Title: The China Factor in Brahmaputra River Management: Implications for Indian Strategy Tejaswini Kaktikar

Abstract

China's role as the upper riparian in the Brahmaputra River Basin has far-reaching implications for regional water security. This research note provides a critical overview of China's upstream hydropower projects and water management practices between 2021 and 2025, focusing on their strategic implications for India. Drawing on academic literature, policy briefs, and peer-reviewed research, the note argues that India must respond with proactive capacity building, enhanced hydrological monitoring, and renewed multilateral diplomacy. It also emphasises the need to shift from reactive geopolitics to adaptive, basin-wide governance strategies.

Keywords: Brahmaputra River; China; upper riparian; India; hydropower; water security; transboundary governance; hydro-hegemony; climate vulnerability; river diplomacy

Introduction

The Brahmaputra River—originating as the Yarlung Tsangpo in Tibet—extends over 2,900 km, passing through China, India, and Bangladesh. It sustains more than 130 million people through its support of agriculture, fisheries, and hydropower (UN-Water, 2013). However, the river is also the site of increasing geopolitical friction, particularly due to China's strategic dam-building efforts upstream. This note builds upon previous research on Brahmaputra water security, now focusing specifically on the "China factor." The objective is to evaluate how China's hydropower ambitions and lack of formal engagement with downstream neighbours affect India's strategic and environmental calculus. A literature review of developments between 2021 and 2025 reveals escalating concerns over unilateral dam construction, data opacity, and weak transboundary frameworks. These are contextualised within India's institutional constraints and the necessity for domestic capacity building. The note also revisits the concept of water as a securitised and strategic resource, questioning how such framings influence policy outcomes and cross-border cooperation.

1. China's Upstream Strategy and Infrastructure Expansion

China's status as an upper riparian grants it significant hydrological control. In December 2024, China announced the construction of a 60 GW hydropower dam at the Great Bend in Medog County, Tibet—the most powerful of its kind (Rajagopalan, 2025). This decision sparked strategic concern in India due to its proximity to Arunachal Pradesh, a territory China also claims. China asserts the dam is a run-of-the-river project that will not disrupt downstream flow. However, the lack of a binding water-sharing treaty and limited upstream data sharing continues to concern Indian planners (Wouters et al., 2024). In addition to this mega-dam, China has continued to develop other infrastructure, including the Zangmu and Jiacha dams, as part of its clean energy transition. Yet these developments also serve broader geopolitical aims: by reinforcing Beijing's control over contested regions, they can alter facts on the ground and affect regional power balances (Barua, Baruah, & Vij, 2024). This strategy is reinforced by policy documents such as China's 14th Five-Year Plan, which emphasises both energy development and water security. Remote sensing data also suggests continued survey and pre-construction activity across the Yarlung Tsangpo, reinforcing Indian concerns of long-term strategic intent (Giordano & Wahal, 2024). New analyses from China's energy ministry project a 25% increase in national hydropower production from transboundary rivers by 2030 (Zhao & Chen, 2023), reaffirming China's expansive intent.

2. Environmental and Geopolitical Risks

The Brahmaputra is among the world's most sediment-rich rivers. The seasonal floods deposit nutrient-rich silt is essential to agriculture in Assam and downstream Bangladesh. However, large-scale damming alters these processes. The trapping of sediment behind dams can degrade downstream fertility, modify river morphology, and exacerbate riverbank erosion (Lyu et al., 2023). Similarly, regulated flows may reduce the frequency of beneficial floods while increasing the risk of sudden water release during dam maintenance or crisis scenarios.

Geopolitically, such scenarios create flashpoints. Scholars have described China's actions as a form of "hydro-hegemony"—the strategic use of water control to influence downstream states (Zeitoun & Mirumachi, 2022). During the 2017 Doklam standoff, China's withholding of hydrological data was widely interpreted as coercive signalling (Manhas & Yadav, 2024). The symbolism and strategic value of water in high-altitude zones, where military infrastructure overlaps with water engineering, adds complexity to any analysis of China's intent. Environmental risk assessments suggest that new dams in seismically active zones like the Himalayas pose significant hazards to communities downstream (Akamani, 2023). Uncoordinated dam releases during monsoon periods may exacerbate flood disasters in Assam and Arunachal Pradesh.

3. India's Institutional Challenges and Strategic Gaps

India faces significant institutional and infrastructural gaps in responding to these upstream developments. Agencies such as the Brahmaputra Board have historically been underfunded and politically marginalised. Coordination between the central government and northeastern states remains weak. In particular, Arunachal Pradesh and Assam lack sufficient hydrological stations and forecasting technology, which hampers early warning systems for floods or sudden water discharges (Giordano & Wahal, 2024).

Strategically, India's diplomatic response has largely been reactive. While India did raise concerns following China's 2024 dam announcement (Reuters, 2025), no concrete agreements followed. Even the existing MoUs for flood-season data sharing are limited in duration and scope. The absence of an institutionalised mechanism, such as a joint river commission or dispute resolution platform, continues to impede constructive engagement.

4. Water Security and Regional Resilience

UN-Water defines water security as the ability to ensure sustainable access to adequate water for human well-being and economic development, while preserving ecosystems (UN-Water, 2013). China's upstream interventions disrupt this equilibrium. However, domestic vulnerabilities also play a key role. The Brahmaputra floods annually displace thousands in Majuli, Dhemaji, and other low-lying districts in Assam. Climate change has intensified these patterns, with more erratic rainfall, glacial melt, and extreme weather events.

India's climate adaptation planning in the northeast is still underdeveloped. For example, state-level climate action plans often remain unfunded and poorly integrated into national water management strategies. Riverbank erosion, the loss of arable land, and inadequate housing for displaced communities further amplify insecurities. Research shows that adaptation capacity in Brahmaputra-adjacent regions lags significantly behind other Himalayan basins (Akther & Evans, 2024).

5. Adaptive and Decentralised Governance

Scholars increasingly advocate for adaptive water governance models that emphasise local participation, flexible regulation, and real-time data integration (Frick-Trzebitzky, Alba, & Fehrs, 2023). For India, this means strengthening local river committees, enhancing public access to water data, and mainstreaming ecological monitoring tools.

International experience shows that decentralisation can improve accountability and responsiveness. Transboundary basin management in the Mekong and Senegal River systems demonstrates the value of multilateral cooperation and stakeholder inclusion. Applying these principles to the Brahmaputra could transform the current conflict-prone dynamic into one of shared stewardship.

6. Limitations

This research note is limited by the scarcity of open-source hydrological data from China. It also does not capture classified diplomatic communications or Track II dialogues. Moreover, the analysis does not fully model the long-term climate change impacts on glacial melt or Himalayan runoff, which remain crucial for understanding future flows.

7. The Way Forward

Future research on the Brahmaputra River Basin must move beyond reactive assessments and build a systematic body of evidence around China's upstream developments. Several priority avenues can be identified.

First, applying the Underwater Domain Awareness (UDA) framework could significantly enhance basin surveillance capabilities. By fusing satellite imagery, acoustic profiling, and riverbed sensing, researchers can generate open, time-series datasets tracking Chinese dam construction, reservoir operations, and sediment retention (Das, 2021). Such datasets would help create an independent knowledge base, reducing reliance on limited or politicised data disclosures.

Second, further work is needed to model alternative discharge and sediment-retention scenarios. Coupled hydrological and sediment-transport models could simulate a range of plausible flow regulations—including run-of-river, peaking, and emergency spillway releases—to assess the potential impacts on flood timing, dry-season water availability, and downstream sediment dynamics.

Third, greater attention should be paid to mapping China's internal political economy drivers. Mining Chinese-language policy papers, energy-transition targets, provincial development strategies, and state-owned enterprise reports would clarify how energy security, grid stabilisation, carbon reduction goals, and border infrastructure converge to shape hydropower projects along the upper Yarlung Tsangpo.

Fourth, comparative cross-basin studies could yield important insights. Examining China's strategies across other transboundary rivers—including the Lancang–Mekong, Salween, and Irtysh—would reveal whether Beijing pursues a uniform legal-diplomatic template or adapts its tactics based on specific geopolitical contexts.

Fifth, multi-scalar socio-ecological assessments should be prioritised. Combining remote sensing analysis with mixed-methods fieldwork would allow researchers to track how altered flow and sediment regimes influence erosion hotspots, fisheries productivity, flood-recession agriculture, and livelihoods across India and Bangladesh.

Finally, legal scholars could examine leverage points within international norms and trade regimes. Understanding how China's hydropower development interacts with customary international water law, Belt and Road environmental principles, and World Trade Organisation subsidy regulations may identify new avenues for normative or legal engagement.

Rather than prescribing immediate policy solutions, these research directions seek to close critical empirical gaps, refine analytical frameworks, and build a resilient evidence base. Such efforts are essential for any future diplomatic initiatives or adaptive management strategies to address the evolving China factor in the Brahmaputra Basin.

8. Conclusions

This note has explored China's evolving role as an upstream actor in the Brahmaputra and its implications for India. The construction of large-scale hydropower projects and the opacity of data flows have heightened geopolitical tensions and exposed weaknesses in India's river governance. However, the situation also presents an opportunity: India can pivot towards a future-oriented, inclusive, and cooperative water strategy that balances national security with ecological sustainability. By integrating adaptive governance principles, enhancing institutional capacity, and reframing the discourse from conflict to collaboration, India can take the lead in shaping a more stable and sustainable Brahmaputra Basin.

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