects aimed at reaping benefits from hydroelectric infrastructure development, not only within its own Yunnan region but also through collaborative efforts with neighbors like Laos and Cambodia.

Since becoming a dialogue partner of the Mekong River Commission (MRC) alongside Myanmar in 1996, China has significantly expanded its influence in the basin. While typically engaging bilaterally with each country, this dialogue platform has nudged China towards multilateral engagements. In 2002, cooperation with the MRC was bolstered with the signing of an MoU on providing daily water discharge and precipitation data from two monitoring stations in China's Yunnan province during the rainy season, enhancing flood forecasting capabilities (MRC, n.d.). This agreement was renewed in subsequent years, notably in 2013 and 2019.

Strategic cooperation between the MRC and China has evolved further, evidenced by the October 2020 agreement between the MRC Secretariat and China's Ministry of Water Resources (MWR), committing China to supply hydrological data from its Upper Mekong dams throughout the year (MRC, n.d.). This accord aims to enhance monitoring of the Mekong and its tributaries, facilitating early warnings and predictions of future droughts and floods across the basin. It is noteworthy that China and the MRC also collaborate in other areas such as sharing relevant monitoring and water quality data, exchanging technical knowledge in flood prevention and management, electric development, and environmental management (MRC, n.d.).

It is crucial to emphasize that the MRC is an intergovernmental agency that collaborates with various governments to foster sustainable and goodwill cooperation. It operates as a technical rather than a political commission, providing data and issuing recommendations to assist in diplomatic negotiations among its member states in the Mekong basin. The MRC does not make collective decisions or impose sanctions for non-compliance with agreements.

In 2016, China initiated the Lancang-Mekong Cooperation Mechanism (LMCM), persuading other MRC member states to join. China's objective is to promote a regional

collective mechanism aimed at developing common strategies to mutually benefit socio-economic development. Initially, according to a Chinese Ministry of Foreign Affairs official, the LMCM did not focus on water management (Xie & Warner, 2021), but it is expected to address this issue in accordance with the national policies and priorities of its six members over time.

The LMCM includes an institutional framework that integrates ministerial officials from all riparian states, who regularly convene to develop action plans on transboundary water issues. This cooperative framework encompasses meetings of leaders, foreign ministers, senior officials, and working groups addressing various areas (Lancang-Mekong Cooperation, 2017). Additionally, the Lancang-Mekong Water Resources Cooperation Center and the Environmental Cooperation Center of the LMCM have been established.

Under this framework, China has promoted both intra-sectoral links (focusing on Mekong River water issues) and inter-sectoral links (related to infrastructure development, trade, economic opportunities, and environmental protection in its projects, including responses to the COVID-19 pandemic through the provision of health assistance), primarily managed bilaterally with other member countries (Xie & Warner, 2021).

Recently created, the Five-Year Plan of Action on Lancang-Mekong Cooperation (2023-2027) (LMC, 2024) builds on significant achievements since the launch of LMC in 2016, and the successful implementation of the 2018-2022 Five-Year Plan. It aims to strengthen cooperation among the six member countries, drive economic and social development, and enhance regional prosperity and security. The Plan complements international initiatives like China’s BRI and ASEAN strategies and seeks to implement consensus from China-ASEAN Dialogue Relations. Key principles include addressing member countries' development needs, promoting equal negotiation and inclusivity, and ensuring high-quality, innovative development. The Plan emphasizes consensus, equality, mutual

respect, and adherence to international laws. The working structure aims to optimize the institutional framework and boost cooperation in political, economic, and social domains. It will explore new areas of collaboration, upgrade Joint Working Groups, improve coordination mechanisms, and consider establishing an LMC International Secretariat.

Regarding water resources cooperation, in order to enhance it the framework will be improved through regular high-level meetings and forums, fostering policy dialogues, technical exchanges, capacity building, and joint research. The Plan of Action (LMC, 2024) will be developed, focusing on technical exchanges, joint research, and practical projects in climate change, disaster management, data sharing, and infrastructure assessment to promote sustainable water use and socioeconomic development. Member countries are encouraged to develop joint projects to address water challenges and support the UN 2030 Agenda for Sustainable Development. The Lancang-Mekong Water Resources Cooperation Center will receive voluntary support in personnel, technology, and budget from member countries, thus the coordination between this Center and the Mekong River Commission Secretariat will be strengthened. Efforts will be made to improve water management, ensure transparent data sharing, and address trans-boundary water issues. A joint study on hydrological changes and adaptation strategies will be promoted. Coordination will consider national conditions, upstream-downstream relations, and ecological protection to achieve sustainable development.

The proposal by LMCM is particularly intriguing as it pledges support for ASEAN Community, advocates for the implementation of the UN Agenda 2030, and promotes South-South cooperation (Lancang-Mekong Cooperation, 2017).

China has undergone a significant transformation in its security practices. It can be argued that it has moved away from securitization by unilaterally engaging in information exchange, demonstrating transparency, and actively seeking dialogue with other riparian

states (Xie & Warner, 2021). This increasing openness to dialogue and pacifism reflects an effort to present itself as a responsible state, potentially leading to a de-securitization in the Mekong River basin.

Lastly, China's approach to water security in the Mekong basin has proven effective. Given that lower Mekong countries typically view water resources as income sources, they have largely endorsed China's management policies, fostering cooperation both internally and externally in water-related matters (Xie & Warner, 2021).

Chapter IV: Case study: Comparison between both basins.

4.1. Hydraulic mission's variable.

In the 20th century, the idea of water missions emerged, which promote improvements in quality of life through more efficient and controlled management of water resources. Although they have brought obvious benefits globally, they also present critical weaknesses according to the Atlantic Council (Engelke & Michel, 2019). These weaknesses include prioritizing water supply over water demand, focusing solely on utilitarian goals such as energy and irrigation without considering environmental impacts, and favoring large industrial complexes over local communities and ecosystems.

As the economic, social and environmental problems resulting from these infrastructures were recognized, a new approach emerged at the end of the last century, supported by multilateral organizations such as the United Nations and the World Bank (Allouche, 2016; Engelke & Michel, 2019): the Integrated Water Resources Management (IWRM). This paradigm prioritizes balanced demand management and ecosystem protection, promoting cooperation between countries by sharing river basins. In contrast, China has pursued a robust strategy focused on water demand management and has incorporated policies such as the "Three Red Lines" to address its water challenges. Through its 14th Five-Year Plan, it commits to (Asian Development Bank, 2021):

- Increasing its commitment to the environment, seeking sustainable ways of working and living for society, with significant mention of carbon emission reduction targets. (Indeed, Xi Jinping, during the last United Nations General Assembly, reported China's goal of reaching peak CO2 emissions by 2030 and achieving carbon neutrality by 2060.)
- Promoting comprehensive human development and prosperity across the board.

However, China's massive construction of water infrastructure, such as the South-North Water Transfer Project (SNWTP)[5] and the Three Gorges Dam, has generated significant tensions with its neighbors due to the potential impact on water flows and social and cultural patterns of other riparian states.

4.1.1. Brahmaputra Basin.

China's engineering capabilities have surpassed all expectations. In 2015, it inaugurated its first series of large dams on the Yarlung Tsangpo and its tributaries, forming the Zangmu Hydroelectric Station. This facility is set to generate 22,500 megawatts per hour (mW/h) of electricity annually. Naturally, this did not escape New Delhi's notice, where China's hydroelectric agenda was opposed with arguments about future hydrological and ecological deterioration in the basin during floods or droughts.

China's strategy of frantically building dams and reservoirs poses a significant threat to India, which fears that China might divert a large portion of the river's flow to meet its growing water demand. The Chinese government's plans that India fears the most include the western route of the SNWTP and the mega-dam in the so-called Great Bend of China. For decades, Chinese academics have proposed diverting the Brahmaputra's flow as a solution, going well beyond the SNWTP. Although none of these proposals have been endorsed, Chinese experts' forecasts of severe future water shortages motivate the government to consider utilizing this river's water (Samaranayake, Limaye & Wuthnow, 2016).

[5] The South-North Water Transfer Project is a clear example of a large-scale water transfer scheme. It started in 2002 and is based on three routes: east, central and west. The east and central routes focus on diverting water from China's southern rivers, the Yangtze and Han, and the northern Yellow River. Both routes provide water to northern cities such as Beijing and Tianjin. The western route, on the other hand, focuses on domestic rivers in the Qinghai and Tibetan Plateau regions, mainly diverting water from the three tributaries of the Yangtze River (the Tongtian, Yalong and Dadu) to the Yellow River by 2050 (Sheng, Webber & Han, 2020).

Although China's contribution to the total flow is less than its share of the basin's surface area[6], and the western route of the SNWTP seems costly, complex, and time-consuming, India's concern is growing. Despite seeming unfeasible, China has already made considerable progress in constructing the necessary infrastructure. Until recently, these were mere speculations, but tensions have risen, evidenced by Xi Jinping's announcement in March 2021 of the XIV Five-Year Plan (2021-2025) and the project of a mega-dam just kilometers from India's Arunachal Pradesh border. Since discovering this unexplored area, China has been considering building what will be the world's most powerful hydroelectric dam. It is located in one of the most remote parts of the planet, between two of the highest mountains in the Himalayas (Namcha Barwa, 7,782m, and Gyalha Peri, 7,294m), where, just before crossing into India, lies a massive canyon—the world's longest and steepest—containing Asia's largest untapped water resources (Chellaney, 2020). It will dwarf the Three Gorges Dam on the Yangtze River (the world's largest) with the potential to generate 60 million kilowatts (kW/h), almost three times more. It is suggested that it could produce a total of 300 billion kW/h annually, not only for Tibet but also for export to other Chinese provinces (Zhang & Donnellon-May, 2021).

Speculations suggest that this construction has been under consideration for two decades and will be the riskiest, most expensive, and most challenging to build. Details are scarce, and the project is yet to be launched. The site proposal is known as the Motuo Hydropower Station (also called Mêdog, after the Tibetan County where it will be built),

[6] However, the exact extent of this lower contribution is unclear due to the scarcity of measurement stations and limited access to existing data. Additionally, the exchange of information between the two countries, and within India domestically, is quite lacking. On one hand, in 2011, FAO figures indicated that China's contribution to the Brahmaputra's flow was 30%, while on the other hand, anonymous sources from the Indian government suggest the figure is 7% (Luthra & Bhaskar, 2022; Giordano & Wahal, 2022). Other scientific evidence shows that China only generates 14% of the Brahmaputra's total flow (Hilton, 2012; Jyoti Deka, 2021) compared to the area it covers; rainfall downstream is 12 times higher than that on the Tibetan plateau; and the utilization rate of Brahmaputra waters is low, representing only 4% of the total discharge (Ray, 2014; Jyoti Deka, 2021). Ghosh states that about 75-85% of the Brahmaputra's water comes from downstream tributaries, particularly the Dihang, Dibang, and Lohit (Ghosh, 2019; Jyoti Deka, 2021)..

with experts considering the drilling of a massive water diversion tunnel through Namcha Barwa (Doman, Shatoba & Palmer, 2021). The process would involve sending water through the tunnel to turbines on the other side of the lower curve, generating enormous amounts of energy (Doman, Shatoba & Palmer, 2021).

While the president of the China Energy Construction Corporation, Yan Zhiyong, describes the project as a “historic opportunity,” it will be unfortunate for India (Chellaney, 2020). Experts and engineers worldwide consider it madness, but they are confident that China will achieve its goals regardless of the consequences. The mega-dam will significantly impact the ecosystem, allowing China to manipulate the transboundary flows of the Yarlung Tsangpo more effectively. Economically, the Tibet Autonomous Region is expected to benefit from 200 billion RMB annually and attract investment (Zhang & Donnellon-May, 2021).

Traditionally, the Government of India has downplayed the risks posed by Chinese infrastructure, often citing the minimal water contribution from China mentioned earlier (Giordano & Wahal, 2022). However, this stance shifted in 2020 when the Ministry of Water Resources decided to build a 10-gigawatt hydroelectric project on the Brahmaputra, specifically to "mitigate the adverse impact of Chinese dam projects" (Giordano & Wahal, 2022), justifying it as a countermeasure to Chinese operations. It is important to note that in 2020, both countries experienced clashes along the LAC, and the Chinese mega-dam project was announced, reflecting India's change in attitude with its own mega-project. Also, Indian hydroelectric projects are typically located on the tributaries of the Brahmaputra, not its mainstream; therefore, this would be the first such project on the main river, and in a contentious area.

It is important to mention that the increasing demand for water and China's potential options to develop water storage infrastructure and diversion projects to channel the

Brahmaputra's waters to drier regions have led to the development of the "Brahma hypothesis" (Jyoti Deka, 2021). This refers to the potential negative impacts on downstream ecology and populations that could arise from China's unilateral efforts to harness the Brahmaputra's waters. Therefore, it encompasses the rising tensions due to China's unilateral actions to appropriate these waters and the general sense of insecurity this would create in Northeast India. The Brahma hypothesis is driven by (Jyoti Deka, 2021): 1) India's fear of losing Brahmaputra waters if China builds large-scale dams and executes upstream water diversion projects; 2) the fear of being devastated by sudden floods caused by the collapse of these upstream dams; and 3) concerns that Chinese upstream activities would affect the floodplains of Assam and Bangladesh. Some authors label this as a "media myth" (Ghosh, 2017; Jyoti Deka, 2021) or an illogical public perception based on "presumptive linear logic and patriotism" (Ghosh, 2019; Jyoti Deka, 2021), or even an "illusion" (Zhang, 2016; Jyoti Deka, 2021). As previously mentioned, scientific evidence shows that compared to the area it covers, China's generated percentage is smaller. Therefore, it is reiterated that the SNWDP would not be highly detrimental since it only plans to divert 20% of the water from six upstream rivers, including the Brahmaputra (Hongzhou, 2015; Jyoti Deka, 2021).

According to Saikia, India's counter-hegemonic policy to prevent China from building mega-dams on the Brahmaputra is with a 'dam-for-dam' strategy (Saikia, 2020), and can be explain by the announcement, in August 2023, that the Government of India and the Government of Arunachal Pradesh had joined forces to revive 12 stalled hydroelectric projects in the state (Press Information Bureau -PIB- of Government of India, 2023). MoUs were signed, establishing a total installed capacity of around 11,517 MW. Of these 12 projects, the government allocated five with a capacity of 2,620 MW to NEEPCO, five projects with 5,097 MW to SJVN, and the remaining two projects with 3,800 MW to

NHPC (PIB, 2023). These projects were previously awarded to private sector developers about 15 years ago but did not progress for various unspecified reasons. Therefore, the State Government decided to turn to central hydroelectric companies to boost the languishing projects (PIB, 2023).

What is more, India plans to invest $1 billion to accelerate the construction of 12 hydroelectric plants in the state of Arunachal Pradesh, in the northeastern Himalayas, according to two government sources (Singh, 2024). The Federal Ministry of Finance, led by Nirmala Sitharaman, recently approved financial aid of up to $89.85 million for each hydroelectric project in the northeastern region (Singh, 2024). The plans for these plants are expected to be announced in the 2024/2025 federal budget, which Prime Minister Narendra Modi's government will present on July 23; the information remained confidential. There have been no comments yet from the Indian Ministries of Finance and Energy, nor from the Chinese Ministry of Foreign Affairs.

However, the state that will suffer the most is not India, but densely populated Bangladesh, whose primary source of freshwater comes from this river. The resulting water stress could cause an exodus of refugees to India, where millions of Bangladeshis already live illegally. In response to India’s concerns, Chinese officials have stated that they are undertaking run-of-the-river hydroelectric projects that do not involve diverting the Brahmaputra’s waters (Zhang & Donnellon-May, 2021).

Bangladesh, on the other hand, has no dams on the Brahmaputra or any of its tributaries. However, on the Teesta River within Bangladesh, the construction of dams on the river for irrigation and hydropower generation has been discussed.

Hydropower Project Count by Country

Country	Operating	Construction	Pre-construction	Announced	Prospective (Sum of Construction, Pre-construction, Announced)	Shelved	Mothballed	Retired	Cancelled
Global Total	**2.637**	**283**	**575**	**463**	**1.321**	**133**	**11**	**5**	**154**
China	498	136	197	68	401	10	0	0	1
India	133	27	42	79	148	22	2	0	16
Bangladesh	1	0	0	0	0	0	0	0	0

Figure 2. Hydropower projects of the direct riparian countries of the Brahmaputra[7]. Source: World Energy Monitor

4.1.2. Mekong Basin.

The Southeast Asian region with dynamic economies, growing population and industries have been conducive to increasing electricity demand. Since President Xi announced the BRI, the influential and growing role of Chinese state-owned enterprises in overseas infrastructure development has intensified. In the hydropower sector, China has stimulated dam construction and Chinese companies are estimated to cover 70% of the global market (International Rivers, 2021). In particular, Powerchina Resources and

[7] It is important to distinguish between dam and hydropower project. A dam is a structure built across a river or stream to hold back water, whereas a hydropower project uses the energy of flowing or falling water to generate electricity.

China Three Gorges Corp account for more than half of all dams currently under construction (International Rivers, 2021). Thus, across the length and breadth of the Mekong there is a vast network of hydropower plants in operation, under construction and/or proposed.

It is important to emphasize that China remains the upstream state, signifying its enormous power and influence over the rest. However, although the Lancang contributes 100% of the Mekong's flow as it crosses China's border with Laos, its contribution diminishes considerably as it reaches the capital. During the dry season, the Lancang accounts for 24% of the total Mekong flow, but in the annual computation it only contributes between 14% and 16% of the total river flow (MRC, n.d.; De Simone, 2013; Ogden, 2022). This low annual contribution is due to the large number of large tributaries in the Mekong below the Chinese border. Also, this does not detract from the importance of China's role in controlling the Mekong headwaters, as all downstream countries also influence the river flow (Ogden, 2022).

Focusing on individual countries, in 2020, China had 22 water projects (as far as is known), of which 11 are operational dams, one is under construction, and 10 are planned (MRC, n.d.), without any formal consultation with the rest of the riparian states. The 11 that are already operational are referred to as the "Lancang cascade of dams". They are controversial because of the footprint they leave on the ecology of the basin. According to International Rivers, China currently has 12 operational dams, including Xiaowan and Nuozhadu storage dams that allow China to regulate the flow of the Mekong (Ogden, 2022), and two planned (International Rivers, 2024). However, the number of operational, planned or under construction dams will depend on the sources consulted, for example, illustration 1 of the MRC of 2020 shows the above; on the other hand, illustration 2 of International Rivers of 2024, is not so detailed, but updated and mentions the latter.

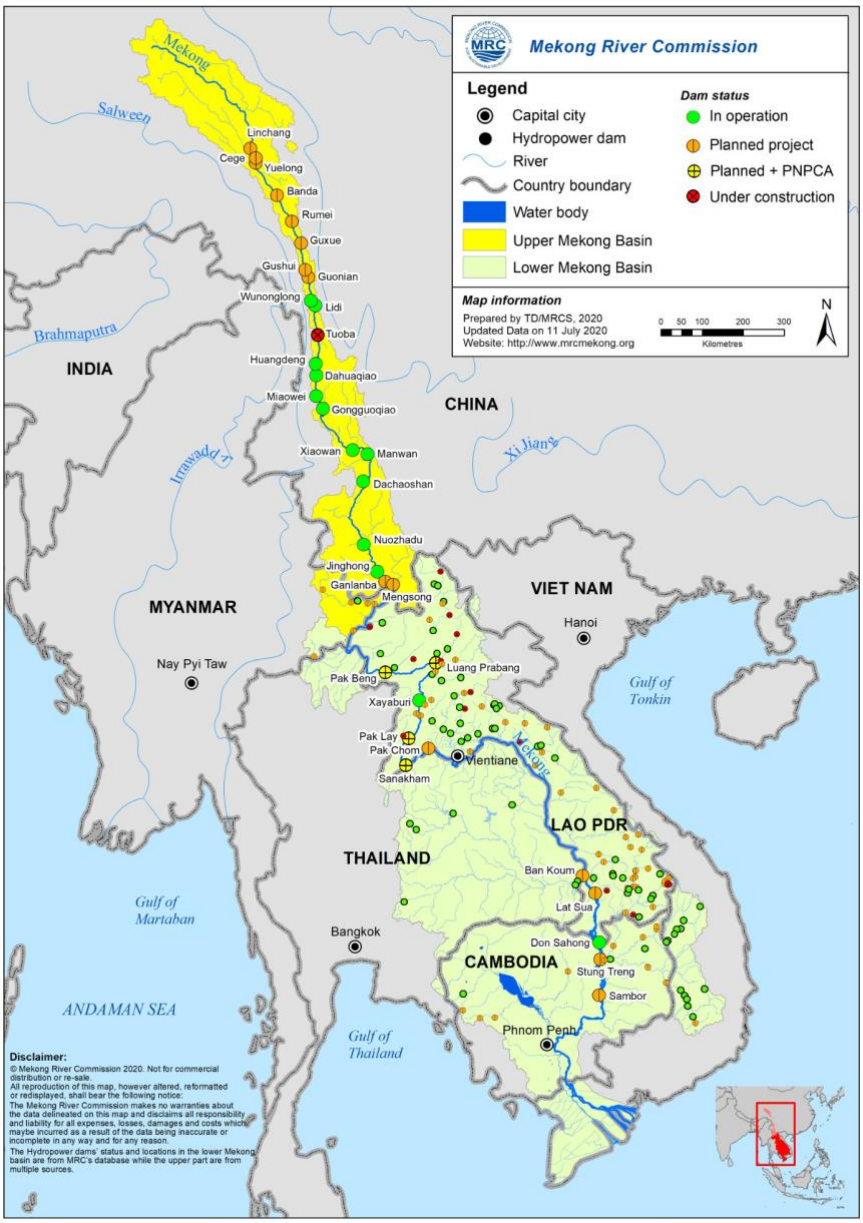

Figure 3. Hydropower dams in the Mekong River Basin (2020). Source: MRC

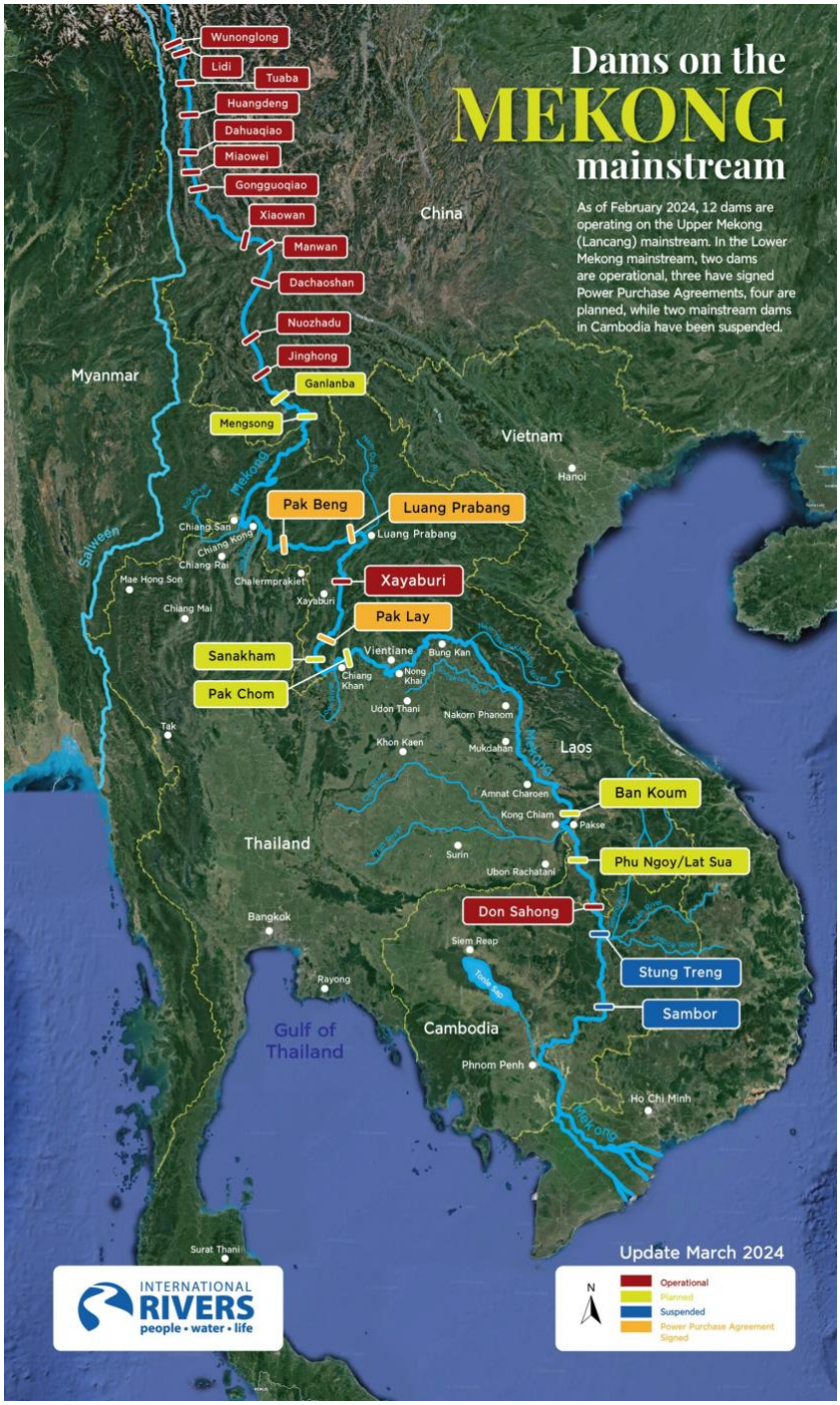

Figure 4. Hydropower dams in the Mekong River Basin (2024). Source: International Rivers

The case of the Lao People's Democratic Republic (Lao PDR) is the most striking, as it aims to be the "battery of Southeast Asia" by providing electricity to its country and exporting it to other countries such as Thailand. Its plans are the most controversial in the entire southern basin, either because of their location and number, or because of their magnitude. The most objectionable are the first dams to be built: Xayaburi (in the north)

and Don Sahong (in the south). The Lao government, under the MRC, was required to submit its plans for review and consultation under the Procedures for Notification, Prior Consultation and Agreement (PNPCA). In both processes there was controversy and accusations, especially from Cambodia and Vietnam with arguments about lack of information, as well as being misleading and not properly following the PNPCA. However, Laos disregarded and continued its projects without concern[8] (Engelke & Michel, 2019), signing a contract with a Thai company for the construction of the Xayaburi. While the PNPCA requires member states to cover a monitoring and dissemination of their hydropower plans, the MRC does not possess the means to deny that which is detrimental and objected to by its constituents.

By 2020, Laos has already completed more than 40 dams and more than 30 planned (shown in Figure 1), half of which are financed by Chinese investors, both those from state-owned companies and others, who are very important in financing hydropower plants throughout the region.

Decades ago, Thailand stopped building hydropower infrastructure on its territory due to social pressure and began to rely on Laos to meet its electricity demand. As a result, Thai companies have credited Laos for building dams with their help. However, Bangkok began to withdraw its support after a dam collapse in southern Laos in July 2018 (BBC, 2018), also influenced by civil society. It also postponed signing a power purchase agreement from the planned Pak Beng dam, realizing that it had underestimated its electricity needs and that wind and solar power costs had dropped significantly (Open Development Mekong, 2018). However, Thailand's National Human Rights Commission and the National Ombudsman, the state-owned Electricity Generating Authority of

[8] For its part, if we add to the weak authority of the MRC, the 2016 Sino-initiative (the LMCM), China's influence will encompass and impose itself on the security, economic, development or cultural sectors of its neighbors.

Thailand (EGAT), have supported commercial interests, signing long-term power purchase agreements (PPAs) approving the Pak Beng project and two other new ones - Luang Prabang, Pak Lay (International Rivers, 2024). All projects will take several years to build before becoming operational.

International Rivers (2024) sets out all the relevant information on these three deals. The 912 MW Pak Beng hydropower project will be built by a subsidiary of China's Datang Hydropower Company, together with Thailand's Gulf Energy Development PCL, 97km from Thailand's Chiang Rai province. Although there are potential transboundary impacts, such as irregular water level fluctuations or reduced food security. In September 2023, EGAT signed a 29-year PPA, with commercial operations expected to start in 2033. The Luang Prabang hydropower project is located 25km from the historic town of Luang Prabang, and just 4km from the Pak Ou caves, home to ancient Buddhist shrines. The 1,460 MW dam threatens local livelihoods and a UNESCO World Heritage Site. In addition, it is located in an active seismic zone with no clear emergency earthquake safety plan. However, in November 2022, EGAT signed a 35-year PPA, with power exports planned for 2030. Finally, the 770 MW Pak Lay dam, developed by Gulf Energy Development PCL of Thailand and Sinohydro Corporation of China, is being built 70km downstream of the Xayaburi dam and 200km from Chiang Khan in Thailand's Loei province. This project will displace more than 4,850 people and affect some 82,000 people directly and indirectly. The 29-year PPA was signed in March 2023 with EGAT, and commercial operation is scheduled for 2032.

There are also projects in the planning stage, such as Sanakham and Phou Ngoy, which have not yet signed PPAs. A subsidiary of China's Datang International Power Generation Company and Thailand's Gulf Energy Development PCL will develop the 684 MW Sanakham hydropower project in Laos (International Rivers, 2024). The Sanakham dam

will be located just 2km north of Thailand's Loei province. This dam is expected to aggravate fish migration patterns and sediment blockage, in addition to dispossessing some 3,000 people from 13 villages in the surrounding areas (International Rivers, 2024). The 778 MW Phou Ngoy hydropower project will be developed in partnership between Thailand's Charoen Energy and Water Asia Co. and the Lao Government, with construction by South Korea's Doosan Heavy Industries & Construction and Korea Western Power (International Rivers, 2024). The environmental impact assessment submitted by the project developers to the MRC recognized potential transboundary impacts, such as flooding along the Mun River and implications for people's livelihoods (International Rivers, 2024).

For its part, Cambodia in March 2020 committed to a ten-year moratorium on the construction of hydropower dams on the Mekong, as it reaffirmed in 2023, but with a nuance: no construction of hydropower dams on the Mekong mainstream (Sereyrath, 2023). That is why the Sambor and Stung Treng dams are suspended. All this is due to the civil society, journalists or academics who expressed the consequences and damages of all these projects on their source of life, as reflected in the projects.

Hydropower Project Count by Country

Country	Operating	Construction	Pre-construction	Announced	Prospective (Sum of Construction, Pre-construction,	Shelved	Mothballed	Retired	Cancelled

					Announced)				
Global Total	**2.637**	**283**	**575**	**463**	**1.321**	**133**	**11**	**5**	**154**
China	498	136	197	68	401	10	0	0	1
Cambodia	6	2	1	2	5	0	0	0	1
Laos	29	12	9	2	23	0	0	0	3
Thailand	9	2	2	1	5	0	0	0	1
Vietnam	52	3	1	1	5	0	0	0	1

Figure 5. Hydropower projects of the direct riparian countries of the Mekong. Source: World Energy Monitor

4.2. Economic variable.

In order to be able to economically relate the hydroelectric development of these countries, we have obtained data from the World Bank for the period 2000-2023 on the GDP of each country, as well as its population. In addition, the hydroelectric capacity of each country as of April 2024 is presented, as well as the number of hydroelectric projects. It should be noted that, given the lack of information, it has not been possible to find accurate data on how much of the GDP is allocated specifically to hydroelectricity, however, it is possible to find information on investment in renewable energy in general terms, but not for all states. Likewise, there is no certainty on the capacity and/or number of hydropower projects per country for both the Brahmaputra and the Mekong specifically. For this reason, only the numerical data for the country as a whole is presented. Nevertheless, these data show the development of hydropower in all the

riparian countries analyzed, which helps national development. On the other hand, in relation to the Mekong River, it is easier to obtain information given the number of existing multilateral organizations, which is why the geoeconomic analysis is extended a little, especially on Laos and Cambodia, since they are the two states with the closest proximity to China.

First of all, China will be analyzed before the sections because it is located in both basins. In 2000, China's GDP stood at $2.77 trillion, while its population reached 1.26 billion. Over the years, the Chinese economy experienced spectacular growth, so that by the year 2023, China's GDP amounted to $17.17 trillion, which represents a remarkable increase compared to the year 2000. This economic development has been accompanied by an increase in population, which in 2023 is estimated at 1.41 billion inhabitants. This remarkable economic and demographic growth has prompted China to lead in the development of energy infrastructure, particularly hydropower. China's hydropower generation capacity has expanded significantly, making it the world's largest hydropower producer.

According to predictions by the International Energy Agency (IEA) in 2021, China will remain the largest hydropower market until 2030 with a projected 40% growth in global capacity. For this reason, China is investing in numerous hydropower projects around the world. In Asia, excluding India, almost 45% of all hydropower plant capacity planned to be built until 2030 is accounted for by a Chinese company, and it is anticipated that, of the countries of concern to us in this research, the Lao PDR will receive the largest Chinese contributions in terms of financing or construction (IEA, 2021). Relative to Chinese GDP in 2023, renewables presented about one-fifth of its 5.2% growth. In fact, renewables accounted for around 5% of GDP growth in 2023 (Soo, 2024; Myllyvirta,

2024; IEA, 2024). Without investment in this sector, GDP would not have reached this 5% government target, but would have remained at only 3% (Myllyvirta, 2024).

However, the pace of growth in hydropower development by China has slowed due to increased concerns about its environmental impact, as well as less availability of attractive economic sites for large projects (IEA, 2021). As a result, China's share of the global increase has been declining from its peak of almost 60% between 2001 and 2010 (IEA, 2021). As shown in 2023 (Figure 5), the year-on-year growth of investment in power generation capacity and electricity generation decreased by 1% and 6% respectively.

Sector	Activity	Value in 2023, CNY bln	Value in 2023, USD bln	Year-on-year growth
Hydropower	Investment: power generation capacity	80	11	-1%
Hydropower	Electricity generation	512	72	-6%

Figure 6.China's investment on power generation capacity and electricity generation in 2023. Source: Carbon Brief

As of April 2024, China, with a total hydropower capacity of 323,919 MW in operation, 171,411 MW under construction, and an additional 308,994 MW in pre-construction and announced phases, is a global leader in hydropower development (Figure 6). This massive capacity reflects China's extensive investment in renewable energy, aligning with its status as the world's second-largest economy. China's hydropower infrastructure not only supports its substantial industrial base but also contributes significantly to its GDP growth.

4.2.1. Brahmaputra Basin.

In 2000, India's GDP stood at $800.53 billion, while its population reached 1.06 billion. Over the next two decades, the Indian economy experienced significant growth. By the year 2023, India's GDP amounted to $3.2 trillion, reflecting a remarkable increase

compared to the year 2000. This economic development has been accompanied by an increase in population, which in 2023 is estimated at 1.42 billion. India's economic and demographic growth has had a considerable impact on its energy sector. According to the IEA's 2021 forecast, India, the second fastest growing market globally, was expected by its new long-term targets and financial incentives to free up numerous stalled projects, which indeed happened. In 2023, India was the fastest growing economy, with GDP growth of approximately 7.7%. As far as renewables are concerned, they contributed just under 5% to GDP growth (IEA, 2024).

For its part, in 2000, Bangladesh's GDP stood at $83.49 billion, while its population reached 129.19 million. Over the next two decades, Bangladesh's economy experienced significant growth. By 2023, Bangladesh's GDP amounted to $323.28 billion, reflecting a remarkable increase compared to 2000. This economic development has been accompanied by an increase in population, which in 2023 is estimated at 172.95 million. Bangladesh's economic and population growth has had a considerable impact on its energy sector, and although the country is not known for its large hydropower capacity due to its predominantly flat geography, it has taken steps to diversify its energy sources, including the development of hydropower projects in limited mountainous areas and the exploitation of other water resources. Hydropower development in Bangladesh, although limited, has been an essential component in supporting the country's economic growth.

As of April 2024, the global hydropower capacity demonstrates the significant role that renewable energy plays in the economic landscapes of these countries. India has a total hydropower capacity of 43,440 MW currently operational, with 14,922 MW under construction and 41,467 MW in pre-construction and announced stages. This development aligns with India's ongoing efforts to enhance its renewable energy sector as part of its broader economic growth strategy. India's hydropower capacity plays a

critical role in supporting its growing economy, which is among the fastest growing in the world. On the other hand, Bangladesh operates a relatively modest 230 MW of hydropower capacity. With no significant projects under construction or in the planning stages, Bangladesh's current hydropower capacity is limited compared to its larger regional counterparts.

In summary, China and India's significant hydropower investments reflect their economic ambitions and the role of renewable energy in supporting robust growth. In contrast, Bangladesh's current capacity highlights the potential for future development as its economy continues to evolve.

Hydropower Capacity by Country (MW)

Country	Operating	Construction	Pre-construction	Announced	Prospective (Sum of Construction, Pre-construction, Announced)	Shelved	Mothballed	Retired	Cancelled
Global Total	**1.133.406**	**250.780**	**528.842**	**309.113**	**1.088.735**	**49.470**	**9.945**	**773**	**64.115**
China	323.919	171.411	308.994	81.143	561.548	3.982	0	0	100
India	43.440	14.922	41.467	47.359	103.748	7.478	571	0	5.865
Bangladesh	230	0	0	0	0	0	0	0	0

Figure 7. Hydropower capacity of the direct riparian countries of the Brahmaputra (MW)[9]. Source: World Energy Monitor

4.2.2. Mekong Basin.

China's investment in the energy and economic infrastructure of the Greater Mekong Subregion[10] (GMS) has become a means to promote interconnectivity and regional economic integration, while also posing a challenge to the Western-defined international order (Ogden, 2022). The Basin Development Strategy 2021–2030 and the MRC Strategic Plan 2021–2025 highlight the significant growth in energy demand across Southeast Asia, which increased by 60% over the past 15 years. In response, hydropower in the basin has rapidly expanded to meet part of this demand, especially for enhancing transport and connectivity. Electricity generation from hydropower in the LMB surged from 9.3 GWh in 2005 to 32.4 GWh in 2015, with its gross value rising from about USD 0.5 billion to over USD 2 billion (MRC, 2021). Lao PDR is the leading producer, contributing over 50% of LMB's hydropower. The hydropower in China generates approximately 80 GW of electricity annually, valued at more than USD 4 billion. Projections by the IEA (IEA, 2019) suggest that Southeast Asian energy demand will grow by two-thirds by 2040.

Over the past two decades, Thailand, Vietnam, Cambodia, and Laos have experienced significant economic growth, with their GDP and population figures reflecting broader developmental trends. These changes are intricately linked to infrastructure projects, among other sectors, in this case in hydropower development, which has played a crucial

[9] This figure does not only represent the hydropower generated in the Brahmaputra but the total river flows of each country.

[10] The Greater Mekong Subregion is a regional cooperation initiative established by the Asian Development Bank in 1992, aimed at promoting economic development, improving infrastructure, and fostering regional integration among the countries in the Mekong River basin (GMS, 2024b). The GMS includes Cambodia, China (Yunnan Province and Guangxi Zhuang Autonomous Region), Laos, Myanmar, Thailand, and Vietnam.

role in shaping their economic landscapes. Thailand saw its GDP rise from $221.45 billion in 2000 to $458.44 billion in 2023, a substantial increase. During the same period, its population grew from approximately 63 million to over 71 million. This economic expansion, combined with a growing population, underscores the demand for sustainable energy solutions. Vietnam experienced even more dramatic economic growth, with its GDP surging from $93.53 billion in 2000 to $377.36 billion in 2023. Its population increased from about 79 million to nearly 99 million over the same period. This economic boom has driven an increased demand for energy.

Cambodia has also seen notable growth, with its GDP rising from $5.91 billion in 2000 to $26.31 billion in 2023. The population has grown from approximately 12 million to nearly 17 million. Despite being smaller in scale compared to its neighbors, Cambodia's investment in hydropower is crucial for its development. The Mekong River and its tributaries offer significant hydropower potential, which Cambodia is beginning to tap into to drive its economic progress and improve energy access. Finally, Laos, with its GDP increasing from $4.98 billion in 2000 to $20.3 billion in 2023, and its population rising from around 5.4 million to 7.6 million, exemplifies a smaller yet rapidly growing economy. Laos is often dubbed the "Battery of Southeast Asia" due to its vast hydropower potential. The country is leveraging its abundant river systems to develop hydropower projects not only for domestic use but also for export, which plays a significant role in its economic strategy.

Hydropower Capacity by Country (MW)

Country	**Operating**	**Construction**	**Pre-construction**	**Announced**	**Prospective** (Sum of	**Shelved**	**Mothballed**	**Retired**	**Cancelled**

					Construction, Pre-construction, Announced)				
Global Total	**1.133.406**	**250.780**	**528.842**	**309.113**	**1.088.735**	**49.470**	**9.945**	**773**	**64.115**
China	323.919	171.411	308.994	81.143	561.548	3.982	0	0	100
Cambodia	1.298	230	100	4.000	4.330	0	0	0	51
Laos	8.503	2.936	4.457	430	7.823	0	0	0	412
Thailand	3.570	1.186	1.185	900	3.271	0	0	0	51
Vietnam	14.749	1.782	80	1.500	3.362	0	0	0	140

Figure 8. Hydropower capacity of the direct riparian countries of the Mekong (MW)[11]. Source: World Energy Monitor

As of April 2024, the hydropower capacities of Thailand, Vietnam, Cambodia, and Laos reflect their economic priorities and energy needs (Figure 7). Thailand, with a GDP of $458.44 billion in 2023, has invested significantly in its hydropower infrastructure. The country currently operates 3,570 MW of hydropower capacity and has an additional 1,186 MW under construction and 1,185 MW in the pre-construction phase. The total operating capacity represents a crucial part of Thailand's energy mix, helping sustain its economic growth and development. Vietnam, with a GDP of $377.36 billion in 2023, has harnessed

[11] This figure does not only represent the hydropower generated in the Mekong but the total river flows of each country.

its substantial hydropower potential to support its rapid economic expansion. The country operates 14,749 MW of hydropower and has a further 1,782 MW in construction and 80 MW in pre-construction.

Cambodia, with a GDP of $26.31 billion in 2023, operates 1,298 MW of hydropower and has an additional 230 MW under construction. The modest scale of Cambodia's hydropower projects compared to its regional counterparts mirrors its developing economy. However, with 4,000 MW announced. And finally, Laos, with a GDP of $20.3 billion in 2023, stands out as a major player in the hydropower sector relative to its size. The country operates 8,503 MW of hydropower and has 2,936 MW in construction and 4,457 MW in pre-construction. This substantial investment in hydropower aligns with Laos's strategy to leverage its abundant river resources for both domestic use and export. With regard to Chinese investments in hydropower infrastructure in the Mekong countries, Laos and Cambodia stand out. It is therefore essential to take a brief look at how these have affected the economy, for better or worse, under the so-called "debt trap". Laos has transitioned from being landlocked to be a "land-linked" country (Qi, 2023). In consequence, Laos suffers from headline inflation, which reached 25.6% in July 2022. The WB argues that structural weaknesses have been exacerbated by the COVID-19 pandemic, the rapid depreciation of the Lao kip, as well as the deterioration of the global macroeconomic environment. According to WB data, total public and publicly guaranteed debt accounted for 88% of its GDP in 2021. However, the WB excludes hidden public debts between Laos and China, so the true level of Laos public debt exposure to all creditors is estimated to be around 120% of GDP (AidData, 2022; Macan-Markar, 2022). This places Laos as the country with the highest level of public debt exposure to China on a percentage of GDP basis.

It also faces liquidity problems as it does not have sufficient assets to meet its obligations. That is, its foreign exchange reserves stand at USD 1.3 billion, equal to the annual amount it needs to service its debt. It is worth noting that the reserves figure reached the figure in 2020 due to the currency swap agreement between the Lao Central Bank and the People's Bank of China as a bailout of foreign exchange reserves.

However, even before the pandemic, warnings were raised about the country's high levels of debt, mainly due to macro hydroelectric infrastructure projects on the Mekong River and its tributaries, as well as a high-speed rail project with an estimated size of USD 5.9 billion (WB, 2020). Chinese public-private companies are backing the projects, mainly motivated by the development of the BRI, e.g., Sinohydro Corporation and Power China Resources (Hiebert, 2021).

Along these lines, in 2020 the debt burden faced by Lao state-owned power utility Électricité du Laos (EDL) reached around USD 8 billion, almost 50% of Laos' GDP (Reed, 2020). The pandemic made it difficult to service the company's debt (it faced bond redemptions totaling approximately USD 362 million) and led Laos to break up part of EDL into a new entity, much of which has been acquired by a Chinese power grid company. In September 2020, Laos created a new company from EDL, the EDL Transmission Company (EDL-T), which would be responsible for the country's national electricity transmission network. It later handed over a stake of approximately 90% of the new company to the Chinese state-owned China Southern Power Grid Co Ltd, which would assume part of the Lao government's debt (Hiebert, 2021). Even so, EDL was still struggling to meet its debt repayments, so it had to sell ¼ of its shares to the Lao Stock Exchange in EDL-Generation Public Company, a leading Laotian construction company that is very active in the energy sector (Barney & Souksakoun, 2021).

Notwithstanding, Laos is the battery of the Mekong countries. In 2022 it was the country that exported the most electricity[12], with Thailand being the largest importer (85.3%), followed by Cambodia (7.93%), Vietnam (5,63%), Singapore (1.01%) and China (0.16%) (OEC, 2024). In 2023, its largest annual energy export was to Cambodia, followed by Thailand (GMS, 2024).

On the other hand, China owns numerous hydroelectric power plants and is helping the Cambodian government finance a few more. Although these projects are not as large-scale as in Laos, they are causing significant concern in the country, especially after the severe impacts caused by the Lower Sesan II dam. This dam is controlled by the China Huaneng Group (51%), the Cambodian conglomerate Royal Group (39%), and the Vietnamese electric company EVN (11%). These groups are responsible for approximately 5,000 displaced people, mostly belonging to ethnic minority communities, according to the Human Rights Watch report from August 2021, which describes the consequences of the dam as violations of economic, social, and cultural rights. Therefore, China is by far the largest foreign economic actor in Cambodia, accounting for 23% of all foreign investment in the country in 2000-2018 (OECD, 2018; Loughlin, 2021). Moreover, in 2018, FDI in Cambodia amounted to USD 4.6 billion, ¾ parts of which came from China (Takahashi, 2019; Mackenzie et. Al., 2023). Nevertheless, Cambodia faces the risk of speculative money flow and short-term investments may jeopardize Cambodia's economic structure and market order (Chen, 2018), thus the idea of long-term is studied. In short, Chinese FDI is a crucial driver of Cambodia's economic development, it has arguably become the engine that perpetuates this system.

[12] Laos electricity production comes from hydro and solar energy, being the first the most important with a 70%.

As it was previously stated, Thailand's investment in Laos hydropower has resulted in it being the biggest importer of Laotian electricity. And, in the case of Vietnam, its major concerns are environmental and therefore, social.

4.3. Environmental and social variable.

4.3.1. Brahmaputra Basin.

The residents of Assam and Arunachal Pradesh firmly believe in the Brahma hypothesis (Jyoti Deka, 2021), especially due to the negative impacts on the ecosystem they have already experienced from the construction of dams on the Chinese side, particularly the disastrous incident in 2000. Consequently, the 10-gigawatt Indian hydroelectric project on the Brahmaputra has faced several attempts to be implemented previously. However, the Northeast India region (NER) is inhabited by numerous ethnic groups and tribes, which strongly opposed the project due to its potential consequences, such as the displacement of communities, flooding, loss of agricultural land, and more.

The recklessness of the mega-dam project is based on the fact that the area is seismically unstable, where the Eurasian and Indian tectonic plates meet; moreover, it is prone to large landslides. It is also important to emphasize that the basin's biodiversity is unique. This mega-dam will block fish migration and the flow of sediments necessary to enrich the soil during floods. It will also be a significant blow to the culture and society of Tibet, where nature and its preservation are revered. This is why the canyon region is sacred territory for Tibetans, as its main mountains, cliffs, and caves represent the body of their guardian deity, the goddess Dorje Pagmo, and the Yarlung Tsangpo represents her spine (Chellaney, 2020).

In addition, the basin will be very sensitive to monsoon floods (from June to September). Climate change will lead to higher temperatures, as well as more frequent rainfall, which

will be very severe and have terrible consequences. In addition, there is concern about violent flooding due to the release of water upstream by China.

Bangladesh is the Brahmaputra state that will be more prejudicated by the damming consequences. Dams have been identified as a major factor in the 84% decline in freshwater species since 1970 (International Rivers, 2021). Bangladeshi officials have expressed concerns that they may encounter excessive water flow when it is not needed and insufficient water flow during the dry season when it is most critical. As well as India, Bangladesh also sees that the dam construction, whether Chinese or Indian, will block fish migration and the flow of sediments necessary to enrich the soil during floods

4.3.2. Mekong Basin.

The World Bank reports that Chinese dams have significantly reduced sediments (by 50-55%) in the Mekong Delta. Most sediment now comes from tributaries downstream of China, but dams in Cambodia, Laos, and Vietnam also trap sediments (World Bank, 2015; Ogden, 2022). Yunnan's hydropower dams negatively impact migratory fish in China's lower Lancang River, preventing their upstream migration.

In Thailand, many civil society organizations and residents began opposing Laos' plans due to the impacts on fish migration and sediment flow downstream, as well as the government buying a significant portion of electricity from Laos. Laos' Xayaburi and Don Sahong dams further block hundreds of migratory species in the Lower Mekong (Kang et al., 2009; Asia International Rivers Center, 2010; Ogden, 2022). The fish resources below Vientiane are larger than those above, so dams downstream have a more significant adverse effect on Mekong fisheries than China's Lancang dams (Barlow et al., 2008; Kang et al., 2009; Ogden, 2022). Chinese ichthyologists highlight that flow changes from China's dams are the greatest threat to the Lancang's fish species, causing habitat fragmentation and degradation. They also point to pollution from mineral exploitation

and urbanization as major threats to fisheries (Kang et al., 2009; Asia International Rivers Center, 2010; Ogden, 2022).

The Lower Sesan II dam in Cambodia has forced thousands of people to move from their homes to new villages built by the government. The compensation they receive does not compare to their previous situation, where their houses were of better quality, their jobs were nearby, the lands were suitable for farming or livestock, and they maintained their way of life (Bompan, 2017). Now, these people must adapt to a new life, poorer and far from all the benefits provided by the Mekong tributary. Additionally, their jobs in the fields or fisheries are several kilometers from their new homes, making it necessary for them to stay away for several days a week and sleep in huts (Bompan, 2017).

The Mekong's biodiversity is very important, not only for subsistence but also for maintaining the ecosystem's balance and its species. This river is home to the famous Irrawaddy dolphins, located between Laos and Cambodia (also in Myanmar and Indonesian Borneo), which are in danger of disappearing. According to the World Wildlife Fund, it is estimated that only 92 specimens exist in the Mekong. Their main threat is the Laotian Don Sahong dam, which prevents them from accessing upstream and gradually limits their food supply as fish stocks decline, along with the machinery network. This is why they have taken refuge in a pool a few meters from the dam, where they know they cannot be harmed. Additionally, the dolphins are a significant source of sustainable tourism income for many families in the area.

Moreover, the construction of more dams with Chinese financing is accelerating climate change patterns, as evidenced by Cambodia's Tonle Sap Lake. During the wet seasons of 2019 and 2020, the lower Mekong flows reduced the return flows and the area of the lake that seasonally floods (which quintupled in size during the dry season, becoming the largest lake in Southeast Asia), on which a large part of the Cambodian population

depends (MRC, 2021). According to the June 2021 MRC report, this led to adverse impacts on agricultural production, ecological balance, reduced mobilization of nutrient-rich sediments, and decreased domestic fish catches in the Tonle Sap area.

In 2019, the combination of climate change, El Niño[13], and dams in the Mekong River and its tributaries caused the lake to reverse in August instead of June, taking only six weeks instead of the usual 5-6 months. The result was shallow, warm water with little oxygen for fish survival. Due to this event, the Cambodian government, under pressure from environmental groups and civil society, decided on a ten-year moratorium on new dam projects to protect downstream basin areas (Kasztelan, 2021). The halted hydroelectric dams are Sambor and Stung Treng, on the Mekong's main course. The first corresponds to a Chinese conglomerate, China Southern Power Grid Co., and the second to Vietnam. However, the fishing problems in Tonle Sap originate upstream with the dams in China's territory and their water management (storage and release).

The drought that occurred in 2019 during the rainy season devastated the livelihoods of farmers and fishermen in the communities living along the lower Mekong, i.e., Laos, Thailand, Cambodia, and Vietnam. Initially, it was suspected that it could be due to the mentioned climate combination and low rainfall. However, in April 2020, the affected states learned the real cause thanks to a US research company that provided satellite images showing that the upper Mekong dams (in China) were holding large amounts of water when the others were facing critical water shortages (Johnson, 2020). China had maintained the narrative that it also had low rainfall levels while being perfectly supplied with higher-than-normal levels (Hiebert, 2021). Of course, it denied the satellite evidence

[13] Climatic phenomenon, one of the most important on the planet, occurring cyclically and irregularly, which modifies climate patterns, weather, temperature, wind flows, etc. It has a greater impact in areas of South America (especially Peru and Ecuador), Southeast Asia (particularly Indonesia), and Australia (mainly the north). (National Geographic Society, 2023).

and did little about it, as there was another drought in 2020 (Hiebert, 2021). This situation posed an unprecedented threat to downstream populations.

Finally, Vietnam, as the last downstream state, suffers the most from the consequences of China and its closest neighbors, Laos and Cambodia. The Mekong Delta, located in the south of the country, contains some of the world's richest agricultural areas, producing enormous amounts of rice (the area is known as the "rice bowl of Asia" (World Bank, 2024)), making Vietnam one of the largest exporters; it contains sediments from the Himalayan mountains and more than 20 million people. However, the delta is barely above sea level, making it very vulnerable to saltwater incursions and climate change. Given the region's vulnerability, the dams built upstream by China, Laos, and Cambodia block the flow of water, sediments, and fish movement. It is estimated that beyond 2020, the silt reaching the delta in Vietnam will be about one-third below 2007 levels (MRC, n.d.), which is very concerning.

Conclusions

Water is a strategic natural resource, especially in a transboundary river basin, and one that often causes tensions. In this case, China is a dominant power, as an upstream state, over the headwaters of the Brahmaputra and Mekong, which it considers paramount to human and regime security. It is, therefore, that it considers water as an element of national security and defense, since the Chinese authoritarian system links them. Therefore, we come to the following conclusion and verification of the hypothesis put forward in Chapter I: on the basis that Chinese water securitization leads to more conflictive relations in the Brahmaputra basin, and more cooperative relations in the Mekong basin, it can be said that China, through securitization processes, takes advantage as a power upstream to control its flow, creating somewhat uncertain neighborly relations, since, when it comes to water, distrust is present at all times.

For its part, this control does affect the economic and developmental level of downstream riparian states, both for better and for worse. However, it cannot be confirmed that China makes control of freshwater reservoirs from the Himalayas a *central element* of its strategy to position itself as a regional and international power. Water resources are a key part of its strategy, but not central. In recent years, China has made progress in cooperating in sharing hydrological data with the other basin states. It has also funded many of the infrastructure projects, as well as those that are moderately water-related under the BRI. The case of the Mekong best demonstrates this by looking at the amount of information available or the Chinese willingness to engage, especially at the multilateral level. In the case of the Brahmaputra, given the territorial disputes, there is tension all the time, which shows that water is more than a backdrop on which to rely narratively. Therefore, the hypothesis put forward at the beginning of the research is only half fulfilled.

In 1993, Miriam Lowi stated that the chances of cooperation in transboundary waters are low, as upstream countries have little to gain from cooperation (Lowi, 1993). Thus, we reach the following conclusion: the realist authors are right. That is, they argue for cooperation as long as states can maximize their power, otherwise the chances of triggering conflictual relations will be very high, as in the case of the PRC, which sees an increase in its power position, and consequently, its national security is rewarded. Neoliberal scholars employed the repeated prisoner's dilemma to demonstrate that lack of information coupled with informational asymmetries leads to non-cooperative outcomes, which is reflected in the swings in Sino-Indian relations. The realist theory is confirmed, China maximizes its regional power, so it cooperates, especially in the Mekong Basin and to a lesser extent in the Brahmaputra Basin.

Bringing back Fischhendler, China excels especially in institutional and linguistic water securitization mechanisms. The institutional ones are exemplified by the early plans to divert the channel of the Brahmaputra in the 1980s, which were supported by the Chinese military establishment, as well as which was supported by the Chinese People's Political Consultative Conference (Holslag, 2011; Vivekanandan, 2024); as well as China's 2006 National Defense White Paper stated that the SNWDP would be one of twenty-one infrastructure projects undertaken by the People's Armed Police (Holslag, 2011; Vivekanandan, 2024). In fact, Chinese law states that data on transboundary rivers are “state secret”, at least since 1960. Therefore, the fact that China has an exclusive ministry for water hints at the importance of its treatment in the government. India also has a ministry of water resources.

For their part, linguistic mechanisms take as an example when China's Vice Premier in 1998, Wen Jiabao, commented that the country's water crisis threatened the “survival of the Chinese nation” (Holslag, 2011; Vivekanandan, 2024). Like the use of headlines such

as “water wars,” these are linguistic acts intended to draw the attention of a particular audience with the goal of creating or urging the need for the state to appropriate this resource.

In contrast, India also employs securitization. It is afraid of losing water, of it becoming an instrument of submission and blackmail, as well as of diminishing its power and territorial control at the national and regional levels. A clear example of linguistic securitization is Brahma Chellaney, who describes the Chinese manipulation of transboundary water as a “political weapon” (Chellaney, 2009). Likewise, the “Brahma hypothesis”, whose author Jyoti Deka (Indian geologist) exposes the rising tensions due to *China's unilateral actions to appropriate these waters* and the general sense of insecurity this would create in Northeast India.

Historically speaking, China's relations with the two basin states are completely different. On the one hand, Sino-Indian territorial disputes are a burden that persists to this day and thus poison their relations. On the other hand, the Mekong states do not have any conflict (land territorial - not counting the case of the South China Sea dispute) that they carry over from the past or that prevent them from having cordial or friendly relations with China. This is why China enjoys a superior position over the Mekong countries, not as an upstream state, but as a power in the international arena. That is why Beijing has established a mechanism of understanding with all of them, especially when they see the opportunity to develop faster, especially in hydropower infrastructure.

For its part, China's interest in this region of Indochina is more than evident because of its capacity to generate electricity in a more sustainable way, as well as to invest in other energy sectors, and thus connect these countries with their border provinces for export and import. However, a Chinese double standard can be identified in this case: financing projects for the development of the countries concerned and financing in exchange for

support on certain political issues in international and regional organizations, as well as almost complete freedom in the development of their upstream projects. The latter is simpler because of the similarity of the Laotian and Cambodian government regimes to Beijing's, as well as the fact that they are developing countries that really need a push from countries with capital.

The latter could be in line with Luttwak's idea, which stresses the role of national ideologies and policies in determining the adoption of geo-economic behaviors. Thus, PRC finances and invests in hydropower projects, especially in Laos and Cambodia, and becomes its main economic partner. However, Beijing presents itself as a fierce creditor that takes advantage of the situation where they cannot pay their debts to expand BRI. However, one could argue that the debt trap is a myth, as China did not cause the above domestic problems, although it did aggravate them afterwards. Just as there are also middle-income countries indebted to China.

It should be noted that, although hydropower production is a form of renewable energy, and an alternative to coal (as announced by China to reach peak CO2 emissions by 2030 and achieve carbon neutrality by 2060), the consequences for the ecosystem and dependent population, especially in seismically active areas, are and will be devastating. Thus, both basins will be affected and their environmental, civil and food security will be reduced. In this line, respect for the beliefs of the most marginalized populations or ethnic communities are displaced in exchange for minimal compensation for what they have left behind, and without considering their places of worship or sacred reserves.

It is essential to note that all downstream riparian states have something in common, and that is that they are clear that the consequences of a problem with China could be catastrophic through the use of water as a “weapon” and that they will affect all spheres of the system: ecological, social, political and economic. Among them we can glimpse a

cut in the exchange of data for the prevention of floods and droughts or the creation of these artificially. Water becomes an instrument of blackmail and/or manipulation, which together with Chinese secrecy generates uncertainty and/or distrust on the part of downstream states. The problem arises from the poor institutionalization to manage these rivers. On the Brahmaputra it is non-existent, despite the prayers of Bangladesh as the state that suffers most from the consequences; and the Mekong, with a body, the MRC, that does not have sufficient capacity to enforce the recommendations and policies by law to its member countries.

In short, the river networks are an excuse of geopolitical background and power of domination in the Sino-Indian détente. China is positioning itself as a regional hegemon; river control benefits it not only in achieving its objectives at the domestic level, but also at the regional level.

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