



AN ANALYSIS OF TRANSBOUNDARY WATER RESOURCES: A CASE STUDY OF RIVER BRAHMAPUTRA

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Abstract: The need for water management on hydrological boundaries is mainly triggered by the growing competition for water or by the need to cooperate in an upstream downstream relation. For an institution operating on political boundaries, not coinciding with the boundaries of the river basin, it is very difficult to allocate or prioritise water or carry out flood control measures. A system of water management on political boundaries will induce the respective authorities to either monopolise the water supply sources within its area and to transfer the problem of flooding to downstream.

In this article it is attempted to explore the major transboundary issues that need to be addressed in the whole Brahmaputra River basin. Sharing of resources, sharing of basic data and information and protection and preservation of ecosystem are identified as three major issues. In this context, controversial legal issues between the riparian nations in the past were also analysed which has triggered the scope for integrated approach to manage the Brahmaputra River basin. In the later part of the article, a critical analysis was made to understand the principles, approaches and instruments to address the above problems. Finally, some legal materials are presented which could be used as a basis for solving the major river basin issues.

1. INTRODUCTION

River basins are the natural systems for our water resources. The best way to deal with water resources is to recognize the boundaries of the natural water systems rather than the administrative boundaries. However, when a river basin is intersected by frontiers between states or countries, administrative boundaries can no longer be ignored, because the legislation, the administration, the water policies and the standards are generally different on either side of such boundaries within the same river basin. The situation becomes more complicated when the river basin covers more than two neighboring states and transboundary issues and items are to be addressed. In this paper, the river Brahmaputra has been chosen as a transboundary river and attempt has been made to identify and analyse the different

problems associated with the water sharing issues between the riparian states.



Fig. 1. Map showing the River Brahmaputra

The River Brahmaputra, originates from the Manas Sarobar glacier on the northern slope of the Himalayas in Chinese Tibet, and is called as Tsang-Po. It then flows into the Indian states of Arunachal Pradesh, Assam and Meghalaya and then it enters Bangladesh where it is called river Jamuna till it joins river Ganges. The total length of the river from the source to the sea is about 2997 km. The lengths of Brahmaputra River that flows in each country are presented in Table 1.

Table 1. The lengths of Brahmaputra River that flow in each country

Country	Length of Brahmaputra River (km)
China	1,627
India	1,130
Bangladesh	240

The river defines by its diverse terrain subject to regular earthquakes, natural disasters, and other changing conditions. Due to heavy rainfall in the catchments areas and inadequate capacity of the river channel to contain the increased flow, floods are common in the lower reaches especially in Assam, Meghalaya and West Bengal of India and in the parts of Bangladesh. The discharge from the tributaries, is heavily silt-loaded during floods, which when deposited in favourable environment, create more problems of floods. Large areas are inundated every year, embankments, spurs etc., were severely damaged each time and heavy expenditure has been incurred to maintain them. Some figures related to discharge of Brahmaputra are presented in Table 2.

Table 2. Discharges in Brahmaputra River

Description	Discharge in m ³ /s
Annual discharge	19,200
Highest discharge (recorded on 1962)	72,460
Lowest discharge (recorded on 1960)	3,280

2. BACKGROUND

The Brahmaputra is part of the third largest water resources in the world. Yet, the region has one of the lowest per capita water availability because of the huge population of half a billion people living within the basin stretching from Tibet to the southern region of Bangladesh. Increasing population and accelerating economic development activities in the basin have now made the sustainable water management of the region even more critical than in the past. Moreover, the sharing of water resources of the Brahmaputra river basin has been a long matter of dispute due to the absence of a well-coordinated process of sharing and prioritising diverse uses within the riparian countries.

In 1980, the Indian government established unilaterally the Brahmaputra Board as a statutory body under the Ministry of Water Resources to plan for and implement projects to harness the river for hydropower, flood control, and economic development. It is estimated that the Brahmaputra's power potential could provide about 48,000 MW which constitutes as much as 30 % of the total hydropower reserves of India. Currently there are no large dams on the river Brahmaputra in the Indian Territory. But the Indian Government has been working for implementing the plan of diverting water from Brahmaputra and Ganges basin through linking the rivers. Water would be diverted to the water deficit Haryana, Rajsthan, Gujarat and the southern regions. This initiative of diverting water from 'surplus' eastern rivers to 'deficit' regions of India is a matter of grave concern for riverine Bangladesh. Concerns are equally made on both India and Bangladesh over the much-published Chinese mega dam project across the river Tsang-Po and diversion of river water to the Gobi region. The proposed Indian River linking project and Chinese dams are supposed to be completed before 2013 and

2009 respectively. The unilateral decisions to construct such huge projects by the respective countries, if implemented could adversely affect not only the hydrodynamic and hydrological cycle of the whole Brahmaputra river basin but will also raise several social and political issues in the whole region. In this context it is worthwhile to discuss major transboundary problems (issues) that need to be addressed in the whole Brahmaputra river basin.

3. THREE MAJOR PROBLEMS AND REASONS BEHIND SELECTING THEM:

3.1 First and most vital problem is sharing of the water resources

The sharing of river resources is most complex and far reaching consequences issues between the three riparian states and related to that, how to augment the flow of the depleted river. One example is the proposed construction of an ambitious multipurpose hydroelectric dam of 3,000 MW by China in Tibet across the river Tsang-Po and the diversion of irrigation water to the Gobi region. Diversion of river water in such a huge quantity has a negative impact on the downstream interest. This project will adversely affect India's proposed river linking project, which highly depends on the average discharge of the river from upstream basin. Moreover, both Indian and Chinese project will jeopardize Bangladesh's right to use the resources as per international law as a riparian state. Thus it is really a big challenge to find an amicable solution between the riparian countries to share the resources on the principle of equitable and reasonable utilization (Article 5¹ & 6²) and Non-discrimination (Article 32³).

¹ Article 5 in Convention on the Law of the Non-navigational Uses of International Watercourses, 1997: Equitable and reasonable utilization and participation.

Reason: Mutual cooperation on river waters could significantly improve the lives of millions of people. In the case of the Brahmaputra, it is not so much a question of sharing the waters as of tapping the waterway profitably for mutual benefit, primarily for transport, commerce and industry. One example: through cooperation, Assam's famed tea could be shipped downstream to Bangladesh and sent to other parts of the world. Oil from the Numaligarh refinery, can be exported in river barges to meet Bangladesh's energy needs. Only wise and efficient measures for the utilization of such river resources could generate employment and revive the economies of marginalized communities of the region.

3.2 Second problem is the sharing of basic data and information

Every year thousands of life and properties were damaged due to flash floods of the river Brahmaputra and its tributaries mainly in the Indian states of Assam, Meghalaya and West Bengal and in Bangladesh. This is due to intense rainfall in the upper reaches of the basin, steep topography, fragile land, deforestation and urbanization. Large fresh agricultural areas and natural forests are inundated every year.

Reason: Saving of life and properties against the flood can be made only possible by making an effective and efficient flood forecasting and warning mechanisms (Protective and preventive measures). Presently, there is very limited arrangement for hydro meteorological, and land use related data sharing between these three countries. Sharing of such data can assist in

² Article 6 in Convention on the Law of the Non-navigational Uses of International Watercourses, 1997: Factors relevant to equitable and reasonable utilization.

³ Article 32 in Convention on the Law of the Non-navigational Uses of International Watercourses, 1997: Non-discrimination.

flood forecasting and warning which ultimately provides ample time and opportunity to safeguard life and properties.

3.3 Third outstanding problem is the protection and preservation of Ecosystem

During the monsoon, soil erosion is severe in the hills and uplands of the catchments area and the river carries a substantial amount of Sediments, which will impact on fish migrations and changing the composition of riparian ecosystems.

Reason: Common waterway modifications - such as the construction of dams and irrigation channels, inter-basin connections and water transfers - can impact on the hydrology of freshwater systems, disconnect rivers from floodplains and wetlands, and decrease water velocity in riverine systems. This, in turn, can affect the seasonal flow and sediment transport of rivers downstream, impacting on fish migrations and changing the composition of riparian ecosystems. Bangladesh, being in the downstream and delta portion of such a huge watershed, has been most vulnerable to the water quality and quantity that flows from upstream.

4. CONTROVERSIAL LEGAL ISSUES BETWEEN THE RIPARIAN: SCOPE FOR INTEGRATED APPROACH

Regional cooperation based on river basin level appears difficult to come by in South Asia. In the past, Political conflicts between the giants, especially between India and Pakistan (Bangladesh was part of Pakistan till 1971) and between China and India (from 1962 regarding the boarder issues) did not leave much scope to come closer and talk in regional forum for water sharing and mutual benefit issues. Some bilateral agreements had been reached, but fewer efforts were made on integrated approach of sharing the resources. Two bilateral agreements are explained below for the relevant discussions.

When India built the Farakka Barrage in the 1960s, Bangladesh watched helplessly as it wreaked havoc. In the dry season, the barrage blocked the natural flow of water into the country, causing drastic water shortages, and in the rainy season, sudden water releases caused floods and extensive damage, including the loss of property and human lives. India and Bangladesh signed a 30-year water sharing agreement in 1996. The principal objective of the agreement is to determine the amount of water released by India to Bangladesh at the Barrage. The water-sharing agreements aim to make “optimum utilization” of the waters and rely on the principles of “equity, fair play and no harm to either party (article 5⁴, 7⁵ and 8⁶).” However there is a growing dissatisfaction within Bangladesh about the water sharing.

In 2000, a landslide in Tibet caused a dam across the river Tsang-po to collapse, unleashing a 26-metre wall of water that destroyed every bridge on the Siang, in the Indian border state of Arunachal Pradesh. The water then rushed through Assam and, within a week, devastated parts of Bangladesh. Human casualties and damages to property were extensive. Meanwhile, India and China signed an MOU on 17 January 2002 on sharing of hydrological information on the Brahmaputra River basin. The MOU was based on the principle of “regular exchange of data, general obligation to cooperate and not to cause significant harm to either party (article 7⁷, 8⁸ and 9⁹).” Such

⁴ See not 1 above.

⁵ Article 7 in Convention on the Law of the Non-navigational Uses of International Watercourses, 1997: Obligation not to cause significant harm.

⁶ Article 8 in Convention on the Law of the Non-navigational Uses of International Watercourses, 1997: General cooperation to cooperate.

⁷ See not 5 above.

⁸ See not 6 above.

⁹ Article 9 in Convention on the Law of the Non-navigational Uses of International Watercourses, 1997: Regular exchange of data and information.

information is expected to help India anticipate the severity and better handle floods help in flood forecasting and give a better understanding of the river system.

5. WHY THE ISSUES APPEAR ONLY IN BILATERAL LEVELS?

Conflicting interest: The consumptive use of river water to irrigate Chinese mainland by constructing multipurpose dam across the river Tsang-po pose hindrance to India's river linking project. Similarly both these mega schemes will create severe water scarcity in the downstream Bangladesh.

Lack of trust and good neighbourness: India and Pakistan engaged in major wars three times since their independence (from 1947, Bangladesh was part of Pakistan till 1971). China and India also fought a war in 1962 regarding the borders of Arunachal Pradesh through which the river Brahmaputra flows. Thus they did not leave much scope to come closer and talk in regional forum for water sharing.

Different political set-up: India being the world's largest democratic country and relatively politically stable could pressure more to downstream Bangladesh which is less politically stable and struggling hard to meet the food for its overpopulated people. Similarly, communist set up China, being an upstream riparian and newly emerging super power can work in its own way to implement the river project.

6. PRINCIPLES, APPROACHES AND INSTRUMENTS TO ADDRESS THE PROBLEMS: A CRITICAL ANALYSIS

- Since there are more than two countries with unequal power strength, involved in this situation, it is better for one of them (especially Bangladesh, the most powerless) to put an initiative for third party as a mediator.

- The best third party available, considering China and India as the other two riparian, is UN. This is accordingly with the UN aim, which is stated in Article 1 of UN Charter¹⁰.
- To make the appearance of third party become effective, it will be better to have a committee where all the countries could talk. To have a real effective basin committee Bangladesh could join with China for a strategic alliance on water sharing. They together could put a pressure on India for its future river linking project. India will not bully China and willing to talk about water sharing because China situated upstream of India and has power more or less equal with India. If China continue proceeds its hydropower project, India will have no future for its river-linking project. That is why if Bangladesh wants to have their share on water, it should push India to come to a negotiation table by using pressure, created by China. At least Bangladesh could delay the Indian project and establish a basin committee for Brahmaputra.
- When talking about water sharing there are some principles that could be use by each riparian country to support their argument. But, as we could see in those principles, there are some considerations that must come first. Those considerations are: equity, future generation and environment. Especially for environment, the importance of Brahmaputra basin is not only left for those three riparian countries, but also for the whole world. If this issue emerges to the surface of the conflict, there will be an international concern that will put a great pressure to start a talk. Bangladesh as the most powerless country and unfortunately situated at the river mouth

¹⁰ Article 1 of UN Charter: UN is aims at the peaceful settlement of disputes and cooperation between states to solve economic, social, cultural and humanitarian problems.

down stream could bring this issue to get an international interest.

- Each country has their absolute territorial sovereignty that generates their right on water use within the country border. Unfortunately river basin border has nothing to do with the country border. This makes a situation where there is only one basin with limited, or we could say fixed resources of water, teardown by some countries which try to get their own right on those resources. At the same time, there is another principle that speaks about the absolute integrity of state territory. This principle tells that a country has its own right to ensure no other country to use the resources, (in this case, water) in such a way that could harm the physical integrity of the state. For Bangladesh this principle is very important. The river mainly shaped physical form of Bangladesh, and if some major changes take place on the river regime, it could disturb the physical territory of Bangladesh. For an instance, if less water flows to downstream due to water abstraction and more sediment comes due to the flushing from upstream during floods, then, there is a strong possibility of changing the land shape in Bangladesh gradually and even dramatically (theory based on hydraulic and hydrologic science). This situation will limit the sovereignty of India and China to do such a thing that could harm physical territory of Bangladesh. Thus, the only sovereignty that possible to apply among these riparian is restricted territorial sovereignty. To achieve this sovereignty, the only possible way is to start a dialogue in a legal and solid committee.
- But there are also some historical rights that give both India and Bangladesh same right on the water. That is people of either country have been living and cultivating in the basin for thousand of years. This historical reason left China outside, because the idea of bulk water using in Chinese territory is the recent technological development. On the other hand, both India and Bangladesh have the same historical right. But the historical right is for the food production and navigation, not for total consumptive use like the river-linking project. This could ban Indian right on water use for that ambitious project. Bangladesh could claim that the historical right should be based on their ancestral way of water use. Maybe this is not a very strong reason, but at least it could raise a new discussion on historical water right. By using this argument Bangladesh could slowdown the river threatening process by India and China.
- In recent times, people might argue that sovereignty of a country for using the water resources is an outdated concept. This is related to the fact that the river basin boundaries do not coincide with the political boundaries. Usually in a basin, or at least some part of the basin, communities that originally are bound together in the past have been living. Later on, they were splitted under different administrative boundaries mainly due to colonization. Even though, those people who lives in the same basin usually still have a feeling that they are some how not so different to each other. This situation could be use to pull the trigger of human brotherhood feeling among them. Bangladesh could use this argument to start an approach in managing river basin dispute by promoting community approach. Community approach could be use as a starting point to establish a committee in river basin level. This approach is using community who live in the basin as a basis for resources management. The government of India as well as China might not be so interested with this approach. But the acceptance could be different in community level. Local people, who disregard the political boundaries, will have different point of view. When the river basin committee establish this element, could become a strong point.

- To get an equitable share of water, each country will lay their argument on the basis of minimum flow rule. By looking at the situation, where the countries are not equal in terms of power and availability of the other resources, Bangladesh as the most dependent country on the Brahmaputra flow, could initiate a rule of minimum flow with some adjustment. The aim of the adjustment is to get a fair and balance share of flow regarding the nature and economic condition.

As a conclusion, there are some legal materials that could be use as a basis for solving the river basin dispute. The problem is how to make those legal materials become grounded in the land of reality. Bangladesh could seek a worldwide cooperation among countries, which are, suffered from the abuse of water sharing by the other countries. Using this movement, they could turn some principles into a worldwide custom. At the end, all countries or at least most of the countries will accept the custom and left the stubborn country alone. At that point, the sharing of water in an international river basin will come to a legal arena.

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