Reviving Trade through Waterways

Navigating Livelihood Benefits in Ganga and Brahmaputra

CUTS International

#1802

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CUTS Centre for International
Trade, Economics & Environment

Abbreviations

BBIN	Bangladesh, Bhutan, India, Nepal
BIWTA	Bangladesh Inland Water Transport Authority
BRTA	Bangladesh Road Transport Authority
COFFED	Co-operative Fisheries Federation, Bihar
CSF	Civil Society Fund
DRDA	District Rural Development Agency
FGDs	Focus Group Discussions
GBM	Ganges-Brahmaputra-Meghna
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IUCN	International Union for Conservation of Nature
IWs	Inland Waterways
IWAI	Inland Waterways Authority of India
KII	Key Informant Interview
MoU	Memorandum of Understanding
NRGs	National Reference Groups
PGVS	Poorvanchal Grameen Vikas Sansthan
PIWTT	Protocol on Inland Water Trade and Transit
RGVN	Rashtriya Grameen Vikas Nidhi
RSPN	Royal Society for Protection of Nature
RSTA	Road Safety & Transport Authority
SAARC	South Asian Association for Regional Cooperation
SAWTEE	South Asia Watch on Trade, Economics & Environment
SHGs	Self-help Groups
SoPs	Standard Operating Procedures
STA	Surface Transport Authority

Preface

Bipul Chatterjee
Executive Director
CUTS International

Owing to constraints related to physical infrastructure and absence of coherent policies, South Asia remains the least connected regions of the world. Enhancing intra-regional connectivity is one of the major agenda items of the South Asian Association for Regional Cooperation (SAARC). Alas, nothing much happened on that platform.

Therefore, the BBIN (Bangladesh, Bhutan, India, Nepal) sub-regional cooperation has been envisaged to overcome the political intricacies of SAARC so as to realise better integration among these neighbouring countries. This sub-regional group started its cooperation with a landmark agreement on seamless movement of motor vehicles. Once the implementation of this agreement starts, it is expected that it will encompass other areas of connectivity such as railways, waterways.

In this respect, it is important to remember that historically the waterways of the Ganga and Brahmaputra rivers have been instrumental in flourishing trade in the Indian sub-continent with the farther east. The new political boundaries drawn with the end of the British era resulted in a major setback to the vibrant river transportation system that existed in this sub-region.

If effectively revived, being cost effective and environment-friendly, inland water transport can play a significant role in reducing logistics cost in goods transportation. Though water transport is the major means of transport in Bangladesh its scope is explored only to a limited extent in India. With proper inter-modal/multi-modal linkages land locked countries like Bhutan and Nepal can also benefit from the development of inland navigation in India and Bangladesh.

Keeping this context in mind, CUTS International undertook a project entitled 'Expanding Tradable Benefits of Trans-boundary Water: Promoting Navigational Usage of Inland Waterways in Ganga and Brahmaputra Basins' with support from The Asia Foundation under the Civil Society Fund component of the South Asia Water Governance Programme of the UK's Department for International Development.

Its aim was to understand laws, policies and institutions governing inland waterways in BBIN countries from the point of view of trade and livelihoods. Thus, diagnostic studies were conducted to analyse the functions and governance of existing policies, laws and regulations governing inland waterways (IWs) in Ganga and Brahmaputra basins. The

purpose was to understand the ground realities/needs of different stakeholders including civil society groups and community-based organisations to inform and create an alternative policy discourse for enabling reform measures towards better governance of IWs.

The findings presented in this report have been compiled from country-specific diagnostic studies. It provides an overview of the institutional framework governing waterways, opportunities and challenges with respect to inland navigation in BBIN countries as well as the stakeholder perceptions regarding environmental, livelihood and gender implications of developmental initiatives being undertaken in inland water transport sector.

It has come up with recommendations like developing an integrated strategy for closer cooperation within BBIN countries on cross-border navigational use of IWs, engaging local river dependent communities in river training, disaster management, freight handling and other services to supplement their livelihoods and developing ports with multimodal connectivity for seamless transportation.

This report is unique in bringing the BBIN perspective of inland navigation and larger connectivity in the sub-region complemented with an angle of livelihood of riverine communities. As we strive to achieve the Sustainable Development Goals (SDGs) of building sustainable resilient infrastructure, protecting water related ecosystems and creating decent jobs, inland water transport sector seems promising in achieving them. This report is a milestone in this trajectory as it looks at the prospects of inland water transport as an ecosystem service and how its sustainable management can realise economic growth and improve livelihoods.

I thank The Asia Foundation for supporting this project and our partners Unnayan Shamannay, Bangladesh, Royal Society of Protection of Nature, Bhutan and South Asia Watch for Trade, Economics and Environment, Nepal for implementing it in respective countries. I also thank Dr AK Enamul Haque, Professor of Economics, East-West University, Dhaka for compiling this report and my colleagues who have worked sincerely for the successful completion of this project.

Executive Summary

Spanning a total area of over 1.7 million km^2, Ganges-Brahmaputra-Meghna (GBM) river basins (one of the largest river basins in the world) have cradled civilisations since time immemorial. These perennial rivers hold cultural, religious, economic and political importance for Bangladesh, Bhutan India and Nepal, also known as the BBIN sub-region within South Asia. Apart from sharing a rich cultural heritage, war-torn past and huge heterogeneous resource endowments, this sub-region possesses various economic complementarities for the common benefit of people at large.

Unfortunately, with the creation of new geographical boundaries this region has been stymied by several geo-political issues that have exacerbated the mistrust between these neighbouring countries on several issues, transboundary water sharing being the most contentious. Consequently, this region had remained paralysed in framing a regional framework on sharing of transboundary river water and has ignored the prospects of using rivers as a flourishing means of connectivity within and across national borders.

Since past, GBM rivers have been used as transportation routes in thriving trade and commerce within/across the BBIN sub-region. However, during the 19th century their significance deteriorated as more impetus was concentrated in developing road and rail infrastructure. But over the time infrastructural impetus on land-based transportation system has resulted in sub-optimal efficiency due to issues related to over-saturation, economies of scale and environmental sustainability.

Considering several challenges in the present transportation system, off late, this sub-region has been witnessing a new era of strengthened cooperation on promoting connectivity through transboundary waterways which has led to signing of several bilateral and some regional agreements with between member countries on trade and transit. Nevertheless, this region is thwarted by multiple governance, infrastructural, financial and socio-economic challenges that need immediate resolution to reach on a common ground for better integration.

Against this background, CUTS implemented the project entitled *Expanding Tradable Benefits of Trans-boundary Water: Promoting Navigational Usage of Inland Waterways in Ganga and Brahmaputra Basins* which was envisaged as part of the CSF programme of The Asia Foundation for supporting civil society and community engagement on transboundary water issues in the South Asia region.

This project aims to contribute to improving institutions (i.e. policies, laws, and regulations) for IWs governance with particular emphasis on transport connectivity and livelihood in the BBIN region. As part of this project, CUTS conducted a diagnostic study in all four countries so as to identify and analyse the function of policies, laws and regulations taking into account the needs

of local communities connected to these waterways, particularly their livelihoods. This synthesis report is an abridged version of the main reports presented by CUTS and its partners and captures the key findings of the country wise diagnostic studies conducted in all the four countries.

This report is divided into eight chapters. Chapter 1 and 2 introduces the theme of the project and provides a description on the issues of waterways development from the angle of navigation, trade, tourism, environment and livelihood in the four BBIN countries. Chapter 3 delineates the opportunities and challenges related to development of IWs that are specific in nature for the four countries.

Inland water transport requires low public investment and is best suited for the transportation of oversized and bulky products. It also provides livelihood benefits to the community in boat making industry, freight handling, river training, etc. However, various environmental concerns like damage to spawning grounds/sanctuaries due to dredging, river water pollution due to oil spillage and waste disposal have posed some challenges in the development of waterways in Bangladesh and India.

Chapter 4 provides a synoptic description of institutional, legal and regulatory framework of IWs in each of the four countries and also looks at the regional mechanisms devised for the same. From an institutional perspective, Bangladesh and India has set-up Bangladesh Inland Water Transport Authority (BIWTA) and Inland Waterways Authority of India (IWAI) for managing navigational development of waterways in their respective countries.

On the other hand, Bhutan and Nepal has no dedicated institutional structure to consider the prospects of developing its rivers for navigation. Consequently, these two countries lack necessary legal mechanisms whereas India and Bangladesh have a series of acts, polices, rules and regulations concerning IWs as a whole.

Chapter 5 and 6 provides statistic related to trade through waterways and looks at future of trade through this means of transportation from a national, bilateral and regional perspective. Main products transported through National Waterway-1 (1620 km from Haldia to Allahabad of Ganga-Bhagirathi-Hooghly river system) of India are fly ash, iron ore, coal, steel, building material, tyres, rock and stones, oil, sand, food items, timber and aluminium.

Interestingly, major products transported through National Waterway-2 (891 km from Dhubri to Sadiya) are food grains, electrical and transmission equipments, fertilisers, building material and bamboo. Goods transported through the India Bangladesh protocol route include coal, fly ash, steel coil, wire, rod, iron ore, food items and over dimension cargo.

Even though cargo and passenger movement is already taking place within and across Bangladesh and India but intra-regional and inter-regional trade via waterways is not very encouraging at the moment. Nonetheless, more infrastructural investments for the development of multimodal and intermodal terminals along NW-1 and NW-2 in India coupled with signing of bilateral agreements on the use of country specific ports between Bangladesh-Bhutan and India-Bangladesh has raised expectations to make this mode of connectivity a successful entry point to flourish regional trade across and within the BBIN sub-region.

Chapter 7 consolidates the perceptions of local stakeholders and presents their views on waterways development from a socio-economic perspective. Development of IWs is likely to conflict with

environmental concerns in all the four countries and specifically for Bangladesh and India in terms of accidents, oil spills, waste discharge, turbidity changes and loss of spawning grounds for aquatic life with greater movement of vessels and further waterway developments including dredging concerns.

Furthermore, a cumulative impact of these is also a recipe for disaster to the local communities living around the rivers, specifically the fishermen and agrarian communities that depend on the river beds for their overall sustenance. Communities' concerns are more relevant in Bangladesh and India but the scope of waterways development is likely to open up employment opportunities for these groups of people if more impetus is put to promote regional and domestic river-tourism whose spillover effects are also likely to benefit Bhutan and Nepal as well. Moreover, it is important to take into consideration gender implications of waterways development with regards to safety of women once more vessels ply on the dedicated routes.

Lastly, Chapter 8 tries to chalk out common grounds of issue-specific development for each of the four countries and put forwards a list of recommendations considered necessary for promoting inclusive and sustainable development of IWs in the BBIN sub-region.

Apart from several challenges with regards to technical issues for navigation development (high sedimentation rate, complex river characteristics, seasonal nature of river, depth maintenance, unfeasible terrains for navigation and so on), environmental, trade and other communities issues, sustainable development of IWs in the BBIN sub-region will be an harbinger to promote connectivity within and across BBIN if the challenges delineated in this report are adequately addressed while opportunities (presented below) are diligently worked upon by the four countries.

This includes:

- Development of IWs for navigation using an integrated strategy with active participation of BBIN countries;
- Development of a protocol for movement of ships carrying goods on specified protocol routes keeping in view fish sanctuaries, ecologically sensitive areas, bio-reserves and community use of rivers for livelihoods;
- Development of protocol for moving tourists across boundaries and engaging local communities for cultural and nature-based tourism;
- Fostering port of calls that are service-friendly for seamless transfer of goods from one mode to other modes (like onto road and/or rail);
- Development of protocol for disposal of wastes from ships and boats in order to reduce environmental impacts;
- Modification of customs and immigration protocols in order to promote navigational use of rivers across borders;
- Syncronisation of dredging activities across borders and establishment of joint commission between countries sharing the same river;
- Allowing licenced small and mechanised boats to transport goods on short distances across borders to promote local trade across borders;
  - Taking into cognizance conventional rights of the riverine people while developing protocols for cross-border navigational use of IWs to avoid alienation of the local marginalised communities; and
  - Framing strategies for localised river-dependent communities by engaging them in river training, disaster management, freight handling and other services will supplement their livelihoods.

1. Introduction

The transboundary river basins of GBM support the life and livelihoods of over 600 million people. Despite being endowed with fertile soils and other natural resources, GBM basins are marked with poverty and also have a very high density of population. Historically, the GBM rivers had played significant role in flourishing trade and commerce in the region.

However, the new political boundaries created by the partition of British India into independent states, the 1965 Indo-Pakistan war, and independence of Bangladesh in 1971 gradually traversed the region into a territory of disintegration. Movement along the rivers across borders became limited and national priorities took over the regional agenda. This, together with development of roads and highways and railways reduced the role of rivers in terms of providing connectivity for trade and commerce within the region.

However, as domestic economy in each of the countries in the GBM basin grew (i.e. BBIN), these countries gradually realised the need for re-integrating their economies and began discussing a sub-regional group. As such, in 2015 BBIN signed a Motor Vehicles Agreement to promote road connectivity between the countries. The primary objective of this sub-regional agreement is

Figure 1: Ganges-Brahmaputra-Meghna Basins

Source: Wikipedia, 2017

to connect the economies to the ports in Bangladesh and in India using roads. Bangladesh and India already had a protocol signed (in 1972) through which Bangladesh allowed Indian inland ships to ply between West Bengal and Assam. In 2015, the two countries signed a Protocol on Inland Water Trade and Transit (PIWTT) whereby they have also agreed to renew it automatically for a five-year period. As such, PIWTT provides an opportunity for both the countries to explore investment on the routes designated under PIWTT. In 2016, Bangladesh and India signed another Memorandum of Understating (MoU) to allow tourists from Bangladesh and India to use coastal and protocol routes between countries.

Furthermore, Bhutan and Bangladesh signed an MoU in 2017 to use Bangladesh's IWs for transportation of goods and services through Chittagong and Mongla ports for both imports and exports. Similarly, the India-Nepal agreement on Kosi river does provide opportunity to Nepal to access Indian port using inland water navigation but was never materialised. The 1996 joint communiqué mentioned conducting "studies on Kosi, Gandak and Karnali rivers navigational purpose and providing Nepal access to the sea" (Dwarika & Santa, 2009).

Against this background, and given the fact that both Bangladesh and India are currently working together and investing on infrastructure and maintenance to keep their protocol routes navigable throughout the year for cargo ships of no less than 2000 tonnes capacity, there is a renewed hope among the riverine communities to bring back their glory on rivers.

However, it is also true that over time riverine communities have shifted their priorities as economies of all countries have changed with improvement in the road and in some cases rail transportation systems. The markets for products and services in each of the BBIN countries have shifted inwards, farther away from river banks. The richer, the stronger and the influential people in these countries have mostly migrated to cities – away from the river. This has changed the dynamics among various stakeholders on use and 'misuse' of rivers. The narrative has changed as well. The alternative transportation systems using rivers, roads, and rails are now competing with each other in order to capture the market.

In this context, CUTS International undertook the project 'Expanding Tradable Benefits of Trans-Boundary Water: Promoting Navigational Usage of Inland Waterways in Ganga and Brahmaputra' under the aegis of Civil Society Fund of the Asia Foundation. The project aims to contribute to improve understating the institutions (i.e. policies, laws, and regulations) for the governance of IWs in the BBIN countries. CUTS has been implementing this project in partnership with Unnayan Shamannay, Bangladesh; Royal Society for the Protection of Nature (RSPN), Bhutan; and South Asia Watch on Trade, Economics & Environment (SAWTEE), Nepal.

As part of the project a diagnostic study was conducted in all the four countries[1] so as to identify and analyse the function of policies, laws and regulations taking into account the needs of local communities connected to these waterways, particularly their livelihoods. Diagnostic studies are intended to inform alternative policy discourses for enabling reform measures. This report

1 For Bangladesh Country Report please click on the following link:
http://www.cuts-citee.org/IW/pdf/IW_Bangladesh_Report.pdf
For Bhutan Country Report please click on the following link:
http://www.cuts-citee.org/IW/pdf/IW_Bhutan_Report.pdf
For India Country Report please click on the following link:
http://www.cuts-citee.org/IW/pdf/IW_India_Report.pdf
For Nepal Country Report please click on the following link:
http://www.cuts-citee.org/IW/pdf/IW_Nepal_Report.pdf

captures the key findings of the country wise diagnostic studies conducted in all the four countries. This synthesis report is an abridged version of main reports presented by partners of CUTS in this project.

Research Methodology

The individual studies conducted by the partner institutions used a qualitative approach to dig into the stories behind the current impasse on connectivity through IWs in BBIN countries. The study teams used group discussions with local communities and institutions, and key interviews with major government and non-government stakeholders in each country to understand the makeup of the mindset in each country. Findings from each river basin were then shared at sub national, national and basin (cross-country discussion of riparian countries) levels for further validation. For example, stakeholders from Bangladesh, Bhutan and India jointly convened a one day workshop and shared findings on Brahmaputra basin, and stakeholders from Bangladesh, India and Nepal met to share their findings on the Ganges basin.

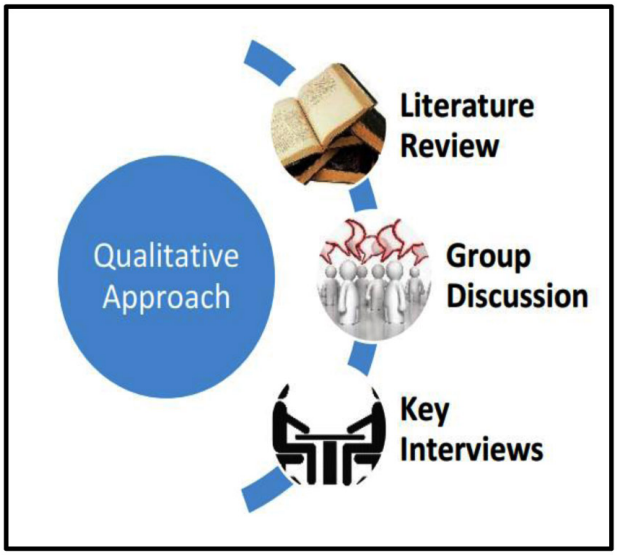


Table 1: Diagnostic Study Locations in Bangladesh, Bhutan, India and Nepal (BBIN)	
Locations	
Bangladesh • Shivalaya • Ashuganj • Chandpur	**India** • Uttar Pradesh – Varanasi, Lucknow • Bihar – Chapra, Patna, Begusarai, Khagaria, and Bhagalpur • West Bengal – Kolkata, and Haldia • Assam (Brahmaputra) – Guwahati, Pandu, Neamati, and Dhubri • Assam (Barak) – Karimganj
Bhutan • Punakha • Phuntsholing • Manas	**Nepal** • Sunsari (Kosi) • Nawalparasi (Gandak)

2. Setting the Theme

The Himalayan Rivers of Ganga and Brahmaputra have been an integral part of the life of the people living in the river basins. The river Meghna, however, is formed within Bangladesh by the joining of Kushiyara and Surma rivers. These river basins experience alternate floods and drought and supports livelihoods of millions of people engaged in agriculture and fisheries. The three rivers form a well-connected transboundary network flowing through the BBIN countries and are also one of the important means of conveyance especially in remote locations. There are several ways for these rivers to be of use to BBIN countries.

Cargo Movement through Inland Waterways

While India and Bangladesh have navigable waterways with an existing PIWTT, Bhutan and Nepal, at the moment, depend entirely on roadways for transporting goods and services. Bangladesh, being a delta, has been about to develop its inland transportation system more compared to India and as such it has a much developed sector of water based transportation system for shipment of goods and passengers.

As per data evidence, in terms of transportation of commercial cargo, 35 per cent of its shipment is through water in Bangladesh where as it is only 3.6 per cent for India. In case of China it is 47 per cent, for Japan it is 44 per cent, and for South Korea it is 35 per cent (Barry, 2016). Bhutan and Nepal, being landlocked countries, have been pursuing their cases to access the sea using IWs of Bangladesh and India. Currently, both Bhutan and Nepal have access to the sea using land transportation systems. However, since water transportation system is cheaper compared to roads and railways, there are potential benefits to these countries if they can use IWs.

Inland Waterways and Livelihoods

Rivers are the source of food, means of transportation, and part of cultivation in these countries. It holds higher importance for the poor income communities who use fishes from the river as their primary source of protein, and use the rivers to transport their daily produces to nearby towns or landing stations. For the land owning class of people, rivers add an additional dimension of use as they often rely on the river water for irrigating their fields.

Agriculture and fisheries are the main livelihoods of riverine communities in the flood plains. In terms of agricultural output, study suggests that compared to the Ganga basin, agricultural productivity in Brahmaputra basin is quite low mostly due to poor infrastructure for irrigation and flood control (Rasul, 2015).

At the same time, the floodplains of Brahmaputra and Barak river basins are important habitat resources for fish. Fishing is the traditional livelihood activity of the people living along the flood plains, especially during monsoon. Consequently, there is a conflict between agriculture and fisheries productivity of rivers and with increased movement of shipping vessels on the river, fisheries might further be squeezed out. On the other hand, developing waterways for 24/7 navigation might also open up new livelihood opportunities for local communities and increase their income.

Boats being used to transport local commodities from Dhubri to Hatsinghimari, Assam PC: CUTS

Environmental Concerns of Inland Waterways

The development of IWs can potentially have adverse effects on the biodiversity of riverine ecosystem. Maintaining a waterway for 24/7 or 365 days involves continuous dredging, sand mining, and other construction works to ensure that river channels are ready for shipment of goods and passengers. This might create stress on the river ecosystem, with potentials for conflicts with local communities engaged in fishing and other non-consumptive use of river water. At the same time, there are increased threat from navigation in terms of accidents, oil spills, waste discharge, turbidity changes and loss of spawning grounds. A cumulative impact of these is a recipe for disaster to the local communities living around the rivers.

The diagnostic studies conducted in BBIN highlights many of these challenges and opportunities from the local community viewpoints. As such, it is expected that this study contributes towards developing a new narrative for sustainable development of IWs in the BBIN region. The following section presents the results of the diagnostic studies conducted in BBIN.

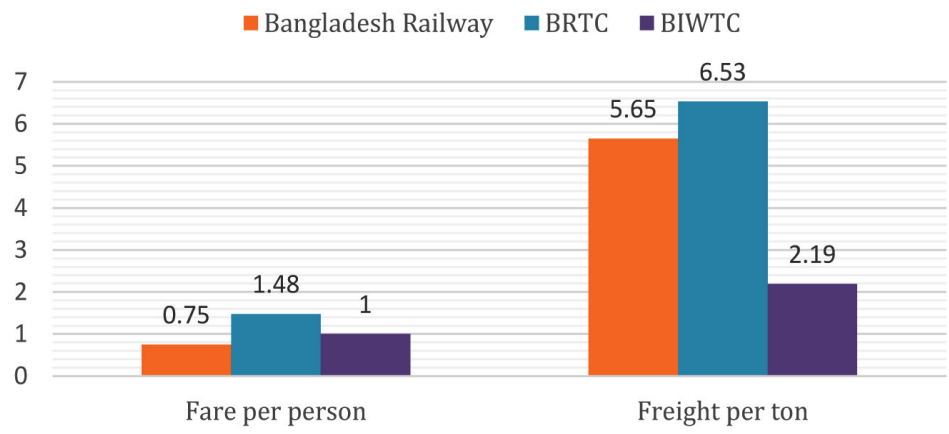
3. Opportunities and Challenges of Connectivity

Of the BBIN countries, Bangladesh and India have already begun their work to improve their connectivity through IWs. Currently, Bangladesh and India has been investing jointly on a cost sharing basis to ensure that Protocol Route 1 remains navigable 365 days on a 24/7 basis. This will ensure uninterrupted movement of goods between Kolkata and Guwahati through Bangladesh. Similarly, India and Bangladesh has also cooperated to develop the Protocol Route 2 to connect Kolkata and Chittagong ports with Agartala. These investments have created opportunities and challenges to different stakeholders. The study teams in Bangladesh and India, therefore, had an advantage to study the real-time challenges and opportunities to the local communities due to better developed IWs connectivity through these routes. On the other hand, Nepalese and Bhutanese team had to depend on perception of the local communities in terms of identifying challenges and opportunities from improved cross country IWs connectivity.

Transportation Benefits to Low Income Communities

IWs, in Bangladesh, are extensively used for both passenger and goods transport in the southern part of Bangladesh to connect to the central region. Except for ferry services, almost all the other services on rivers in Bangladesh are privatised. Despite this, it has been the cheapest source of transportation transporting goods. It, therefore, benefitted the low income communities. Fare per km to transport goods is almost 33 per cent cheaper compared to that of roads.

Figure 2: Comparison of fare in BDT/Km Transportation by Rail, Road and Waterways



Source: Bangladesh Bureau of Statistics, 2016

India study also shows that for transporting a tonne of goods/per km on road costs around INR 1.5, whereas on railways it costs INR 1.3, while on developed waterways it is INR 0.96 and on undeveloped waterways it is INR 2.1. This means that with improved waterways, the cost of transportation of goods will significantly go down.

Livelihood Benefits to the Boat Making Industry

IWs have always been the most accessible means of transportation for local communities because they are locally produced and maintained and further support thousands of local artisans who are engaged in making and repairing boats and ships. There are different types of boats operating in Bangladesh – (i) steel body boats; and (ii) wooden boats. The latter industry in Bangladesh is very large and has been supporting thousands of communities engaged in construction, repair and maintenance. The steel body boats are also made in local shipyards and are supporting many medium and large enterprises engaged in ship building.

Low Public Investment and Reduced Tax Burden

Compared to road and rail systems river-based transportation system requires very less investment. Except for dredging (periodic) and maintenance of signals for safety purposes there is not much investment required for river-based transportation system. The entire system is dependent on private investment. All large passenger and cargo ships in Bangladesh are equipped with night-navigation system with radars to detect shorelines and small boats in complete darkness. As such, there is no need for lights to light the waterways like that of roads. Therefore, public expenditure per km of navigation is very low compared to that of roads and rails. In Bangladesh, investment on waterways in 2016 is only Bangladeshi Taka (BDT) 11 bn for 6000 km compared to BDT 56 bn for 3400 km on railways and BDT 146 bn for 21000 km on roads.

Livelihood Dependence

Nearly 1.3 million farming household and 84 thousand fishing households in the GBM basins are dependent on the rivers. The rivers are their source of livelihood and so changes in the river ecosystems in terms of quality and quantity of water in the seasons of production will reduce their income.

Table 2: Livelihood Dependence on GBM Basin

Basins	Total Farm Holding	Fisherman
Padma R. (Ganges)	711476	43685
Jamuna R. (Brahmaputra)	454480	22163
Meghna	189589	18364
Total	1355545	84212

Source: Bangladesh Bureau of Statistics, 2014

Damage to Spawning Grounds and Sanctuaries

There are nearly five *Hilsa* fish sanctuaries on the protocol routes 1 and 2. *Hilsa* is a national fish of Bangladesh and a source of income for a majority of the fishing folks living in the coastal areas. Increased navigation might threaten the sanctuaries unless adequate precaution is taken to prevent the damages from movement of ships. Bangladesh government has developed strategies to compensate fisher folks against fishing moratorium every year during spawning seasons. However, the system is not full proof in terms of corruption and hence local communities are apprehensive of protecting these sanctuaries by the government in case of this new threat. Similar issues were flagged in Indian and Nepalese studies. The turtle sanctuary at Varanasi, Uttar Pradesh and the Vikramshila Dolphin Sanctuary at Bhagalpur, Bihar fall in the premises of NW-1 in India and environmentalists have objected vessel movement and dredging in these stretches.

Gender Aspects

There are several gender aspects to development of IWs. First, the general safety and sanitary aspects of women passengers in the vessels must be ensured in order to make the system accessible to women. Second, communities living on the bank of rivers use river water for bathing and washing. Increased navigation will increase risk of harassment for them unless regulatory oversight is strengthened. Third, women engaged in local business and petty trade will find their livelihoods under threat due to rapid changes in the overall economic activities in the area. As communities get linked with nearby river ports, women will find it difficult to switch to new jobs because many of them are illiterate or have very low level of literacy.

Threats on Rivers by Roads

River routes are squeezed by the road networks as it expands and build bridges and culverts on rivers and channels. As such, the river system loses the last mile connectivity. This loss of last mile connectivity works against the entire river-based transport system. Rivers get encroached and filled with garbage. River banks are often used as open storage sites for sand, stone, bamboo, etc. As such, local boat people find it increasingly difficult to support their livelihood. In several countries, governments have developed necessary regulatory frameworks to ensure that construction of roads does not constrain movement on rivers. Such a framework allows waterways and motorways to become complementary rather than substitutes.

Threat on Quality of River Water

Expansion of cross-border water transportation might damage the quality of water if these vessels and/or upstream communities are not regulated to prevent throwing of garbage, oil, and other pollutants in the river. River water contains minerals which are used by local communities for healing purposes. Pollutants often get deposited at the bottom of the river which is habitat of several types of fish (like cat fish). Reduction of fish in the river system will threaten livelihood of many people.

Transportation of Oversize and Bulky Products

Bangladesh and Indian study reveals that river routes are increasingly in use for transporting bulky products like coal, fly ash, stones, sand, minerals, construction materials, etc. This is happening both within and across countries. It shows that as economies are growing, there is a

need for transporting both bulky products and oversize cargos. For movement of these products, waterways are the cheapest means of transportation, i.e. there will no need for strengthening roads and bridges to carry loads, or cutting of trees on road sides while transporting them.

Challenges and Opportunities related to Navigational Development across BBIN

BANGLADESH

Challenges	Opportunities
• High sedimentation rate • Seasonal waterways • Significantly higher investments costs for maintaining channels • Multiple government agencies for governance • Poor governance and administrative delays • Poor institutional capacity • Lack of adequate draft, limited no. of ports of call	• Inland waterways are the cheapest means of transportation within the country • New scope for investment with MoUs signed between India-Bangladesh for joint dredging and fairway development • Booming vessel manufacture industry in Bangladesh • Connecting Bhutan to the Bay via waterways

BHUTAN

Challenges	Opportunities
• Strong legal frameworks on conservation of water resources • Rivers prominently used for agriculture and resource extraction but not for navigation • Rivers not feasible for navigation given the stiff terrain and fluctuation of river volume during summer and winter • Low priority at national level on bridging the regional connectivity through initiative of transboundary inland waterway	• Bhutan is well connected to India by road. The country can benefit from the development of waterways in India and Bangladesh by having access to sea through multimodal connectivity • The entry points to India by road could be Phuentsholing, Gelephu or Samdrup Jhongkar and the potential export cargo for Bhutan are boulders, gypsum, limestone etc. • Bhutan could benefit from the proposed multimodal terminal at Joghigopa, Assam or at Chilmari, Bangladesh so as to reach Chittagong and Mongla ports in Bangladesh

INDIA

Challenges	Opportunities
NW-1 • Maintaining least available depth for navigation • Private sector investment concerns due to hard challenges (infrastructure and facilities related) and soft challenges (regulatory aspects) • Very few companies, and logistics service providers for the commercial movement in both cargo and passenger segments • Limited number of vessels and poor maintenance by government • Need for up gradation of river systems on core routes that can support large modern vessel fleets • Absence of night navigation aids	**NW-1** • Linking to Amritsar Kolkata Industrial corridor and developing a supply chain • Cargo from Nepal if connected to waterways can increase the trade volume • Trade prospects along India Bangladesh protocol route • Long term cargo commitments from fertilisers and coal plants
NW-2 • No dedicated cargo movement; mostly project based cargo • Shifting channels, high sedimentation and erosion • Alternate interests and political influence of truck lobby	**NW-2** • Great potential for local trade across shorter stretches • Over Dimensional Cargo, fertilisers and food grains as transit cargo to North East via India Bangladesh protocol route • Cargo from Bhutan if transferred to waterways can increase the volume of trade

NEPAL

Challenges	Opportunities
• The trade and transit treaties signed by Nepal with India and Bangladesh do not identify any IWs route as a recognised transit and trade route. Emphasis for road infrastructure led to negligence of prospects of inland navigation in Gandak river, though there is a provision of navigational lock in Gandak barrage • Inadequate studies on feasibility of water transport • Weak institutional memory and gaps in knowledge management • Lack of resources	• Development of the proposed NW-37 in Gandak (Bhaisaslotlal barrage-Hajipur) could revive the navigational use of Ganga • The intermodal terminal at Kalughat, Bihar and the multimodal terminal at Sahebganj, Jharkhand along NW-1 in India can be accessed through the entry points at Raxaul and Biratnagar respectively in Nepal

Promoting River Tourism for Socio-economic Development

River tourism is a promising sector for not only integrating local community but also generating state revenue. There are several places of interest with historical, religious and cultural significance along the banks of rivers Ganga and Brahmaputra. In 2017, India and Bangladesh signed an MoU for operating cross-border river cruises along protocol routes. There is immense potential for heritage, nostalgia and nature tourism between India and Bangladesh. The pristinely beautiful Sundarbans delta which is also a world heritage site has the potential to become one of the leading eco-friendly river tourism destinations by easing out cross border protocols and complicated immigration issues.

Apart from places like Varanasi which is the holiest place for Hindus, there is ample scope for Buddhist circuit as well (Bodh Gaya, Kushinagar, Lumbini) offering cross-border experience with multi modal transits. Adventure tourism in Panbang and Manas region of Bhutan as well as Rishikesh in India cater to its niche category. It is expected that tourism sector will also create livelihoods for local people and boost the local economy.

Conclusion

This section has flagged several aspects of opportunities and threats to communities who are dependent on waterways or on the river for their livelihoods. It is evident from the discussion that the impact is two-fold. On one hand, integrating IWs will create new opportunities for many riverine people, on the other hand, there are several key challenges which, if not regulated, will serve against the interest of local communities. Similarly, there exists opportunities in trade and transit via waterways in the sub-region provided the challenges related to infrastructure, navigation and resources are adequately addressed. It is therefore, important to analyse the institutional aspect of IW governance. This is presented in the next section.

4. Institutional Framework of Governance of Inland Waterways

Bangladesh and India inherited the colonial administrative structure from the British rule and as such have very similar institutional arrangements to govern those inland waterways. The BIWTA is the key authority responsible for inland waterways in Bangladesh. In Bhutan there is no such authority but the Department of Hydro-Met Services is the key authority for management of river systems. In India, it is the IWAI and in Nepal it is managed by the Transport Department of the Ministry of Physical Infrastructure and Transport.

Clearly, there is diversity not only in terms of authority but also in terms of their objectives. In Bangladesh BIWTA's primary function is to manage the water transport system and it is parallel to the Bangladesh Road and Transport Authority (BRTA) on road transportation. This is similar in India except the fact that water issue is provincial matter and hence IWAI needs to develop consent with their provincial counterpart to manage water.

In Nepal, water is part of transport system and has no separate authority to govern it. Bhutanese government, on the other hand, is primarily focussed on managing their hydro product in order to manage its water. But with the recent impetus on formalisation of an institution to deal with the aspect of IWs in Bhutan, the Government of Bhutan is in the process of renaming the existing Department of Road Safety & Transport Authority (RSTA) to Surface Transport Authority (STA) so that this new renamed institution can deal with all modes of transportation including IWs.

Consequently, the strategy of management in each case differs. Ministries and Departments within the governments of Bangladesh, Bhutan, India and Nepal have overlapping responsibilities to manage water resources. In India and Bangladesh, management of river means managing the river system to promote irrigation for agriculture. In Bangladesh, the main strategy is to promote water-based transport system (the country is less dependent on surface water irrigation system). As a result, despite the fact that Bangladesh's waterway network has shrunk in terms of kilometer over the last few years, it still has a very vibrant river based transport system.

In India, however, the system has been bifurcated between the Central and the State system among the line of water and river. The bifurcation has contributed towards development of large scale irrigation projects to transfer water from river to agricultural land and to use water resources for developing hydro power projects.

Bhutan and Nepal, on the other hand, focussed primarily on hydro power production with its water resources. As such, in each of these countries, the principle of water governance varies not only in terms of institutions and ministries but also in terms of how each look at water and the river basins.

Table 3: Country Specific Institutions Governing IWs in BBIN

	Bangladesh	Bhutan	India	Nepal
Central Level	Ministry of Shipping	Department of Hydro-Met Services	Ministry of Shipping	Ministry of Physical Infrastructure and Transport
Central Level	Bangladesh Inland Water Transport Authority	Department of Road Safety & Transport Authority*	Inland Waterways Authority of India	Water and Energy Commission Secretariat
State Level	Not Applicable	Not Applicable	State Level Transport Departments in West Bengal, Assam, and so on	Not Applicable

**Royal Government of Bhutan might change the name of this department to Surface Transport Authority so that matters relates to IW can also be dealt through this institution*

Source: Compiled by the authors

Table 4: Country Specific Acts and Policies Relevant to IWs in BBIN

Country	Act/Policy
Bangladesh	• The Inland Water Transport Authority Ordinance, 1958 • The Inland Shipping Ordinance, 1976 • Inland Shipping (Amendment) Act 1990 • Bangladesh Inland Water Transport Corporation Order, 1972 • Interference with Aids to Navigation Ordinance,1962 • National River Protection Commission Act, 2013
Bhutan	• No separate policy/act for Inland Waterways • No recognised inland waterways in the country
India	• The Inland Waterways Authority of India Act, 1985 • The National Waterways Act, 2016 • The Inland Water Transport Policy, 2001 • Inland Vessel Act, 1917/Inland Vessels (Amendment) Act, 2007 • Draft New Inland Vessel Act/Bill 2016 • Bengal Ferries Act, 1885 • The Northern India Ferries Act, 1878 • The Regulations on Cargo & Traffic in Inland Ports on National Waterways, 2012 • Prevention of Collision on National Waterways Regulations, 2002 • National Waterways, Safety of Navigation and Shipping Regulations, 2002 • The Multimodal Transportation of Goods Act, 1993
Nepal	• No separate policy/act for Inland Waterways • No recognised inland waterways in the country • Other relevant polices with fleeting mention of inland waterways includes: • National Transport Policy 2002 • Water Resource Strategy 2002

Source: Compiled by the authors

Regional Framework and Cross-border Protocols

Trans-boundary water sharing is one of the most contentious issues around the world, specifically in the South Asian context. BBIN shares many trans-boundary rivers and have devised specific bilateral water sharing treaties with each other, dating back to the mid-19th century.

Being both upstream and downstream riparian, India has forged bilateral water sharing treaties and agreements with Bangladesh, Bhutan and Nepal but none of these treaties and/or agreements have clauses with regards to promoting trade through the use of commonly shared waterways. IWs development is at a nascent stage in India, hence the bilateral water sharing treaties in the BBIN region do not address or take into account the likelihoods of promoting freight transportation through waterways as most of the treaties were signed in the mid-19th century whereas development of IWs has recently gained momentum through political and financial back up in India.

Furthermore, rivers have to be navigable enough to use them as waterways, which presently is feasible between India and Bangladesh whereas the geographical terrains of Nepal and Bhutan make trans-boundary navigation inaccessible or unexplored.

Table 5: Regional Treaties with Navigation as a Sub-component

Sr. No.	Treaty	Objectives
1.	MoU on use of inland waterways for transportation of bilateral trade and transit cargoes between Bhutan and Bangladesh, 2017	• To allow export-import cargo of Bhutan to be handled at maritime ports of Chittagong and Mongla in Bangladesh and same will be transited to the identified destinations in Bhutan through the waterways in Bangladesh
2.	MoU between India and Bangladesh concerning cooperation on aids to navigation, 2017	• To extend advice on lighthouses and beacons • To extend advice on vessel traffic service and chain of AIS • To impart training as per International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) training module to managers and technicians
3.	MoU between India and Bangladesh on passenger and cruise services on the coastal and protocol routes, 2017	• To further develop friendly relations and strengthen cooperation in the field of passenger and tourist transportation in the Indo-Bangladesh Coastal and Protocol routes in accordance with principles of equality and mutual benefits
4.	MoU between India and Bangladesh on development of fairway from Sirajganj to Daikhowa and Ashuganj to Zakiganj on Indo-Bangladesh protocol route, 2017	• To develop the navigable fairway round the year (between the stretches of Sirajganj to Daikhowa and Ashuganj to Zakiganj) to enhance the trade and safe passage of goods between the two countries
5.	MoU between India and Bangladesh in the field of blue economy and maritime co-operation in the Bay of Bengal and The Indian Ocean region, 2015	• To ensure the systematic and balanced development of the national capacity in the field of maritime sector

Sr. No.	Treaty	Objectives
6.	Agreement on coastal shipping between India and Bangladesh, 2015	• To secure harmonious development of the maritime commercial navigation between India and Bangladesh • To cooperate actively in the field of maritime commercial navigation
7.	Protocol on inland water transit between India and Bangladesh, 2015	• To make mutually beneficial arrangements for the use of waterways for commerce and for passage of goods
8.	MoU between India and Bangladesh on cooperation in the field of fisheries, 2011	• To strengthen the existing friendly relations between the two countries through development of co-operation in the fields of fisheries and aquaculture and allied activities
9.	Framework agreement between India and Myanmar for construction and operation of a multi modal transit transport facility on Kaladan river connecting the Sittwe port in Myanmar, 2008	• To explore the possibility of constructing a multi-modal transit transport facility connecting the Sittwe in Myanmar with the state of Mizoram in India combining a system of IW and highways
10.	Agreement between India and Bangladesh on sharing of the Ganga waters in Farakka, 1977	• To make an interim arrangement for sharing of the Ganga waters at Farakka
11.	Revised agreement between India and Nepal concerning the Kosi project, 1966	• Constructed for the purpose of flood control irrigation, generation of hydro-electric power and prevention of erosion of Nepal areas • All navigation rights and related permits in the Kosi river in Nepal shall rest with Government of Nepal

Source: Compiled by authors

Thus, with regards to regional mechanisms, BBIN lacks a regional organisation and a regional treaty for linking waterways to promote trade facilitation. Hence, India and Bangladesh had to continue on a bilateral arrangement by signing a protocol on inland water trade and transit in 1972.

Additionally with the recent political reinforcement to promote enhanced regional connectivity in BBIN and using waterways as a of the means to promote trade, the years 2015, 2016 and 2017 witnessed a renewed direction of mutual cooperation between India and Bangladesh in multifarious sectors, which led to ratification of the Agreement on Coastal Shipping and its Standard Operating Procedures (SoPs) in 2015 and signing of several MoUs concerning trade and tourism development through IWs.

5. Inland Water Transport

Currently IWs based trade only exists between Bangladesh and India. Despite the fact that Bangladesh and India signed IWs connectivity protocols, the trade between them is still pretty small. Similarly, despite the protocol routes for Indian/Bangladeshi ships to ply between Assam and West Bengal via Bangladesh, trade using these routes is not significant. However, it is not so within Bangladesh.

Table 6: Bangladesh Waterways at a Glance

Information	2011-12	2012-13	2013-14	2014-15	2015-16
Length of inland Waterways (km)	24,000	24,000	24,000	24,000	24,000
Navigable Waterways- Monsoon (in km)	6,000	6000	6,000	6,000	6,000
Dry Season (in km)	3,824	3800	3,800	4,347	4,347
Yearly no. of passenger (in million)	209.8	232.8	175.8	196.3	188.1
Yearly quantum of cargo (in million tonnes)	16.7	20.3	23.9	24.6	17.4

Source: BIWTA, 2017

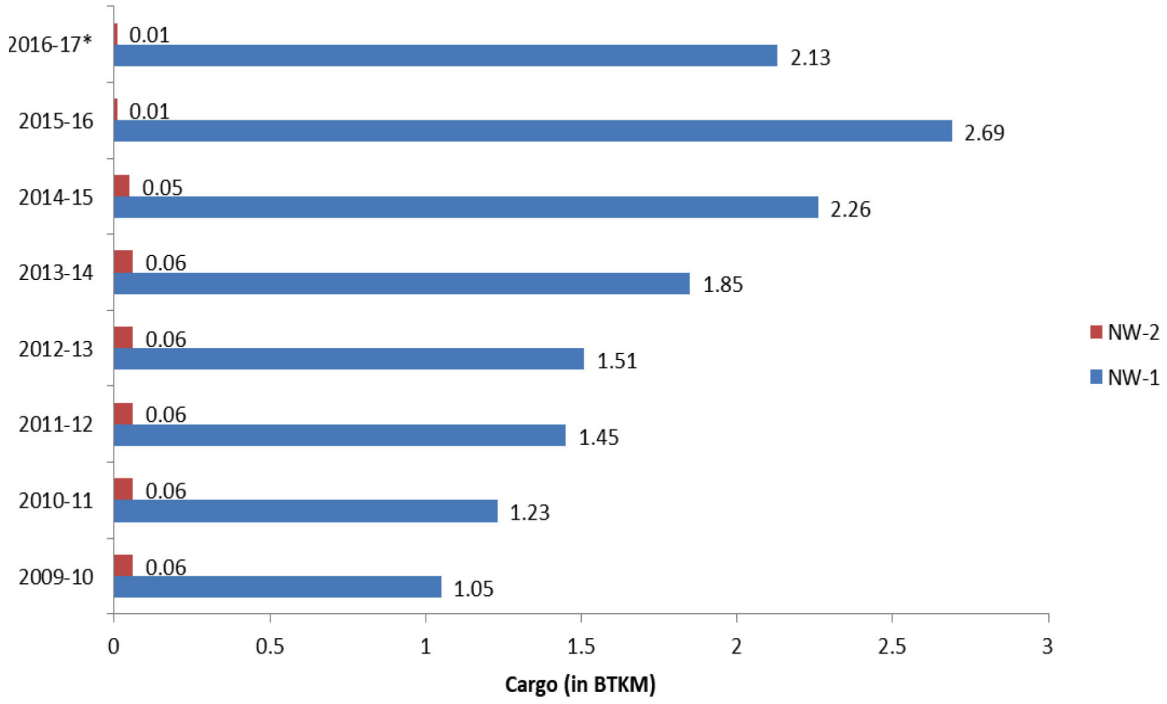
Table 6 shows the state of IWs in Bangladesh. It shows that a major portion of IWs are not navigable throughout the year. The capacity of navigation drops to nearly 78 per cent of the monsoon capacity in dry season.

Figure 3 shows cargo movement along the National Waterways in India and its shows that on NW-2 (which is in Assam) the movement is very low as compared to NW-1. Overall, cargo movement on NW-1 and NW-2 is limited to the State of West Bengal and for limited products. States, such as Bihar and Assam have comparatively smaller share in total cargo movement, and some of the states, such as Uttar Pradesh and Jharkhand have minimal presence.

As indicated in Figure 3 cargo movement on NW-1 has seen a substantial rise over the past few years. Cargo movement has increased by a proportion of 1:1.64 from 2009-10 to 2015-16. But cargo movement on NW-2 has remained stagnated in this duration even registering a decline in the past three years. Around 23.21 per cent in NW-2 is under unorganised sector as reported by the Central Government where small mechanised boats are used for transportation of local commodities.

Some of the major products transported through NW-1 are fly ash, iron ore, coal, steel, building material, tyres, rock and stones, oil, sand, food items, timber and aluminium. Interestingly, the major products transported through NW-2 are food grains, electrical and transmission equipments, fertilisers, building material and bamboo (IWAI, 2017). In Bangladesh, however, items are similar except that liquid fuels are also transported using IWs.

Figure 3: Cargo Movement on NW-1 and NW-2



*Source: IWAI, 2016; Note: * Provisional data available till March 2017*

6. Intra-regional Trade and Transit

Bangladesh-India PIWTT has been operational since 1972, allowing cross-border trade and transit facility through IWs. As per the protocol, Bangladeshi vessels for transit must be registered in Bangladesh under its Inland Shipping Ordinance, 1976 and similarly Indian vessels must be registered under its Inland Vessels Act, 1917.

The "Ports of Call" along the protocol routes in Bangladesh are: Narayanganj, Khulna, Mongla, Sirajganj and Ashuganj and in India they are: Kolkata, Haldia, Shilghat, Pandu and Karimganj for loading and unloading of goods.

Table 8 shows the cargo movement through protocol routes and indicates that the movement, however, is increasing only recently despite the fact that PIWTT was originally inked by Bangladesh and India in 1972. It also shows the dominance of Bangladeshi vessels in carrying goods which was substantiated during field study. The cost of ship building is much higher in India owing stringent regulations; higher labour cost, uncompetitive freight charges and bigger vessels have given a competitive advantage to Bangladeshi vessels.

Table 7: Cargo Movement on Protocol Routes between Bangladesh and India

Year (July to June)	Quantity of goods (Million Tonnes)		Number of trips under protocol	Ratio of goods carried by Bangladesh and India vessels
	Carried by Bangladeshi vessels	Carried by Indian Vessels		
2011-12	1.42	0.055	2069	96:4
2012-13	1.50	0.046	2009	97:3
2013-14	1.91	0.021	2363	99:1
2014-15	1.94	0.012	2355	99.3:0.7
2015-16	2.25	0.008	2651	99.6:0.4

Source: Compiled from IWAI, 2016; and IWAI, 2017

Table 9 shows movement of cargo between Kolkata and Dhubri/Karimganj ports in Assam and between Kolkata and Ashuganj ports in Bangladesh (for transshipment to Tripura) over the past few years.

It shows a significant rise in the volume in recent years. According to sources, cargo contains coal, fly ash, steel coil, wire, rod, iron ore, food items and over dimension cargo.

Table 8: Movement of Cargo between West Bengal and Assam/Tripura using Protocol Routes (in Metric Tonnes)

Route/Year	2011-12	2012-13	2013-14	2014-15	2015-16
Kolkata-Dhubri	140	1118	2373	4322	2430
Kolkata-Karimganj	2555	17567	—	12928	3495
Kolkata-Ashuganj	—	—	—	19537.29	1004

Source: Compiled from MoS, 2016; and Ahmed, 2017

Fly ash in Ashuganj terminal, Bangladesh
PC: CUTS

Issues on Cross-border Shipments

This study finds that there are several reasons for such low volume of trade using navigational routes. These includes:

a. Absence of navigation facilities throughout the year – as such traders prefer to use other transportation systems to transport goods between two locations.
b. *De-facto* cost of transportation is higher due to low traffic between two ports of calls – since ships taking goods from Kolkata to Mongla returns empty, the actual cost of transportation via IW is higher than what has been estimated in many studies. This further reduces incentives to transport goods on rivers between Bangladesh and India.
c. Last Mile Connectivity on roads – goods transported via IWs need to be shipped from business to business in two countries.
d. Facilities at the port in Bangladesh and India do not help businesses to transfer their products on roads/trains seamlessly. Port of calls on both sides are not still ready with facilities to handle captain and crews of vessels from across the borders and hence quality of crew members and captains in these vessels are low, often little trained and without possession of valid travel documents. As such the formal movement of crews and captains across borders has elements of informality and there is absence of trained captain and crew for vessels plying on inland waterways in both countries.
e. Many of the crews working on vessels operation on IWs do not have in their possession valid travel documents – because of high rate of turnover of employees it also becomes costly for employers to pay for their travel documents. Discussion at the workshops revealed that the crews often travel with certification from employers and hence they often complain about ill treatment by immigration and customs authorities at the port of calls. As a consequence, appetite for using river based transportation reduces.
f. On passenger movement, immigration and customs facilities at the first port of call on each side of the border still do not exists and hence there has been no movement of passengers on board on IWs. On tourism, Bangladesh and India are still working on developing regulations for transfer of tourists on board. More flexibility for tour operators in terms of designated routes, jetties and disembarkation points in case of cross border tourism between India and Bangladesh along protocol route and providing necessary infrastructure of berthing and emergency services has been pointed out by your operators in Ganga and Brahmaputra basin dialogues. Similarly, local regulations for small and non-mechanised boats vary across borders. In India, for example, all mechanised boats are subject to mandatory registration whereas it is not so in Bangladesh and hence it is difficult to trade across borders using small boats.

7. Stakeholder's Perception on Future of Connectivity

Analysis above presented the current state of connectivity that exists in BBIN region on IWs. However, it has already mentioned that changes are at the doorsteps. Bangladesh and India have renewed their commitment to maintain 24/7 and 365 days connectivity for cargo movement upto 2000 tonne per ship. Bhutan has signed an MoU with Bangladesh to use Bangladesh's IWs to ship goods from Bangladeshi sea ports and to secure access for export and imports using sea ports and inland waterways. Nepal has been eyeing on developing water transportation system using the Ganges.

While there are many reasons behind this political reality, the strategy also needs to be discussed with local communities who are likely to be affected because of these changes. Based on this, CUTS and its partners in Bangladesh, Bhutan and Nepal conducted a series of Focus Group Discussions (FGDs) with local stakeholders to understand how the new realities will be perceived by them. This section presents the findings briefly.

BANGLADESH

Unnayan Shamannay – the partner of CUTS – conducted several FGDs, Key Informant Interviews (KIIs), and organised meetings with National Reference Groups (NRGs) to develop a consensus on effects of IWs based connectivity in BBIN countries through Bangladesh. The findings are briefly summarised below.

Livelihood Impacts

Local communities living on both sides of the rivers (Brahmaputra and Meghna) are primarily engaged in farming and fishing activities using country boats (non-mechanised), fishing trawlers, and knitting of fishing nets; boatmen operating passenger and freight services across rivers; low paid (unskilled) workers at the local huts, bazaars and ports; and self-employed traders.

Operation of small boats for freight and passenger services provide nearly 60 per cent of all employment in transport jobs, nearly 40 per cent of the people are dependent on the riverine sources for their livelihood.

Livelihood of boatmen is affected with both shortage of water during winter season and with excessive water in rainy season. For them, maintenance of a minimum depth in the river will not be a threat to the river ecosystem, specifically the fisheries sector. They also perceive that with increased riverine traffic they are likely to benefit as new jobs will be created if the ports are developed, and working environment comes under more regulation.

Environmental Impacts

Local communities engaged in fishing perceive that increased traffic in the rivers might seriously hamper the river ecosystem and may damage the fish habitat and sanctuaries. Fishing and inland navigation conflict with each other due to removal of sand bars and pools through dredging which leads to habitat loss of the fishery sector. Heavy traffic and underwater noise also reduce fish productivity and migration.[1]

Communities are also afraid of increased intensity of river erosion due to the waves creation from the big vessels carrying lighter and/or larger cargoes. *Hilsa* sanctuary in the confluence of Meghna and Padma rivers situated at Chandpur will be in a threat due to the increased number of cargo movements along this PIWTT protocol route. Proper management of fish production using geo-fencing the sanctuary on PIWTT routes is a possible solution.

Nonetheless, international movement of cargo and passenger vessels will promote local economy for river-based industrialisation, which causes environmental consequences for local development, but environmental cost-minimisation by proper environmental management can be beneficial for local as well as national economy.

Gender Impacts

Women are vulnerable to abuse and harassment while travelling alone or working alone. Absence of restroom facilities, breast-feeding facilities often discourages women to travel to work and hence they remain confined to houses. It is important that in order to create a more gender friendly environment, these facilities are developed at the port of calls.

1 https://www.iucn.org/sites/dev/files/content/documents/report_bridge_gbm_dhaka_workshop_final.pdf

It will become a model for other development projects and eventually encourage women to participate in the workforce. Furthermore, vessels/ships and port of calls need to be developed keeping in view women crews and captains on cross-country voyages. These are true across all BBIN countries.

BHUTAN

RSPN – the partner in Bhutan conducted FGDs, in-depth interviews with key informants and also discussions with experts in order to develop a consensus on perception of the impacts of developing IW based connectivity using Brahmaputra. In general, the scope for using river for transporting goods is very limited in Bhutan due to the fact the many of the rivers do not have sufficient flow in the dry season and have very high current in rainy season.

Livelihood Impacts

The agriculture is the primary occupation of the people in Bhutan living around the river basins. River water is their main source of irrigation for agricultural land. However, they see a possibility of changing their livelihood if tourism activities are linked to IWs connectivity. To them, scope for rafting, bird watching, and hiking will increase if connectivity includes tourism.

There is also possibility of increasing trade of sand and stones if the last mile connectivity from Bhutan to the nearest port improves. This is because many remote corners of Bhutan have high quality stones and sand which can be used for construction of roads and buildings. Trading of medicinal plants might also become useful to them if connectivity increases between Bangladesh and India using rivers.

Sub-national Dialogue at Manas, Bhutan
PC: RSPN

Environmental Impacts

The study also found that in Bhutan growing interest on river tourism among private sectors and few initiatives have been already begun. However, initiating this at the transboundary level needs proper study and feasibility assessment keeping in mind environmental and social sensitivity, and national security. The outcome of study could possibly contribute to planning a river system-based integrated livelihoods programme for the targeted areas.

INDIA

CUTS team used similar method to determine the perception of local stakeholders on the impacts of IWs connectivity between countries on the Ganges and Brahmaputra. As such they conducted FGDs, in-depth interviews and NRG meetings on both basins. Field level interactions with boatmen, fishermen, traders, vendors, freight handlers, private sector and academia at multiple locations have thrown light on how inland navigation influence their livelihoods in one way or the other.

Livelihood Impacts

Boatmen

The boatmen in Assam, Bihar and Uttar Pradesh were mostly owners of small mechanised boats and country boats, predominantly falling in the unorganised sector. The livelihoods of these people are entirely dependent on waterways and these people are anxious for how new developments may impact their lives. For instance, there are around 50,000 people associated with the boatman families (*Mallah/Navik/Nishad Samaj*) with more than 150 people directly involved in boating related activities in the Varanasi district whose livelihood is directly dependent on the Ganga. However, it was communicated that whenever the Central or state government decides on a plan or scheme for Ganga development, the community is not consulted.

The community has been denied the renewal of the licences for small mechanised boats since the enactment of Turtle Sanctuary Act[2] in Varanasi. At present, they are operating these boats without government licences as the local administration (Municipal Corporation/*Nagar Nigam*) allowed them to operate after strong agitation. The community questions that if the licences for their mechanised boats have not been renewed because of Turtle Sanctuary, how can big ships/boats be given licence and permission for operation in the zone or to pass through this route.[3]

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2 Water area/stretch of 7 km between Rajghat/Malviya Rail/Road Bridge and Ramnagar Fort in Varanasi is a wildlife protected zone (Kachua Sanctuary/Turtle Wild Life Sanctuary) under the purview of Wild Life Protection Act 1972 and by a special order of UP State Government released on 21st December 1989. Since, 1989 more than 34000 turtles are being released by the Turtoise Breeding Centre in Sarnath under the Ganga Action Plan which was launched in 1986 to clean the biological pollution from river Ganga. It is believed that these turtles eat dead bodies thrown in river.
See: http://upforestwildlife.org/turtle.htm and http://timesofindia.indiatimes.com/city/varanasi/34000-tortoises-released-into-Ganga/articleshow/8553068.cms

3 Two cargo vessels which were supposed to be navigate on NW-1 were docked near Rajghat and waited for permission to reach to Ramnagar terminal but, forest officials of UP did not allowed them to go to Ramnagar even after wait of more than 2 months and ultimately Union Shipping Minister Nitin Gadkari had to give green signal to these vessels from Rajghat instead of proposed terminal of IWAI in Ramnagar. See: http://timesofindia.indiatimes.com/city/varanasi/Cargo-vessels-await-forest-department-nod/articleshow/53296506.cms?from=mdr

They demand that the activities like driving boats, river training and employment activities related to river should be given to local *Mallah Samaj*. The *Mallah Samaj* is known as Ganga Putra (Son of Ganga river) and the members of the community are well aware of the river system. But they have been ignored by both Central as well as the state government. *Jal Police* was created to save people in case of emergency but jobs of that department have been given to people who hail from other districts and do not even have proper swimming skills. Even in the local NDRF teams, local *Mallah Samaj* should be given a role. They expressed that during every flood they work to save people and provide relief through their small boats.

The members of Assam Meghalaya Country and Shallow Boats Association in Dhubri, Assam shared that the association is mostly engaged in settling the dispute and conflicts in deciding routes for ferrying passengers. Of the several *ghats* in Dhubri, only five are operated by the State Inland Water Transport Department while others are operated by the unorganised sector. Dhubri is a commercial hub due to its proximity to West Bengal and water transport (being the major mode of conveyance in the district) is marked with several *sapots* and *chars*.

Issues related to governance and administrative delay in the registration of boats, were the main concerns of the boatmen association. Multiple taxes of state and local municipality consume a major share of their income. They also demanded a sub-divisional office of Inland Water Transport (IWT) in Dhubri since for all administrative work these people have to go the state capital in Guwahati which is quite far from Dhubri.


Ponchu Ghat, Dhubri, Assam
PC: CUTS

Ferrying passengers is also an avenue for generating local livelihood, especially in Bihar, Assam and West Bengal. At Kendyamari, Nandigram it was observed that the passenger boats are used around the year to ferry people, two-wheelers, etc. for a minimal cost of INR 4 with an interval of twenty minutes between each ferry. At the same time, roadway connectivity to commute from Haldia from Nandigram is both time-consuming and costly (at least INR 50).

Similar case was observed in Patna and Khagaria, where due to the road congestion, even ambulances cannot detangle from the traffic jams. However, waterways for passenger transit

can be developed for movement between villages like Kaunhara (Sonepur), Kacchi Dargah (Patna), Bidupur (Hajipur) and cross-bank connectivity for Khagaria and Kahalgaon.

Fishers

Riverine fisheries are the backbone of communities settled along the banks of Ganga and Brahmaputra. Innovative cooperative models of pond and river fishing in Bihar and Assam is the evidence for the small-scale local trade aspects related to waterways.

The members of Co-operative Fisheries Federation, Bihar (COFFED) want to scale up the fish production, cold storage and road transport for ease of connectivity to the main markets. But at present, lack of such facilities remains the inhibiting factor in the development of the fisheries sector in Bihar.

There is an open-access to fishing in the entire Bihar state, whereas in Assam stretches of river are identified and registered for fisheries (called *Mahals*) by the State Revenue Department. Fisheries department promotes culture fisheries in ponds, floodplains and wetlands.

Local fishermen in Varanasi felt that the waves created by the movement of big ships may harm their net and fishing gears. However, some of the fisherman also expressed that movement of big vessels will blow horn while passing, so that they can clear the route. Nevertheless, in NW-2 such conflicts were not reported as big vessel movement is negligible and also because fishing area is demarcated and mostly lies in the secondary channels.

Sand traders

While fishing remains the largest employer for communities in Assam, Uttar Pradesh and West Bengal, sand-mining in Chhapra and Doriganj seems to stand out as an immensely profitable yet unsustainable practice along the Ganga in Bihar. Unchecked extraction of sand from the river has multiple environmental and governance violations, however it also generates local employment opportunities for the small boat-building industry and boatmen that transport sand from river beds to the mainland.

It is interesting to note that boat-building is also a key source of income for local communities at the ferry ghat at Haldia (West Bengal), because port led industrialisation has necessitated people to commute across the river for livelihoods and other services.

The sand trade at Chhapra and Doriganj is also an excellent example of locally produced good (sand) being produced at one river bank (Chhapra) and being consumed across the state (Patna, Bhagalpur, Arrah etc.) and even to neighbouring states (Jharkhand, Uttar Pradesh). Auctioning the river sand collected during dredging is another means of formalising sand trade adding revenue to the state.

These interactions with local communities at field level at multiple locations on the banks of Ganga and Brahmaputra have highlighted the need for a more inclusive policy discourse. Developmental interventions for the sake of inland navigation would definitely enhance the livelihood opportunities; but unheard voices of the community imply that a holistic and inclusive planning is essential to address their concerns for the benefit of the local communities. For instance, the Forest Department in Uttar Pradesh has given conditional relaxation to the movement of big vessels in the turtle sanctuary in Assi ghat, Varanasi but the concerns of small boatmen to cross the sanctuary remain unaddressed. Unless efforts of their concerns are not taken seriously, local communities would not connect to the larger developmental agenda of economic growth

and trade prospects, rather their livelihood opportunities will be lost in the whole new developmental paradigm.

Environment Impacts

The Fisheries Department, Government of Uttar Pradesh raised concerns with regards to the impact of developmental activities for inland navigation on the aquatic fauna in the Ganges river, specifically on their breeding grounds. It was pointed out that native/inland fish varieties and other aquatic animals have fixed breeding grounds in the Ganga river and every year they travel or migrate from a very long distance (through a fixed pathway) to breed only in those breeding grounds.

The officials were concerned that continuous vessel movement may affect fish breeding as high frequency sound waves from big ships can destroy the fragile fish eggs and can also affect the migratory pattern of fish. This is disruptive of ecological balance and needs to be taken into consideration.

Generally, in this area breeding season of most of the aquatic fauna starts from June 15 and ends by retreating monsoons in September, so a workable solution needs to be made if big vessel movement starts through the Varanasi river stretch during this period.

Gender Impacts

Initial scoping visits by CUTS showed that women are minimally involved in activities related to trade and navigation along NW-1 and NW-2. However, women are able to avail borderline benefits from the livelihood options related to waterways like fishery, local foods, shops, etc.

At Khagaria (Bihar) women are involved to a certain extent in the fish value chain. They pick-up fish leftover from market-sale from the ghat and sell it to the houses in the nearby villages. They have also started cleaning and adding value to the fish for immediate consumption at household levels. There are multiple SHGs working in this area helping these women for saving money and also for accessing many other women-oriented government schemes. Some other women were also found to be selling homemade savoury and sweets at the Khagaria *ghat* to passengers. They make a rough profit of INR 200-300 per day from sale of these products.

In Srigouri village which falls under Karimganj district of Assam, the women respondents shared that they generally do not travel much, either for trade or tourism. Peak season for commuting through IW is from November-March. They also shared concerns about their safety since there are no good vessels with adequate safety standards and using waterways as a means of transportation is more time consuming. This is because availability of road transport has also led to reduction of movement through river ways.

While advantages from navigational usage of waterways for women might be minimal however CUTS discussions in Brahmaputra did flag some concern that might originate from seamless waterway connectivity.

One such concern was that many household activities like bathing, washing dishes, clothes etc. are carried out by the river bank. Hence, entry of foreign boats or vessels could be a possible threat for the privacy of women who perform these household activities.

Women sharing their concerns about erosion and floods in Dhubri, Assam
PC: CUTS

Moreover, trafficking of young girls and women is another matter of serious concern for vulnerable communities living in make-shift house by the river. A sudden influx of out-state and foreign footfall via waterways might elevate trafficking activities. These concerns are also closely inter-linked with the processes followed by governance structure to keep track of boat movement in border areas on Barak and Brahmaputra.

NEPAL

In Nepal, the South Asian Watch on Trade, Economics & Environment (SAWTEE) – a partner of CUTS was engaged in the study. SAWTEE used similar method to understand the perception of local people on BBIN connectivity using IWs.

Livelihood Impacts

Like Bhutan, the number of people dependent on water transport for livelihood is very low in Nepal. However, near the major river basins of Nepal (Narayani and Kosi river basins) there are communities dependent on fishing, boating, and similar activities.

Most of the livelihood activities are heavily dependent on agriculture as the flood plains are fertile land for agricultural production. River water is mostly used for irrigating agricultural land. Navigation activities are non-existent except a few wooden boats used to ferry people to cross the river to Sunsari from Srilanka Tappu. There are risks of accidents due to flash of water in rainy season. Despite this, people see more jobs linked to developing cross country navigation facilities.

On the Gandak river basin, prospect of developing navigation route on Narayani river exists but is also limited due to the Chitwan National Park – as motorised traffic might disturb the habitat. At present, the only navigation activity that exists here is to travel to the Balmiki Dham across the river and people use ferry services of local boats during the festival season (January-February).

Fishing boats near Kosi Barrage, Nepal
PC: CUTS

Environmental Impacts

Navigation on rivers is limited to country boats used for short distances of less than a kilometre on an average. No modification to the natural course of rivers and an absence of motored diesel-guzzling vessels on the rivers mean the direct environmental impact of navigation is very limited. Both Narayani and Kosi river basins flow through protected forest reserves, so due consideration is provided to environmental aspects.

As in the case of the Narayani river, the concerns regarding habitation of aquatic reptiles such as *ghariyals* (alligators) have prevented navigation on larger motorised vessels. As such, the river safari operated under the ambit of the national park uses wooden row boats for minimal impact on the habitation of the animals.

At the same time, the Kosi Tappu Wildlife Reserve actively monitors the fishing taking place in Kosi river. About 200 households involved in fishing in the lower stretch of the Kosi river are reliant on the Kosi Tappu Wildlife Reserve for their livelihoods and they also do not venture into restricted areas which is monitored by the security force of the wildlife reserve.

The Kosi Tappu Wildlife Reserve and its buffer zone are not spread to Chatara where private companies operated jet boat services and soon a new one is planning to restart the service. However, the ports from where the boats load and unload passengers are in a protected community reed forest under the care of two different groups.

According to the Presidents of the groups, the boating service providers do not contribute to the conservation of the area. As a similar jet service is mooted to begin operation in the same route, this time they are planning to issue a permit to use their lands only after getting a signed commitment on conservation.

On the other hand, earlier when the jet boats were being operated, the operators had placed a request to Ministry of Physical Infrastructure and Transport to remove boulders that obstructed their route. The Ministry said that it would have obliged but the location of the boulders was as such that no existing equipment could reach the place.

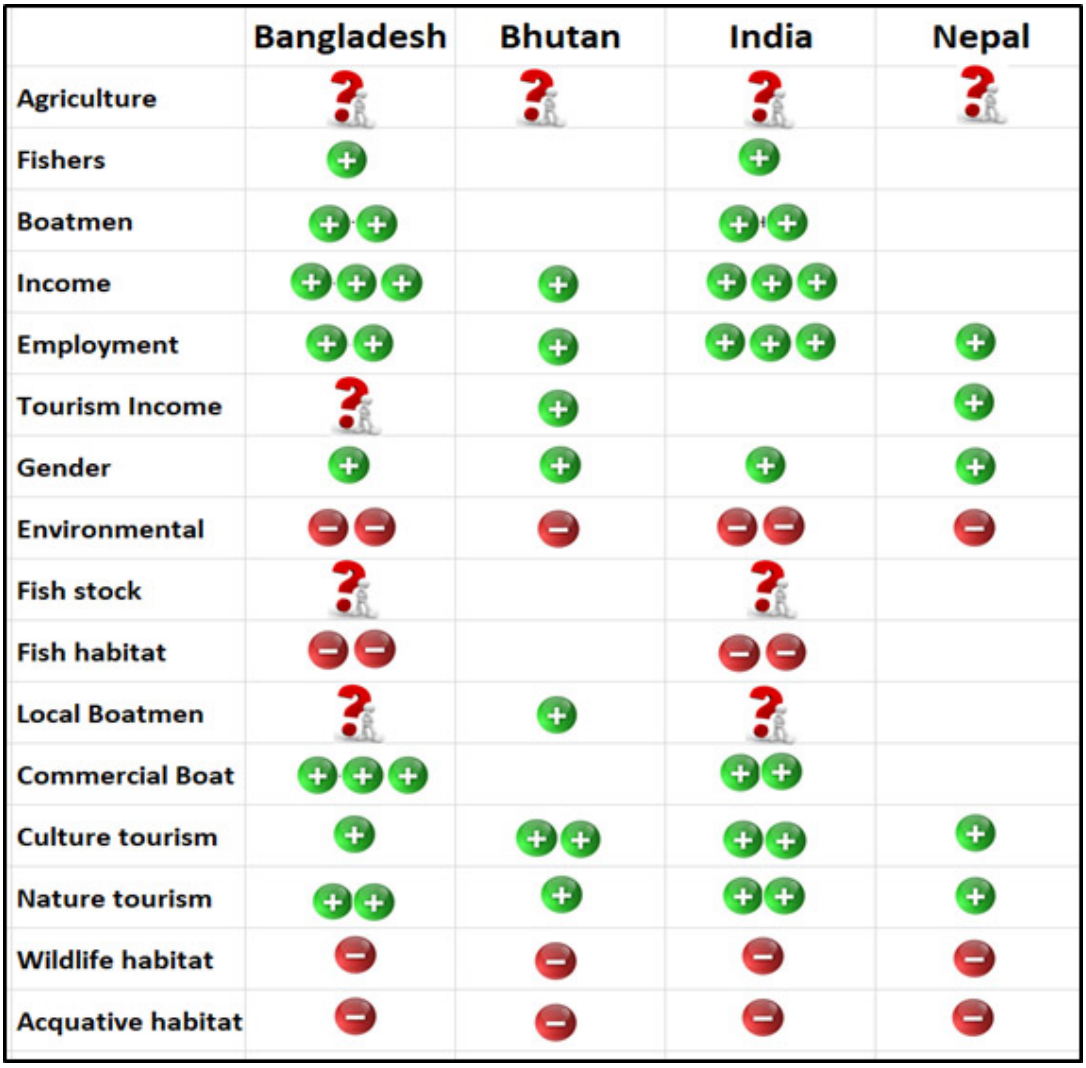
Such a haphazard action without proper impact assessment, if it takes place on a larger scale, could be detrimental to rivers' course and flow. Thus, navigational development also needs to carefully tread in such a manner that ecological and environmental balance is maintained.

8. Conclusion

To summarise, the study observed that there are both hard and soft issues linked with the management of IWs in BBIN countries. Figure 4 shows the overall impression from the cross country study. Plus signs imply expected positive impacts, minus imply expected negative impacts and question marks imply uncertain impacts.

Blank cells imply no impacts. It shows that while India and Bangladesh are likely to benefit the most from the cross-border use of IWs, Nepal and Bhutan will also receive positive benefits from this cooperation on IWs use for navigation purposes.

Figure 4: Perception by Stakeholders on Impacts of Cross-border IW Navigation



Based on this impact table, the overall observations from the study has been summarised below.

1. River dependent population are of several kinds – farming communities who depend on river for irrigation water; fishing communities who depend on river for fishing activities; char people living in riverine islands who depend on rivers for transportation, irrigation, and also migration; local marginalised population who has no de jure right on rivers so could be farther marginalised when river become a source of income for commercial operations; ship liners using IWs for transportation of passengers and goods. A growth in economic power of one group might reduce economic outcome of other groups.
2. Small fishing and ferry boats on the main protocol route will find it difficult to continue to work when river gets more traffic and the environment is disturbed.
3. Opportunities for non-consumptive household use of water will come under threat with increased commercial use of river and women will find it difficult to use rivers for bathing and washing.
4. Transboundary navigation activities will probably be more useful for transportation of bulky and/or oversized products.
5. Tourism activities across borders will require changing the rights of the tourist operators to drift away from protocol route and allow them to visit designated cultural and natural heritage sites and developing facilities for immigration and custom clearance.
6. Development of navigable waterways for 365 days and that is operable 24/7 is needed to reduce cost of transportation on rivers. For this synchronised dredging activity between India and Bangladesh is needed. Keeping the channels open will remain a challenge for both India and Bangladesh.
7. All port of calls must have facilities for seamless transfer of shipments onto roads and trucks to ensure that the last mile connectivity at each end of the ports exists. This will promote use of IWs for transportation of goods. Given this problem of erosions, introducing mechanised/hydraulic dismantling and assembling system for pontoon bridges for passage of vessels can serve to be the solution.
8. BBIN countries should cooperate in sharing information with each other on any infrastructure construction so that it does not hinder navigational use of waterways. Inland navigation has to be part of the overall transport narrative of the sub-region as Nepal and Bhutan can also access the waterways in India and Bangladesh with proper multimodal/ intermodal connectivity.
9. All facilities for captains, crews, passengers, and also workplace should be sensitive to the needs of women to make the new development gender friendly.
10. Adverse effects on environment due to navigational use of IWs must be monitored and reported publicly. There might be requirements for joint survey on rivers shared by Bangladesh and India.
11. The cost of maintaining the navigation routes should be shared by all BBIN countries in proportion to the benefits accrued to them.
12. There should be an impetus to promote an integrated approach for basin-wide management of GBM basins.

Recommendations and the Way Forward

In order to promote closer cooperation within BBIN countries on cross-border navigational use of IWs, this study recommended following works in order to broker a deal on the current discourse.

These include:

a) Development of IWs for navigation using an integrated strategy with active participation of BBIN countries;

b) Development of a protocol for movement of ships carrying goods on specified protocol routes keeping in view fish sanctuaries, ecologically sensitive areas, bio-reserves and community use of rivers for livelihoods;

c) Development of protocol for moving tourists across boundaries and engaging local communities for cultural and nature-based tourism;

d) Fostering port of calls that are service-friendly for seamless transfer of goods from one mode to other modes (like onto road and/or rail);

e) Development of protocol for disposal of wastes from ships and boats in order to reduce environmental impacts;

f) Modification of customs and immigration protocols in order to promote navigational use of rivers across borders;

g) Syncronisation of dredging activities across borders and establishment of joint commission between countries sharing the same river;

h) Allowing licenced small and mechanised boats to transport goods on short distances across borders to promote local trade across borders;

i) Taking into cognizance conventional rights of the riverine people while developing protocols for cross-border navigational use of IWs to avoid alienation of the local marginalised communities; and

j) Framing strategies for localised river-dependent communities by engaging them in river training, disaster management, freight handling and other services will supplement their livelihoods.

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Expanding Tradable Benefits of Trans-boundary Water: Promoting Navigational Usage of Inland Waterways in Ganga and Brahmaputra Basins

The Himalayan rivers of the Ganga and the Brahmaputra have created extensive systems of inland waterways in the region consisting of Bangladesh, Bhutan, India and Nepal – BBIN region. The current political discourse on trans-boundary cooperation among these countries has set the stage for institutional analysis of policies, laws and regulations governing inland waterways in the BBIN countries. This study aims to contribute to improving institutions (i.e. policies, laws, and regulations) for inland waterways governance with particular emphasis on transport connectivity and livelihood in the BBIN region. More details about the project can be accessed here: http://www.cuts-citee.org/IW/index.htm

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Established in 1983, CUTS International (Consumer Unity & Trust Society) is a non-governmental organisation, engaged in consumer sovereignty in the framework of social justice and economic equality and environmental balance, within and across borders. More information about the organisation and its centres can be accessed here: http://www.cuts-international.org.

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