

Abstract

Freshwater is a critical natural capital that is non-substitutable at the interface of economy and environment. Globally, demographic and socioeconomic drivers, along with the impact of climate change, have created unprecedented water scarcity, with demand exceeding supply. Collaborative water management can strengthen resilience and cope with risks from imminent water crises, aiding the achievement of the Sustainable Development Goals (SDGs). However, management becomes increasingly complex for transboundary rivers, a global common good that flows without obeying borders. The complexity arises from the additional layer of political economy to the economy-environment interface, encompassing transboundary rivers. Transboundary interaction among power asymmetric riparians is influenced by overlapping state sovereignty and diverse strategic interests in river utilisation. Unilateral water interventions without internalising associated external costs strain international relations between nations. The non-cooperative behaviour exists because riparian nations equate transboundary negotiations with sovereignty bargains, interpreting lost autonomous control over the river. As the entire problem relates to water-sharing, an innovative principle called benefit sharing emphasises sharing the benefits derived from the water resource rather than the water itself. Despite hydro-political tensions, benefit sharing incentivises transboundary water cooperation as it overlooks sovereignty issues, producing win-win outcomes for riparians. This thesis focuses on the relatively under-researched transboundary river basin- the Brahmaputra River Basin (BRB). The mighty river that originates in China and transcends three South Asian countries, India, Bhutan, and Bangladesh, needs more institutionalised water cooperation. Although the basin has not faced an acute water crisis to date, growing and competing water interventions have been underway since the millennium to use the river as a power consolidation mechanism, particularly by China and India. This has intensified the vulnerability risks for the basin communities. Existing literature is silent on the economic and political factors driving the interaction between power asymmetric BRB riparians. Therefore, this thesis aims to examine the existing and evolving bilateral water interaction among the BRB riparians and the prospect of benefit sharing. It deploys the state-of-the-art analytical framework of game theory to analyse riparians' strategic behaviour. Game theory is the science of rational decision-making for conceiving social situations among competing players and fits best to understand the economic and political dimensions of water management even without quantitative information. The primary objective is to promote basin-level cooperation for xi

sustainable water management. However, transboundary water cooperation being incremental, the main argument of the thesis is to induce bilateral cooperation through sharing economic benefits from the river to build the required trust and, eventually, inspire multilateral cooperation.

Against this backdrop, the thesis laid down three key objectives and raised related research questions to address those, using secondary and primary data sources. First, the scope of implementing benefit sharing was discussed by identifying the most preferred economic benefits from the river and the common strategic interests of the riparians. This revealed that despite the potential, the river benefits are sub-optimally utilised and development is impacted by basin geopolitics. The second objective is to examine if there is a correlation between hydropolitics and geopolitics in influencing Brahmaputra River interaction. It was found that hydropolitics and geopolitics are mutually reinforcing and lead to a status quo, hindering water cooperation at the basin level. Third, to see if benefit sharing can help break the status quo and create win-win outcomes, it was thought prudent to understand the factors framing riparian strategies. For this, the thesis conducted a two-player game theoretical analysis to explain and predict the strategic interests and payoffs of China-India, Bhutan-India, and India-Bangladesh Brahmaputra River interaction, based on riparian geographical configurations. The empirical game models constructed subsumes hydropolitics enmeshed in geopolitical dynamics within their respective diplomatic timeframes. The period of analysis for the China-India timeline is from 1950 to date, Bhutan-India is 1949 to date, and India-Bangladesh is 1971 to date.

Results showed varying forms of strategic interactions at the bilateral level. The power-infused payoffs or outcomes of riparian decision-making are sub-optimal, bearing a causal link with the type of bilateral relation shared. China-India interaction is on one extreme of the BRB continuum with a strictly dominant non-cooperative strategy due to the greater influence of geopolitics. Bhutan-India interaction is on the other extreme, with a strictly dominant cooperative strategy due to mutually beneficial hydropower trade and strong mutual trust. With a weakly dominant strategy, India-Bangladesh leaves scope for evolutionary cooperation through inland water navigation. Keeping with the main argument of promoting basin-level cooperation through sharing economic benefits of the river, the thesis concluded with the possibility of sub-basin cooperation between India, Bhutan, and Bangladesh in hydropower and inland navigation sectors. Given its emerging position, India can assume a leadership role in the BRB by initiating sub-basin cooperation with Bhutan and Bangladesh as a climate adaptation, water-energy-food security, and disaster risk mitigation strategy. The Brahmaputra,

for India, holds both interests like economic development and values of shared history and culture. Such a move by India can be instrumental in retaining the trust and confidence of its close South Asian allies, amidst geopolitical competition with China. India's more favourable bilateral relations with Bhutan, and Bangladesh, marked by warm diplomatic relations without any geopolitical complexities, increase the scope for such an arrangement. India and Bhutan already share a mutually beneficial relationship through hydropower cooperation. Besides, Bangladesh acknowledges India's wholehearted assistance to its independence, and both countries have always supported each other in every forum. Under its 'Neighbourhood-First Policy', India's water diplomacy holds significance for a better and secure future in South Asia

