# Fostering Inclusive Development in the Brahmaputra River Basin: Harmonizing Nature Conservation and Human Progress

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The transboundary basin of Yarlung Zangbo–Brahmaputra–Jamuna river (henceforth, the Brahmaputra River Basin) originates in the Chemayungdung mountain ranges in China's Tibet Autonomous Region (TAR), flows through parts of India, and ends in Goalundo Ghat in Bangladesh (see below figure). The river is a lifeline for many. It provides food, water, and other resources to local communities. It is home to a plethora of wildlife, including the endangered Ganges River Dolphin (*Platanista gangetica*).

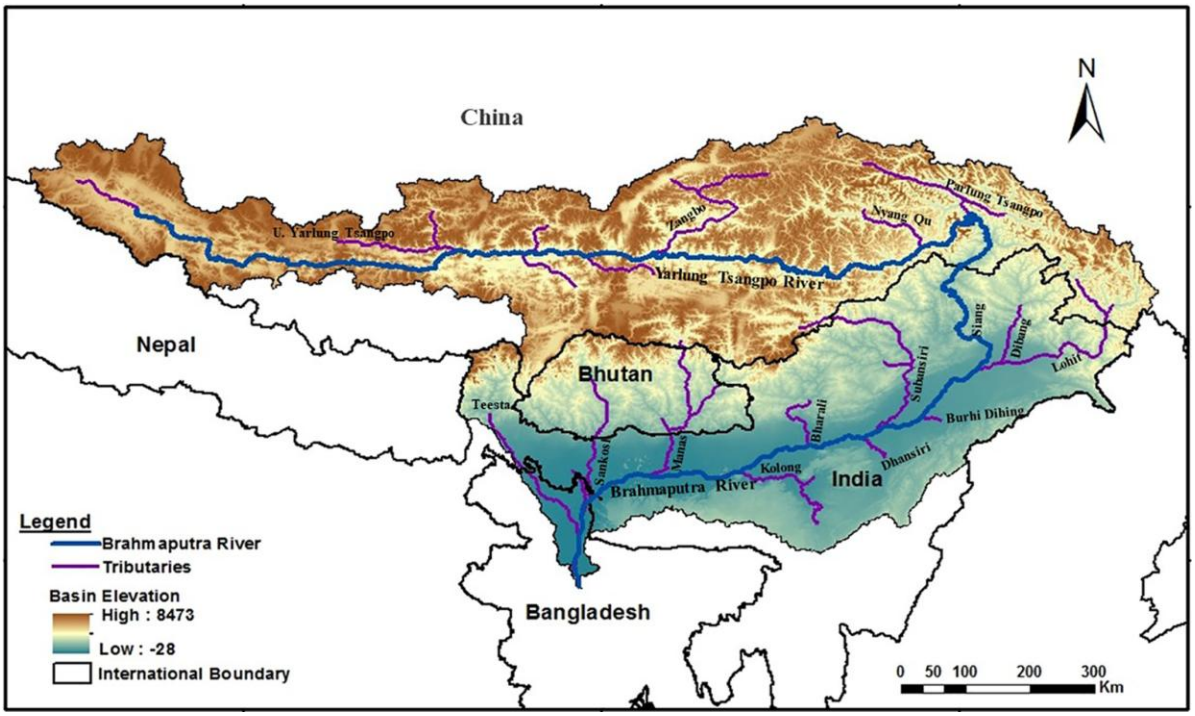

Figure. Map of Brahmaputra River Basin. Source: Indian Institute of Technology, Guwahati, India.

The river, with a total length of 2880 km in the basin countries, could intensify the inland water transport industry. Expansion of the inland water transport in the perennial Brahmaputra River Basin is critical as it is energy efficient and has a low carbon footprint, supporting the idea of enhanced climate consciousness, an emerging reality as countries strive to meet their targets to achieve carbon neutrality.

There is a bilateral Protocol on Inland Water Transit and Trade (PIWTT) on the Brahmaputra between India and Bangladesh. This protocol was first signed in 1972. It was last renewed in 2015 for five years with a provision for its automatic renewal for a further five years, providing long term assurance to various stakeholders. The PIWTT between India and Bangladesh allows mutually beneficial trade arrangements for the use of their waterways for the movement of

goods between the two countries by vessels of both countries along the notified Indo-Bangladesh Protocol (IBP) routes.

Inland water transport is crucial for the movement of goods and passengers across rivers including the transboundary ones. It creates opportunities for regional socio-economic development through trade, tourism, promoting diplomatic ties and cultural exchanges. On the downside, rivers are often modified to cater to the needs of inland water transport, and the Brahmaputra River Basin is no exception. These minor or significant developments alter the attributes of the river and impair the river ecosystem's functioning.

Importantly, in the Brahmaputra River and its tributaries, inland water transport threatens the population and habitat of the endangered dolphin species. Inland water transport creates loud underwater noises that adversely affect the dolphins, which depend on echolocation to find their prey. Dredging (riverbed excavations) affects the riverbed, home to many of its prey populations. Various waterways' developmental activities affect the dolphins' physiological and psychological health. Studies by the Assam Inland Water Transport Development Society (AIWTDS) and the Bangladesh Forest Department note that the IBP routes along the Brahmaputra River overlap with previous dolphin sighting records across the region. Moreover, with a vision of increasing inland water transport potential, the intensity of vehicular traffic in the Brahmaputra River is bound to increase. Therefore, given the soaring risks of inland water transport on the overall river ecosystem and allied stakeholders, a long-term provision for safeguarding nature-society interactions must complement the essence of regional developmental strategies.

The question is whether developing inland water transport in the Brahmaputra River Basin is ecologically sustainable. A satisfactory answer to this question will be for inland water transport to include environmental protection and consideration of the needs of the people who live along the banks of the river by bringing transformations in the basin. Transformation refers to fundamental changes in socio-technical-ecological systems that lead to new patterns of interactions and outcomes. Transformations are dynamic and often altered under undesirable circumstances to conform to the current reality of interaction between humans and their environment. In this context, water transformations must augment the needs of multiple stakeholders, such as transporters, technocrats, environmentalists, and local community members, for prioritising a consensual understanding of the impacts of inland water transport on nature-society interactions in the Brahmaputra River Basin. Thus, a transformative change is imperative *via* co-production and using relevant modern technologies to support and accentuate sustainability in the Brahmaputra River Basin. These transformations can bring balance to nature-society interactions in the basin.

In an initiative to bring these transformations to the Brahmaputra River Basin, the Indian Institute of Technology Guwahati (IITG), an institution located at the bank of the Brahmaputra in north-eastern India, has embarked upon a study focusing on the impacts of inland water transport on the Brahmaputra River. The aim is to understand the complex interplay between political, economic, and ecological factors contributing to interactions in the river related to inland water transport. In this context, a two-day workshop was held in New Delhi, India, in April 2023 involving project stakeholders, such as civil society organisations, media professionals, traders, academicians, and government and international organisations from India and Bangladesh. The workshop found that stakeholders need to understand the impacts of inland water transport on the river's ecology. Therefore, the workshop proved pivotal in sensitising stakeholders to transform inland water transport towards ecological sustainability.

The project is part of a larger initiative called Trans-Path-Plan: Water Transformation Pathways Planning, involving eight countries worldwide and is funded by the Dutch Ministry of Foreign Affairs. The future intentions of the project are to highlight the power dynamics prevalent in institutions and policies that can directly or indirectly affect the decision-making processes necessary for effectively balancing the needs of multiple stakeholders to reduce adverse impacts on nature-society interactions. Moreover, IITG, through this project, aspires to be instrumental in expanding the criticality of using modern technology, such as AI-driven monitoring systems, sensors, and early warning systems that can aid in safeguarding aquatic wildlife, specifically dolphins, from the impacts of inland water transport.