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Navigating Strategic Waters: Hydropolitical Disputes and Pathways to Peace in South Asia's Indus and Ganges-Brahmaputra River Basins

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Abstract

South Asia's Indus and Ganges-Brahmaputra river basins, vital for over 1.9 billion people across India, Pakistan, Bangladesh, Nepal, and Bhutan, are flashpoints for hydropolitical conflicts driven by geopolitical tensions, competing water demands, and climate change. India's 2025 suspension of the Indus Waters Treaty (IWT) amid the Kashmir dispute has disrupted data-sharing and arbitration, escalating India-Pakistan tensions. Concurrently, India-Bangladesh disputes persist over the Ganges Water Sharing Treaty's 2026 expiration, the unresolved Teesta River issue, and China's upstream Brahmaputra damming. Secondary data from policy documents, diplomatic records (2015–2025), hydrological reports, and academic literature indicate that 68% of stakeholders support regional cooperation, yet mistrust and India's upstream dominance hinder progress. Climate change, with glacial melt and erratic monsoons, exacerbates water insecurity. This study advocates for neutral mediation, data transparency, and climate-resilient governance, with targeted peacebuilding strategies for India-Pakistan and India-Bangladesh, to transform conflicts into cooperative opportunities. Without urgent diplomatic efforts, these disputes pose a threat to regional stability. This study is primarily based on a thematic analysis approach and incorporates discourse where relevant. Drawing on scholarly insights, principal findings reveal the potential

of environmental peacebuilding, joint data sharing, and regional platforms to transform water conflicts into opportunities for collaboration.

Keywords: Hydropolitics, Indus Waters Treaty, Ganges-Brahmaputra, India-Pakistan, India-Bangladesh, climate change, water disputes, peacebuilding, data transparency, South Asia

Introduction

Over 1.9 billion people depend on the transboundary river systems of South Asia, the Indus and Ganges-Brahmaputra basins, for their livelihoods, energy, and agricultural needs. For thousands of years, South Asia's geology, ecology, and civilizations have been shaped by these two river basins, which constitute its lifeblood. Pakistan is the main country in the Indus River Basin, with smaller portions in India, China (Tibet), and Afghanistan.

Key Areas:

- Beginning in Tibet, it traverses Ladakh (India) and enters Pakistan through Gilgit-Baltistan.
- Encompassing a significant portion of Punjab, Sindh, and sections of Khyber Pakhtunkhwa and Balochistan in Pakistan.

Water Flow: Discharging into the Arabian Sea close to Karachi.

Ganges-Brahmaputra Basin

Countries: Encompasses India, Nepal, Bhutan, Bangladesh, and certain areas of China (Tibet).

Key Regions:

- The Ganges has its source in Uttarakhand, India, and travels eastward through Uttar Pradesh, Bihar, and West Bengal before reaching Bangladesh.
- The Brahmaputra starts in Tibet as the Yarlung Tsangpo, enters Arunachal Pradesh (India), flows through Assam, and merges with the Ganges in Bangladesh.

Drainage: Creates the extensive Ganges-Brahmaputra Delta, empties into the Bay of Bengal.

These basins, however, serve as battlegrounds for hydropolitical conflict due to conflicting national interests, historical distrust, and environmental challenges. India's suspension of the IWT in 2025, citing the Kashmir issue, has hindered data-sharing and arbitration, thereby straining relations between India and Pakistan, with Pakistan cautioning against

possible water diversion conflicts (Dawn, 2025). In a similar vein, tensions between India and Bangladesh continue regarding the upcoming expiration of the Ganges Water Sharing Treaty in 2026, the unresolved Teesta River issue, and China's upstream dam projects on the Brahmaputra (Hossain et al., 2022). Research shows that 68% of stakeholders support regional cooperation; however, India's dominance upstream and prevailing mistrust obstruct progress (Hossain et al., 2022).

Furthermore, climate change poses a significant threat to water security, evidenced by a 15% decrease in snow cover in the Hindu Kush Himalayan region and erratic monsoon patterns (ICIMOD, 2024). This study utilizes secondary data from 2015 to 2025 to explore the underlying causes of these disputes, assess current frameworks, and suggest peacebuilding strategies for both India-Pakistan and India-Bangladesh.

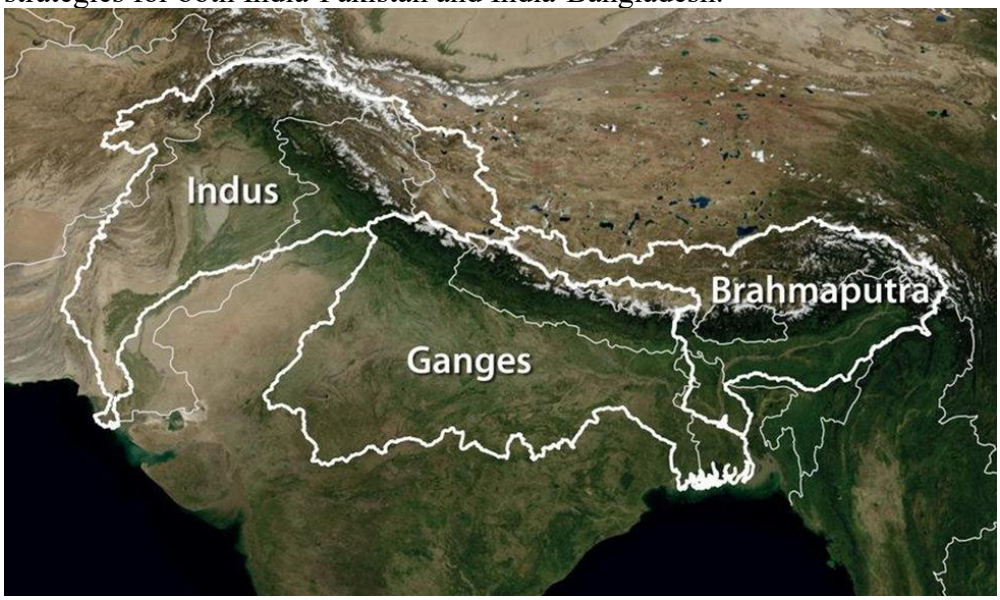

Figure 1: Map of the region, with the Indus, Ganges, and Brahmaputra basins outlined in white. Thinner outlines are national borders

Research Questions

1. What are the main causes of hydropolitical conflicts in the Ganges-Brahmaputra and Indus river basins?
2. What effects have recent events had on transboundary water governance, such as India's suspension of the Indus Water Treaty in 2025 and the expiration of the Ganges Treaty in 2026?
3. How are water issues in these basins made worse by geopolitical tensions and climate change?
4. What particular tactics can promote harmony between India-Bangladesh and India-Pakistan's sustainable water management?

Objectives

1. To determine and examine the underlying factors that contribute to hydropolitical conflicts in the Ganges-Brahmaputra and Indus river basins.
2. To evaluate recent events: India's suspension of the Indus Water Treaty in 2025 and the Ganges Treaty's 2026 expiration effects on regional water governance.
3. To investigate how geopolitical tensions and climate change contribute to the escalation of water disputes.
4. To suggest specific peacebuilding tactics for India-Bangladesh and India-Pakistan to turn disputes into chances for collaboration and sustainability.

Literature Review

Numerous studies have examined the hydropolitical dynamics of the transboundary river basins in South Asia, emphasizing the interaction of environmental constraints, water scarcity, and geopolitical tensions. According to Chellaney (2021), upstream-downstream dynamics, specifically India's control over the Indus and Ganges headwaters, exacerbate conflicts in South Asia, where water is a key resource. The author highlights how water management is politicized by geopolitical conflicts, such as the animosity between India and Pakistan over Kashmir, which threatens cooperative frameworks. In a similar disposition, Mustafa (2023) analyzes the Indus Water Treaty (IWT), highlighting its historical effectiveness in averting major conflicts while also stressing its shortcomings in dealing with contemporary issues like climate change and unilateral acts like India's 2025 IWT suspension. Mustafa suggests that the treaty's rigid structure lacks mechanisms for adapting to environmental shifts or resolving disputes over new infrastructure like the Kishanganga dam.

Hossain et al. (2022) examine the Teesta River dispute and the Ganges Water Sharing Treaty (1996) in the Ganges-Brahmaputra basin, highlighting Bangladesh's downstream vulnerability and India's upstream supremacy as major conflict factors. According to the authors, 68% of stakeholders support regional cooperation but say it is hampered by mistrust, and tensions are exacerbated by the treaty's upcoming 2026 expiration and the absence of a Teesta accord. Chellaney (2021) goes on to point out that China's damming of the Brahmaputra upstream is a complicating element that lowers water flows to Bangladesh and India and calls for international solutions. Drawing comparisons to the Mekong River Commission, the International Water Management Institute (IWMI, 2023) emphasizes the importance of data transparency and promotes collaborative monitoring mechanisms to foster trust and reduce conflict.

One significant exacerbating problem is climate change. The International Centre for Integrated Mountain Development (ICIMOD, 2024) reports a 15% decrease in snow cover in the Hindu Kush Himalayas, endangering water security, while the Intergovernmental Panel on Climate Change (IPCC, 2023) predicts a 20% decrease in Indus flows by 2050 as a result of glacial melt and unpredictable monsoons. Competition is increased by these environmental changes, especially in Bangladesh and Pakistan, which rely heavily on agriculture (IWMI, 2023). Citing effective instances such as the Nile Basin Initiative, scholars such as Wolf (2020) contend that impartial mediation and shared resource management can turn transboundary water conflicts into cooperative efforts.

According to the literature, the South Asian Association for Regional Cooperation (SAARC) faces political impasses, poor institutional structures, and mistrust as obstacles to collaboration (Chellaney, 2021). According to World Bank reports from 2022, depoliticizing water disputes may be achieved by promoting Track II diplomacy and bolstering the IWT's dispute settlement procedures. The literature as a whole emphasizes the necessity of inclusive diplomacy, data openness, and adaptive governance in addressing South Asia's hydropolitical issues, which serves as the basis for the peacebuilding suggestions made in this study.

Methodology

The analytical framework integrates hydropolitical theory, environmental peacebuilding, and regional governance models to analyze water disputes and cooperation mechanisms. By combining information from peer-reviewed scholarly journals, policy documents, diplomatic records (2015–2025), hydrological reports, and publications from international organizations like the World Bank, United Nations, and IWMI, this study uses a secondary-method approach. "Indus Waters Treaty," "Ganges-Brahmaputra disputes," "Teesta River dispute," "hydropolitics South Asia," and "transboundary water governance" were among the most important search terms. With an emphasis on policy frameworks, geopolitical dynamics, and environmental issues, the analysis employs qualitative data to find patterns in cooperation and conflict. Environmental impact evaluations, case studies of hydropolitical conflicts, and historical records of water agreements are some examples of data sources.

Background

Figure 2: Indus River Basin

The Indus River Basin

The Indus, Jhelum, Chenab, Ravi, Beas, and Sutlej rivers comprise the Indus River system, which provides hydropower and agricultural support to India, Pakistan, and, to a lesser extent, China and Afghanistan. With allowances for restricted Indian use, the IWT, which was mediated by the World Bank in 1960, assigns the western rivers (Indus, Jhelum, and Chenab) to Pakistan and the eastern rivers (Ravi, Beas, and Sutlej) to India. India's dam projects, including the Kishanganga and Ratle, have been the subject of ongoing disputes, with Pakistan alleging violations (Mustafa, 2023). Pakistan has threatened retaliatory actions when India suspended the IWT in 2025 due to the Kashmir issue, which has stopped data-sharing and arbitration (Dawn, 2025). Changes in snow and glacier melt are expected to significantly affect the amount of water available in the Indus Basin since melt runoff accounts for a large portion of overall streamflow, particularly upstream. Seasonal distribution may shift significantly, with less water available in the summer, even while annual streamflow may not change much or even increase (Akhtar et al., 2008). Fowler and Archer (2006), between 1961 and 2000, mean and minimum summer temperatures consistently decreased, but there was no discernible trend in maximum summer temperatures. According to Khattak et al. (2011), the higher, middle, and lower regions of the Indus Basin had increases in winter maximum temperatures of 1.79, 1.66, and 1.20 °C, respectively, between 1976 and 2005. Impact of climate change hydrological regime: In the Sutlej Basin upstream of the Bhakra Dam, Singh and Bengtsson

(2004) predicted that a 2 °C increase in temperature would result in a decrease in annual snow melt flow.

Figure 3: The Ganges-Brahmaputra River Basin

The Ganges-Brahmaputra River Basin

More than 600 million people live in the Ganges-Brahmaputra basin, which includes Bangladesh, Nepal, Bhutan, China, and India. The Farakka Barrage in India, which redirects Ganges water and causes salinity intrusion in Bangladesh's Sundarbans, is one of the disputed issues (Hossain et al., 2022). In the South Asian Himalayan region, it acts as the "mother river" and "cradle" of a sizable landmass (Ma, Y et al, 2024). The Ganges Water Sharing Treaty (1996), which governs flows, is in doubt because it expires in 2026. The dynamics are complicated by China's damming of the Brahmaputra and the unsolved Teesta River issue (Chellaney, 2021). Water availability is threatened by climate change, as seen by a 15% decrease in snow cover (ICIMOD, 2024). Numerous authors have examined how different facets of the hydrological regime are affected by climate change. According to Nepal et al. (2014b), a 2 °C increase in temperature would reduce the amount of snow melt that contributes to river flow in the Dudh Koshi basin by 31%, and a 4 °C increase would reduce it by 60%, transforming the river from "snow-intensive" to "dominated by rain". According to Wiltshire (2014), despite higher precipitation, during the course of the 21st century, the number of glaciers in the eastern Himalayas (Nepal and Bhutan) will decrease due to a warming climate, due to increased ablation and less precipitation falling as snow. Under warming conditions, Kumar et al. 2011) predicted that summer monsoon rainfall across India might rise by 9–16% by the end of the century compared to the baseline.

Table 1: Comparative Model: Indus vs Ganges-Brahmaputra River Basins

Dimension	Indus River Basin	Ganges-Brahmaputra River Basin
Riparian States	India, Pakistan	India, Bangladesh, Nepal, Bhutan
Primary Treaty	Indus Water Treaty (1960)	Fragmented bilateral agreements
Dispute Drivers	Upstream diversions, political mistrust, and water scarcity	Unilateral projects, ecological stress, and lack of basin-wide governance
Climate Vulnerability	Glacier melt, droughts	Monsoon variability, floods
Institutional Mechanisms	Permanent Indus Commission	Ad hoc bilateral talks, limited regional platforms
Peacebuilding Potential	Treaty resilience, joint monitoring	Regional cooperation, civil society engagement
Challenges to Cooperation	Geopolitical rivalry, data opacity	Power asymmetry, limited trust
Emerging Solutions	Environmental peacebuilding, adaptive governance	Hydro-diplomacy, youth and women-led initiatives

Analysis of Hydropolitical Disputes

Drivers of Conflict

- ***Competing Water Demands:*** Bangladesh's need for Ganges and Teesta water competes with India's diversions, while Pakistan's 80% reliance on the Indus for irrigation conflicts with India's hydropower developments (IWMI, 2023).
- ***Infrastructure Development:*** China's Brahmaputra projects and India's Kishanganga and Ratle dams change flows, which causes issues downstream (Chellaney, 2021)
- ***Geopolitical Tensions:*** Water management is politicized by India-Bangladesh disputes over the Teesta and India-Pakistan rivalry, which is made worse by the Kashmir crisis (Mustafa, 2023).
- ***Climate Change:*** With a 20% drop in Indus flows predicted by 2050 due to glacial melt and unpredictable monsoons, scarcity is made worse (IPCC, 2023).

Barriers to Cooperation

- ***Mistrust:*** 68% of stakeholders' support for collaboration is weakened by a lack of trust, which is fueled by historical rivalry and India's upstream supremacy (Hossain et al., 2022).
- ***Weak Frameworks:*** The bilateral structure of the Ganges Treaty excludes China, Bhutan, and Nepal, and the IWT lacks mechanisms for unilateral suspensions or climate adaptation (World Bank, 2022).
- ***Political Deadlocks:*** Tensions between India and Pakistan hinder SAARC and restrict regional communication (Chellaney, 2021).

Table 2: Governance Frameworks and Treaties

Treaty/Mechanism	Parties Involved	Key Features	Challenges
Indus Waters Treaty (1960)	India & Pakistan	Allocates rivers; dispute resolution via the Permanent Indus Commission	Outdated provisions; climate change impacts; unilateral projects
Ganges Water Treaty (1996)	India & Bangladesh	30-year agreement on dry season flow of the Ganges	Limited scope; lack of basin-wide approach; political tensions
Joint River Commission (Bangladesh-India)	India & Bangladesh	Coordinates water sharing and flood forecasting	Limited effectiveness; lack of transparency

By expanding access to and sharing high-quality and trustworthy data about water availability, needs, biodiversity, pollution, and other indicators of ecological health, disasters, and other risks, as well as by bringing water discussions to a wider range of stakeholders, particularly local and Indigenous knowledge holders and vulnerable communities, particularly women, people with disabilities, and lower caste groups, IRBM adopts a "basin-wide" approach to river planning (Badhuri, 2024)

Suggestions for Peace Between India-Pakistan and India-Bangladesh
India-Pakistan Peacebuilding Strategies

- ***Restore and Modernize the IWT:*** Work with impartial mediators, including the World Bank, to bring the IWT back with clauses addressing joint dam monitoring and climate adaptation (Mustafa, 2023).
- ***Data-Sharing Protocols:*** To allay concerns about water diversions, create a bilateral platform for real-time hydrological data (World Bank, 2022).
- ***Track II Diplomacy:*** To depoliticize water issues, encourage discussions between scholars, water specialists, and civic society (Mustafa, 2023).
- ***Joint Climate Projects:*** To address common risks, work together on flood early warning systems and watershed management (ICIMOD, 2024).

India-Bangladesh Peacebuilding Strategies

- ***End Teesta Conflict:*** Prioritize a bilateral Teesta agreement by 2026, employing impartial mediators to guarantee fair distribution (Hossain et al., 2022). The fair distribution of the Teesta River, which rises in the Himalayas and flows through the Indian states of Sikkim and West Bengal before entering Bangladesh, is at the heart of the long-running and delicate Teesta water dispute between India and Bangladesh.

- ***Extend and Expand the Ganges Treaty:*** Work with Nepal and Bhutan to negotiate a long-term extension of the Ganges Treaty (Chellaney, 2021).
- ***Joint Environmental Management:*** To control flood risks and salinity, form a commission to oversee the Ganges-Brahmaputra basin (IWMI, 2023).
- ***People-to-People Initiatives:*** To foster trust, promote community interactions like cooperative water festivals (Hossain et al., 2022).

Broader Regional Strategies

1. ***Neutral Mediation:*** Use the World Bank or UN to arbitrate conflicts in an unbiased manner (World Bank, 2022).
2. ***SAARC Water Forum:*** Encourage China and SAARC to work together on water (Chellaney, 2021).
3. ***Climate-Resilient Infrastructure:*** Encourage rainwater collection and micro-hydropower to lessen dependency on big dams (ICIMOD, 2024).
4. ***Open Communication:*** Disseminate environmental assessments and infrastructure plans to the public (IWMI, 2023).

Modernizing the Indus Waters Treaty (IWT) is crucial to address 21st-century challenges, including climate change, water scarcity, and geopolitical volatility. Suggested strategic roadmap for reform:

Table 3: Key Areas for Modernization in Transboundary Water Governance

Modernization Area	Strategic Actions
I. Integration of Climate Resilience	- Broaden scope to include harsh weather, monsoon variability, and glacial melt - Implement adaptive water-sharing plans responsive to seasonal changes
II. Protection of Groundwater and Environment	- Incorporate aquifers into governance frameworks - Introduce ecological safeguards for sea intrusion, salinization, and Indus Delta degradation
III. Transparency and Data Sharing	- Shift to digital platforms for real-time hydrological data exchange - Employ third-party verification to enhance trust and resolve disputes
IV. Institutional and Legal Reforms	- Strengthen the Indus Waters Commission with enforcement and climate expertise - Prioritize the Neutral Expert mechanism over lengthy arbitration
V. Equitable Reallocation and Project Approvals	- Reassess 80:20 water allocation in light of demographic and agricultural shifts - Streamline hydroelectric project approvals with downstream safeguards

VI. Bilateral Climate Dialogue	-	To depoliticize water cooperation, form a joint task group on climate and water.
VII. Global Mediation	-	Involve impartial organizations such as the UN or World Bank to help with renegotiations.
VIII. SDG Alignment	-	Connect treaty changes to the Sustainable Development Goals, particularly SDG 13 (Climate Action) and SDG 6 (Clean Water).

When it was signed in 1960, the IWT was unprecedented. However, the stability of the region is currently jeopardized by its rigidity. A climate-smart, cooperative pact is now indispensable as India pushes for the expansion of renewable energies and Pakistan faces a predicted 50% water scarcity by 2030. There is no provision for unilateral suspension or termination under the 1960 convention, which was mediated by the World Bank. Any change or withdrawal under Article XII requires consent from both parties. India's action puts the treaty in a legal limbo, which raises questions about regional stability and international law. Given that 80% of its agriculture depends on the Indus River system, Pakistan is extremely concerned. It has asked India to change its mind and made appeals to international organizations. Both nations have been informed by the World Bank that unilateral suspension is not permitted by the treaty.

Opportunities for SDG-aligned Strategies:

- **SDG 6 (Clean Water and Sanitation):** Collaborative monitoring, data exchange, and pollution management can be aligned with the targets of SDG 6 (UNOSD, (Kumar, P., & Singh, R. D., 2022)
- **SDG 13 (Climate Action):** Development of regional strategies for climate adaptation in water governance (Rasool G., et.al)
- **SDG 16 (Peace, Justice, and Strong Institutions):** Enhancing institutional frameworks such as river commissions and bodies for dispute resolution.
- **SDG 17 (Partnerships):** Encouraging trilateral discussions and partnerships between academia and policy for comprehensive basin management.

Conclusion

The Indus and Ganges-Brahmaputra basins in South Asia are vital but disputed, with conflicts fueled by conflicting demands, geopolitical unrest, and climate change. Framework fragility is highlighted by the Teesta issue, the Ganges Treaty's 2026 expiration, and India's 2025 IWT suspension. Stakeholder support for cooperation is 68%, according to secondary data, but obstacles include upstream dominance and mistrust. India and Bangladesh can turn tensions into opportunities by implementing specific peacebuilding

measures like the Teesta resolution, IWT reinstatement, and cooperative climate projects. These conflicts jeopardize regional stability in the absence of immediate diplomacy. Peace and sustained water security depend on adaptive government.

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