Navigating borders and waters: India-China border disputes and the complexities of transboundary river management

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ABSTRACT

Border issues, such as sovereignty, territorial claims, and security, play a significant role in transboundary river management. Borders can act as physical barriers that impede cooperation and coordination, and disputes over ownership and control of river resources can exacerbate tensions and lead to conflicts. Transboundary river management is a complex and critical issue that has gained increasing attention in recent years. The management of rivers that cross international borders raises numerous challenges, including political, economic, social, and environmental concerns. Effective management requires the cooperation of all countries sharing the river basin, and it involves the development of legal and institutional frameworks that promote sustainable use, equitable sharing, and peaceful resolution of conflicts. This paper aims to explore the intricate relationship between India's persistent border disputes with China and their far-reaching implications for the management of transboundary

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rivers. Their unresolved territorial disputes have profound implications for the shared river basins, such as the Brahmaputra Basin, and pose significant challenges to the implementation of effective transboundary river management strategies. Through an interdisciplinary examination of historical, geopolitical, and hydrological factors, this study sheds light on the multifaceted dimensions of India's border disputes with China and elucidates their detrimental impacts on the use of transboundary river resources.

Keywords: Geopolitics; hydro-politics; transboundary river management; Brahmaputra basin.

Navegando por fronteras y aguas: las disputas fronterizas entre India y China, y las complejidades de la gestión de los ríos transfronterizos

RESUMEN

Las controversias fronterizas, tales como las reclamaciones territoriales, la seguridad y la soberanía, desempeñan un papel importante en la gestión de los ríos transfronterizos. Las fronteras pueden actuar como barreras físicas que impiden la cooperación y la coordinación entre naciones, y las disputas sobre la propiedad y el control de los recursos fluviales pueden exacerbar las tensiones y derivar en conflictos. La gestión de los ríos transfronterizos es una cuestión compleja y crucial a la que, en los últimos años, se le ha prestado cada vez más atención. La gestión de los ríos que atraviesan fronteras internacionales plantea numerosos retos, entre ellos aspectos políticos, económicos, sociales y medioambientales. Una gestión eficaz necesita de la cooperación de todos los países que comparten la cuenca fluvial y requiere desarrollar marcos jurídicos e institucionales que promuevan el uso sostenible, el aprovechamiento compartido equitativo y la resolución pacífica de conflictos. El objetivo de este artículo es explorar la compleja relación entre las reiteradas disputas fronterizas entre India y China, y las consecuencias de mayor alcance para la gestión de los ríos transfronterizos. Sus disputas por conflictos territoriales no resueltos tienen profundas implicaciones para las cuencas fluviales compartidas, como la del río Brahmaputra, y plantean importantes desafíos a la hora de implementar estrategias eficaces para la gestión de los ríos transfronterizos. A través de un examen interdisciplinario de factores históricos, geopolíticos e hidrológicos, este estudio arroja luz sobre las polifacéticas dimensiones de las disputas fronterizas entre China e India, y esclarece sus perjudiciales repercusiones en el aprovechamiento de los recursos fluviales transfronterizos.

Palabras clave: geopolítica; hidropolítica; gestión de ríos transfronterizos; cuenca del río Brahmaputra.

INTRODUCTION

The management of transboundary rivers poses significant challenges worldwide and requires cooperation among neighbouring countries sharing river basins. In regions where border issues, such as sovereignty, territorial claims, and security, intersect with transboundary river management, complexities arise that can hinder effective cooperation and coordination. One such region where these challenges are starkly evident is the border between India and China. These two Asian giants share several transboundary rivers, making the resolution of their long-standing border disputes crucial for the successful and sustainable management of these shared water resources.

Border disputes between India and China have a deep-rooted history, dating back to the British colonial era and the subsequent formation of modern nation-states. Neville Maxwell summed up the genesis of the Sino-Indian border conflict succinctly: "British power in India expanded… until it reached the great retaining arc of the Himalaya. There it came into contact with another, that of China. In the central sector of the frontier zone, where lay petty states and feudatories, there began a contest for dominance over these marcher lands that continues to the present day. In the north-west and the north-east, where no minor, independent polities existed to act as buffers, the British sought secure and settled boundaries with China: these they failed to achieve, and the failure was to lead in the middle of the twentieth century to the border war between India and China" (Maxwell, 1970).

Territorial claims and competing national interests have fuelled tensions and conflicts between these two nations. The disputed border areas include strategic locations and vital water sources, including rivers flowing through the Himalayan region, such as the Brahmaputra, the Indus, and the Sutlej. The unresolved border disputes between these two countries have profound implications for transboundary river management in the region, particularly in the Brahmaputra Basin. As both countries assert their claims over territories that straddle the basin, questions of sovereignty and control over river resources arise, hampering the development and implementation of effective management strategies. Disputes over river waters exacerbate existing tensions and have the potential to escalate into conflict.

The complexities of transboundary river management in the India-China context are multifaceted. They involve not only political and territorial issues but also economic, social, and environmental concerns. The management of these shared river basins requires the establishment of legal and institutional frameworks that promote sustainable use, equitable resource sharing and peaceful conflict resolution. Therefore, navigating these intricate relationships between border disputes and transboundary river management requires a comprehensive understanding of historical, geopolitical, and hydrological factors that shape the dynamics of the region. This study highlights the

multifaceted dimensions of India's border disputes with China and their detrimental impact on the use of transboundary river resources.

The methodology employed in this study integrates interdisciplinary approaches to comprehensively examine the intricate relationship between India's unresolved border disputes with China and their implications for transboundary river management. Drawing on historical, geopolitical, and hydrological analyses, the study explores the multiple dimensions of these disputes and their impact on shared river basins like the Brahmaputra Basin. The study employs qualitative research methods, including document analysis, expert interviews, and case studies, to collect and analyse data on the historical context, geopolitical dynamics, and hydrological challenges associated with the India-China border issues and their effects on transboundary river management. In addition, the research uses a comparative approach to examine similar cases of transboundary river complexities in other regions, providing insights into potential strategies and best practices to address the complexities of the India-China border disputes within the context of river basin governance. By adopting an interdisciplinary methodology, this study aims to provide a comprehensive understanding of the challenges and opportunities for effective transboundary river management in the context of unresolved border disputes between India and China.

The significance of this study lies in its potential to contribute to the understanding of how border issues affect the management of shared water resources between neighbouring countries. By focusing on the India-China case, the research sheds light on the complexities of transboundary river management, particularly when geopolitical disputes are intertwined. The findings of this study will be relevant for policymakers, scholars and stakeholders involved in international river governance and conflict resolution. In addition, the study's findings will contribute to the development of more effective and inclusive legal and institutional frameworks for transboundary river management, which can be applied to other regions facing similar challenges. Understanding the repercussions of unresolved border disputes on river management can facilitate diplomatic engagement, confidence-building measures, and promote a more sustainable approach to the use of shared water resources. Consequently, this research seeks to contribute valuable knowledge to the field of international relations, water diplomacy, and environmental governance by shedding light on the complexities of transboundary river management and the importance of resolving border disputes to promote regional cooperation and sustainable development.

GEOPOLITICS AND TRANSBOUNDARY RIVER GOVERNANCE

The relationship between geopolitics and transboundary river governance is inherently intertwined, as geopolitical factors often influence the management and allocation

of transboundary water resources. Geopolitical considerations such as sovereignty, territorial disputes, power dynamics and regional cooperation have a significant impact on decision-making processes regarding the use, distribution, and protection of shared water bodies. An example of the intersection of geopolitics and transboundary water governance is the Indus River Basin, shared by India and Pakistan, where geopolitics strongly influences transboundary water governance. Longstanding political tensions between the two countries have led to disputes over water-sharing agreements and the construction of dams, affecting the availability of water resources for millions of people who depend on the river.

Transboundary river management, which involves the cooperative management and governance of shared river basins that cross international boundaries, is a critical global issue. According to United Nations projections, by the year 2025, more than fifty per cent of the global population is expected to live in countries facing water stress or scarcity, with a significant proportion concentrated in China and India (UNDESA, n.d.). In particular India, with its high population density, is highly dependent on transboundary river flows originating in Tibet, making it vulnerable to potential strategic manoeuvres by China over water resources. It requires cooperation among riparian states to ensure sustainable use, equitable sharing, and conflict prevention. According to the Food and Agriculture Organization, "more than 3,600 treaties related to international water resources have been drawn up since 805 AD" (United Nations, n.d.). The preponderance of these pacts relates to issues of navigational rights and territorial delimitation. Notably, the focus of diplomatic deliberations and treaty formulation in the last century has shifted from navigation-centred concerns to encompass broader aspects such as the exploitation, development, safeguarding and sustainable use of water resources. In this evolving landscape, the indispensability of legal and institutional frameworks becomes evident, acting as central agents in cultivating cooperation, mitigating conflicts, and facilitating the effective management of transboundary rivers.

On a global scale, the 1997 United Nations Convention on the Non-Navigational Uses of International Watercourses stands out as a prominent international instrument that addresses the intricacies of shared water resources. This Convention introduced a pair of fundamental principles to guide the behaviour of nations in relation to shared water bodies: the notions of "equitable and reasonable use" and the "obligation not to cause significant harm" to neighbouring entities. For the Convention to become a legally binding instrument, at least 35 nations must ratify it (United Nations Economic Commission for Europe, n.d.). Currently, there are 38 parties to the Convention and 16 Signatories (Germany, Finland, Hungary, Jordan, Syrian Arab Republic, Venezuela, Yemen, Tunisia, Portugal, Paraguay, Netherlands, Namibia, Luxembourg, Côte d'Ivoire, Norway and South Africa). China is not a signatory to

this convention. The precise delineation of the scope and interpretation of these principles within their respective river basins is a prerogative retained of individual countries.

In addition, on December 11th, 2008, the 63rd session of the UN General Assembly adopted "Resolution A/RES/63/124" on the Law of Transboundary Aquifers (United Nations, 2009). This resolution urges nations to establish appropriate bilateral or regional agreements to effectively manage their shared underground aquifers, taking into consideration the stipulations contained within the attached draft articles. These articles cover various aspects, including cooperative measures among nations to prevent, mitigate and manage contamination within shared aquifers. Given the considerable significance of these hidden resources, countries are encouraged to consider these draft articles as a foundational framework for the formulation of a comprehensive convention. The emergence of the Law of Transboundary Aquifers marks a tangible step towards the consensual sharing of groundwater resources. Prior to this, there was a lack of a comprehensive set of recommendations and guidelines in international law for the sustainable and harmonious governance of transboundary aquifers. In addition, the UN-Water Thematic Priority Area (TPA) dedicated to transboundary waters serves as a platform designed to promote coherence and synchronisation of actions among UN-Water members and partners (UN-Water, 2015). This platform achieves its objective by facilitating a continuous exchange of insights, experiences, and lessons learned, while simultaneously promoting collaborative efforts.

In the midst of ongoing conflicts on several fronts, legal arrangements pertaining the distribution of shared water resources have continued. A prominent example is the cooperation among Cambodia, Laos, Thailand, and Vietnam. These nations have successfully maintained collaborative efforts under the aegis of the Mekong River Commission since 1957, even fostering technical exchanges during the Vietnam War. In a similar vein, Israel and Jordan have been engaged in ongoing discussions on the sharing of the Jordan River since 1955, despite their recent cessation of a long-standing state of legal war (United Nations, n.d.).

Remarkably, the Indus River Commission has not only survived but thrived through two armed conflicts between India and Pakistan. In a broader context, "the Nile River Basin, with a population of 160 million spread over 10 countries, witnessed the establishment of a comprehensive framework in February 1999. This framework was conceived to alleviate poverty and stimulate regional economic development, by emphasising the principles of equitable water use and collective benefit. Similarly, the nine nations encompassing the Niger River Basin have come together under an analogous framework to nurture cooperative engagement and equitable resource use" (United Nations, n.d.).

These cases highlight two important aspects of international cooperation on water resources: the need to create a strong

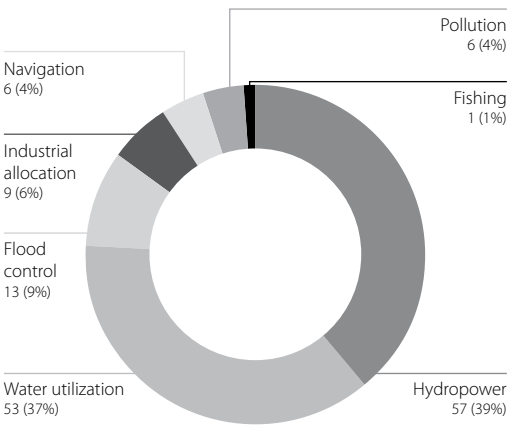
organisation to foster cooperation over time, and the need for significant outside assistance that all involved parties trust and rely on. However, when looking at the situation between India and China, the Brahmaputra River Basin has always been a source of disagreement. In this environment of conflicts, unresolved territorial disputes become a major focus, greatly shaping efforts to address the challenges of managing transboundary rivers.

Both countries have "a Memorandum of Understanding upon the provision of Hydrological Information on the River Brahmaputra / Yaluzangbu, a Memorandum of Understanding of Hydrological Data Sharing on River Sutlej / Langqen Zangbo, and Expert Level Mechanism (ELM)" (Ministry of Jal Shakti, n.d.). Moreover, India and China have consistently engaged in discussions on water resource cooperation. On the 12th and 13th of June 2019, the 12th meeting of the India-China Expert Level Mechanism (ELM) on transboundary rivers was held in Ahmedabad. During the meeting, both sides signed the "Implementation Plan on the Provision of Hydrological Information of Brahmaputra River in Flood Season" (Ministry of External Affairs, n.d.), following the MoU for the provision of hydrological information on the Brahmaputra River. A similar MoU for the provision of hydrological information on the Sutlej River is also in force. More generally, China and India address transboundary river issues under the aegis of the India-China ELM. In May 2015, Beijing hosted the ninth meeting of the ELM (Rajya Sabha, 2015).

However, there is no particular treaty ever signed related to the water issues between India and China. The absence of a water treaty between India and China significantly impacts the flow pattern and distribution criteria within the Brahmaputra basin. This absence leaves uncertainties regarding water management strategies, exacerbating tensions and complicating efforts to effectively address transboundary water issues. Although China has consistently assured the Indian government that it has no intention of diverting water from the Brahmaputra, Indian analysts remain sceptical and doubt the likelihood of any such diversion occurring in the near future. The Indian people have raised concerns regarding the potential implications of diverting the Brahmaputra, particularly fearing adverse effects on agricultural and fishing activities. These concerns stem from anticipated increases in water salinity and sedimentation downstream. India's main concern lies in the possibility of China gaining greater influence through water diversion, potentially tilting the balance of power further in China's favour over India. Around 260 river basins around the world support nearly 40 per cent of the world´s population, with roughly 145 sharing agreements or treaties governing the distribution of these river waters (See Figure 1). Despite this, China has not signed any water-sharing agreements with its neighbouring countries (Baxi, 2011). Moreover, China also opposed the 1997 UN "Convention on the Law of the Non-navigational Uses of International Watercourses". This global

convention aims to establish standards and regulations, which China rejects. China's strategies for exploiting, controlling, and diverting its water resources are highly non-transparent and confidential, causing significant concern for all of its downstream neighbouring countries.

FIGURE 1. SECTORIAL DISTRIBUTION OF 145 AGREEMENTS ON TRANSBOUNDARY WATER RESOURCES



Source: United Nations (n.d.).

Effective management of transboundary rivers is essential to ensure the sustainable and equitable use of shared river basins and to avoid disputes over water reserves. This requires the establishment of legal and institutional frameworks that include global agreements, reciprocal treaties and the active involvement of international organisations. These frameworks are essential for fostering collaborative endeavours and mitigating conflicts among nations that share river systems.

There is a growing consensus among scholars that international watercourses pacts should embrace a more concrete form, outlining actionable measures for upholding treaty stipulations and incorporating meticulous protocols for resolving disputes, should they arise. The attainment of enhanced cooperation also depends on the delineation of precise yet adaptable water allocations and water quality standards. This entails a comprehensive consideration of hydrological vagaries, shifting basin dynamics, and societal preferences.

Moving away from a purely anthropocentric approach to an ecosystem-based approach is crucial for sustainable river management. Several countries have adopted this ecosystem-based approach. For instance, the collaborative efforts among Central Asian nations to safeguard the ecosystems of their interconnected rivers is clearly manifested through various regional water agreements. These agreements include important frameworks, notably the Framework Convention on Environmental Protection for Sustainable Development in Central Asia and the Agreement on the Utilization of Water and Energy Resources within the Syr Darya Basin (Xie & Ibrahim, 2021). These particular cases serve as potential models for other nations grappling with the imperative of mitigating climate change. These instruments underscore a concerted commitment by participating states to address relevant environmental concerns and promote sustainable use of water resources within the hydrological landscape of the region. This approach considers the intricate

ecological relationships within the river basin and aims to maintain the integrity of the ecosystem. Comprehensive environmental impact assessments must be carried out before initiating any development projects near transboundary river systems to assess potential risks and benefits. These assessments should include multidisciplinary expertise and public consultation. Moreover, recognizing the impact of climate change on river systems, strategies should integrate climate change adaptation measures. This may include water conservation, reforestation, and resilient infrastructure planning to cope with changing precipitation patterns and water availability.

Water resources are not merely physical entities but are deeply intertwined with power dynamics and national interests. Borders act as crucial determinants in shaping the dynamics of hydro-politics, influencing cooperation and coordination among riparian countries. Borders between nations can act as both physical and psychological barriers that impede cooperation and coordination in the management of transboundary rivers. The presence of a border can create a sense of "us versus them" between riparian countries, further complicating negotiations, and diplomatic efforts. Territorial claims over river resources can exacerbate tensions, making it challenging to reach mutually agreeable solutions for shared water management. The distribution and use of water resources often becomes an issue of sovereignty and territorial claims. Understanding the complexities of the India-China border disputes has become a necessity to understand their impact on the shared river basins i.e. Brahmaputra Basin.

INDIA-CHINA BORDER DISPUTES

The exacerbation of tensions and the incitement of conflicts between India and China has been driven primarily by the assertion of territorial claims and the concomitant pursuit of divergent national interests. The complex historical conundrum surrounding the Indo-Chinese border, which originated during the colonial period, plays a crucial role in shaping the current territorial predicament. The British colonial administration's efforts to delineate the Himalayan borders were largely motivated by its strategic competition with Russia, which was particularly prominent during the era of the Great Game. This context added a layer of complexity to the process of demarcating territorial boundaries within the Indo-Tibetan domain, which posed challenges to the British administrative authorities.

An early attempt in 1865, led by Surveyor General Sir W. H. Johnson, aimed to expand the territorial scope of the Dogra state. However, this attempt was not accepted. Subsequently, in 1897, Sir John Ardagh of the British Military Intelligence revived a similar proposal, driven by strategic considerations against Russia. This move laid the foundation for India's later claims concerning Aksai Chin (Banerjee, 2022). During the period from 1865 to 1897, the colonial era witnessed oscillations in the definition of the northern and northeastern boundaries of the Kashmir

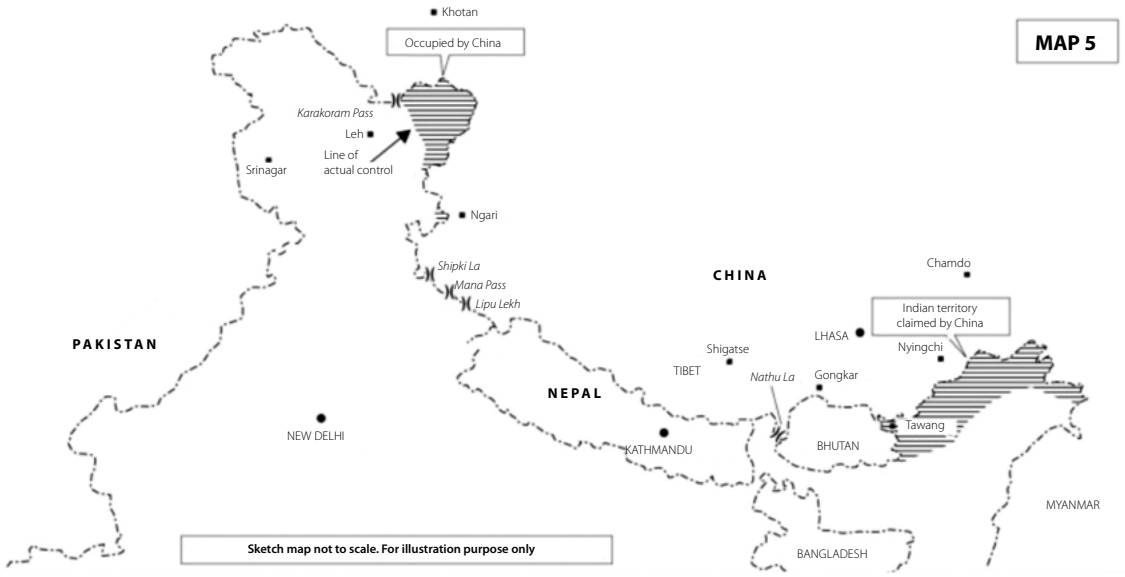
region. These shifts were driven by concerns about potential threats from Russia. Importantly, China did not endorse any of the proposed boundary delineations during this period. The formal proposal known as the Macartney-MacDonald Line, which was submitted to Beijing in 1899, failed to gain official recognition from China's ruling Manchu dynasty (Banerjee, 2022). Similarly, the Simla Conference of 1913 aimed to address border disputes but proved ineffective in securing China's acceptance of the McMahon Line. With the end of the British colonial rule, unresolved provisions related to the North-East Frontier Agency (NEFA) and Tawang were influenced by China's priorities at the time. Moreover, in the post-1945 era, a cartographic representation by the Survey of India hinted at claims over the Aksai Chin region (Banerjee, 2022). However, the British military maintained a vague stance on this issue, leading to the informal recognition of the Macartney-MacDonald and Ardagh-Johnson Lines as the boundaries. The state of ambiguity continued until 1947, leaving India's northern borders undefined. A similar uncertainty prevailed in the eastern sector, where British presence was largely confined to the Brahmaputra plains (Banerjee, 2022).

Later, on the 1st of April 1950, India achieved the distinction of being the first non-socialist bloc nation to initiate diplomatic relations with the People's Republic of China. This significant step was followed by Prime Minister Nehru's visit to China in October 1954. Despite the 1962 border conflict, which caused a setback to their relations, a turning point emerged with Prime Minister Rajiv Gandhi's momentous visit in 1988, marked a turning point and ushered in a period of improvement in bilateral relations. A milestone in this trajectory occurred in 1993, during Prime Minister Narasimha Rao's visit, with the signing of an agreement concerning the Maintenance of Peace and Tranquillity along the Line of Actual Control in the India-China Border Areas. This agreement underlined the increasing stability in the mutual engagements between the two nations (Ministry of External Affairs. n.d.).

Moreover, the establishment of the Special Representatives (SR) mechanism in 2003, to address the India-China Boundary Question, set the stage for a series of dialogues. Over time, 22 rounds of talks have been held under this framework. Notably, the 22nd round included talks between Mr Ajit Doval, the National Security Advisor of India, and Mr Wang Yi, the Foreign Minister of China, which took place in New Delhi on the 21st of December 2019. Within the framework of these dialogues, a significant development materialized during the 15th Round of SR talks in New Delhi in January 2012. This saw the signing of an Agreement to establish a Working Mechanism for Consultation and Coordination on India-China Border Affairs (WMCC). The WMCC has subsequently met 19 times, most recently on the 30th of September, 2020 (Ministry of External Affairs. n.d.).

The border disputes between India and China are a longstanding and complex issue that has significantly shaped the bilateral

FIGURE 2. INDIA-CHINA BORDER



Source: Joshi (2022).

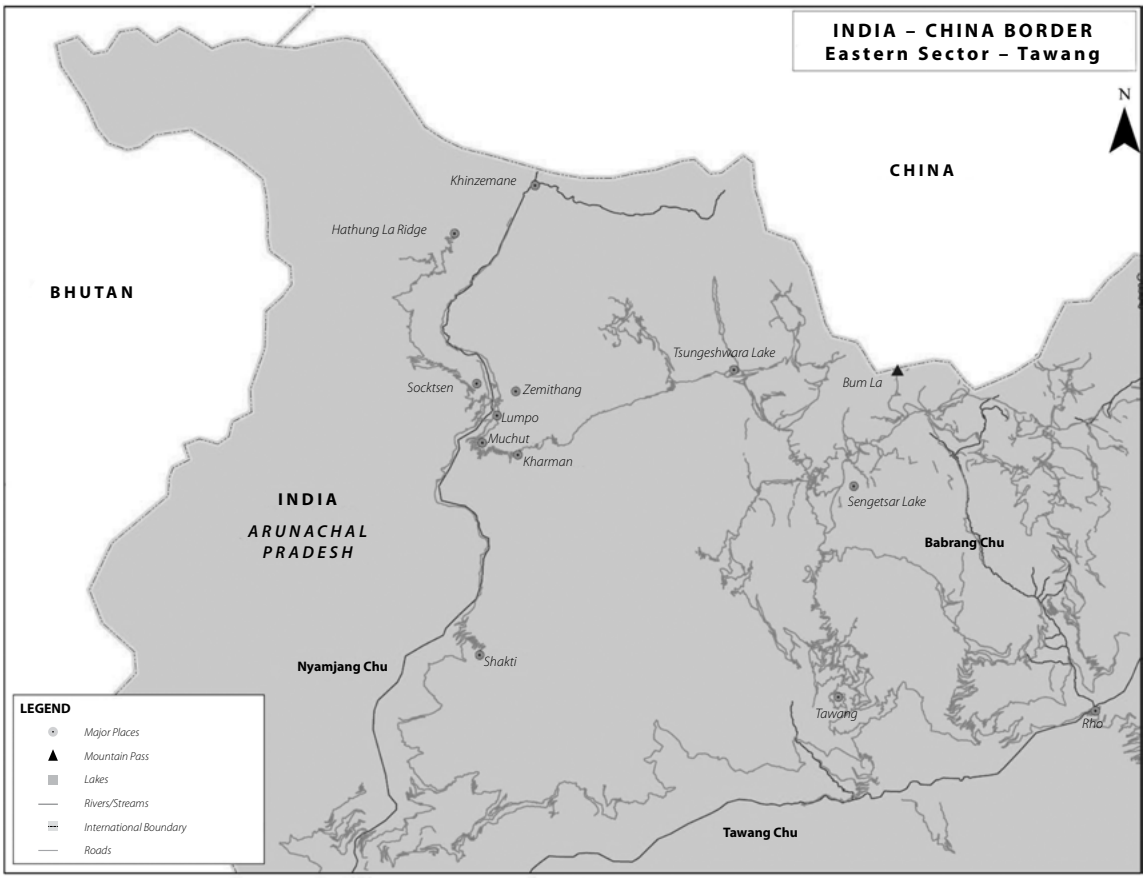
relationship between these two Asian giants. The Sino-Indian border problem is sui generis in many ways. For one, the two countries do not agree on the length of the border that they dispute in its entirety, in its western, central, and eastern sectors. The Indians variously say it is 4,057 and 3,488 km long, while the Chinese say it is only 2000 km (Joshi, 2022). Note that India claims the border from the Afghanistan-Xinjiang-Kashmir trijunction, while the Chinese only begin counting from the Karakoram Pass. The two have occasionally tried to enforce their claims militarily and fought a brief war over the border in 1962 which did not go well for India (Joshi, 2022).

The demarcation of the Sino-Indian border compromises three primary sectors: the eastern and western sectors (See Figure 2). The conflict is primarily between the Western and Eastern sectors. In the Western sector, there is an ongoing disagreement over the Aksai Chin plateau, which is flanked by Ladakh in Indian-administered Kashmir, Tibet, and Xinjiang. Aksai Chin is a high-altitude region in the northwestern part of the Himalayas. This territory is strategically important due to its location, providing a vital link between the Chinese-administered Xinjiang region and Tibet. Approximately 15,000 square miles are the subject of conflicting claims. This section of the boundary is nearly 1100 miles long (Sharma, 1965). India claims that Aksai Chin is part of Ladakh, while China claims that it falls under Xinjiang's jurisdiction. Chinese claims in this area are extensive. At the same time, the eastern sector, located between Bhutan and

Burma, involves a territorial dispute over the region between the pre-1914 British Outer Line and the McMahon Line. Specifically, this pertains to the Assam Himalayan Region, which India claims as an integral part of the state of Arunachal Pradesh–formerly recognised as the North-East Frontier Agency (NEFA) of Assam. China, on the other hand, claims ownership over this territory as an extension of Tibet.

In addition, the issue of Tawang, a prominent town in Arunachal Pradesh, has been a major bone of contention (See Map 1). Tawang has religious significance for Tibetan Buddhists, and the escape of the 14th Dalai Lama to India in 1959 further complicated matters. China's claim over Tawang is closely linked to its position on the disputed border, adding a religious and political dimension to the dispute.

MAP 1. INDIA-CHINA BORDER (EASTERN SECTOR) – TAWANG



Disclaimer: Map not to scale, depiction of boundaries is not authoritative.

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Source: GIS Section, Manohar Parrikar Institute for Defence Studies and Analysis, New Delhi.

At the heart of the Sino-Indian border dilemma, the eastern sector centres around the McMahon Line, while the western sector revolves around the Aksai Chin region. In the current context, the Line of Actual Control (LAC) in the eastern sector aligns with the McMahon Line, encompassing a disputed area of approximately 90,000 square kilometres. Similarly, the LAC in the western sector roughly follows the Karakoram Range, in accordance with China's claims, covering a total area of approximately 33,000 square kilometres (Lu, 2007).

These disputed border regions hold immense strategic and geopolitical importance for both countries. These areas provide access to crucial trade routes, natural resources, and military advantages. As India and China continue to assert their influence in the region and strive for regional dominance, the border disputes remain a source of tension and rivalry.

As a result, both India and China base their territorial claims on historical references and treaties. India claims that the McMahon Line represents the legal boundary between British India and Tibet, thus establishing its sovereignty over Arunachal Pradesh. China, on the other hand, argues that historical records show Tibet's allegiance to China and that Arunachal Pradesh is therefore part of its territory. The historical background of the India-China border disputes is fraught with complexities, historical claims, and geopolitical significance. The overlapping territorial claims, coupled with strategic interests, have made resolving the conflicts a challenging task. Despite negotiation attempts and various agreements, a lasting solution to the border disputes has yet to be reached. As both nations continue to grow in stature and influence on the global stage, finding a peaceful and mutually acceptable solution remains crucial for maintaining regional stability and fostering constructive bilateral relations.

The protracted India-China border dispute remains a major geopolitical challenge, casting a shadow over the bilateral relations between the two Asian giants. An additional concern has emerged in the form of the Brahmaputra River basin, which runs through both India and China. This situation highlights the intricate interplay between geopolitical considerations and transboundary river governance.

THE BRAHMAPUTRA BASIN: A SHARED TRANSBOUNDARY RIVER SYSTEM

The Brahmaputra is one of the biggest rivers in South Asia. It is ranked as the ninth-largest river in the world by discharge volume and the fifteenth longest river overall. It travels 2,900 kilometres (1,800 miles) from its source in the Himalayas to the point where it converges with the Ganges River where the combined waters of the two rivers pour into the Bay of Bengal. With a total basin area of 580,000 square miles, the Brahmaputra River Basin flows through the Tibet Autonomous Region of China (50 per cent), Bhutan (7 per cent), the Indian states of Arunachal Pradesh and Assam (36 per cent) and Bangladesh (7 Per cent) (See

Fig. 3) (FAO Aquastat, 2011). In India, the Brahmaputra River drainage basin located in India is 194413 sq. km. which is almost 5.9 per cent of the total geographical area of the country (Central Water Commission, 2020).

The Brahmaputra River has long been an integral part of the historical and cultural heritage of India and China. Traditionally, the river has facilitated trade and cultural exchanges between the regions through which it flows. For most of its length, the river serves as an important interior waterway. Millions of people living along the Brahmaputra benefit significantly from the ecological, cultural, and economic services provided by the Brahmaputra basin. As a result, the Brahmaputra River is of immense strategic importance to both India and China, shaping their economic, geopolitical, environmental, and social landscapes. Resolving the Indo-China border dispute and addressing concerns regarding the Brahmaputra Basin requires a harmonious blend of diplomatic negotiations, sustainable resource management, and collaborative efforts among the riparian nations. According to the timeline of Sino-Indian water

FIGURE 3. BRAHMAPUTRA RIVER BASIN

Source: Wikimedia (n.d.).

cooperation since 1954, 82 agreements/treaties/joint declarations covering 13 sectors were signed between China and India from 1950 to 2015, 13 of which concerned cooperation on transboundary waters (Feng et al., 2019). Clearly, water has been one of the key issues in the diplomatic relations between the two countries (see Table 1).

TABLE 1. THE CASE OF TRANSBOUNDARY WATER IN INDIA-CHINA BORDER CONFLICTS

Year	Event	Cooperation on Transboundary Water
1959	Border conflicts in 1959–1962	In 1963, China stopped the provision of hydrologic information.
2013	Joint Declaration; Agreement on BorderDefence Cooperation	MoU in 2013 and the Implementation Plans upon the Yaluzangbu/BR in 2013 and 2014. MoU on Strengthening Cooperation on Transborder Rivers in 2013.
2017	73-day Doklam Standoff	In 2017, the provision of hydrological information and the annual meeting of the China-India expert-level mechanism stopped.

Source: Feng et al. (2019).

Water has been at the centre of events following border disputes between India and China. For instance, after the 73-day Doklam standoff between India and China in 2017, there were reports that China had withheld hydrological data for the Brahmaputra and Sutlej rivers – in violation of the agreement – leading to flooding in the states of Assam and Uttar Pradesh (Siddiqui, 2017). This wasn't the first time that shared waterways in the region had raised alarms. Worryingly, in 2004, a lake began to form on the Parechu River, a tributary of the Sutlej which originates in the Tibetan Himalayas, threatening to cause flooding further downstream in India's Sutlej valley. While China remained cooperative at the time, sharing upstream data with India in advance, there was speculation (after China refused an Indian request to send scientists and engineers to the site) that China had deliberately created "a liquid bomb", an artificial lake that could be released at will to potentially devastate downstream areas (Gautam, 2004; Jayaraman, 2004). Such concerns about China possibly breaching and weaponising the waters of this Parechu lake were raised in June 2020, when a rise of 12 to 14 metres was observed in the river (Indo-Asian News Service, 2005). As a result, transboundary water cooperation between the two countries has developed during periods of friendship, while territorial disputes have led to disruptions. Until now, cooperation on sharing hydrological data has been the objective, while further cooperation has been incremental.

IMPLICATIONS OF UNRESOLVED BORDER DISPUTES ON TRANSBOUNDARY RIVER MANAGEMENT

Transboundary river management, which involve the equitable use and sustainable development of shared river basins, is a complex undertaking that requires close cooperation and coordination among riparian nations. However, unresolved boundary issues between neighbouring countries

can significantly hinder effective cooperation and coordination, exacerbating the challenges of managing transboundary rivers. The implications of unresolved border disputes on transboundary river management are far-reaching and can be observed through various obstacles. Unresolved border disputes, for instance, often create political tensions between nations, leading to a stalemate in river management negotiations. Disputes over sovereignty and territorial claims can overshadow discussions on equitable resource sharing and sustainable development, making it difficult for riparian countries to find common ground.

In the absence of clear and agreed-upon border demarcation, riparian countries may lack trust in each other's intentions. This lack of trust can hinder the sharing of critical hydrological data, joint research initiatives, and collaborative efforts to manage the transboundary river basin. Border disputes can lead to a focus on individual national interests rather than the collective benefit of all riparian countries. This competition for resources and development opportunities can undermine cooperation and lead to a "zero-sum" mentality, where gains for one nation are perceived as losses for others. Effective transboundary river management also depends on the timely exchange of information on water flows, rainfall patterns, and environmental data. However, unresolved border disputes can lead to restrictions on data sharing and transparency, hindering the development of comprehensive management strategies (See Table 1).

Furthermore, unresolved border disputes have a profound impact on the use and development of resources within the transboundary river basin. The uncertain status of borders and ownership can lead to various challenges and constraints. For example, investment in infrastructure projects, such as hydropower plants, irrigation systems, and navigation channels, is essential for harnessing the potential of transboundary rivers. However, the uncertainty caused by border disputes can deter investors and delay the development of much-needed infrastructure. In the absence of clear boundaries and agreements, riparian nations may exploit resources unilaterally, leading to unequal distribution of resources. This imbalance can exacerbate tensions and hinder the equitable sharing of benefits from the transboundary river.

Lack of cooperation and coordination can lead to unilateral decisions on water abstraction and diversion. This can directly affect water availability in downstream countries and lead to conflicts over water rights and access. In addition, unplanned resource use and infrastructure development can have serious environmental consequences. For example, since the Three Gorges reservoir began to be dammed in 2003, a significant number of seismic events, numbering in the tens of thousands, have been duly documented in the geographic vicinity of the reservoir (Xiao, 2021). Persistent investigations into the Yangtze Three Gorges region have shown that the geological layer surrounding the dam site, although currently stable, is underlain by an inherent

tectonic foundation, that has the potential to generate seismic phenomena (Yunsheng, 2013). In this case flash floods could occur in Arunachal Pradesh. Furthermore, in May 2008, a seismic event of considerable magnitude, measuring 7.9 on the Richter scale, which resulted in the tragic deaths of approximately 80,000 people in the Sichuan region, was attributed to the construction activities associated with the Zipingpu Dam (MIT, n.d.). This incident is a notable example of a seismic event potentially induced by dam infrastructure and ranks as one of the most profound seismic manifestations stemming from such anthropogenic interventions. The lack of coordinated efforts to mitigate environmental impacts, such as pollution and habitat destruction, can damage the river ecosystem and its biodiversity.

These unresolved border disputes also have significant environmental and ecological implications. The interconnected nature of river ecosystems makes it essential for riparian countries to work together to protect their shared environment. However, border disputes can lead to several environmental problems. The absence of a cohesive management approach can result in increased pollution and degradation of the river basin. Large-scale infrastructure development, such as dams and reservoirs, can lead to the fragmentation of habitats and disrupt the migration patterns of aquatic species. This can have negative effects on fish populations and aquatic biodiversity. The dam's architectural configuration serves as a barrier to the migratory passage of fish populations within the river. The transformation of a small, fast-flowing body of water into a vast, still reservoir causes an alteration in hydrological dynamics, thereby reducing the ecological suitability for the sustenance of native species and increasing the spectre of species extinction. Additionally, the physico-chemical characteristics of the reservoir water, including temperature and compositional distinctiveness, deviate from the adjacent flowing river environment. The reduction in the flow of water downstream leads to an increase in salinity downstream, making it inhospitable for specific piscine nurseries and accessible to predatory organisms. For example, the construction of the Three Gorges Dam led to the extinction of the Yangtze River dolphin, exemplifying the detrimental impact of such infrastructure projects on aquatic biodiversity. Similarly, the diverse array of fish species in the Mekong region, like the aforementioned river dolphins, face imminent extinction as a result of anthropogenic interventions (MIT, n.d.).

In addition, the impacts of climate change, such as altered rainfall patterns and the increased frequency of extreme weather events, further exacerbate challenges for transboundary river management. Lack of cooperation hinders adaptive strategies and collective efforts to address climate-related changes. Unregulated land use and deforestation in one riparian country can contribute to erosion and sedimentation downstream. This can affect river flow dynamics, increase flood risks, and affect agricultural productivity.

Lastly, border disputes and the resulting challenges of transboundary river management have significant socio-economic consequences for riparian communities living along the shared river basin. Uncertainty over resource availability and development projects can disrupt traditional river-dependent livelihoods, such as fishing and agriculture. This can lead to economic hardships for riparian communities. If water resources are unequally distributed or mismanaged due to border disputes, this can lead to water scarcity in certain regions, causing conflicts between communities and even nations. In addition, environmental degradation and reduced access to resources can force communities to migrate in search of better opportunities, resulting in the displacement of people living in the river basin. Furthermore, shared rivers often hold cultural and social significance for riparian communities. The disruption of these natural systems due to unresolved disputes can lead to the loss of cultural heritage and identity.

CONCLUSION

Achieving collaborative water management within the Brahmaputra River basin becomes particularly challenging in the presence of a confluence of factors encompassing territorial disputes, lack of trust, enduring resentments, rivalry over water allocation and the compounding influence of climatic changes. The dynamics between the border dispute and the Brahmaputra basin reflect not only the complexity of regional geopolitics but also the urgent need for multi-faceted strategies to ensure stability, cooperation, and sustainable development throughout the region. The obstacles to cooperation and coordination, impacts on resource use and development, environmental concerns and socio-economic consequences on riparian communities all underscore the urgency of resolving border disputes to ensure effective and sustainable management of shared river basins. Addressing these challenges requires diplomatic engagement, regional cooperation and the development of legal and institutional frameworks that promote equitable resource sharing and peaceful resolution of conflicts. Only through collaborative efforts can riparian countries effectively address the complex issues arising from unresolved border disputes and ensure the well-being of their shared transboundary river systems and the communities that depend on them.

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