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HYDRO-DIPLOMACY AS A STRATEGIC LEVER: COMPARATIVE INSIGHTS FROM INDIA AND CHINA IN REGIONAL COOPERATION AND GLOBAL WATER GOVERNANCE

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Abstract

Hydro-diplomacy has become a strategic tool for rising powers to balance regional cooperation and have an impact on global water governance. This paper compares India and China to see how they can use their shared water resources to improve their global standing and strengthen their regional alliances. India and China both have several concerns to deal with when it comes to the Brahmaputra River Basin, which is very important for stability and growth in the region. India uses hydro-diplomacy to build cooperative structures in South Asia, with a focus on fair water sharing and ways to settle disputes. On the other hand, China uses its position as an upstream riparian state to influence regional policies, often making its water strategies fit with its larger geopolitical goals. The use of the water events intensity scale and long-term water conflict forecast helps us better understand hydro-diplomacy as an important part of the foreign policy of rising powers. It also gives us ideas about how it could change regional dynamics and the way the world is governed.

Keywords

Multi-Track Hydro-Diplomacy, Transboundary Water Management, Regional Cooperation, Water Governance, Geo-politics.

Resumo

A hidrodiplomacia tornou-se uma ferramenta estratégica para as potências emergentes equilibrarem a cooperação regional e exercerem influência na governança global da água. Este artigo compara a Índia e a China para compreender como podem usar os seus recursos hídricos compartilhados, melhorar a sua posição global e fortalecer as suas alianças regionais. A Índia e a China têm várias preocupações quando se trata da bacia do rio Brahmaputra, que é muito importante para a estabilidade e o crescimento da região. A Índia utiliza a hidrodiplomacia para construir estruturas cooperativas no sul da Ásia com foco na partilha justa da água e meio de resolução de conflitos. Por outro lado, a China utiliza a sua posição como Estado ribeirinho a montante para influenciar as políticas regionais, muitas vezes fazendo com que as suas estratégias hídricas se coadunem com os seus objetivos geopolíticos mais amplos. O uso da escala de intensidade de eventos hídricos e da previsão de conflitos hídricos de longo prazo ajuda-nos a compreender melhor a hidrodiplomacia como uma parte importante da política externa das potências emergentes. Também oferece ideias sobre como poderia mudar a dinâmica regional e a forma como o mundo é governado.

Palavras-chave

Hidrodiplomacia Multifacetada, Gestão Transfronteiriça da Água, Cooperação Regional, Governança da Água, Geopolítica.

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HYDRO-DIPLOMACY AS A STRATEGIC LEVER: COMPARATIVE INSIGHTS FROM INDIA AND CHINA IN REGIONAL COOPERATION AND GLOBAL WATER GOVERNANCE

PINTU KUMAR MAHLA

Introduction

The cooperation over transboundary hydro resources prevails in most instances. There has been a minor increase in water conflicts since 2000. These conflicts that do occur are of limited intensity and hardly ever involve violence (Transboundary Freshwater Diplomacy Database Project, n.d.). However, they are often related to their uneven distribution, upstream-downstream dynamics, competition, and securitisation. This context can lead to disagreements and conflicts while negatively impacting sustainable water resources management and the relations, peace and stability of any region.

Water conflicts invite several upstream and downstream nations to come together for cooperation. However, some countries do not find cooperation over hydro resources a suitable step concerning their national interests. China's unilateral actions over the Brahmaputra River basin are a great example among us. While the benefits of cooperation typically outweigh those of unilateral action, there might be various incentives to not engage in cooperation/pursue unilateral or conflictive behaviour. This behaviour can have long-term negative consequences on all riparians involved. Consequently, hydro-diplomacy addresses these conflict risks to prevent or limit negative repercussions and ensure cooperation and peace.

People often call water 'blue gold' because it is so important for life. It is also called a common resource, which means that it is meant for everyone to use and manage. Water is very versatile, which means it can be used in many different ways. But it also has a lot of potential to cause bad things to happen, both at the domestic and global levels. Water has been a source of conflict throughout history, causing fights at the local, regional, and international levels. The Brahmaputra water dispute between India and China is a prime example.

In the world of Himalayan hydro-politics, China and India are both important players. India, as a lower-middle riparian, is more vulnerable to water insecurity because it is more dependent on the Tibetan plateau's headwaters to keep rivers like the Indus, Sutlej, and Brahmaputra flowing. China, with its advantageous hydrological position, holds greater power to determine broader political relationships with its riparian neighbours. The lack of proper institutionalisation exacerbates existing challenges in the basin, which runs across a disputed border between two nuclear-armed countries engaged in tense

border interactions. China's focus on strategic infrastructure dominance is a bugbear for regional and global water governance. It can deteriorate the downstream nations' water scenario.

Both countries, India and China, have a limited 'Track 1' stance within the hydro diplomacy track mechanism. Track 1 is a form of formal inter-state diplomacy conducted by government officials in predefined settings. In the case of India and China, it involves only a few agreements and limited discussions about the Brahmaputra River basin. Neither country trusts the other because there are no effective ways to resolve disputes, prevent their occurrence, or collaborate more closely. This lack of trust hampers cooperation, making the region less stable and affecting the people living there. This study examines the effectiveness of India's collaborative approach versus China's assertive stance in managing transboundary waters through hydro-diplomatic strategies. This approach is generally less visible in the existing research. It also assesses how these approaches will give rise to water tensions in mitigating cross-border water issues. To assess the effectiveness of these approaches, the Basin at Risk Scale (Water Event Intensity Scale) framework has been employed. This framework places this study in another context, which is barely researched in contemporary transboundary water research. The findings deepen understanding of hydro-diplomacy as a key element of the foreign policy of emerging powers, offering insights into its ability to influence regional dynamics and shape global governance.

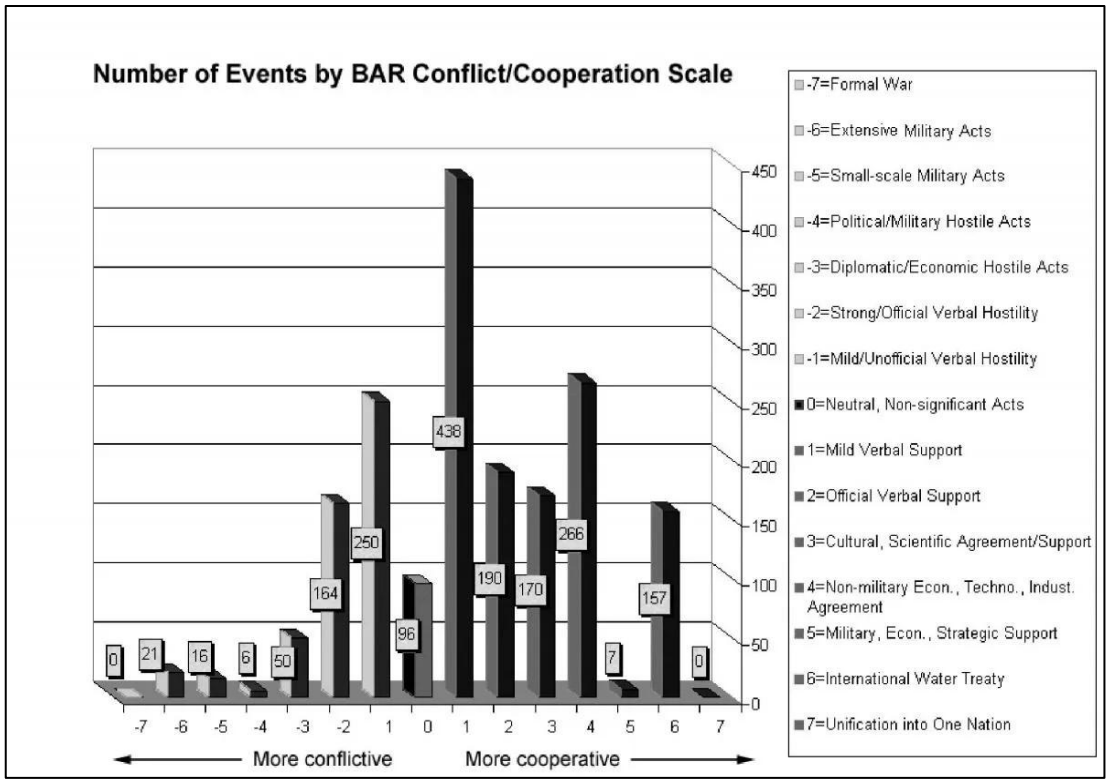
Research Methodology

The study adopts the mixed-method approach, which consists of both qualitative and quantitative methods. The qualitative data relies on secondary data, which consists of rich literature on transboundary river cooperation. The quantitative data accompany the secondary data to examine or give legitimacy to the qualitative data. Quantitative data will be referred from the transboundary freshwater diplomacy database by Oregon State University, the water conflict chronology database by Pacific Institute, global tools by the Water, Peace and Security (WPS) partnership, government reports, policy documents, and international agreements (See the reference section for further exploration of databases). This research examines a comparative analysis of the hydro-diplomacy strategies of India and China on transboundary river basin conflicts and the cooperation framework. The comparative case study will be used to explore the roots of water conflicts, including geopolitical, economic, and environmental factors.

Moreover, this research has also employed the Basin at Risk Scale (Water Event Intensity Scale), a part of The Transboundary Freshwater Diplomacy Database developed by the Oregon State University, to identify historical indicators of international freshwater conflict and cooperation between India and China and, from them, create a framework to identify and evaluate international river basins at potential risk for future freshwater conflict (See Fig.1.). To do that, there are some indicators, population density, Gross Domestic Product (GDP), overall relations, water development projects, treaties or agreements, based on the qualitative judgement of statistical and empirical analyses in Transboundary Freshwater Diplomacy Database (Transboundary Freshwater Diplomacy Database). The purpose of using this scale was to identify these indicators of international

freshwater conflict and cooperation between India and China and, from them, create a framework to identify and evaluate transboundary river basins at potential risk for future freshwater conflict. Through this comprehensive approach, a nuanced understanding of the hydro-diplomacy framework as a critical aspect of emerging powers' foreign policy offers insights into its potential to reshape regional dynamics and influence the global governance landscape.

Fig. 1. Basin at Risk Scale (Water Event Intensity Scale)



Source: The Transboundary Freshwater Diplomacy Database, Oregon State University, USA

Theoretical Framework of Hydro-Diplomacy

Hydro-diplomacy is the process of discussing and resolving political issues that arise when countries have disagreements over water resources that cross borders. It involves establishing collaborative water governance frameworks using foreign policy tools integrated within bilateral and multilateral relations, which operate at various levels and through different channels. It also involves several diplomatic tracks to enhance transboundary river cooperation. These tracks highlight the diverse approaches used to manage and resolve conflicts. Track I diplomacy refers to formal, government-led negotiations that occur in official, pre-established settings, often representing the primary channel for state-to-state interactions. In contrast, Track II diplomacy involves informal and unofficial dialogues where state representatives or other adversarial groups engage in discussions without the constraints of formal negotiations, fostering open

communication and mutual understanding. Track I and a Half diplomacy bridges the gap between Tracks I and II, offering a semi-official platform where government officials interact with non-state actors such as scientists, non-governmental organisations (NGOs), or mediators, often facilitated by a third party. This track is particularly effective in generating innovative solutions and building trust. Lastly, Track III diplomacy is characterised by citizen-led initiatives and grassroots efforts, where NGOs, civil society organisations, and individuals engage in cross-border dialogues to promote peace, understanding, and collaboration. The synergy among these tracks, i.e., multi-track hydro-diplomacy, is very necessary to support the overall diplomatic process. It provides several platforms for conflict resolution and cooperative engagements.

While formulating robust hydro-diplomacy, it is worth adopting several hydro-diplomacy tools and approaches such as dispute prevention, dispute resolution, reconciliation of interests, agreements, negotiation and an enlarging basket of benefits. Besides these approaches, the geopolitical significance of water invites the first and foremost consideration of the policy framework. Most scholars have traditionally understood geopolitics within the context of territorial disputes. Imperialist geopolitics is linked to scholars like Alfred Mahan, Friedrich Ratzel, Halford Mackinder, Karl Haushofer, and Nicholas Spykman, who stressed the importance of controlling land and sea power strategically. During the Cold War, scholars like George Kennan and leaders from both the West and the Soviet Union used the language of containment, First/Second/Third World hierarchies, and the binary of Western vs. Eastern blocs to shape geopolitics. During this time, there was competition between ideas and strategic alignment. After the Cold War ended, a new kind of geopolitics called the New World Order began. It was led by scholars like Mikhail Gorbachev, Francis Fukuyama, Edward Luttwak, George Bush, and groups like the World Trade Organisation (WTO) and the North Atlantic Treaty Organisation (NATO). Some of the most important ideas were new ways of thinking about politics, the end of history, neo-liberalism, rogue states, and Huntington's Clash of Civilisations. Finally, Environmental Geopolitics puts global ecological issues at the centre of its work, with contributions from Al Gore, Robert Kaplan, Thomas Homer-Dixon, and Michael Renner. The lexicon has begun to conceptualise geopolitics within an environmental framework. Gore has been particularly active in advocating for environmental initiatives, while Homer-Dixon and Renner have focused on the concept of environmental scarcity (See Table 1). This highlights the fact that environmental issues, especially water issues, can play a central role in geopolitics. In this context, there is a direct correlation between hydro-political and geopolitical conflicts, as excessive water resource consumption leads to scarcity and impacts the environment, ultimately giving rise to geopolitical tensions. By conceptualising water as both an environmental and developmental resource, as well as a strategic and security asset, the geopolitical lens shows how countries use water as a tool for diplomacy, coercion, or leverage, and how water conflicts can either cause bigger problems or bring people together. Geopolitics deals with hydro-politics by looking at water as a way to get power, a security issue, and a way to talk to other countries. It sees the risks (ecological crisis) and chances (cooperation, treaties, shared infrastructure) that come from having water resources that everyone can use.

Table 1. The Discourse on Geopolitics

Discourse	Key Intellectuals	Dominant Lexicon
Imperialist geopolitics	Alfred Mahan Friedrich Ratzel Halford Mackinder Karl Haushofer Nicholas Spykman	Seapower Lebensraum Landpower/Heartland Landpower/Heartland Rimlands
Cold War geopolitics	George Kennan Soviet and Western political and military leaders	Containment First/Second/Third World countries as satellites and dominoes Western vs. Eastern bloc
New world order geopolitics	Mikhail Gorbachev Francis Fukuyama Edward Luttwak George Bush Leaders of G7, IMF, WTO Strategic planners in the Pentagon and NATO Samuel Huntington	New Political Thinking The end of history Statist geo- economics US-led new world order, Transnational liberalism/Neo-liberalism Rogue states, nuclear outlaws and terrorists Clash of Civilisations
Environmental geopolitics	World Commission on Environment and Development Al Gore Robert Kaplan Thomas Homer-Dixon Michael Renner	Sustainable development Strategic environmental initiative Coming Anarchy Environmental scarcity Environmental scarcity

Source: O'Tuathail (1998)

Water is an environmental resource that has gained significant geopolitical importance due to its scarcity and commonality across international borders. It can be inferred from the words of Lao-Tsu, a 6th-century Chinese philosopher and founder of Taoism, that "in the world, there is nothing more submissive and weaker than water. Yet for attacking that which is hard and strong, nothing can surpass it" (Sinha, 2005).

Disputes regarding water resources have evolved into a progressively challenging issue to address, especially in a multipolar world where water is regarded as a source of economic and political influence. The inequitable allocation of water resources, in conjunction with population growth and development, may result in water scarcity, potentially inciting violent conflict (Burgess et al., 2016). To deal with and settle these water disputes, there have been many bilateral and multilateral efforts, such as dialogues, treaties, and joint commissions.

In South Asia, groups like the South Asian Association for Regional Cooperation (SAARC) and the Indus Basin Initiative have given people a place to talk and work together on water issues. These groups have made it easier for South Asian countries to work together. The Asian Development Bank (ADB) is also actively engaged in enhancing water security and resilience in the Himalayan region through its support for inclusive, resilient,

sustainable, and well-governed service delivery and resource management. ADB extends its assistance to its developing member countries in attaining water-related Sustainable Development Goals, which encompass climate change resilience, access to fundamental water and sanitation services, heightened food security, rural revitalisation, gender equality, improved health, and a healthier environment (Asian Development Bank, N.d.). Moreover, the Himalayan University Consortium (HUC) Thematic Working Group on Water (Water Group), a thematic working group within the HUC, serves as an illustrative instance of a regional initiative endeavouring to foster enhanced collaboration and cooperation between research institutes and practice-based organisations (Himalayan University Consortium, N.d.). The primary objective of this initiative is to promote evidence-informed water resources management within the Himalayan region.

However, no transboundary water cooperation institution has materialised thus far. In October 2020, representatives from all eight countries within the Hindu Kush Himalayan (HKH) region signed a declaration during the Ministerial Mountain Summit (Sprouse, 2022). The declaration called for increased deliberation on emerging issues in the HKH, a unified regional representation in global forums, the establishment of a science-policy forum concentrating on mountain environments, and the formation of a Task Force to evaluate the feasibility of establishing a regional institutional mechanism. The impetus behind the summit arose from a 2019 evaluation that projected a complete collapse in water availability to downstream regions of the Tibetan Plateau by the end of this century under a 'business as usual' scenario (Ibid.). Moreover, Glaciers in the HKH region are vanishing rapidly, "with a 65% increase in the melting rate from 2011 to 2020 compared to the previous decade. Their melt rate surpasses the global average, with the eastern HKH experiencing the most substantial losses. Projections suggest that if global temperatures rise by 1.5–2°C, the region's glacier volume could decline by 30–50% by 2100. In scenarios where warming exceeds 2°C, glacier volume may decrease to 20–45% of its 2020 level" (UNESCO, 2025). With escalating atmospheric temperatures causing the ongoing melting of glaciers and other frozen water sources across the HKH, which directly sustain the lives of nearly two billion individuals, the window of opportunity for creating an effective water resource management system in South Asia is rapidly closing.

South Asia, especially the Himalayan region, is known around the world for having a lot of resources and is home to more than a million people. Most people in the area live in rural areas and get most of their food from farming and small-scale subsistence farming. The Himalayan region is one of the most vulnerable places to climate change because of several factors, including a growing population, the depletion of natural resources, and climate change caused by humans. The rise in temperatures and the growing carbon footprints are two clear signs of climate change in this area. Both of these things are good signs of how the climate is changing in the Himalayan region. It is easy to see how climate change is affecting the region's water resources around the world. This phenomenon has had a significant negative impact on the region's main river basins, especially the Indus and Brahmaputra basins.

The region, South Asia, is known for its water-related disputes. For example, the 1960 Indus Waters Treaty between India and Pakistan. In addition to the competition over the Indus Basin, China's strategic hydrological involvement in South Asian hydro-politics

regarding the Brahmaputra is also concerning. In this context, the hydro-politics of South Asia calls for an examination of the hydro-diplomacy strategies employed by both India and China.

India's Approach to Hydro-Diplomacy

India's hydro-political interests in South Asia have undergone significant changes and become increasingly complex over the years. India's water management plans, hydroelectric power generation, and efforts to collaborate in the region are all significantly influenced by the Himalayas, which have extensive large river systems. The Indus River Basin, the Brahmaputra River Basin, and the Ganges River are all important sources of water for India's agriculture, industry, and homes. India has made building dams and reservoirs a top priority so that it can control the flow of water, provide irrigation, and generate hydroelectric power. India is trying to use its water resources for sustainable growth through projects like the Kisenganga hydroelectric dam on the Jhelum River, the Nathpa Jhakri Dam on the Sutlej River, and the proposed Dibang Multipurpose Project on the Brahmaputra River (NHPC, N.d).

However, India's hydro-diplomacy in South Asia faces challenges. The transboundary water disputes are a major concern, especially with China and Pakistan. To address these issues, India manages its transboundary waters through the IWT and Expert-level Mechanism (ELM) in the case of China (Department of Water Resources, River Development and Ganga Rejuvenation, n.d.). India's hydro-political growth in the region has also raised awareness of environmental issues and the impact of large infrastructure projects on river ecosystems. Building dams and reservoirs alters river flow, damages aquatic biodiversity, and disrupts downstream ecosystems (He et al., 2024). Hydropower development also involves problems such as sedimentation, water pollution, and displacement of people (Liu et al., 2013). India recognises the need to balance energy requirements with environmental sustainability to tackle these challenges. It has taken measures to reduce the negative effects of dams through environmental impact assessments, the construction of fish migration systems, and afforestation.

Table 2. The Case of Hydro-diplomacy over the Indus Basin and Brahmaputra Basin

Aspect & Approaches	**Indus River Basin**	**Brahmaputra River Basin**
Riparian Countries	India, Pakistan	India, China, Bangladesh, Bhutan
Main Agreement	Indus Waters Treaty (1960)	No formal treaty; bilateral agreements with China
Mediator	World Bank	No third-party mediation
Water Sharing	India controls 3 eastern rivers (Sutlej, Beas, Ravi); Pakistan controls 3 western rivers (Indus, Jhelum, Chenab)	No comprehensive water-sharing agreement, but data-sharing mechanisms exist.

Conflict Management	Permanent Indus Commission (PIC) and Neutral Expert for dispute resolution	Periodic bilateral talks and technical exchanges
Infrastructure Projects	India constructs hydro projects within treaty guidelines	China's dam constructions on the upper Brahmaputra raise concerns in India
Legal Framework	Legally binding treaty with robust dispute resolution mechanisms	Bilateral agreements and diplomatic engagement, like the Expert-Level Mechanism, but no enforceable treaty
Recent Developments	Periodic disputes over Indian dam projects (e.g., Kishanganga, Ratle)	Concerns over China's proposed dams on the Yarlung Tsangpo (upper Brahmaputra)
Diplomatic Leverage	The treaty provides a limited scope for renegotiation, maintaining stability.	India relies on diplomatic channels and regional influence.
Environmental Concerns	Focuses on water allocation, with limited environmental considerations	Growing concerns over the ecological impact of Chinese projects
Future Outlook	Pressure to renegotiate due to changing hydrological patterns	Need for comprehensive multilateral dialogue on water management

Source: The Table prepared by the Author

Moreover, India and China's hydro-diplomatic approach to the Indus and Brahmaputra River basins reflects their strategic and geopolitical concerns, respectively (See Table 2). Even though there are political tensions, the IWT has mostly held up. India has followed treaty rules and used its legitimate water share. On the other hand, the Brahmaputra River Basin does not have a full-fledged treaty. India's hydro-diplomatic efforts in the Brahmaputra basin depend on bilateral talks and cooperation in the region because of the lack of a binding legal framework. The Brahmaputra basin needs more multilateral cooperation to deal with new problems. Environmental issues and climate change make both river basins even more difficult to deal with.

Consequently, India's hydro-diplomacy in the area is a complex and changing situation. To deal with the problems and opportunities that the Himalayan rivers bring, as well as to make sure that everyone has equitable use of water and to build good relationships with neighbouring countries in the name of shared prosperity, regional cooperation, and sustainable development, will continue to be very important.

China's Approach to Hydro-Diplomacy

China's interest in the Himalayan region (especially the Tibet Autonomous Region) stems from several factors. First and foremost, the Tibetan Plateau, commonly referred to as the 'Third Pole,' harbours a significant amount of freshwater. Numerous major rivers in Asia, such as the Yangtze, Indus, Brahmaputra, and Sutlej, originate from this plateau. It is estimated that "Tibet contributes approximately 627 Cubic kilometres of hydrological

flows annually, accounting for approximately 6 per cent of Asia's total runoff. The availability of freshwater in Tibet is approximately 104,500 Cubic meters per year, positioning Tibet as the world's fourth-largest reservoir of freshwater after Iceland, New Zealand, and Canada, which makes it the water tower of Asia" (Sinha, 2016). The watersheds of these rivers, which have their sources in Tibet, play a crucial role in providing water resources to South Asia. It plays a crucial role in sustaining the livelihoods of millions of people downstream. Recognising the economic and geopolitical advantages of controlling water resources, China has pursued hydropower projects in the region to meet its growing energy demands and enhance its national security.

In China, water resources are characterised by seasonal and regional imbalances, with floods common in summer and droughts in winter. The South experiences water abundance, while the North faces shortages. This uneven distribution leads to frequent flooding and drought disasters. It has been noted that "despite hosting 46% of the national population, 63% of the arable land, and generating 39% of the GDP, North China has only 18% of the country's water resources and 40% of the national per capita water availability" (Ministry of Water Resources China, 2023). This disparity between resource availability and demand has long posed challenges to sustainable development and regional stability. Moreover, China's limited water resources are further underscored by its "per capita water availability of 2,000 m³, merely 35% of the global average" (Ministry of Water Resources China, 2023). Regions such as the Yellow River basin, the Hai River basin, and Northwest China face particularly acute water scarcity (Ministry of Water Resources China, 2023). With economic growth and social progress driving increased water demands, the country's modernisation efforts are confronted with significant water resource constraints.

To address these challenges, China has pursued large-scale hydropower and water management projects, reflecting its hydro-political strategy (Ministry of Water Resources, China, n.d.). Significant investments have been made in constructing massive dams, including the Three Gorges Dam and the South-to-North Water Diversion Project, as well as several projects on the Brahmaputra River (International Commission on Large Dams, n.d.). These initiatives aim to balance water distribution across regions through extensive inter-basin and cross-regional water transfers. Currently, there are "129 major water diversion projects operational, effectively redistributing water to align with population centres and economic zones. The South-to-North Water Diversion Project stands as a prime example of this effort (See Fig.2). Its first phase on the Eastern and Middle routes has transferred 65.4 billion m³ of water, benefitting 176 million people. Between 2012 and 2022, China's total water supply capacity increased from 700 billion m³ to nearly 900 billion m³" (Ministry of Water Resources China, 2023).

Fig. 2. Roadmap of the South-To-North Water Diversion Project

Source: Ministry of Water Resources, China (2019, March 20)

Furthermore, rural water supply projects have provided "870 million rural residents with access to clean water, achieving 87% tap water coverage in rural areas" (Ibid.). These water management efforts grant China greater control over water flow, enhancing its influence over downstream regions. By regulating river systems, China strengthens its hydro-political presence in the region, impacting neighbouring riparian states like India. This combination of domestic water management and strategic resource control underscores the critical role of water in China's long-term economic and geopolitical objectives.

In addition, China's hydro-political development in the region is closely tied to its involvement in regional infrastructure initiatives. The Belt and Road Initiative (BRI) encompasses numerous hydropower and water infrastructure projects, including the China-Pakistan Economic Corridor (CPEC), which involves the construction of hydropower plants in the Indus River Basin. These efforts enhance China's economic presence and influence in the region.

President Xi Jinping has emphasised the importance of prioritising water conservation, advocating for a comprehensive approach that includes raising awareness, implementing conservation measures, and promoting water-efficient practices across agriculture, industry, and urban areas. In line with this vision, China has pursued a national water-saving strategy, enforced the National Action Plan for Water Conservation and improved policies and systems to encourage responsible water use. As a result, from 2013 to 2022, "the country's GDP expanded by 69.7%, while its total water consumption remained stable at around 610 billion cubic meters. Water use per 10,000 yuan of GDP and industrial-added value decreased by 42.8% and 58.2%, respectively. Additionally, the effective irrigation water use coefficient rose from 0.523 to 0.572" (Ministry of Water

Resources China, 2023). These efforts have transformed China's water management from an inefficient model to one that is intensive and efficient. It is worth to note here "despite possessing only 6% of the world's freshwater resources, China provides water for nearly 20% of the global population and contributes over 18% to the world's economy" (Ministry of Water Resources China, 2023). To enhance water governance, the Chinese government has introduced comprehensive plans like the Program of Action for the Construction of the National Water Network and the 14th Five-Year Plan for Safeguarding Water Security. Digital technologies are also being integrated into water management, with developments in digital twin basins, water networks, and projects. Advanced monitoring systems using meteorological satellites, rain-measuring radars, and hydrological stations further bolster China's water management capabilities (Ibid.).

Recognising the global challenges posed by water security, including water hazards, resource scarcity, ecological degradation, and pollution, China is advocating for international collaboration. This vision aims to support the achievement of the water-related goals outlined in the United Nations 2030 Agenda for Sustainable Development (Ministry of Water Resources China, 2023).

Comparative Analysis: India vs China in Hydro-Diplomacy

In the case of China and India, water plays a significant role as a catalyst for territorial disputes, as abundant water resources within a contested territory often escalate tensions between the nations involved in the dispute. India's border dispute with China is a hydro-political. These disputes also include the concern of Tibet. Although China has full political control over Tibet, the headwaters of the region are transboundary. The competition over hydro resources leads to issues that can never be settled because Water relations cannot be permanent because stream flows are not constant. As argued by Uttam Sinha, "Political relations can easily be impacted by changes in the quantitative and qualitative nature of the river. Varied interpretations of the use of river water have resulted in claims and counter-claims" (Sinha, 2014). The hydro relations between India and China are currently in a nascent stage, presenting a wider opportunity for establishing cooperation and fostering the exchange of hydro resources at the scientific and societal levels. The history of water treaties, agreements, and institutions between the two nations spans a considerable period. In the case of the Brahmaputra River, there is no formal treaty per se, but concerning sharing and utilisation, both countries are committed to exchanging information for flood control purposes, data sharing, and transmission through the Expert-Level Mechanism (ELM).

Regarding the Indo-China River basins, an expert-level mechanism, consisting of representatives from both sides, was established in 2006 to discuss cooperation on various matters such as the provision of hydrological data during the flood season, emergency management, and other pertinent issues on an annual basis. The inaugural meeting took place in 2007. In terms of sharing and utilisation, both countries have agreed to exchange data for flood control, emergency management, and other related concerns.

However, comprehensive assessments regarding the extent of cooperation are still pending. Given their hydrological position and dependence on the Himalayan streams, China and India are important players in the hydro-politics of the region. It is clearly evident that "the leadership in both countries has, from time to time, acknowledged the water problem as an existential threat. Back in 1998, Deputy Prime Minister Wen Jiabao expressed concern that the 'very survival of the Chinese nation' is threatened by the looming water shortage. In his first Independence Day address in 2004, Prime Minister Manmohan Singh highlighted the issue of water and raised it as one of the '*Saat Sutras'* (seven sectors) needing attention" (Sinha, 2016).

Consequently, China, as a complete Upper-riparian, is an important player in the hydro-politics of South Asia. However, India, a significant participant in the realm of hydro-politics, assumes the role of a lower riparian in the case of the Brahmaputra basin. India's position as a lower riparian increases its reliance on the upstream sources of rivers, including the Brahmaputra, which originates from the Tibetan plateau (See Fig.). This dependency amplifies India's water insecurity, as its access to water resources is directly linked to the origins of these rivers. On the other hand, China's insecurity stems from the uneven distribution of hydro resources within its territory rather than external dependencies. Consequently, "China's hydrological position gives it a higher advantage in dealing with larger political equations with its riparian neighbours. India, on the other hand, given its middle riparian position and its longstanding commitment to bilateral river treaties, has to assiduously balance the anxiety and concerns of its lower riparians without compromising its water requirements" (Sinha, 2016). Several key concerns, including dam construction, flood control, joint management, and water quantity issues, emphasise the need for cooperation. The Basin at Risk Scale indicates an increasing conflict intensity, forecasting an emerging long-term conflict in the Brahmaputra basin.

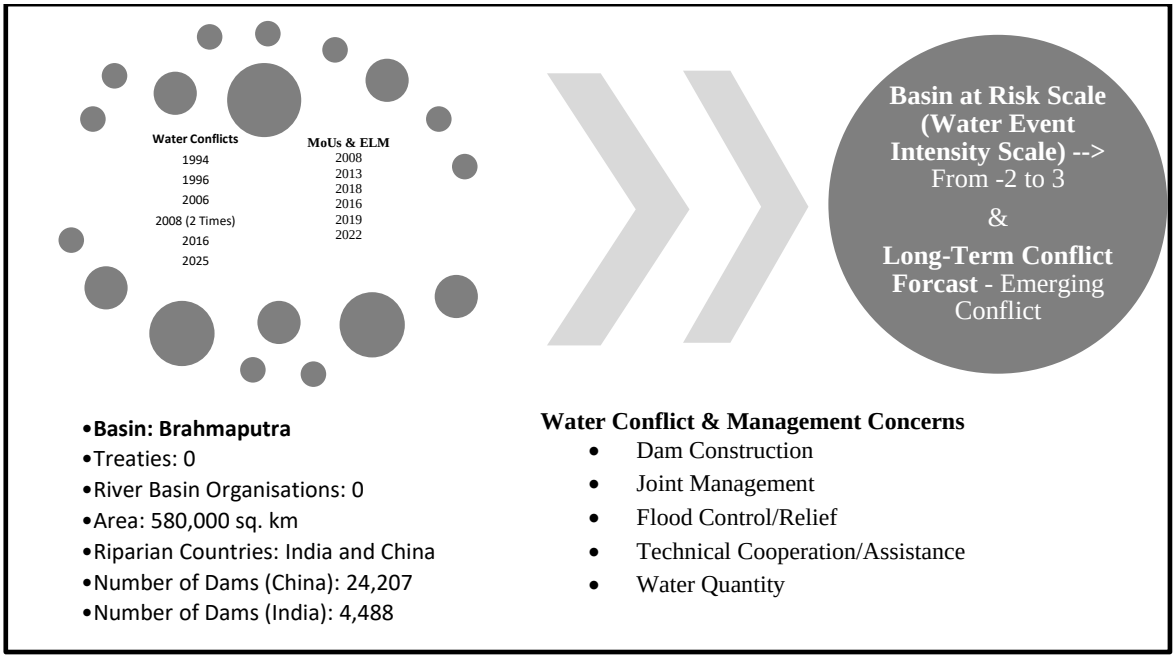
Based on the Basin at Risk Scale, certain indicators (see methodology section) need to be considered to identify waters at risk for future conflicts over hydro resources. Firstly, basin countries with greater differences in their population densities tend to cooperate more over shared freshwater resources. India, with 492 people per square kilometre, and China, with 151 people per square kilometre, show a significant difference in population density (Worldometer, 2025). Basins between both countries, in particular, have a high population density, such as 18 inhabitants/km2 in China and 432 inhabitants/km2 in India (Food and Agriculture Organisation, 2011), which is an indicator of a basin at high risk of conflict. However, this challenge will be a common point of cooperation on the proper utilisation of water resources amid a growing population. Secondly, while the difference in their Gross Domestic Product (GDP) appears large and seems risky at the current stage (WorldData.info, N.d.), their overall relations are more conflictual. Globally, countries with generally friendly relations tend to cooperate over hydro resources. However, regionally, there is a weaker correlation. In South Asia, India and China have not maintained amicable hydro relations because of some past upheavals on certain national border issues (Mahla, 2024).

Lastly, on an infrastructure level, basins with a high dam density and treaties demonstrate significantly higher levels of cooperation than those without treaties. However, this is not the case with India and China, which do not have a strong agreement to address concerns related to water infrastructure in the Brahmaputra basin, which is a

high-dam-density basin. Therefore, considering all these factors, it is probable that there will be a risk in the basin shared between India and China. Moreover, there are a lot of instances where water conflicts or triggers have been the cause and result of the border skirmishes between India and China (Ibid.) In addition, according to the Basin at Risk Scale (Water Event Intensity Scale), water events related to conflict between India and China cover the scale from -2 to 3 (see Fig.1, Fig.3, Transboundary Freshwater Diplomacy Database, and Water Conflicts Database). This result shows the growing water conflict issues between the two countries. The risk scale showcases the more conflictive nature between India and China.

China may employ water as a means to exert pressure or as a political bargaining chip against India to secure concessions on the boundary issue. Given the backdrop of Sino-Indian relations, marked by territorial disputes, entrenched mistrust, border tensions, and geopolitical rivalry, water emerges as a crucial factor that will significantly influence the prospects of peaceful coexistence, cooperation, and competition between the two countries regarding the utilisation of the vital rivers originating from the Tibetan region, which are essential for sustaining life.

Fig. 3. Long-Term Conflict Forecast (The Brahmaputra River Basin)



Source: The Figure was prepared by the Author by retrieving data from the International Commission on Large Dams, the transboundary freshwater diplomacy database by Oregon State University, the water conflict chronology database by the Pacific Institute, and global tools by the Water, Peace, and Security (WPS) partnership.

Given its status as an Upper-riparian state, China may potentially seek to coordinate and challenge the water-related discussions between Pakistan and Bangladesh in conjunction with India, while refraining from explicitly disclosing its hydroelectric projects on the

Indus Basin and Brahmaputra Basin. The growing nexus between China and Pakistan is also a significant cause for concern for India. "Pakistan had been under the strategic and economic tutelage of the United States for more than fifty years, enjoying an unprecedented economic boom in the form of free aid from the United States, which had been interrupted after the notorious Al-Qaeda leader bin Laden's killing by US commandos. Pakistan quite cleverly opened up to China once the era of bonhomie was over with the United States. The surrogate, Pakistan, of the United States has now turned to step up being a surrogate of China" (Panigrahi, 2018).

Hydro-political Nexus between China and Pakistan

China's engagement in Pakistan's hydropower sector commenced in 2006 with the initiation of the first Pakistan-China Energy Forum in Islamabad. The forum focused on discussions about energy security and explored various energy sources, including hydro, thermal, and nuclear power. It also delved into the exploration of potential avenues for public-private partnerships and Chinese investments in Pakistan's energy sector (Kumar, 2007).

During President Hu Jintao's visit to Islamabad in November 2006, a joint statement was signed, reaffirming the shared commitment of both countries' leadership to strengthen their cooperation. The agreement encompassed the implementation of projects in the energy sector, encompassing hydropower, nuclear power, renewable energy sources, as well as the mining and resources sector (Pakistan Embassy Beijing, 2006). President Hu Jintao specifically emphasised the achievement of a consensus on collaborative efforts in hydroelectric power and the pursuit of "new sources of energy" (Kumar, 2007). As China rises, its axis with Pakistan will have a greater reach in the Himalayan region. It makes India's water vulnerable to two hostile regional neighbours: Pakistan and China. Moreover, the Increasing nexus between China and Pakistan, in the future, can hamper the hydro-diplomacy between India and China (Mahla, 2025).

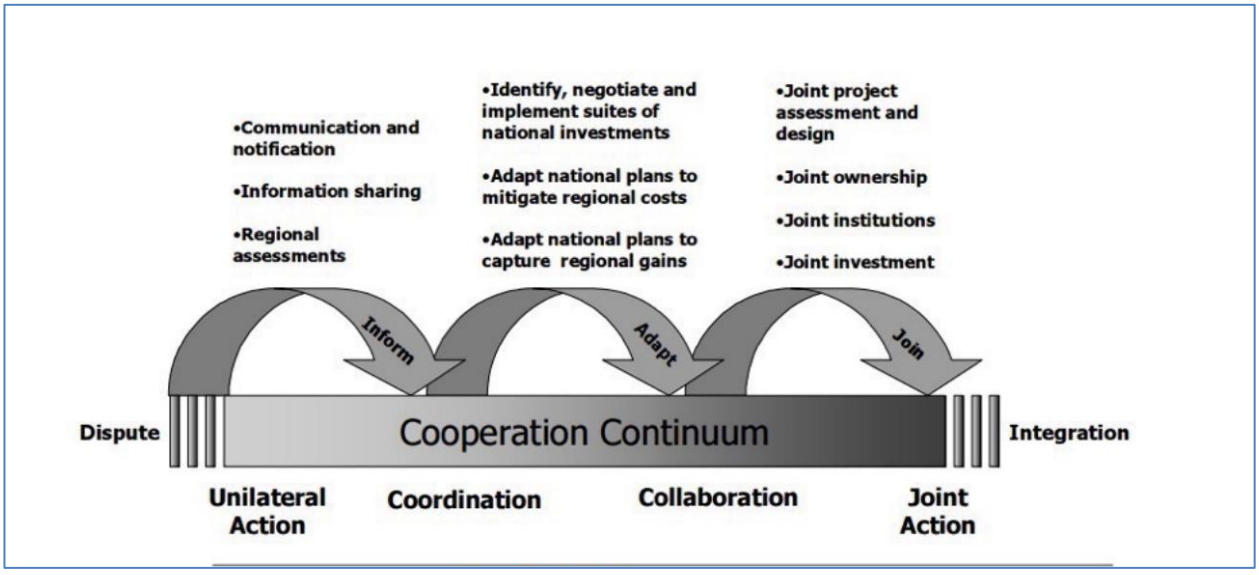
Policy Recommendations and Future Directions

With mounting environmental pressures and political tensions in the Himalayan region, the urgency of achieving tangible advancements in multilateral water-sharing cooperation cannot be overstated. As competition for water access intensifies in the coming decades, the risk of mass migration, civil conflicts, and potentially violent confrontations between state actors may rise. In light of the current momentum, Himalayan countries must expedite the development of joint action or institutional arrangements that facilitate cooperation, thereby addressing the collective action challenges and diverse interests they face. Using Integrated Water Resources Management (IWRM) methods can help make water management more sustainable and collaborative. IWRM encourages cooperation among different groups by recognising how social, economic, and environmental factors are all connected. It also promotes fair distribution, efficient use, and conservation of water resources. As more and more mechanisms and initiatives come up to deal with shared water resources and related issues in South Asia, these efforts must promote inclusion and responsiveness to water

demand and access (Patra, 2018). These kinds of efforts should be based on strong evidence that includes an understanding of why they are needed, what they involve, and what the risks are. This evidence-based foundation is essential for mobilising sustained political commitment from various stakeholders, like non-state actors, over the long term. Presenting potential synergies, trade-offs, and a compelling business case is of utmost importance to empower stakeholders with the necessary information to make informed decisions regarding cooperation.

Cooperation initiatives often falter or have short lifespans when rushed or approached with a one-size-fits-all mentality that fails to adequately grasp the motives, priorities, and interests of stakeholders. Partnerships should be at the heart of shared water projects, making sure that important stakeholders and actors are involved in a meaningful way. There is a range of cooperation that goes from unilateral action (independent, non-transparent national plans) to coordination (communication and information about national plans) to collaboration (changing national plans for the benefit of both sides) to joint action (joint plans, management, or investment) (See Fig. 4).

Fig. 4. Types of Cooperation- The Cooperative Continuum



Source: Sadoff and Grey (2005)

In this context, the case of the Brahmaputra Basin showcases China's unilateral assertive actions over the Brahmaputra River. Taking unilateral action within a river basin implies a complete absence of collaboration. There is no sharing of information, communication, or joint planning regarding the use and management of the shared water resources. This lack of cooperation not only eliminates the potential for mutual benefits but also creates a risk that the development and investment plans of neighbouring countries may interfere with or harm one another. Over time, these uncoordinated efforts can collectively reduce water availability or deteriorate water quality to such an extent that they jeopardise all ongoing and future initiatives. Therefore, the cooperation continuum between India and

China should reach the joint action stage. Joint action takes place when countries sharing a river work collaboratively as partners in planning, funding, and carrying out projects related to the development of international rivers. Such a high degree of cooperation typically requires formal agreements, such as treaties, to be established. However, China has no formal treaty over the Brahmaputra River with India. It is the contemporary demand of the South Asian region to have a formal treaty over the Brahmaputra River. Multiple factors give rise to geopolitical concerns between India and China (Huntjens et. al., 2016). These factors have a great impact on the transboundary river cooperation between India and China. Water has played a significant role in geopolitical tensions, especially in the context of India-China border conflicts. Following the 73-day military standoff at Doklam in 2017, reports emerged suggesting that China had suspended the sharing of crucial hydrological information regarding the Brahmaputra and Sutlej rivers. This move was seen as a breach of their existing bilateral agreement and was linked to subsequent flooding in Assam and Uttar Pradesh (Mahla, 2024).

Hydropower is a crucial source of clean and renewable energy in the Himalayan region. However, the development, management, and utilisation of hydro resources requires extensive cooperation and coordination among nations. To fulfil this cooperative agenda, multiple concerns need multi-track diplomacy. The dispute over the Brahmaputra River needs multi-track water diplomacy, i.e., a multifaceted strategic leverage that involves various levels of diplomatic tracks and actors to mitigate concerns over transboundary river basins.

Conclusion

Transboundary water resources come with several challenges due to water transcending national boundaries. These challenges can lead to disagreements over the use, development or protection of water and lead to conflict. However, as per the Basin at Risk scale, emerging water conflicts in South Asia are typically limited and mostly non-violent. To always ensure the prevalence of cooperation and mitigate the possibility of water conflicts, the cooperative hydro-diplomacy continuum between India and China is very significant. Both countries face significant challenges in managing transboundary rivers, such as the Brahmaputra and Indus, which are critical for regional stability and development. India employs hydro-diplomacy to foster cooperative frameworks within South Asia, focusing on equitable water sharing and conflict resolution mechanisms. Conversely, China utilises its dominant position as an upstream riparian state to shape regional policies, often aligning its water strategies with broader geopolitical objectives. Regional and bilateral institutions, an omitted hydro-political strategy between India and China, play a significant role in addressing the complex challenges associated with the development, management, and utilisation of hydropower resources. By promoting multi-track hydro-diplomacy, these institutions can pave the way for a more efficient, equitable, and sustainable hydro sector development in the Himalayan region. The establishment and strengthening of robust institutions, especially and solely focusing on the hydro-politics in the Himalayan region, are imperative for harnessing the full potential of hydropower and advancing the transition to a clean and renewable energy future.

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