India

Expanding Tradable Benefits of Inland Waterways

CUTS International

#1715

Expanding Tradable Benefits of Inland Waterways
Case of India

Published By

CUTS International

D-217, Bhaskar Marg, Bani Park, Jaipur 302016, India
Tel: +91.141.2282821, Fax: +91.141.2282485
Email: cuts@cuts.org, Web site: www.cuts-international.org

With the support of

The Asia Foundation

First published: December 2017

This document has been produced by CUTS International

Printed in India by M S Printer, Jaipur

This document is the output of the study designed and implemented by CUTS International and its strategic partners – Royal Society for Protection of Nature (RSPN), South Asia Watch on Trade, Economics and Environment (SAWTEE) and Unnayan Shamannay which contributes to the project 'Expanding tradable benefits of trans-boundary water: Promoting navigational usage of inland waterways in Ganga and Brahmaputra basins'. More details are available at: www.cuts-citee.org/IW/

This publication is made possible with the support of The Asia Foundation. The views and opinions expressed in this publication is that of CUTS International and partners and not of The Asia Foundation.

#1715

Contents

Lists of Boxes, Figures and Tables

Acknowledgement

The study is part of a series of studies conducted across Bangladesh, Bhutan, India and Nepal on 'Expanding tradable benefits of trans-boundary water: Promoting navigational usage of inland waterways in Ganga and Brahmaputra basins' and covers the findings from India. We express our deep gratitude to The Asia Foundation for their generous support for the Civil Society Fund (CSF) programme under which this project is undertaken.

We wish to acknowledge and appreciate the information received from stakeholders who we interviewed and interacted during field work. We also thank our local partners – Poorvanchal Grameen Vikas Sansthan (PGVS), Indian Grameen Services (IGS BASIX) and Rashtriya Grameen Vikas Nidhi (RGVN) for facilitating field level interactions in Uttar Pradesh, Bihar and Assam, respectively.

We would also like to acknowledge inputs received from the community consultations in Dhubri, Assam jointly organised by CUTS International and International Union for Conservation of Nature (IUCN) as well as the Bangladesh-India Dialogues facilitated by IUCN under the project 'Building River Dialogue and Governance in Ganga, Brahmaputra and Meghna basins' (BRIDGE GBM).

Abbreviations

ABN:	Assam Bengal Navigation
BBIN:	Bangladesh, Bhutan, India and Nepal
BMC:	Bhartiya Micro Credit
CIWTC:	Central Inland Water Corporation Limited
CNES:	Centre of North East Studies & Policy Research
COFFED:	Co-Operative Fisheries Federation
CSF:	Civil Society Fund
CSOs:	Civil Society Organisations
DCCAA:	Delhi Customs Clearance Agents Association
DGPS:	Differential Global Positioning System
DRDA:	District Rural Development Agency
EBR:	Extra Budgetary Resource
FDI:	Foreign Direct Investment
FGDs:	Focus Group Discussions
IBP:	India-Bangladesh Protocol
IGS:	Indian Grameen Services
IRS:	Indian Register of Shipping
IUCN:	International Union for Conservation of Nature
IW:	Inland Waterways
IWAI:	Inland Waterways Authority of India
JMVP:	*Jal Marg Vikas* Project
KIIs:	Key Informant Interviews
LAD:	Least Available Depth
LCS:	Land Customs Station
MGNREGA:	Mahatma Gandhi National Rural Employment Guarantee Scheme
MMT:	Multimodal Terminals
MT:	Million Tonnes
MoEFCC:	Ministry of Environment, Forests & Climate Change
MoS:	Ministry of Shipping
NW:	National Waterway
ODC:	Over Dimensional Cargo
PGVS:	Poorvanchal Grameen Vikas Sansthan
PIWTT:	Protocol Inland Waterways Transit and Trade
PPPs:	Public Private Partnerships
PSUs:	Public Sector Undertakings
RFD:	River Front Development
RGVN:	Rashtriya Grameen Vikas Nidhi
SHGs:	Self-Help Groups
SoPs:	Standard Operating Procedures
STPs:	Sewage Treatment Plants

Contributors

Akshat Mishra

Akshat is a Senior Research Associate at CUTS International. He holds a Master's degree in Economics from Symbiosis School of Economics with a further specification in Environmental Law and Policy from NLU Delhi & WWF India. He is also the founding editor of an e-magazine-Pathway to Development. Prior to CUTS he was associated with Himachal Pradesh State Electricity Board Limited in the capacity of a Project Coordinator. He is also a certified Level 1 Partnership Broker and specialises in qualitative research in the areas of climate change, sustainable development and food-water-energy security.

Bijaya Roy

Bijaya is a Research Assistant at CUTS International. She pursued her Graduation in Economics from Gokhale Memorial Girls' College and post-graduation in Economics from Banaras Hindu University with specialization in Econometrics. Prior to CUTS, she was a Guest Lecturer at Gokhale Memorial Girls' College, Kolkata.

Bipul Chatterjee

Bipul is Executive Director of CUTS International and heads CUTS Centre for International Trade, Economics & Environment. Prior to joining CUTS International, he worked at several economic policy think tanks in New Delhi, such as National Council for Applied Economic Research, and Institute for Economic Growth. He has more than 20 years of experience on issues related to international trade and development, especially on political economy of trade and economic policy reforms, particularly pro-poor aspects of reforms.

Kyle Cote

Kyle is a Policy Analyst at CUTS International. Prior to CUTS, Kyle has worked with International Labour Organisation, Search for Common Ground and German Institute for International and Security Affairs. He holds a Master' s degree in International Relations from the University of Kent, Brussels School of International Studies with a specialisation in areas of human rights and development. He has done extensive research and published on trade and labour rights, including the European Union's incorporation of labour standards in Sustainable Impact Assessments of free trade agreements. His research profile covers India's trade and development relations at the regional and international level.

Prashant Sharma

Prashant is a Senior Programme Officer at CUTS International. He holds Masters in Diplomacy, Law and Business from Jindal School of International Affairs, O.P Jindal Global University, India. Prior to CUTS, he was involved in short and long term assignments with FICCI; National Tsing Hua University, Taiwan; Help Age India and IBM Global.

Prithviraj Nath

Prithviraj is Associate Director, CUTS International. He has expertise on participatory research in the areas of trade, sustainability and energy. His recent and current research includes political economy of cross-border trade and its impact on regional integration and local economic development, with particular emphasis on Eastern South Asia. His other work spans energy governance, renewable energy and sustainable development issues. Before joining CUTS, he worked with the Department of Municipal Affairs, Government of West Bengal. He did his master's in Business Management after graduating in Economics from University of Calcutta and has published several research papers and articles.

Saurabh Kumar

Saurabh is a Policy Analyst at CUTS International. He has a PhD in International Relations from Jawaharlal Nehru University. He also worked at the London School of Economics and Political Science. He has more than five years of research experience on issues related to international trade, regional cooperation, and international politics.

Susan Mathew

Susan is an Assistant Policy Analyst at CUTS International. She is a post graduate in horticultural sciences and a graduate in agricultural sciences with field experience engaging with communities in Brahmaputra, Ganga, Indus and Kosi river basins. Prior to CUTS, she has been in various positions with Indian Institute of Management Ahmedabad, Department of Agriculture (Gujarat and Kerala) and Ministry of Agriculture and Farmers Welfare, Government of India.

Veena Vidyadharan

Veena is a Fellow at CUTS International. She holds a PhD in Agricultural Science (Agronomy) from Rajasthan Agricultural University, Bikaner. Prior to joining CUTS, she has worked with various institutions under diverse sectors viz., government, non- profit organisation and research institutions. She has done extensive field work across India and has more than 11 years of experience in conducting research and managing projects in the fields of agriculture, water management, food security and climate change.

Executive Summary

With an estimated length of around 2500 km and 3800 km, Ganga and Brahmaputra rivers form the backbone of waterway connectivity among the BBIN countries. Historically these rivers played a major role in flourishing trade and commerce in the sub region but over the time lost its significance owing to better developed road and rail infrastructure. Of late there has been a renewed focus on connectivity through waterways with several agreements signed between member countries on trade and transit. However multiple governance and infrastructural challenges have to be overcome before these Himalayan rivers are utilised for inland waterway connectivity.

The project 'Expanding tradable benefits of trans-boundary water: Promoting navigational usage of inland waterways in Ganga and Brahmaputra basins' was envisaged as part of the Civil Society Fund (CSF) program of The Asia Foundation. The Fund supports civil society and community engagement on trans-boundary water issues in the South Asia region. The Fund seeks to improve the lives of communities, especially of vulnerable groups, including women, affected by decisions made regarding the governance and management of Himalayan Rivers in order to deliver sustainable, fair, inclusive, and climate resilient development of water resources.

Given this background, the project 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.

As part of this project, CUTS and its partners conducted a diagnostic study in Bangladesh, Bhutan, India and Nepal to compile an institutional analysis reviewing secondary and available evidences on inland waterways, its institutional governance structures, existing laws and policies. This report presents the information gathered from the diagnostic study in India. The study was also successful in mapping the perceptions of various stakeholders like boat operators, freight handlers, boatmen, sand traders, fishermen community, private tour operators, logistics companies, academia and government officials to understand the current state of policy discourse on inland waterways with respect to trade, connectivity and livelihoods.

This report is divided into five parts – introduction to the study along with methodology, institutional analysis of inland waterways in India, scope of trade and transit on inland waterways, discussing stakeholder perceptions from the field study and finally the challenges and recommendations that need to be dealt with.

The study has been helpful in identifying the key areas of interventions for promoting waterways as a mode of regional transport and connectivity. However, this recommendation comes with certain caveats which require minute and judicious policy deliberations.

The major challenges in inland navigation are maintaining minimum depth for year round navigation, high sedimentation rate, competition from other modes of transport, less emphasis on storage structures, infrastructural challenges and lack of night navigation facilities. Luke warm interest shown by private players owing to infrastructural and regulatory challenges, poor coordination among various line departments involved in transboundary water governance space and relatively poor trade volume in Brahmaputra are also highlighted in the report.

Large-scale infrastructure development should also be smartly marketed to the private sector so as to entice them towards long term cargo commitments for scaling up cargo and transport movement on the waterways. Multimodal and intermodal junctures in selected locations can assure year round navigation along waterways and connect landlocked countries like Nepal and Bhutan to the Bay of Bengal.

The study finds that instead of promoting large-scale infrastructural developments for navigation in India, government has to critically analyse what are the immediate gains for the local communities so that they can also benefit and be part of the developmental paradigm. Boosting the unorganised sector by providing adequate policy support will foster local trade across smaller stretches within and between states as well as national borders would enhance the trade volume and contribute to the local economy.

The study also identifies river tourism as another promising sector for establishing local community benefits and generating revenue and employment opportunities. While people to people connectivity remains the crux of all inland waterway connectivity deliberation, it is worthwhile to note that governance of waterways can improve the quality of navigation services for the riverine communities.

Development of waterways in India can be attained if state governments (departments) and initiatives by the Central government are tied to each other for a long-term sustainability. With proper environmental impact assessments, risk management strategies and technological interventions, inland navigation can definitely transform the transport narrative of the sub region bringing in better integration and economic growth.

1. Introduction

Background and Rationale

Himalayan rivers of South Asia hold importance in the region's geographical, cultural, religious and economic development. The rivers Ganga and Brahmaputra were used as a corridor for connectivity even prior to the colonial era. Historical evidences support the use of waterways for riverine trade from middle and far east. With the development of road and rail infrastructures, waterways got neglected and lost its significance over time.

Of late there has been a renewed focus on the development of waterways particularly in India with the declaration of 106 rivers as new National Waterways in 2015. Trade and transportation via inland waterways is cost effective and environmental-friendly alternative to land-based transportation systems that grapple with congestion and capacity constraints and has the potential to enhance trade competitiveness by reducing logistics cost. Waterways as part of multimodal connectivity have also been shown as an emerging area of cooperation in the area of trade and transit among the countries of Bangladesh, Bhutan, India and Nepal (BBIN) (CUTS International 2016). With an estimated length of around 2500 km and 3800 km, Ganga and Brahmaputra rivers form the backbone of waterway connectivity among the BBIN countries.

In recent years, the importance of regional connectivity among the BBIN countries has emerged as a model and champion of efficient policies with several Memorandum of Understanding (MoUs) related to trade, transit and connectivity being signed between countries. In this context, India and Bangladesh have tremendous potential to connect the land-locked nations of Bhutan and Nepal to sea and to the emerging markets in South East Asia. Equipped with this knowledge, CUTS had established a possible area of intervention for connecting waterways of Bangladesh and India and develop multi-modal connectivity infrastructure for Nepal and Bhutan in which rivers formed an integral part.

However, there is also a concern that the developmental paradigm of inland waterways is not inclusive owing to multiple environmental and social issues as evident in print and electronic media. Keeping this view, a diagnostic study was undertaken across the BBIN countries to absorb grassroot evidences from various stakeholders and build an inclusive policy discourse on the development of inland waterways.

This report captures findings of the diagnostic study from India and looks into the existing policies, laws and regulations governing inland waterways in the country. With special focus on national waterway 1 (NW-1) and national waterway 2 (NW-2) along Ganga and Brahmaputra respectively, the study further analyses the perceptions of various stakeholders on the governance of inland waterways and their impact on navigational usage and livelihoods of the communities, especially those on women, residing in adjoining areas of these river basins.

Given the unique intersection for waterways where river water is a scarce trans-boundary resource and inland navigation is an ecosystem service intersecting with livelihoods of riverine people, it was a challenge to assimilate perceptions from a wide range of stakeholders. Nevertheless, these grassroot evidences enabled CUTS to identify the policy gaps, possible policy synergies and the expectations of various stakeholders (from state and non-state actors) and underline possible ways of expanding tradable benefits of waterways in India and the BBIN region.

The objectives of the study were to:

- identify and analyse functions (what they do) and governance (why and how they do) of existing laws, regulations and policies governing NW-1 and NW-2 in India; and
- contribute to the evidence-backed inclusive policy discourse in the India.

Limitations of the Study

Due to the diverse and extensive nature of the study, following limitations were encountered during its progress:

1) Since the duration of the project was for a short-term (14 months), the time period available for conducting field studies across four states along two major national waterways was considerably concise and the entire exercise was logistically resource consuming.

2) The development of waterways in India is yet to scale-up at the commercial and business level, hence establishing clear linkages between local benefit through river-borne cargo movement was a challenge.

3) A key impediment to extracting information regarding cargo movement and trade statistics through the waterways in India is the lack of state wise/commodity wise cargo data and in public domain.

4) Since the study focussed on the governance aspects of waterways with emphasis on trade and transit, the gender dimensions of economic benefits

through inland navigation was beyond the scope of study. However, maximum attempt has been made to capture the social and economic aspects of riverine livelihoods and its intersections with inland navigation on gender.

Methodology

The study was composed of two parts given the niche area of research on inland waterways. The first part was composed of extensive literature review which helped recognise and shortlist locations for the field study. The second part consisted of field research comprising key informant interviews (KIIs), and focus group discussions (FGDs) at identified locations followed by a series of consultations and dialogues at subnational, national and basin levels to validate these findings.

Based on a literature review, which included analyses of existing laws, policies and regulations governing inland waterways at national and sub-national levels, KIIs and FGDs were conducted in the four target states of Assam, Bihar, Uttar Pradesh and West Bengal to cover NW-1 (Ganga) and NW-2 (Brahmaputra). KIIs were conducted with officials of the Inland Waterways Authority of India (IWAI), officials of various other state departments and ministries, such as tourism, transport, agriculture, water resources, state inland water transport departments, subject experts, private sector stakeholders and civil society organisations (CSOs).

Whereas FGDs were conducted with boatmen, fishermen, freight handlers, ferry operators, boat builders, and women groups at homes, offices, *ghats*, and markets along the river side. The field surveys aimed to capture the perception of various stakeholders on pre-identified issues related to inland waterways governance and development. After compiling grassroot insights, multiple stakeholder consultations were conducted at various governance levels to validate the findings.

The locations within each of the four target states were chosen for their proximity to the Ganga or Brahmaputra and/or their representation in each state's governance of NW-1 or NW-2.

Table 1: Location and Participation in Field Consultations

National waterways	State	Locations	FGD Participants	KII Participants
NW-1 (Ganga)	Uttar Pradesh	Lucknow, Varanasi	25	11
	Bihar	Chapra, Patna, Begusarai, Khagaria, Bhagalpur	43	11
	West Bengal	Kolkata, Haldia	28	15
NW-2 (Brahmaputra)	Assam	Guwahati, Pandu, Majuli, Dhubri	32	9
NW-16 (Barak)	Assam	Karimganj	30	16
New Delhi			0	9
Total			158	71

Structure of the Study Report

It was intended that the India diagnostic study would look at the governance framework of rivers and thereby waterways along Ganga and Brahmaputra. However, on closer examination, it was noted that multiple laws and policies govern these waterways. It was proposed that the country studies would focus on the NWs 1 and 2 and aim to look at the governance aspect with a trade and transit lens. To ensure a holistic approach, livelihood and community perspectives (with a gender lens) were deemed essential to ensure that the benefits of waterways are expanded to the grass root beneficiary.

The succeeding sections in this diagnostic report include chapters on the institutions governing inland waterways in India, the scope of trade and transit on NW-1 and NW-2 followed by the grassroot insights from stakeholders (as part of extensive field study by CUTS) and finally recommendations and conclusions.

2. Institutions Governing Inland Waterways

Institutions for Governance of Inland Waterways in India

Institutional governance of Inland Waterways[1] (IW) in India date backs to the pre-independence year of 1942 converging into the genesis of Department of War. Post-independence and over of years of political reshuffles, there have been subsequent changes cum re-organisation in the name of the institutions governing transportation with several bifurcations of transportation ministries and departments like shipping, railways, aviation, road and highways handling different modes of freight and passenger transportation.

Ministry of Surface Transport (covering shipping and road transportation under its ambit) was bifurcated to two separate ministries in 2000, namely Ministry of Shipping and Ministry of Road Transport & Highways. In 2004, these bifurcated ministries were again re-organised and integrated as Ministry of Shipping, Road Transport and Highways with two separate departments - viz. Department of Shipping and Department of Road Transport & Highways.

Another remnant of the waterway governance from the colonial era was the Central Inland Water Transport Corporation Limited (CIWTC). Incorporated on February 22, 1967 under the Companies Act 1956 by the Government of India, CIWTC was amalgamated when it took over assets and liabilities of the erstwhile River Steam Navigation Company Limited. However, the union cabinet had approved the dissolution of CIWTC in 2016 as part of initiatives to revitalise Central Public Sector Undertaking and all assets have now been taken up by the IWAI (PIB 2016).

Ministry/Department of Shipping (MoS)[2] is the apex organisation that regulates governance of declared National Waterways in India. Formed in 1986, IWAI is the nodal executing/implementing agency, under the aegis of MoS that looks after the development and regulation of inland waterways transport infrastructure on national waterways[3] for facilitating seamless shipping and navigation (Figure 1).

[1] *As per Inland Vessel Act, 1917, an inland waterway in India comprises of (i) any canal, river, lake or other navigable water within a State, (ii) any area of any tidal water deemed to be the inland water as defined by the Central Government under section 70,(iii) waters declared by the Central Government to be smooth and partially smooth waters under clause (41) Section 3 of the Merchant Shipping Act, 1958 (44 of 1958)*

[2] *The Ministry of Shipping of Government of India covers shipping, ports sector including ship and vessel building, construction and maintenance of ports as well as inland water transport and national waterways. It formulates policies on these sectors and ensures implementation of those policies.*

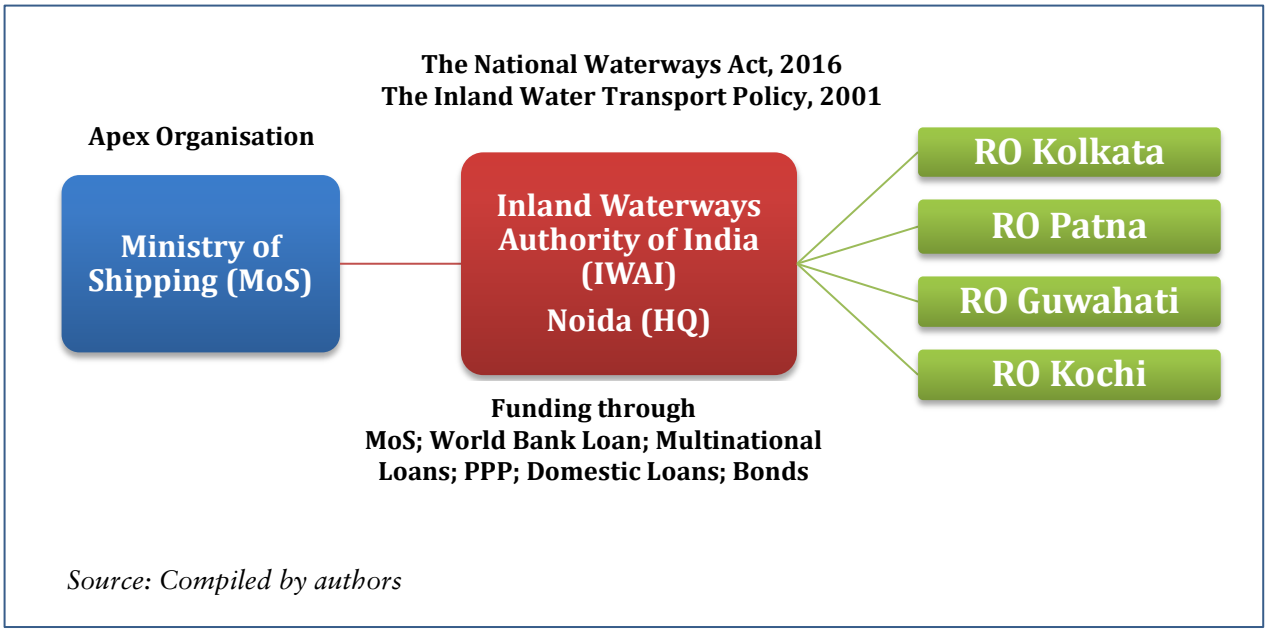
[3] *An inland waterway can be declared a national waterway only by an Act of Indian Parliament.*

All policy matters related to the development of national waterways are decided and implemented by the MoS under the advice of IWAI. IWAI is headquartered in Noida (Uttar Pradesh) and has established operations in four regional offices situated in Kolkata (West Bengal), Patna (Bihar), Guwahati (Assam) and Kochi (Kerala).

The primary function of IWAI is to regulate and facilitate development of national waterways by carrying out hydrographic surveys, fairway development for navigation, maintenance of river's least available depth (LAD) by carrying out dredging and bandalling[4], installation of day and night navigation aids and construction of permanent and floating terminals/ports/jetties along national waterways.

Apart from these, IWAI is responsible to coordinate with various other Central and state ministries to facilitate research and development activities for classification of new waterways and development of navigation on existing waterways apart from taking care of overall standards of procedure with regards to safety measures (IWAI 2017).

Figure 1: Institutional and Policy Regime of IWAI



Source: Compiled by authors

[4] *Bandalling is used to maintain required LAD in various river stretches for seamless vessel navigation. Under this processes river water is diverted from the secondary channel to the main channel by installing bamboo poles and bamboo mats at a length of 15 to 30 metres across the river. However, if the current is either less than 1 metre/second or shoal (sedimentary deposits at river's mouth or it's harbour) is large in length (greater than 150 metre) or depth to be improved is greater than 50 centimetre or when there is no scope for diversion of water from secondary channels, dredging through suction excavators and other machines is carried out to maintain the desired LAD.*

Policies, Acts, Rules and Regulations for Governance of Inland Waterways in India

With regards to principle governing legislations at the Centre, four main policy and acts (IWAI Act, 1985; The National Waterways Act, 2016; The Inland Water Transport Policy, 2001; and Inland Vessel Act, 1917) govern the overall framework of inland waterways development at the Central level and the definitive clauses have to be complied by the State government as per their discretion or as mentioned in the policy and/or act. For information on other relevant policies, acts, rules and regulations please refer to Annexure 2.

Table 2: National Policies, Acts, Rules and Regulations

Sr. No.	Law	Provisions
1.	The Inland Waterways Authority of India (IWAI) Act, 1985	The Act lays down provisions for constitution of an institutional authority for development and regulation of inland waterways for the purposes of shipping and navigation.
2.	The National Waterways Act, 2016	The principle governing legislation for regulation, development and declaration of existing and new national waterways in India. Under this recently enacted legislation, apart from existing five national waterways, 106 additional waterways (divided into three categories) have been declared as national waterways.[5] More details: http://iwai.nic.in/showfile.php?lid=882
3.	The Inland Water Transport Policy, 2001	The objective of the policy is to develop the inland waterway transportation sector into an attractive alternative to road and railway transportation. A 100 per cent grant to North-eastern states and 90 percent grant to other states are also given to develop and maintain waterways. More details: http://iwai.nic.in/index1.php?lang=1&level=1&sublinkid=7&lid=27
4.	Inland Vessel Act, 1917/Inland Vessels (Amendment) Act, 2007	It regulates the movement of inland vessels on waterways. It lays down detailed procedure for different kinds of vessels with regards to vessel survey, vessel registration, drivers of vessels, reporting casualties during an accident, safety measures for the passengers, penalties and other legal proceedings. In 2007, this Act underwent amendments in few of its original clauses, renaming it as the Inland Vessels (Amendment) Act, 2007. More details: http://iwai.nic.in/WriteReadData/l892s/act-18845788.pdf

[5] *The argument raised by the Ministry of Shipping for the enactment of the National Waterway Act, 2016 stresses that because of exhaustive and cumbersome legislative process, India was only able to declare and develop five waterways in the last 30 years and had deprived itself the benefits of promoting trade through development of IWT on several inland waterways.*

Sr. No.	Law	Provisions
5.	Draft New Inland Vessel Act/Bill 2016	With the objective of replacing the existing Inland Vessels Act, 1917 (1 of 1917) with amendment as of 2007 dealing all matters connected with operation of Inland Vessels in Inland Waters, a new Inland Vessel Act have been drafted through Indian Register of Shipping. More details: http://iwai.nic.in/showfile.php?lid=860
Source: Compiled by authors		

Institutional and regulatory governance of inland water transportation (IWT) is taken care by both the Centre and respective State governments as per the waterway category (Figure 2). At the central level, MoS and IWAI is specifically responsible for undertaking navigational development and maintenance of IWT infrastructure along protocol routes only for the declared national waterways as per the recently enacted National Waterways Act, 2016. On the other hand, the respective State governments are responsible for development and maintenance of IWT on State specific waterways not categorized as national waterways.

The role of state governments in the development of NWs in tandem with IWAI starts with land acquisition for fairway widening and development along with road connectivity at terminals. IWAI coordinates with respective state governments so that they can expedite the process of land acquisition as per the State law and have to make sure there are no physical obstructions on the protocol routes and if there are any (like fishing nets of local communities, modifications of cross structures, etc.), the State has to resolve them (IWAI 2017).

Shipping and navigation of mechanically propelled vessels[6] on declared national waterways falls under the direct control of the Central government. Shipping and navigation of mechanically propelled vessels on waterways other than national waterways falls in Concurrent list of Indian Constitution and comes under the jurisdiction of both Centre and the State. However, shipping and navigation of non-mechanised vessels comes under the jurisdiction of the State. Since water is a state subject in India, the role of the respective state government is indispensable in the overall developmental framework of inland waterways.

State governments play a vital role with regards to cargo/passenger transportation, traffic regulation and vessel registration as per various acts/policies/rules. Taking the case of NW-1 and NW-2, IWAI is primarily responsible for construction of permanent multimodal terminals (MMT) along with construction and/or

[6] *As per Inland Vessel Act 1917, mechanically propelled vessel means every description of vessel propelled wholly or in part by electricity, steam or other mechanical power including dumb vessel towed by the mechanically propelled vessel and vessel propelled by outboard motor.*

maintenance of other floating and fixed terminals, jetties, pontoon barges, pontoon gangway, vessel repair warehouses, navigation aid facilities and so on.

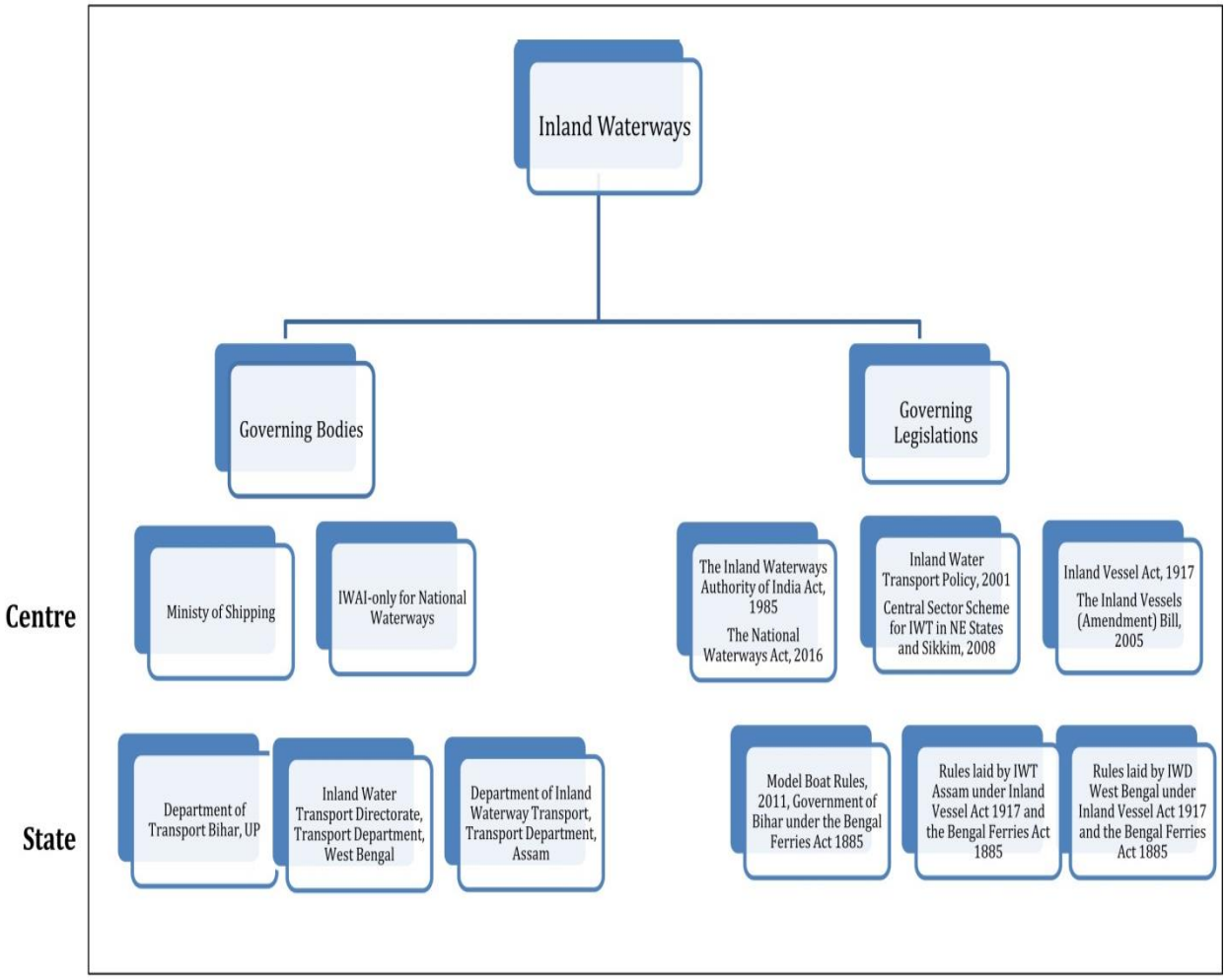
The state governments of Uttar Pradesh and Bihar undertake boat and waterway vessel registration through dedicated desks at the department of transport while states, such as West Bengal and Assam have separate department of inland waterway transport or inland waterways directorate under the aegis of its department of transport that undertakes regulatory activities of boat/ferries operating on inland waterway routes of the respective states.

Current Scenario of Inland Navigation in National Waterways 1 and 2

Reasons for development of freight transportation through inland waterways were first elaborated in India's Ninth Fiver Year Plan (1997-2002). The primary reason was India's need to explore other means of cargo transportations, given limitation on its overtly saturated road and rail infrastructure.

Moreover, government data shows that cargo diversion of around one billion tonne km to inland water transportation (as an alternative to environment friendly mode) will result in reduction of cost of freight transportation by 45 crores and fuel cost by 25 crores (IWAI 2017). A policy impetus in this direction paved way for the introduction of the National Waterway Bill, 2015 in Lok Sabha on May 05, 2015, which was ultimately passed by the Parliament and led the enacted of the National Waterways Act, 2016.

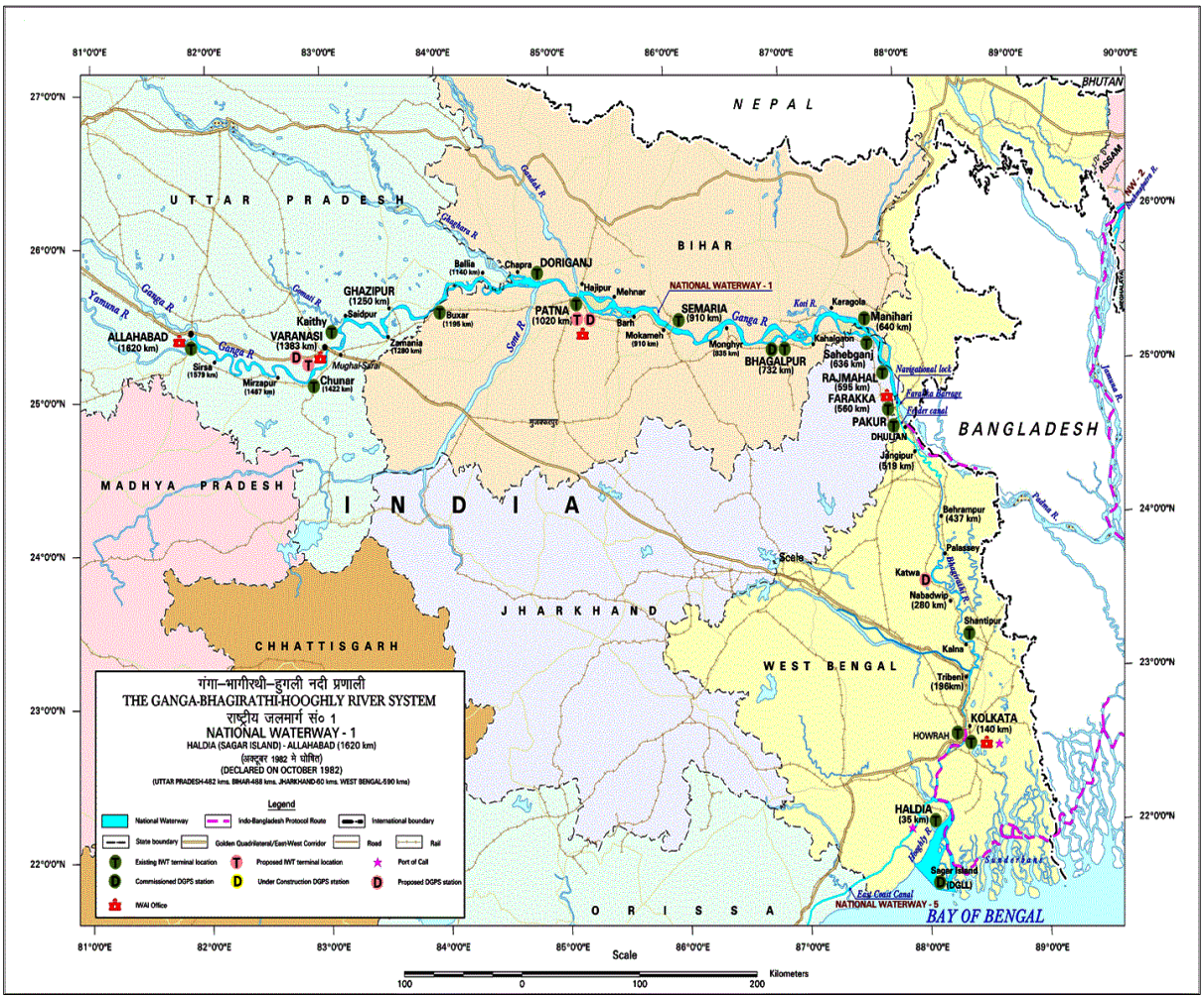
Figure 2: Governance of Inland Waterways in India (NW-1 and NW-2)



Source: Compiled by authors

Since the enactment of this Act, a renewed sense of direction to develop and accelerate commercial activities on several waterways, specifically NW-1 and NW-2, has been noticed in India. Furthermore, with an impetus to promote India's trade competiveness in the global market and recognising the importance of strengthening trade connectivity in BBIN sub-regional grouping, India's MoS is making efforts to align inland waterway development with multimodal connectivity, mainly focusing on developing road and railway infrastructure in cities where permanent inland waterway terminals are being constructed. This step flickers the importance of growing recognition of mutual cooperation and coordination between IWAI, along MoS, with various ministries, departments, corporations and private sector, namely Ministry of Railways, Dedicated Freight Corridor Corporation of India Limited, Ministry of Road Transport and Highways, and the Ministry of Commerce & Industry.

Figure 3: Route Map of National Waterway-1



Source: (IWAI 2016)

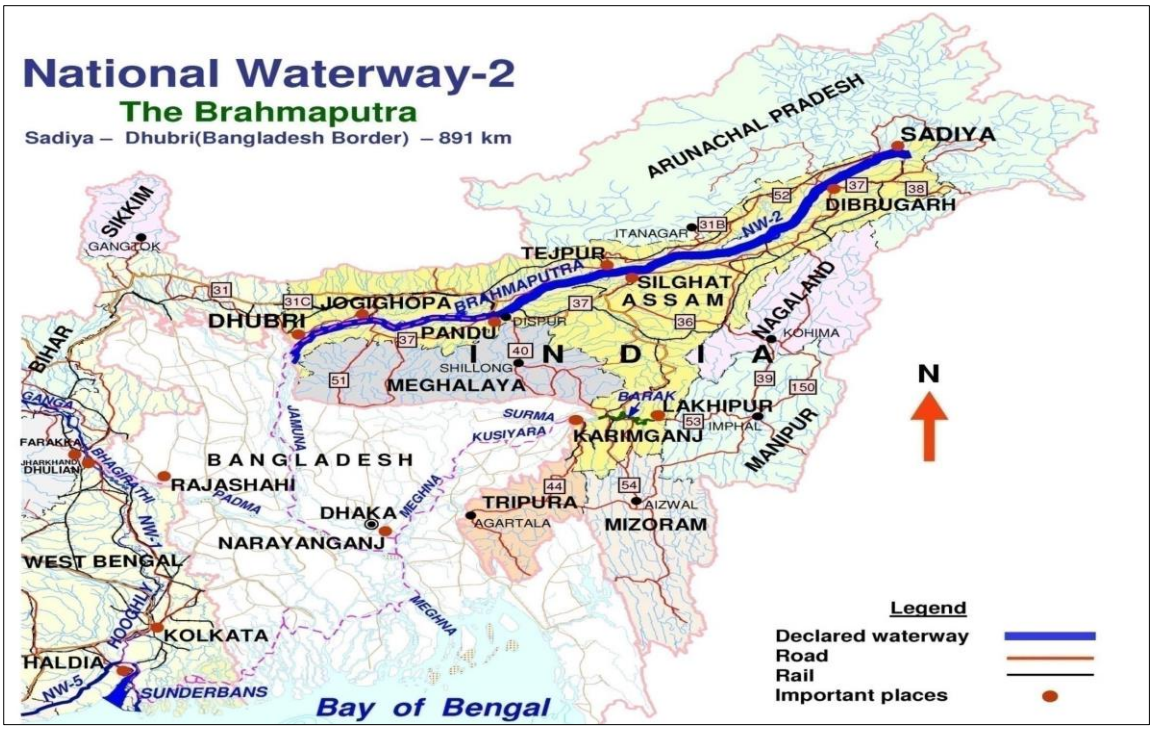
Jal Marg Vikas Project

The Government of India aims to increase the percentage share of cargo transportation through waterways to 15 per cent in 2019 from present 3.5 per cent coupled with creation of additional 1,60,000 jobs along NW-1. Hence, the *Jal Marg Vikas* Project (JMVP) will entail development of fairway with 3 meters depth between Varanasi and Haldia (Phase-I) covering a distance of 1380 km at an estimated cost of INR 5369 crore with target for completion in six years (PIB 2017). JMVP will be implemented with the financial and technical support of the World Bank. IWAI is also exploring additional funding opportunities through issuance of government serviced bonds,[7] getting private sector investments, and so

[7] *In order to raise funds for infrastructural development and maintenance of shortlisted national waterways, IWAI got approval from the Union Cabinet to raise government serviced bonds worth Rs 1000 crores in 2016, whereas IWAI was only successful in raising bonds worth Rs 340 crores during the same year. On July 20, 2017, the Union Cabinet reissued permission to IWAI to raise bonds in terms of Extra Budgetary Resource (EBR) worth Rs 660 crores in the year 2017-18.*

on. For updated information on the implementation of ongoing and proposed projects on NW-1, NW-2 and North-eastern states please refer to Annexure 1.

Figure 4: Route map of National Waterway-2



Source: (IWAI 2016)

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 – an upstream and downstream riparian country, 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.

Inland waterways 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 inland waterways 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 3: 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 (Link)	• 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 (Link)	• 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 (Link)	• To further develop the friendly relations and to 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 (Link)	• 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 (Link)	• To ensure the systematic and balanced development of the national capacity in the field of maritime sector
6.	Agreement on coastal shipping between India and Bangladesh, 2015 (Link)	• 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 (Link)	• 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	• To strengthen the existing friendly relations between the two countries through

Sr. No.	Treaty	Objectives
	the field of fisheries, 2011 (Link)	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 (Link)	• 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 inland waterway and highways
10.	Agreement between India and Bangladesh on sharing of the ganga waters in Farakka, 1977 (Link)	• 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 (Link)	• 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 (Table 3).

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 recent couple of years have witnessed a renewed direction of mutual cooperation between India and Bangladesh. This has also 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 inland waterways (Table 3).

3. Trade and Transit on Inland Waterways

Unlike other coast-bound countries (like Bangladesh), inland water transportation in India has remained low in share of freight transportation (both goods and passenger) among all modes of transport. Waterborne goods transportation, particularly by inland waterways, has great promise as it is cheaper and environment friendly mode of transport for bulky goods such as iron ore, steel, timber, and coal. It also helps in reducing stress on the already congested railway and road networks. Several studies have been conducted on the advantages (GoI 2014), cost estimation (World Bank 2017) and viability statistics (MoSPI 2014) of inland water transportation in India. Studies also show that transport systems through waterways is not only fuel efficient but also environmentally friendly in comparison to transportation by road and railways (Nagabhatla and Jain 2013). Moreover, cross-border transportation through waterways has the potential to become a locus for expanding regional cooperation.

This chapter will aim to present the current status of goods and passenger movement in NW-1 and NW-2 as well as on the India-Bangladesh Protocol (IBP) route. The information in this chapter has been compiled from various government and non-government sources.

Categories of the Cargo

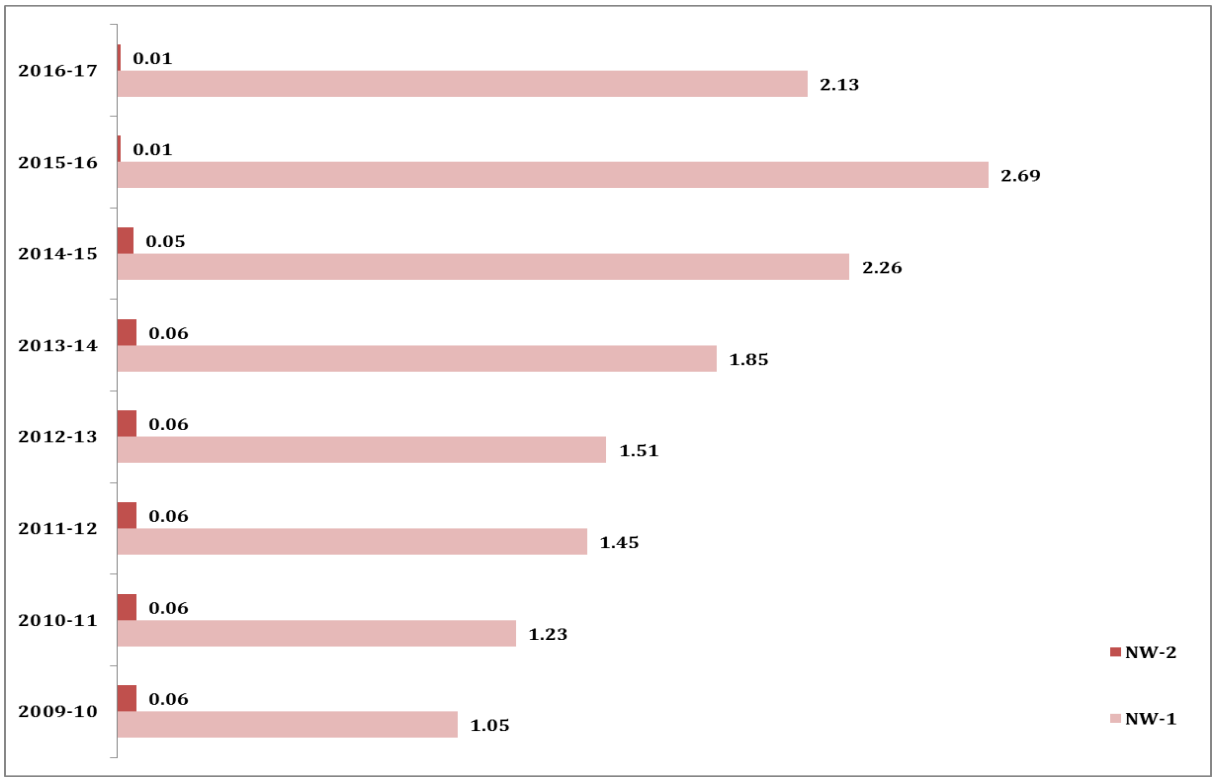
The stark difference which sets apart trade and transit on NW-1 and NW-2 is the quantum and type of trade. Overall, cargo movement on NW-1 and NW-2 is limited to the state of West Bengal and for limited products.

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 5 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.

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 equipment's, fertiliser, building material and bamboo (IWAI 2017).

It has been estimated that coal and fertiliser movement on bulk scale will support large-scale cargo transportation on NW-1. CUTS' discussions with stakeholders indicate that the coal transported along NW-1 is primarily to cater to the need of power plants located on the river banks of Ganga. This is mainly because there is a huge demand of coal for ten existing thermal power plants and eleven new power stations which are under construction or being constructed in Bihar and Uttar Pradesh in the next eight years on the banks of NW-1. Around 20 per cent of coal requirement of these power plants will be completed by imported coal through Haldia route. Hence, this will give a significant potential to NW-1.

Figure 5: Cargo Movement on NW-1 and NW-2 (in BTKM)



Source: (IWAI 2016)

Similarly, fertiliser plants, such as IFFCO Phulpur Plant in Varanasi, Indo Gulf Fertilisers in Jagdishpur (near to Allahabad) and Tata Chemicals Limited in Haldia, West Bengal will require multimodal transport infrastructure to cater to the need of farmers in these states and for nation-wide coverage.

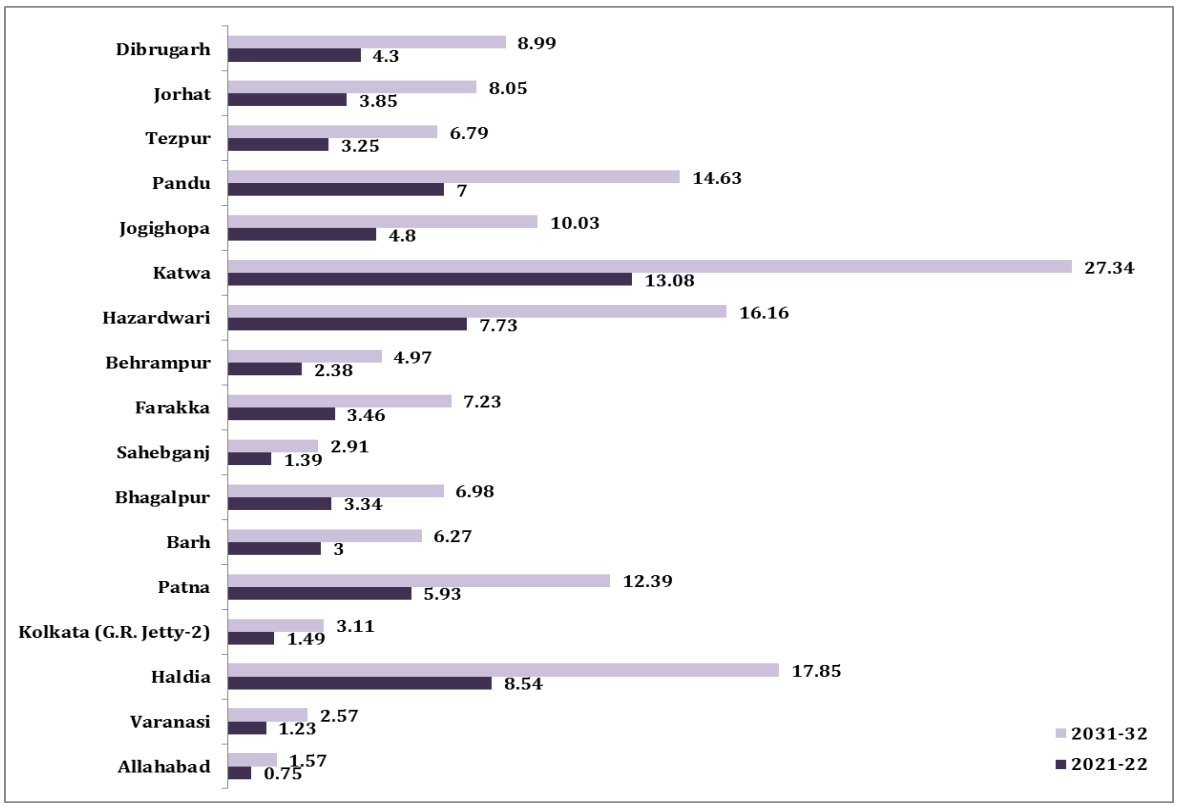
Location of Cargo Production and Consumption

A critical point of consideration for trade and transit, especially in India, is the location of cargo production and consumption. CUTS' consultations with stakeholders show that private sector prefers to have minimal costs and

documentations for the processes related to offloading and loading of cargo. Locations of bulk production and consumption eliminate such tertiary costs in the logistic framework, especially for small and medium private players who depend on cost-savings for turning annual profit.

As mentioned in the above section, coal and fertilisers, being bulky commodities need to be transported from their point of bulk production to the point of bulk consumption. In fertiliser, bulk consumption point cannot be comparable to that of coal, yet can be estimated to be a location with substantial multi-modal connectivity.

Figure 6: Projections for Quantity of Cargo on Selected Terminals (In MT)



Source: (IWAI 2014)

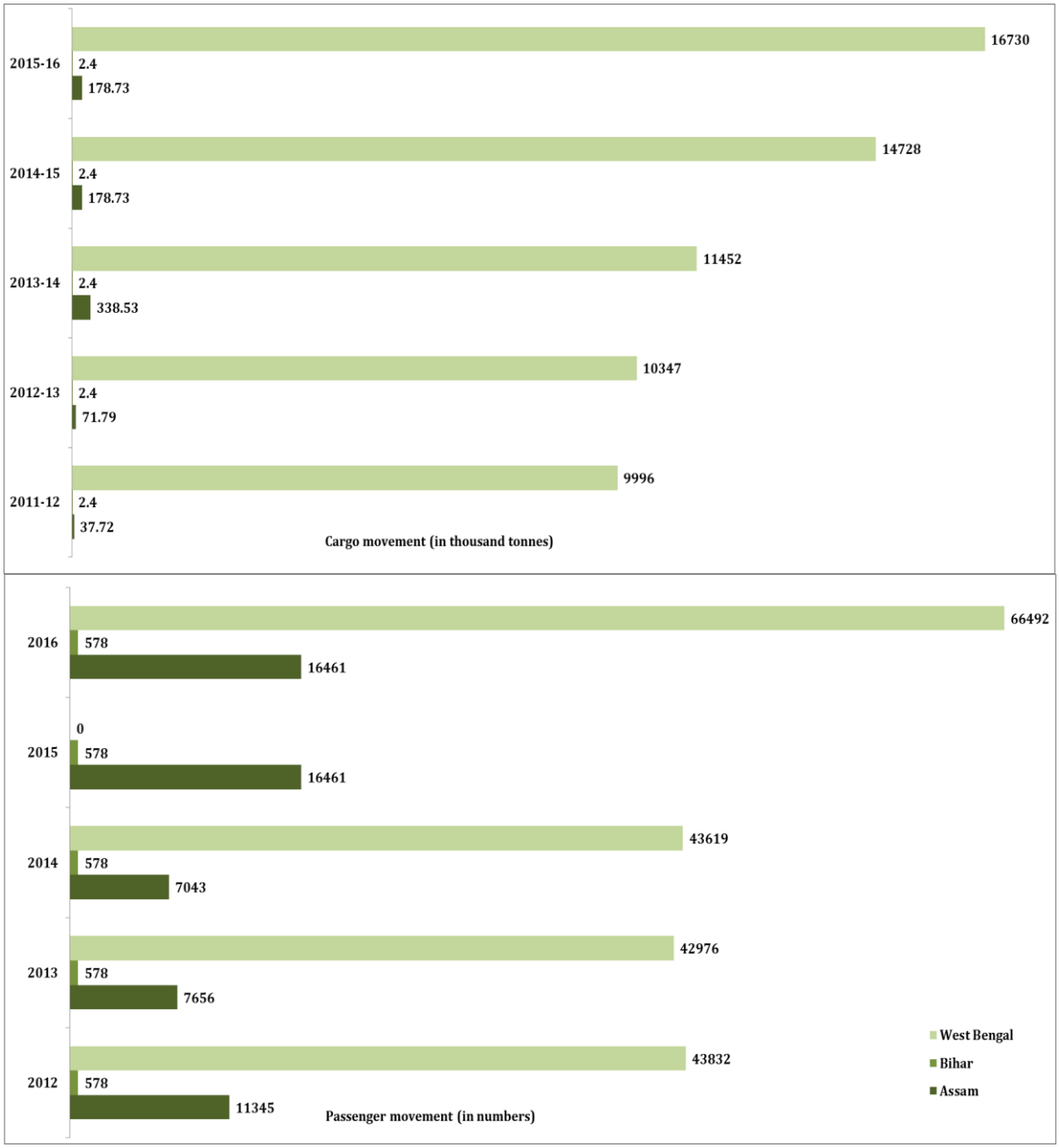
A joint study by IWAI and RITES (Table 4 and Figure 6) also estimated that by the year 2031-32, there will be substantial movement of cargo on selected terminals. For example, Joghighopa and Pandu in Assam, Patna in Bihar and Haldia, Katwa and Hazardwari in West Bengal hold the potential for moving cargo quantities higher than 10 MT.

Table 4: Projections for Type of Products on Selected Terminals

National Waterways	Terminal	Products
NW-1	Allahabad	Coal, cement, food grains, fertilisers, iron and steel
	Varanasi	Food items
	Haldia	Coal, containers and ore
	Kolkata (G.R. Jetty-2)	Food items, coal and containers
	Patna	General goods and containers
	Barh	Coal
	Bhagalpur	Coal
	Sahebganj	Coal, ore and minerals
	Farakka	Coal
	Behrampur	Food items, coal and building material
	Hazardwari	Coal, iron and ore and steel
	Katwa	Coal
NW-2	Jogighopa	Coal
	Pandu	Food items, cement, coal, fertilizers, building material
	Tezpur	General goods
	Jorhat	General goods
	Dibrugarh	Food items, fertilisers

Source: (IWAI 2014)

Figure 7: State-wise Cargo and Passenger Movement

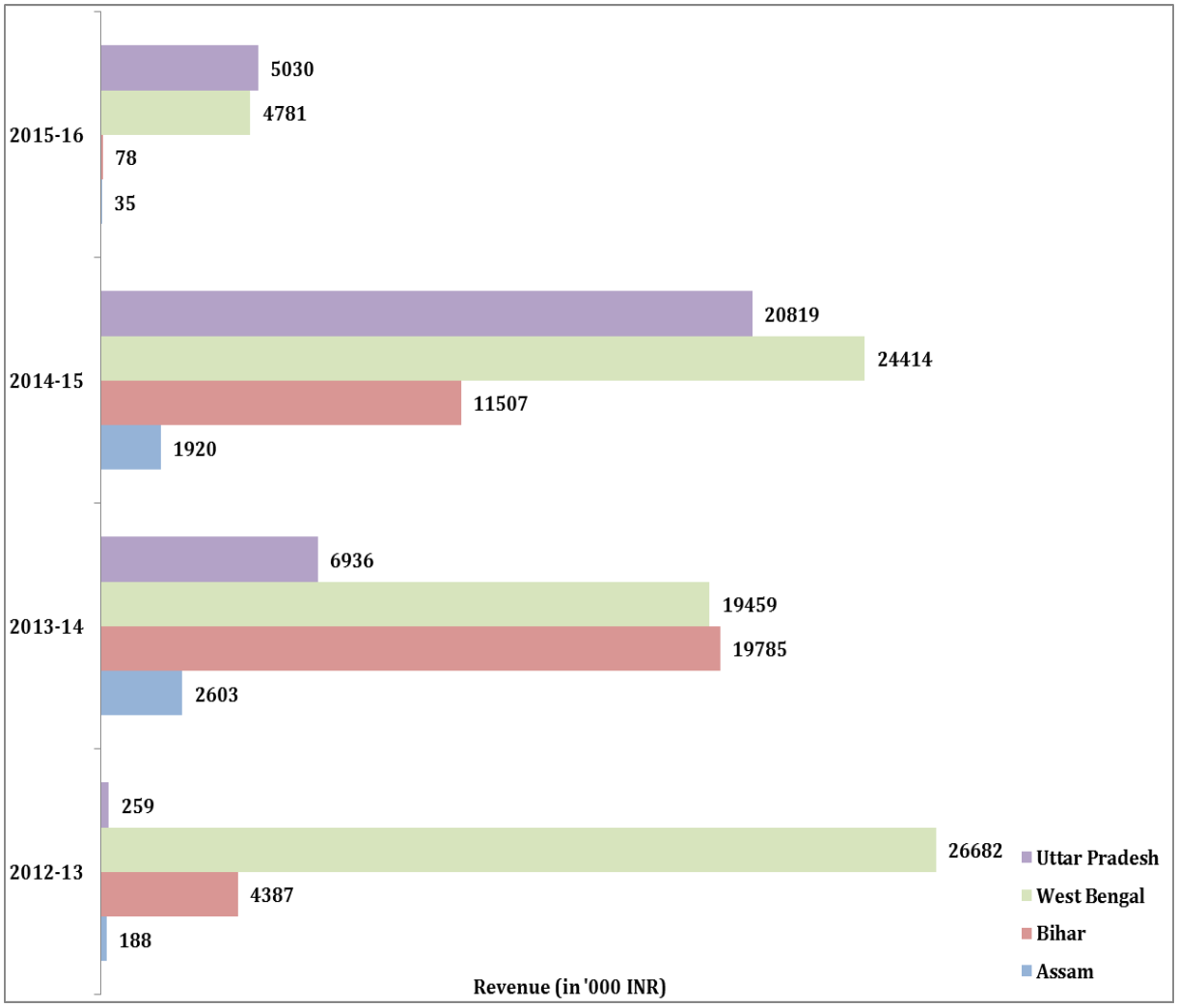


Source: (MoS 2016)

Figure 7 shows that cargo and passenger movement is quite significant in the state of West Bengal, followed by Assam and Bihar. During field visits to these states, it was observed that local trade and passenger movement occurs through the informal and unorganised modes of waterway transport. Around 23.21 per cent in NW-2 is under unorganised sector as reported by the central government. For

instance, in Assam, residents of *char*[8] area prefer using boats owned or leased by them for local movement in the area. If such cargo and passenger movement are also monitored and quantified, the above figures might tell a different picture.

Figure 8: Selected State-wise Total Revenue Earned from NW in India (in '000 INR)



Source: (Lok Sabha 2015)

In the context of cargo and passenger movement, it is interesting to note that West Bengal was generating significantly higher revenue consistently in the past few years (Figure 8). This can be attributed to the increased transportation of inter country and transit goods via IBP route and transportation of coal to the NTPC plant at Farakka. The surge in revenue generated in Uttar Pradesh in the recent years can be attributed to transportation of over dimensional cargo (ODC), coal and cement.

[8] *The mid-channel bars (locally referred as char) are 'almond' shaped alluvial formations found in Brahmaputra and its tributaries*

Impetus to Private Sector

As described in preceding sections, NW-1 has visible evidences for commercial interventions within the country as well as cross-country transit. These interventions have been possible due to public private partnerships (PPPs) and investments. Table 5 shows some examples of companies (private and government funded) who have a substantial turnover because they have high number of vessels and bulk cargo movement.

Table 5: Operations of Major Companies (2015-16)

Company Name	No. of Vessels	Cargo Transported (in '000 tonne)	No. of Passengers Carried	Products Transported
Eastern Navigation Pvt. Ltd., Kolkata	11	79.28	--	ODC cargo, fly ash, boiler drum
Vivada Inland Waterways Ltd, Kolkata	14	582.80	116128	High Speed Diesel/Furnace Oil/Light Diesel Oil/Lube Oil
West Bengal Surface Transport Corporation	30	228.92	11139421	General goods
Hooghly Nadi Jalapath Paribahan Samabaya Samity, Kolkata	34	--	8130429	--
Jindal ITF Limited, Uttar Pradesh	26	52.45	--	Coal

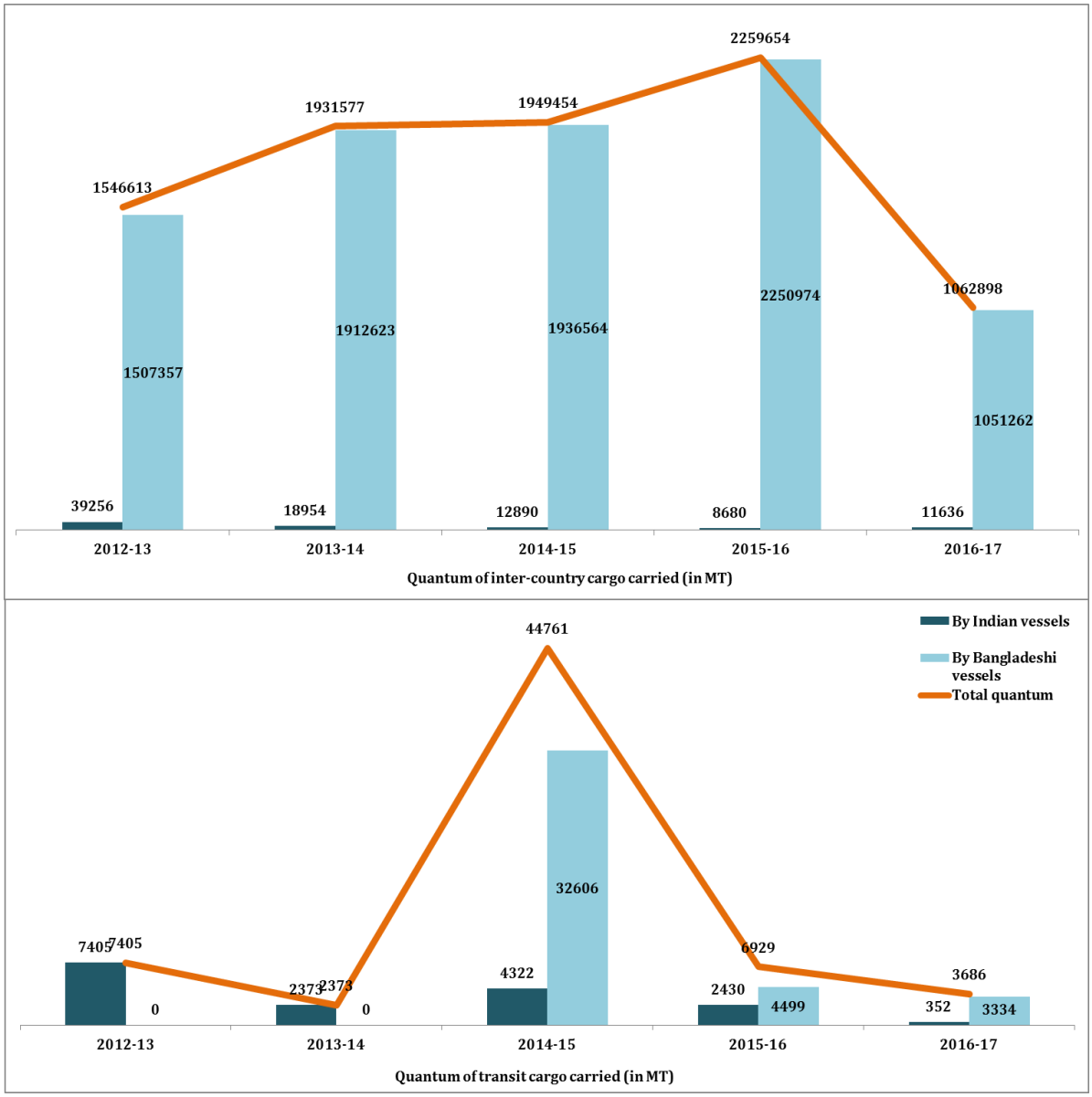
Source: (MoS 2016)

Although there are more than two dozen private companies and public sector undertakings (PSUs) involved in transportation of passenger and goods on NW-1, only four companies have significance presence. Rest of the companies, such as Paradeep Boating Company (with 1 vessel and 780 tonnes cargo moved in 2015-16), Indo Swiss Trading Company (with 2 vessels and movement of 231221 passengers) and West Bengal Tourism Development Corporation (with 3 vessels and 11139 passengers moved) have minimal presence, currently.

Discussions with private sector stakeholders indicate that the interest of multi-national logistic companies as well as cargo products has increased due to the Protocol on Inland Waterways Transit and Trade (PIWTT) route between India and Bangladesh. Despite multiple bottlenecks and reforms required for easing cross-border business through this route, Figure 9 shows considerable quantum of inter-country and transit cargo carried by Bangladeshi vessels. This was also substantiated during field level interactions that Indian vessels are bigger in size and hence the fuel cost is higher compared to Bangladeshi vessels.

Furthermore, the cost of ship building is much higher in India owing stringent regulations and higher labour cost. Non availability of adequate number as well as size of vessels and very few vessel operators in West Bengal have led to higher freight rates which are uncompetitive. Hence the ratio of goods carried by Bangladeshi and Indian vessels remains with an average variation of 99:01 from 2012-2013 to 2016-2017. The data also shows that during this period, the nature of cargo transported through the PIWTT route is diverse consisting of general cargo, coal, fly ash, steel coil, M. S. wire rod, iron ore, container cargo, ODC, wheat and food grains, steel grader, steel plate and stone chips.

Figure 9: Cargo Transported under PIWTT (in Metric Tonne)



Source: (BIWTA 2017)

The data also shows that the inter-country cargo movement has increased considerable in the recent years whereas there is year to year variation in transit cargo. Higher values of 2014-15 can be attributed to the ODC transported to Agartala via Ashuganj (T). Further bifurcation of the transit cargo data through different routes is also shown in the table below.

Table 6: Transit Cargo Movement between India-Bangladesh (in Metric Tonne)

Route	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: **(MoS 2016, BIWTA 2017, Ahmed 2017)**					

As indicated by Table **6**, out of the prescribed eight routes, merely three protocol routes are currently being used for cargo transportation between India and Bangladesh under the PIWTT agreement. Out of these, regular movement of cargo can be seen solely in Kolkata-Dhubri route, though the quantum of cargo is less compared to other routes.

CUTS stakeholder interactions show that the recent surge in cargo movement through the Kolkata-Ashuganj route is subsequent to the amendment of the protocol in 2015 and primarily included ODC to the Palatana power project in Tripura, comprising of steel, TMT bars in addition to the usual consignments of food grains. Similarly, in terms of volume of cargo transported, Kolkata-Karimganj is much ahead of Kolkata-Dhubri owing to the transport of fly ash and food grains. However, poor navigability due to low water availability in the lean season is the major constraint faced by this port.

As indicated by Table **6**, fly ash, steel, food grains and iron-ore are major products being traded through the use of PIWTT. The data reconfirms the contribution of ODC in the total trade through the protocol route. This surge in ODC is mainly attributed to the project cargo transported to north-east region of India for the upcoming hydro and thermal power plants in the region.

It is evident from the analysis of this section that there is a huge potential for goods and passenger movement between states and across India and Bangladesh. The massive investments for infrastructure development under the *Jal Marg Vikas* project with the support of World Bank is intended to attract traders and logistics firms.

It is also anticipated that the developmental projects coming up in North Eastern states of India will make use of waterways for the transportation of heavy machinery and equipment. Further, the Government of India intends to transport food grains to NE via waterways. Development of terminals, warehouses, transhipment facilities at major ports, navigation aids, ship repairing facilities, multi modal connectivity etc. are expected to boost inland navigation and make this sector more competitive.

4. Stakeholders Perception

This chapter captures the perceptions of various stakeholders who were consulted during the course of project. The evidences were gathered through Key Informant Interviews and focus group discussions conducted with government officials, academia, civil society, freight handlers, private sector, boat associations, boatmen, tour operators, fishermen, sand traders etc. in the states of Uttar Pradesh, Bihar, West Bengal and Assam. This information was further validated in a series of consultations at sub-national, national and basin levels. This chapter will aim to collate the evidences from the field study as well as juxtapose the evidence on the current governance and policy scenario for inland waterways in India.

Navigation at the Cost of Environment?

The perception study conducted in the states of Assam, Bihar, Uttar Pradesh and West Bengal, exhibits an undisputed fact that inland navigation and environment are interconnected by the common thread of community engagement. River ecosystems thrive on the sustainable usage of its services by the communities surrounding it. The floodplains of Ganga, Brahmaputra and Barak river basins are important habitat resources for fish. Developmental interventions like dredging, sand mining, construction of barrages and dams etc. for channellising Rivers for navigation purposes will modify the riverine ecosystem and disturb the river continuity. Hence, it was a challenge to disaggregate the intricate discussions comprising of navigation and environment.

FGDs with passengers at Varanasi, Uttar Pradesh
PC: CUTS

In the subnational consultation at Varanasi, the officials from the Fisheries Department, Government of Uttar Pradesh shared their concerns with regards to the impact of developmental activities for inland navigation on the aquatic fauna in the Ganga 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.

Multiple studies by state and national organisations have also shown that navigation and dredging activities to maintain the waterway stretch also disturbs the aquatic ecosystem. However, recently the Ministry of Environment, Forests & Climate Change (MoEFCC) has set up a committee to decide whether the Varanasi Turtle Sanctuary should be de-notified and possibly shift to another location which would eliminate the concerns surrounding 'development activities' along the 'waterway' stretch.[9] A similar case for concern also exists at the Vikramshila Dolphin Sanctuary at Bhagalpur. Government bodies, such as the IWAI have mandates and practices to ensure minimal disturbance to aquatic life during dredging activities, however environmental activists demand that all such activities on the rivers and waterway stretches should be prohibited to ensure minimal environmental impacts.

Moreover, in Brahmaputra, fish breeding/rearing is mostly done in secondary channels to avoid direct water flow. The sand collected while dredging is usually released in the secondary channels as the river is wide up to 15- 20 km at several places. This could clog the mouth of secondary channels thus damaging the breeding sites. The area identified for fish spawning should be marked so that it is not disturbed. This demands more coordination between fisheries and water resource department.

[9] *More details on the de-notification here:* *http://www.upenvis.nic.in/ViewGeneralLatestNews.aspx?Id=1559&Year=2017*

Box 1: All Sewage Pipes lead to Ganga

The government officials admit that around 80 per cent of the sewage pipes in Patna drain into Ganga. One key step to handle this issue is the establishment and scheduled running of the Sewage Treatment Plants (STPs.) Ravindra Sinha[10] (Patna University) and Subrata Hait (IIT Patna) also corroborated this fact by quoting multiple statistics from recent times. However, the municipality office in Patna and the state government has been unsuccessful in even mapping the different sewage pipe outlay and connections in Patna. They also opined that in addition to causing multiple sanitary and health issues to residents on river banks, due to high level of faecal coliform and other industry effluents the sewage also critically endangers multiple fauna like the Ganga river dolphin.[11] The impact of sewage in navigation was not a direct hindrance, but it is worthwhile to note that if the Patna stretch of Ganga is being opened for tourism, then sewage management has to take the priority.

Similarly, industrialisation at Haldia (West Bengal) triggered development of facilities like roads, schools and hospitals, markets and creating decent livelihood opportunities, but at the risk of huge environmental cost to the ecosystem, including humans. Because of the environmental hazard, some years ago, Haldia was declared a critically polluted (air) zone. However, due to incessant government and industry efforts, a lot of environmental concerns have been mitigated and Haldia is now out of the critical category.

Many Means of River-dependent Livelihoods

Inland navigation has cross connections with various means of livelihoods of riverine community. 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 other.

Boatmen

The boatmen whom CUTS interviewed in Assam, Bihar and Uttar Pradesh were mostly owners of small mechanised boats and country boats predominantly in the unorganised sector. The livelihoods of these people are entirely dependent on waterways and thus 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

[10] https://en.wikipedia.org/wiki/Ravindra_Kumar_Sinha

[11] http://gangapedia.in/

boating related activities in the Varanasi district whose livelihood is directly dependent on the Ganga. However, it was communicated that whenever the state or central 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[12] in Varanasi. At present, they are operating these boats without government licences as the local administration (Municipal Corporation/*Nagar Nigam*) let 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 given license and permission for operation in the zone or to pass through this route.[13]

They demand that the activities, such as 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 members of the community are well aware of the river system. But they have been ignored by both Centre as well as 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.

[12] *Water area/stretch of seven kilometres (7 kms) 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 December 21, 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

[13] *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 two 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

While environmental concerns shadow all livelihood activities related to the waterway, structural and operational hindrances also inhibit boat owners in Uttar Pradesh and Bihar. In Uttar Pradesh and Bihar, a common concern for small boat owners was the monopoly of a few banks for boat insurance and financing purposes. It was pointed out that the community has limited access to financial services for construction and repairing of boats. There is an absence of subsidy from government; bank does not provide loan to buy new boat or to repair old boats.

Furthermore, insurance companies refuse to insure their vessels as they lack licence as per government regulations. This forces the boat owners to resort to using the financial services offered by the *Sahukar* (local money lenders) with less rigid paperwork but harsher interest rates and punitive repaying methods. This financial dependency on the *Sahukar* extends for the out-of-pocket maintenance expenses for the boats too.

The members of Assam Meghalaya Country and Shallow Boats Association, 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 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 which is marked with several *sapots* and *chars*. Issues related to governance and administrative delay in the registration of boats, were 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 IWT in Dhubri as for all administrative will have to go the state capital Guwahati which is quite far from Dhubri.

Table 7: Taxes Paid for Boats Plying between Dhubri (Assam) and Phulbari (Meghalaya)

Passenger boats	Commercial boat
INR 2 per passenger	INR 150 Meghalaya tax
INR 20 per boat	INR 200 Dhubri, IWT
INR 5 to state IWT department	INR 10 for Municipality
INR 20 per boat to Municipality	INR 10 per push cart
Source: Compiled from CUTS field work	

Ferrying passengers is also an avenue for generating local livelihood, especially in Bihar, Assam and West Bengal. An example is that 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 20 minutes with a time gap of 20 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.

Box 2: Solar Power or Muscle Power?

In May, 2016, the launch of solar powered e-boats at Assi*ghat*, Ganga as part of the *Pradhan Mantri Mudra Yojna* attracted much fanfare due to the progressive development claims of the government among *dalits*, tribals and backward classes. Aimed at reducing drudgery of operators, reduced noise pollution and eco-friendly transport mechanism, the e-boats are singing a different tune in 2017. Since the e-boats are not equipped with in-built solar panels to charge the batteries (weighing around 200 kg) operators have to incur an extra charging cost close to INR 200 which would last for four to five hours. In addition to the cost economics, the e-boats have also been found to be unsuitable for the strong under currents of Ganga.

Bhartiya Micro Credit (BMC) in Lucknow, along with many other small and micro enterprises and micro-credit companies have been working on technical and business models to ensure that the solar powered boats do not go back to being 'muscle' powered boats.

Fishermen

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 which is the evidence for the small-scale local trade aspects related to waterways.

For instance, cooperatives like the *Matsya Swalambya Sahyog Samiti* at Kamalpur, also registered with Co-Operative Fisheries Federation, Bihar (COFFED), work closely with the State Department of Fisheries for accessing the Purnea and Bhagalpur fish market by undertaking fisheries in the floodplains and wetlands.

The leaders in such cooperatives have also gone for exposure visits to other states like Andhra Pradesh for riverine fishery training. Though the cooperative members want to scale up the fish production, cold storage and road transport for ease of connectivity to the main markets remains the inhibiting factors. Fishing in river is free for all in Bihar (open- access), 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 expressed concerns that the waves created by the movement of big ships may harm their net and fishing gears. Some of the fishermen also shared that the big vessels can blow the horn while passing so that the fishermen can clear the route. In NW-2 such conflicts were not reported as big vessel movement is negligible and also because fishing area is demarcated and lies mostly in the secondary channels of the river. Another concern for fishermen in NW-1 was that in the flood plains when the water level recedes, farmers forcefully take away the area for farming.

Illegal barriers are set up by farmers when the fishermen have legally bought the *area* and surrounding water from the government department for fishing as reported by fishermen in Khagaria, Bihar.

Sand Traders

While fishing remains the largest employer for communities in Assam, Uttar Pradesh and West Bengal, sand-mining in Chapra 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 the small boat-building industry in the vicinity as well as local employment are highlighted as the positives. 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.

Currently parcels of the river bank and bed are being auctioned by the state government for extraction of sand, however, this process is riddled with practice inaccuracies and price lobbying to a large extent. In this context to convert informal trade of sand to formal means of revenue would require coordination among the state department's handling revenue, environment and fisheries. The sand trade at Chapra and Doriganj is also an excellent example of locally produced good (sand) being produced at one river bank (Chapra) and being consumed across the state (Patna, Bhagalpur, Ara 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.

Table 8: Cost Analysis of Sand Trade in Bihar

Process	Stakeholder	Cost
1. Tender for sand *ghats* produced	Mines and Geology Department, GoB	INR 60000-300000 (depends on the sand price estimate submitted by the District Magistrate)
2. Bidding of the tender	Private contractor/company	On payment of tender amount
3. Auctioning of the sand *ghats*	Mines and Geology Department, GoB to bidder contractor/company	On payment of tender amount
4. Sand *ghat* is acquired	Private contractor/company	Tender amount + Bribe to the government officials who comes to measure and allot the *ghat* space as well as at the different departments involved (depends on the land acquired)

Process	Stakeholder	Cost
5. **Sand is acquired by customers**	Construction companies, Local people, GoB	A truck can hold 3 ft. of sand with tarpaulin cover which sells for around INR 2000-2500
Other livelihoods involved in this business chain:		
Boat owner		Monthly rent for boat is INR 500-600
Boat operator (if not owner)		Monthly salary is INR 500-600
Sand extractor (if not owner/operator + family)		Each truckload is INR 500-600
Sand loader (from boat to truck)		Each truckload is INR 500-600
Truck Driver		Daily wage is INR 1000
Tea shops, rest stops etc. near the *ghat*		Daily revenue is less than INR 700
Check posts/Inspection points		Bribe varies with season and district (approx. INR 50-100 per checkpoint)
Overall expense		Less than INR 3000 per truck load
Overall profit		INR 600-700 per truck load
Source: Compiled from CUTS field work		

Box 3: Religious Trade

Another livelihood option along NW-1 and NW-2 (unique to Indian rivers) originates from the close inter-linking of religious rituals connected with the river. For instance, CUTS observed that at the locations of Assi *ghat* at Varanasi and Simariya *ghat* at Begusarai, the potential of livelihood opportunities transcends the trade aspect of waterways. Multiple small shops and stalls along the *ghat* sell products for religious functions like sacred red scarves, holy threads, coconut, flowers, earthen pots, plastic containers to collect Ganga *jal* (water from Ganga is believed to have religious significance) etc. Some of the local women manage these make-shift stalls and earn around INR 700-1000 per day as profit which them financial security. The boat operators on the river banks also carry passengers to the middle of the river for dissolving pyre ashes in Ganga. They earn around INR 30-50 per trip. These wooden non-motorised boats are manually operated and easily last for 7-8 years without major maintenance, thereby ensuring minimal out-of-pocket maintenance expenses for the boat owners.

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 the 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 their concerns are not taken seriously, local communities won't 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.

Borderline Benefits for Gender

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

For instance, at Kamalbari, Majuli (Assam) women self-help groups (SHGs) under the District Rural Development Agency (DRDA) project by Ministry of Rural Development help women with alternate employment throughout the year, since they are not directly involved in fishing activities.

The key income generating activities for the women in these SHGs are weaving and preparation of sweets. Mainland traders come and collect the products from the women for sale outside the Majuli island. Further, they sell handicrafts to the tourists who visit the island for sight-seeing. The SHGs also get help from non-governmental organisations and other bodies. For example, the Mising Autonomous Council with the support of state government has provided loan for Rangam Cooperative Society of Women.

Similarly, 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 Inland Waterway is from November-March. They also had concerns about the safety of inland navigation; there are no good vessels and it is more time consuming. Availability of road transport has also led to reduction of movement through river ways. Navigation in IW has a considerable impact on livelihood options mobility, access to health services and food as well as social, cultural and religious networks.

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 to women who perform these household activities.

Another concern as reported by civil society organisations in the region was that trafficking of young girls and women is an increasing concern in the north-east region of India. A sudden influx of people from outside the 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.

The Blue-Eyed Boy – Riverine Tourism

River-based tourism is getting popular owing to its uniqueness and cultural quotient. There are several places of interest with religious and cultural significance within and along the banks of rivers Ganga and Brahmaputra. The Ganga Aarti at Varanasi and Patna; the famous yearly cattle and elephant fair held at Sonepur (on the Northern banks of Ganga), Chunar (a place of historical importance) near Varanasi and the world heritage site of Sundarbans are some of the tourist attractions in Ganga.


Docking structure and floating terminal for tourist vessels at Bateshwarsthan, Bihar
PC: CUTS

The Ganga River Front Development (RFD) projects have been sanctioned for the cities of Begusarai, Buxar, Hajipur, Munger and Patna. Out of these five cities, only Patna has on-going projects. Initially 32 towns along the river Ganga in Bihar were selected for RFD, but was later cut down to 20 *ghats* for infrastructure feasibility reasons. Out of the 20 *ghats* proposed almost 16 have been developed and soon will be open to the public for religious and tourism purposes.

The famous cattle and elephant fair held at Sonepur around November every year on the Northern banks of Ganga attracts lots of people who come to the fair to buy and sell agricultural commodities. Similarly, Bateshwarsthan *ghat*, Bhagalpur is located 4-5 km from the historical ruins of Vikramshila and the Vikramshila Dolphin Sanctuary hence acts as a religious and tourist attraction.


Tourist boat plying on Brahmaputra at Guwahati, Assam
PC: CUTS

Brahmaputra is known for its river islands, wild life sanctuaries, local handicrafts, migratory birds and other places of religious significance. At present, Assam Bengal Navigation (ABN) and Mahabaahu and Alfresco Grand organise river cruises in Assam. Cruises are from Guwahati to Kaziranga (seven days) and from there to Jorhat (seven days). ABN conducts cruise from Kolkata to Farakka (seven days) and then Farakka to Patna (eight nights).

The inputs from private sector tourist company operators in Assam and West Bengal highlighted some concerns for ease of business. For example, tax holidays and subsidies are available for hotels but not for river cruises.

Another concern was maintaining navigability in Ganga and Brahmaputra for cruise vessels. Shifting channels and siltation pose obstructions in uninterrupted vessel movement. "For river cruises, the itinerary is very important; the clients can sue the company if it is changed and it affects the business also. Last time we could not reach Patna because the water level was low. Hence as a condition, it is mentioned that the itinerary is subjected to river conditions. Later, it was compensated by taking the tourists to the Sunderbans" said Managing Director of ABN necessitating the maintenance of minimum depth for navigation. The peak business season is from October-April; in Brahmaputra the required depth is available even during winter months.

Another hindering factor for ease of transit for river cruises in Ganga is the pontoon bridges built by villagers and local administration during summer season. These structures have to be manually dismantled every time the vessels come in. Further, when the water level goes up in the months of August and September, the distance between water level and the bridge becomes less restricting the movement of vessels under the bridge. This demands the designing of vessels which can lower the roof for vertical clearance. Earlier cruises used to ply till Chunar which is a historical place of tourist attraction located beyond Assi *ghat* in Varanasi. Right now, the movement is restricted beyond Assi *ghat* on account of the turtle sanctuary near the *ghat*.

Absence of subsidies for building vessels has been flagged as a problem for river cruise vessels. To avail subsidy, vessels have to be registered with the Indian Register of Shipping (IRS). However, this registration is improbable for cruise owners because the definition of 'vessels' in IRS rules is that of a sea-plying vessel. For example, a sea-plying vessel needs to have steel windows to combat deterioration due to salt-dense environment of the sea. For the same reason, a river vessel does not need steel windows and can make do with wooden windows. But this eliminates the river vessel from the IRS definition and thereby unable to access the 30 per cent subsidy rate for vessel building.

River tourism has to be promoted as an integral component of state tourism. The state of Assam is a land with bountiful natural resources, replete with traditional skills and knowledge. However, tourist inflow has improved to a considerable extent as more and more people are coming for river cruises.

Similarly, multiple publications have also happened on the tourism front to create awareness among the people on the natural horizon of the state. Furthermore, domestic tourists need to be attracted to river tourism. The higher fares of long trips are not affordable by the domestic tourists. The sector also provides employment to both skilled and unskilled labour and even engages artists and artisans to display the culture.

With the new political development between India and Bangladesh agreeing to the cross border movement of passenger cruises tremendous opportunities are foreseen in tourism sector in terms of revenue and livelihood generation. But the tour operators have certain apprehensions regarding the customs and immigration procedures, the routes to be followed, necessary infrastructure for berthing etc. It is expected that the standard operating procedures for cross border movement of cruise movement would address the above issues so as to make this sector more appealing to tourists.

Enticing the Private Sector

One of the greatest challenges in the development of inland waterway navigation in India is to make waterway transportation economically viable for large scale

movement of goods by the private sector. CUTS' perception study shows that a number of infrastructure-related factors contribute to the challenge of commercial benefits from inland waterway navigation, including availability and operation of vessels, maintenance of waterways which contributes to the current hesitation of the private sector to use national waterways to move their commodities. However, these operational challenges can be converted to business opportunities at the local and regional level.

For instance, CUTS discussions with the Delhi Customs Clearance Agents Association (DCCAA) show that sending a container to Mumbai port by road or rail scales up the transportation cost makes the product expensive and reduces its competitiveness in the international market. In countries like China, the logistics cost is around eight per cent of total cost of the consignment whereas in India it varies between 15-45 per cent. DCCAA also provided positive reaffirmation that construction and operation of inland waterways will provide an alternate mode of transportation for freight forwarders and will certainly help to reduce the transportation cost.


Passenger boats plying on Brahmaputra for local connectivity at Dhubri, Assam
PC: CUTS

While interactions with private businesses revealed their interest in the possibilities provided by inland waterways navigation, the present scenario is quite limited for commercial movement. Currently, only a few companies and logistics service providers are operating for both cargo and passenger segments in the Haldia-Rajmahal stretch of NW-1. Freight forwarders and clearing agents do not prefer to use government barges to supply bulk cargo as they are not properly managed due to lack of maintenance. Hence, few private operators are able to take undue advantage and maintain uncompetitive freight charges.

It was also noted by private sector actors that in order to create an efficient supply chain eco-system in India, it is vital to identify and develop waterways linkages with industrial development corridors, such as connecting NW-1 with the Amritsar-Kolkata Industrial Corridor. For its part, the IWAI has identified six-seven locations on the Ganga for Ro-Ro facilities. Connection with industrial corridors coupled with appropriate transport facilities could help in creating ideal national supply chain network through combination of inter-modal and multi-modal junctures to reduce overall logistics cost.

The representative of B.V.C. Logistics (a leading company which provides logistics services in India) shared that the clients from Northern India (Delhi, Haryana, Rajasthan, Punjab, Uttar Pradesh, Himachal Pradesh etc.) are less interested in sending cargo through eastern side of India; instead they prefer to send through Mundra port in Gujarat mostly in containers via road. Also, they are not aware of advantages and cost benefits of using waterways for transportation.

With regard to NW-2, there is no observable dedicated cargo that could be transported through the Brahmaputra other than ODC. At present in Assam,

Pandu is the only port on NW-2 that has a cargo handling facility, multimodal connectivity (rail, road and air connectivity), and storage capacity.

Another impediment to developing waterways on Brahmaputra is that, unlike on the Ganga, there were no identifiable commercial industries along the Brahmaputra. Absence of return cargo from the north east region, partly due to low traffic of operators in states such as Assam, no cargo would move through NW-2. Furthermore, conflicting interests and political turmoil were witnessed in Assam with the trucking lobby that have also contributed to the negligence of waterway development for transport.

Currently, the number of vessels plying through national waterways is limited, resulting in low commercial activity in Ganga and Brahmaputra. Traders prefer vessels built in Bangladesh as these vessels are of suitable size and the fuel cost is lesser compared to big Indian vessels. Most of the vessels and machineries are purchased from Europe and Calcutta and thus if a spare part breaks or malfunctions, operators have difficulty in procuring the exact part from the manufacturer. The end result is quite often that the vessels or machinery is kept unused and eventually rots away.[14]

While the private sector has shown interest in using inland waterways for their business, partly as a result of their inclusion in government consultations, representatives have indicated the current situation has not enticed them to invest yet and they prefer to wait to see how development of waterways is perused. This is significant because of the enormous amount of investment required for development of fairways, terminals, low draft vessels, loading -unloading facilities and warehouses. For fairway development, IWAI has initiated an international competitive bidding and there is a tender process for terminal development. Foreign direct investment (FDI) may come at some point, as well, if there is significant progress and scope in the development of inland water transport. IWAI has also shown interest in PPP models to meet development needs, as well.

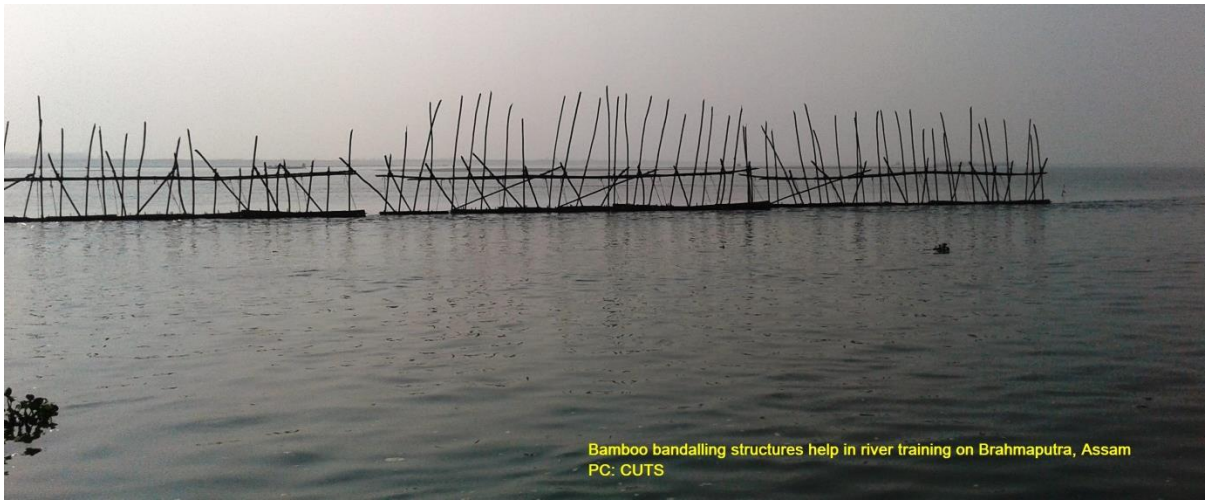
[14] *The current status of vessels at Patna is available at: http://iwai.nic.in/showfile.php?lid=982*

It was also noted that the potential of goods transport by inland waterways at local level, i.e. between states (Dhubri (Assam)-Phulbari (Meghalaya)) or within state (for example: Hajipur-Patna) has to be exploited to its fullest. Small mechanised commercial boats in Dhubri can carry about 18 tonnes and transportation via waterways is much cheaper than roadways. As shared by the boat association members at Dhubri, distance between Manka*char* and Dhubri is covered in 4 hours via waterways whereas by road it will take about 8 hours. Boats can carry double the capacity of truck (18 tonnes for boat and 9 tonnes for truck) with a cost of INR 97 per quintal. The cost of transportation by truck will be as high as INR 165 per quintal.

This underlines the fact that local trade can boost the economic development of local areas as well as add volume to the total trade occurring on the national waterways. For this, commodities with trade potential have to be identified and vessels have to be designed accordingly.

Engaging with Academia

The discussions with hydrologists, academia and subject experts have revealed that main challenges in inland navigation are maintaining required depth for navigation throughout the year owing to reduced water during lean season and heavy sedimentation. A channel width of 45 metre and 2.5 metre depth needs to be maintained for uninterrupted vessel movement through waterways; a depth of 2.5m can carry 1000 MT cargo. In NW-1, the desired of 2.5 metre is maintained only between Farakka and Haldia (in this stretch the depth is 3 metre) resulting in very little vessel movement at the upper end. With regard to NW-2, a depth of 2.5 metre is maintained from Bangladesh border to Nimati, 2 metre from Nimati to Dibrugarh and 1.5 metre from Dibrugarh to Sadiya. The depth declines in the upstream areas as the discharge decreases.



Bamboo bandalling structures help in river training on Brahmaputra, Assam
PC: CUTS

As of now, IWAI resorts to dredging and bandalling to maintain LAD for navigation. Dredging is done only at those locations where the depth is very less as well areas in those areas where bandalling is not effective. The interviews with experts also revealed that dredging is not a feasible option in Brahmaputra owing to the following reasons:

- Dredging can be done only below water level, in Brahmaputra, the sedimentation occurs even above water level where dredgers cannot operate instead bulldozers are required to clear the sand.
- Sediment rate is very high in Brahmaputra, the river changes its course too often making it difficult to maintain a single channel for navigation through dredging.
- River has a natural gradient; dredging at the upper end would increase the slope and velocity of water flow and the implications of such change in gradient have not been studied as of now.

It is important to understand the nature of river before any interfering with its natural course. Lack of long term hydro morphological data makes it difficult to realise the behaviour of flow and sedimentation. Shifting channels and flash floods have made construction of permanent terminal a challenge in NW-2. In Silg*hat*, Joghighopa, Hatsingimari (NW-2) the entire area identified for terminal was engulfed and swept away by the water flow in the river. Need for proper disaster management plan and mandatory GPS tracking system in all vessels were also suggested by experts to address the safety and security concerns.

Rejuvenating Governance for Navigation

Navigation governance in India is a multi-spoked wheel which is yet to start moving. While the concept of national waterways has been set in motion, the various other spokes of infrastructure, terminal building, state governance bodies etc. are yet to be implemented.

For instance, state governments in Uttar Pradesh and Bihar do not have separate departments for waterway management. The post-colonial body of CIWTC had offices at Varanasi, Bhagalpur and Patna. The CIWTC was disbanded and replaced with the IWAI, but when responsibilities changed, so did mandates. While IWAI's functions are limited to terminal development, fairway development and waterway maintenance, the primary functions of a state-level inland water transport department are absent in Uttar Pradesh and Bihar. The end result is that boats in these two states are still being registered with the respective department of transport.

Other governance concerns have also cropped up given the trans-boundary aspect of trade and connectivity through inland waterways. For example, at Dhubri, Assam it was observed that the smuggling of diverse set of goods (like cloth material, cumin (*jeera*), spade, wine etc.) was rampant on the waterways, near borders. The Land Customs Station (LCS) at Dhubri steamer *ghat* has an efficient system of seizing, valuating and cataloguing goods at the Dhubri go down. The seized goods which are valued less than INR 50000 are auctioned at Dhubri LCS, however goods above the value of INR 50000 have to be sent to the Commissionerate of Customs (Preventive) for North Eastern Region at Shillong for e-auctioning. But currently the Dhubri office is not equipped with enough HR to handle both land and waterway customs, so if high-value seized goods from waterways have to be auctioned, then a separate admin desk is required.

Enhancing People-to-People Connectivity

Inland waterways are an integral part of day-to-day life of people dependent on rivers for their livelihood. This is particularly important in the case of those who live in *chars* and *sarpots* where water transport is the cheapest and only means of transportation. Ferry services across the river are offered by state water transport departments in states of West Bengal and Assam while in Bihar it is done by unorganised sector.

Other than basic transportation services, Assam state also sets an example for offering health services via waterways. Emergency ambulances are 7provided in some of the *ghats* under state government. Centre of North East Studies & Policy Research (CNES) has been providing basic health care services to the flood vulnerable population living on the Brahmaputra islands through specially developed boats equipped with OPD, laboratories on board as well as pharmacies.

Similarly, owing to the traffic congestion in Patna, there is ample scope in Bihar for ambulance services from Kaunhara (Sonepur), Doriganj (Chapra), Kacchi Dargah (Patna) and Bidupur (Hajipur) areas to Patna. All these areas are connected to Patna via road, but the traffic and dismal conditions turn a 45-minute ride to more than three-hour ride. If inland waterways from these points to Gai*ghat* (Patna) were developed, then the same journey can be safely covered in 45 minutes. The state government has been scoping for such facilities for some time now, but has not been able to attract investment.

Furthermore, across the Gandhi *ghat* in Patna is the Konhara *ghat* in Hajipur from where many farmers and traders bring their agricultural produce daily to the Patna markets. Most of them use their own dinghy or smaller boats to cross the river. If

a regular government ferry service could be arranged at an acceptable rate, then the load on the roads would also be reduced. The small traders and farmers would also get a respite from the cumbersome roadway transportation costs for their daily products.

Box 4: Life in *Char* (Flood vs Erosion)

Chars in Brahmaputra are small islands formed by alluvial deposits in the mid channel. In Dhubri district alone, which is lower Assam, there are a total of 480 small and big *char*s with human settlements. The *char* areas are highly prone to erosion along the upstream side whereas there is sedimentation in the downstream areas causing migration to downstream whenever land is eroded. Majority of the people residing in *char* areas are Bengali speaking Muslims.

Birsingh Char Part III is one such *char*s in Dhubri district situated 1 km east of Jogomaya *ghat* in Dhubri town. The day-to-day life and livelihood of the people living here is linked with the small motorboats plying between the *char* and Dhubri town. We interacted with few families in a new settlement. The men were mostly engaged in wage labour (push cart/rickshaw puller/agricultural labour). The wage rate is 250-300 per day. Though, each family had ration card and job card (under MGNREGA) but they have never benefitted from the job card.

Agriculture, dairy, fisheries and poultry are other sources of livelihood of the people in this Char. Rice, mustard and black gram are main crops grown whereas beel (lake/wetlands) fisheries is the common type of fisheries found in *char*s. Water transport is the only mode of conveyance for the inhabitants to take their produce to market in Dhubri.

Women are busy with their caretaker role and household chores. School, local market and government dispensary were found about 3 km away from their settlement. Still, we found children using the ferry to go to school in Dhubri. They say "the teacher of the school in *char* comes once in a week and does not provide Mid-day Meal. Hence, we go to Dhubri".

The normal ferry charge to Dhubri is INR 5, but at the time of medical emergencies during night, the rate goes up to INR 700-800. Thanks to the mobile connectivity, that they can give a call to the local cab driver during emergencies so that he will take the diseased to the ferry in the *ghat*. The *ghats* in BirSingh *char* are under the purview of village *panchayat*.

There is one tube well for every three households installed by inhabitants for the purpose of drinking water. But iron toxicity is a problem as mentioned by respondents.

The people in *char* have accustomed to annual floods. With practically no flood warning system from the government, they shift their settlement judging the water level. The relief package from the government is also nominal. They use boats (country boats and rafts) for conveyance. Rather they find it is easier using boats during floods than walking kilometres to the *ghat* to get ferry. They have to do extra labour to fetch their source of living. But erosion is the bigger threat for them. Flood water recedes after three-four days (sometimes it stays up to one month) whereas erosion takes away the whole land.

Box 5: Bridge vs. Waterways

Waterway is the single mode of transport to connect Majuli, the largest river island in Assam to the nearest district Jorhat. There are nine *ghats* in Majuli of which only two (The Kamalbari and Aphalamukh *ghats* are under the jurisdiction of the Inland Water Transport Department, the rest being under the purview of the local *panchayats*. Till 2016, the island was part of Jorhat district and the local people had to use ferry to reach Jorhat for administrative work. The island is constantly under the threat of erosion; agriculture is the main occupation of the people living in the island. The loss of agricultural land has forced people to look out for other livelihood options. Women are mostly engaged in household work and in weaving. Men in the family go for wage labour as alternate livelihood.

Fishing is another important source of income of the local people. The small ponds, wetlands and depressions gets filled with water during floods and become the fish rearing area. There is great demand for local fish within and outside Majuli.

Access to market is the key hindrance in the economic development of people in Majuli. Whether it is fish or the traditional handloom products, the traders have to

come to the island to buy them. Sometimes women cooperatives set up stalls/small counters in exhibitions/*mela* in Jorhat. Majuli is a culturally significant location especially for the Vaishnava section of Hindu religion. The months of November-February are the peak period of tourism which has also increased the business opportunity of handloom products.

"*If we have to buy something from Jorhat, the price is high on account of transportation charges but we don't get better price for our produce since there is no direct access to market. The traders come here and fix the price*" says Bibidas, 27-year-old housewife in Kamalabari. Her family owns around four *bigha* land, wherein they grow mustard and rice (*bao-dhan-* a traditional deep water paddy variety). Other than agriculture, her husband is engaged in fishing in the wetlands and natural ponds. He also does wage-labour(@INR 250/day). There is significant difference in the wage rate for women (INR 50-100) and men and hence women prefer to work under Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGA). "Better connectivity can improve our life," she says. "Bridge connectivity will be extremely helpful particularly during medical emergencies when we have to pay high for the ferries."

Thanu Krishna Dutta from Garmur, Majuli has a different perspective. Majuli's unique land feature and its rich culture and biodiversity have gained the attraction of tourists. "To conserve and protect its unique identity, water transportation has to be developed" he says. "Small boats or even water taxi should be there in every 15 minutes so that people need not have to wait for more than 30 minutes". This is contradictory to the point of view of youth and women who see bridge as the means of economic and social development.

Majuli is connected to Lakhimpur via road. For those who travel to upper Assam, a ferry to Majuli and then road transport saves much time rather than direct road transport from Jorhat to Lakhimpur. This also has enhanced the number of passengers availing ferry services from Nimati *ghat* to Majuli.

5. Challenges and Recommendations

The diagnostic study has enabled in identifying the key challenges and recommendations in developing inland waterways with regards to NW-1 and NW-2. This chapter presents challenges faced in developing waterways, opportunities that lie ahead and also delineate some recommendations to change those challenges into opportunities.

Challenges in Developing Waterways

One of the major challenges faced by the authority is to **maintain the minimum depth** and permanent channel for navigation in both Ganga and Brahmaputra rivers. Heavy siltation in rivers necessitates river training measures like dredging and bandalling but do not offer a permanent solution despite adding costs. The current discourse does not lay stress on **storage structures** without which it is difficult to maintain LAD during lean season.

Water transport system faces **competition from other modes of transport** especially by road and rail transport systems. Enhancing competitiveness of water transport sector through **infrastructure development** and **night navigation aids** would make this sector more attractive. In Brahmaputra, strong current of the river makes installation of the night navigation system a difficult task. Right now, night navigation facilities are there up to Sil*ghat*. On an average the boat sails for 14-15 hours per day. Considering the fact that the speed of vessels is not more than 30km/hour, night navigation is crucial to save time for transportation and make it economically viable. Apart from this, there are issues of **multiple bridges on the river with low vertical clearance** and thus creates obstruction in inland water navigation of large vessels.

Lack of research data on **sedimentation and discharge** (hydrological data), **waste generation due to movement of vessels** and its management, **cost benefit analysis of inland navigation** on specified routes are all challenges that restrict the development of a **comprehensive plan for sustainable inland navigation**.

Bulk movement of cargo in large scale would also raise **security and safety concerns**. IWAI has initiated tracking of vessels using Differential Global Positioning System (DGPS). The River Information System which is a kind of modern tracking equipment to optimize traffic and transport processes in inland navigation has been installed in Haldia-Farakka stretch. RIS aims to streamline the exchange of information between waterway operators and users. The Phase II and

III will cover the stretch Farakka to Patna and Patna to Varanasi, respectively. All information regarding the vessel and the is fed into RIS.

Low of volume of trade is a major challenge which also questions the scale the **investments for infrastructure developments**. Lukewarm interest of private sector shows that inland water transport is yet to entice the sector in terms of its potential to enhance competitiveness of trade at reduced costs.

A further constraint involves the **regulatory gap between the central government's national inland waterway acts and the administrative responsibilities of state governments** and their varied governing structures. In this context, uniform or model rules for inland waterways navigation administration is the need of the hour.

Issues related to **governance** are other hurdles in realising the prospect of inland navigation. Though Ministry of Shipping is the apex ministry for inland navigation, Ministry of Water Resources and Ganga Rejuvenation, Ministry of Environment Forests and Climate Change, Ministry of External Affairs, Central Board of Excise and Customs and Ministry of Tourism are involved in the whole developmental paradigm of inland waterways in the context of meeting sectoral demands of water, environmental clearance, cross border vessel movement and river tourism respectively. However, there is a **need for better coordination** between these ministries at the Central and state level.

Despite the potential of local transit and trade at various locations in the states of Bihar and Uttar Pradesh **there is no dedicated inland water transport department** in these states. Separate departments would have led to proper enforcement of various functions like registration of boats, ferry services and tax collection adding revenue to the state and benefit local people.

Discussion involving local riverine communities revealed that the **current policy discourse on inland waterways is not inclusive** and local communities feel that they are left behind the developmental process. It is important to engage local communities in all interventions for developing inland waterways to make it a people centric process.

Recommendations

Keeping in view of the diversity of the challenges related to inland navigation, it is to be noted that the strategies for revamping inlands navigation in India have to be multipronged so as to harness its potential for enhancing trade and connectivity to the fullest. Given below are the recommendations under various heads

Governance and Institutional Strengthening

- Better coordination among relevant ministries at the Central and state levels as well as between IWAI and Bangladesh Inland Water Transport Authority (with regards to the India Bangladesh Protocol Route) through formal channels is imperative while envisaging sustainable development of inland waterways.
- Address the regulatory gap between the Central government's National Inland Waterways Act and the administrative responsibilities of state governments and their varied governing structures. In this context, uniform or model rules for inland waterways navigation administration is the need of the hour especially for those states falling under national waterways.
- With regard to IBP route between India and Bangladesh, the MoU on protocol route is signed under the Trade Agreement and and hence it is poses some restrictions for amendments for further inclusions of other services like tourism, local trade etc. All relevant ministries of both countries should have representation in the Standing Committee of Protocols.[15] The ambiguities around the management of waterways falling under no man's area near international borders have to be sorted out through an open and transparent discourse between relevant authorities in both countries.
- Ensuring full-fledged customs and immigration facilities at entry and exit points of India and Bangladesh would reduce the cumbersome regulations involved in customs checking at multiple points in foreign country while transit.
- Adequate human resources at customs stations are essential in the context of increased vessel movement and passenger cruises.

Assuring Commercial Viability

- Identifying stretches and commodities (on demand-base) with trade potential within and between states and designing vessels accordingly. IWAI aims to maintain 2.5 metre as LAD throughout the year which is not practical in many locations. A more realistic depth of 1.5 metre can be maintained year round in NW-1, which demands barges of appropriate sizes. This would also lead to rationalisation of costs, as for big barges (2000 MT capacity), the investment costs are high while the operational costs remain low which is contrary in case of barges of smaller capacity (750 MT).

[15] *Information gathered from 2nd Bangladesh-India Joint Consultation organised by IUCN, Kolkata May 30-31, 2017*

- Boosting the unorganised sector to conduct trade in smaller stretches cross the immediate borders between states and national borders through adequate policy support will substantially enhance the trade volume in NW and IBP. For example, the stretch between Dhubri, Assam and Chilmari, Bangladesh has lots of potential for cross border trade using small mechanised boats as the depth of water during lean season will go down to less than 1m which makes big vessel movement impossible. Subsidies for country boats will also rejuvenate and promote local transport and trade and benefit the unorganised sector.
- Multimodal and intermodal linkages of waterways within India and between India- Bhutan and India- Nepal will result in a more realistic and economically viable approach to improve connectivity in the sub-region.

Enticing Private Sector

- Enhancing competitiveness of water transport sector through infrastructure development and night navigation aids will attract private sector. Terminals, warehouses, loading and unloading facilities, cold storages and advanced navigation aids would enable waterways for day and night navigation aids would make this sector competitive with other modes of transport.
- IWAI has limited number of subsidies for private sector for vessel building and upgradation of few inland vessels to river sea vessels would lead to the integrating inland waterways and coastal shipping.
- Mandatory GPS tracking for vessels for assuring safety and security,
- Providing concrete data on cost benefit analysis of trade via waterways will establish the credibility among private traders.
- 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 IBP route and providing necessary infrastructure of berthing and emergency services.
- Introduce mechanised/hydraulic dismantling and assembling system for pontoon bridges for passage of vessels.

Ensuring Sustainability

- Mandatory social and environmental impact assessment for activities related to development of waterways including dredging and vessel movement along the entire stretch of the waterways
- Comprehensive disaster management plan and pollution control measures in case of emergencies/accidents
- Adoption of green standards by cruise operating tourism companies with regards to waste management and pollution control
- Embankment protection to reduce erosion threats due to vessel movement

- Mapping of fish breeding sites for least disturbance due to developmental activities for inland navigation

Knowledge Generation/Research

Data on flow and sedimentation; impact of vessel movement on aquatic biodiversity, waste generation due to vessel movement are indispensable for comprehensive planning for developing inland waterways. Equally important is the economic and environmental modelling to understand the scenarios of trade through waterways and its impact on environment over a period of time. Hence, long term hydro-morphological studies and scenario building exercises are absolutely necessary for prospective planning. Joint studies by the riparian countries and data sharing will facilitate cooperation at sub regional level for the development of inland waterways.

Engaging Local Communities

- Engaging local people in river training, disaster management, freight handling and other services will supplement their livelihoods.
- Capacity building and skill development in hospitality will enhance livelihood opportunities in the tourism sector.
- Establishing crew training centres at state level will facilitate training of local people to interpret sophisticated river information and GPS readings.

Way Forward

The yearlong project has been able to provide an overview of inland navigation along NW-1 and NW-2 from the point of view of trade, connectivity, tourism and livelihoods. The project was also successful to bring in the concerns of local communities as a result of IWT development. Sub-national Dialogues in Varanasi, Patna, Kolkata and Guwahati provided a platform to community representatives to voice their livelihood related concerns directly in the presence of government officials. The challenges and opportunities mentioned in the above section with respect to trade, tourism, livelihoods and larger connectivity within the region also throw light on the kind of strategies that have to be adopted to make inland navigation economically viable.

In line of this, four potential areas of future interventions are given below:

- Exploring prospects of local trade within shorter stretches within and across national borders would definitely improve the local economy as well as contribute the trade volume along national waterways and India Bangladesh Protocol route

- Assessing the needs of riverine communities through more inclusive consultations at ground level would ensure their participation in the development paradigm of inland navigation and contribute to their livelihoods
- Estimating economic prospects of river tourism is another promising area as it generates revenue and provides livelihood for both skilled and unskilled labour
- Futuristic studies or scenario building exercises on economic viability and sustainability of developing waterways would inform decision making, considering the scale of investment required and the stiff competition from other modes of transport

Bibliography

Ahmed, Mahboob. "A study on Indian participation in the Protocol of Inland Water Transit & Trade (PIWTT)." *High Commission of India in Bangladesh*. 2017. https://www.hcidhaka.gov.in/pdf/A%20study%20on%20Indian%20participation%20in%20the%20PIWTT.pdf.

BIWTA. "Cargo trade under PIWTT." *Bangladesh Inland Water Transport Authority*. 2017. http://www.biwta.gov.bd/site/page/e9b3ec96-b908-402f-bec8-e7171d927a9d/Statistics.

CUTS International. "Development of inland waterways for trade and transit in BBIN." April 2016. http://www.cuts-citee.org/SDIP/pdf/Advocacy-Development_of_Inland_Waterways_for_Trade_and_Transit_in_BBIN.pdf.

GoI. "India Transport Report: Moving India to 2032." *Planning Commission, Government of India*. 17 June 2014. http://planningcommission.nic.in/sectors/index.php?sectors=National%20Transport%20Development%20Policy%20Committee%20%28NTDPC%29 (accessed April 25, 2017).

IWAI. "Annual Report of 2015-2016." 2016. http://iwai.nic.in/showfile.php?lid=1042.

—. "Cargo movement for NW-1,2 & 3." *Inland Waterways Authority of India*. March 2017. http://iwai.nic.in/showfile.php?lid=1039.

—. "Integrated national waterways transportation grid study." *Inland Waterways Authority of India*. April 2014. http://iwai.nic.in/index1.php?lang=1&level=3&sublinkid=1006&lid=933.

—. "Jal Marg Vikas Project - FAQs." 2017. http://iwai.nic.in/showfile.php?lid=864 (accessed January 25, 2017).

—. "National waterways." *Inland Waterways Authority of India*. 2016. http://iwai.nic.in/index1.php?lang=1&level=1&sublinkid=124&lid=143 (accessed September 15, 2016).

Lok Sabha. " Selected State-wise Total Revenue earned from national waterways in India (2012-2013 to 2015-2016)." *Lok Sabha Unstarred Question No. 1837*. 30 July 2015. https://www.indiastat.com/table/transport/30/financialprogressundershippingandports19512016/449992/941440/data.aspx.

MoS. "State-wise projection of cargo and passenger movement." *Ministry of Shipping Transport Research Wing, Government of India. (ON1363) & Past Issues*. 2016. https://www.indiastat.com/transport/30/waterways/18157/stats.aspx.

MoS. *Statistics of Inland Water Transport*. New Delhi: Transport Research Wing, Ministry of Shipping, Government of India, 2016.

MoSPI. "Statistical Yearbook." *Ministry of Statistics and Programme Implementation*. 2014. http://mospiold.nic.in/Mospi_New/upload/SYB2016/index1.html (accessed January 25, 2017).

Nagabhatla, N., and P. Jain. "Assessing the potential role of inland water navigation for green economy." *Journal of Environmental Professionals Sri Lanka* 2, no. 1 (2013): 25-37.

PIB. "Cabinet approves dissolution of Central Inland Water Transport Corporation Limited." *Press Information Bureau, Government of India* . 31 August 2016. http://pib.nic.in/newsite/PrintRelease.aspx?relid=149374 (accessed January 25, 2017).

—. "Jal Marg Vikas Project." *Press Information Bureau, Government of India* . 16 March 2017. http://pib.nic.in/newsite/PrintRelease.aspx?relid=159372.

World Bank. "Developing India's first modern inland waterway." *The World Bank Brief*. 12 April 2017. http://www.worldbank.org/en/country/india/brief/developing-india-first-modern-inland-waterway (accessed April 25, 2017).

Annexure 1
Progress of projects on NW-1, NW-2 and north-eastern states of India

Sr. No.	Projects in NW-1, NW-2 & Northeast States	Progress
1.	MMT Varanasi under JMVP in NW-1	Land Acquisition for Phase 1 completed Phase II partial land acquired and rest under process Phase 1 construction under progress EIA, EMP, SIA, RAP completed jointly by consultancy companies- M/s. EQMS India Pvt. Ltd., M/s. Abnaki Infrastructure Application & Integrated Development Pvt. Ltd. and IRG Systems South Asia Pvt. Ltd. Completion Deadline: Phase 1 by August 2018 Project Cost: INR 169.7 crore Tender awardee: M/s AFCONS Infrastructure Ltd.
2.	MMT Sahibganj under JMVP in NW-1	Land Acquisition completed Construction under progress EIA, EMP, SIA, RAP completed All environmental clearance obtained Completion Deadline: April 2019 Project Cost: INR 280.90 crore Tender awardee: M/s Larsen & Toubro Ltd.
3.	MMT Haldia under JMVP in NW-1	Land Acquisition completed Construction not started EIA, EMP, SIA, RAP completed Awaiting MoEFCC's decision on Costal Regulation Zone (CRZ) clearance Completion Deadline: June 2019 Project Cost: INR 517.36 crore Tender awardee: M/s ITD Cementation India Ltd.
4.	Farakka Navigational Lock under JMVP in NW-1	Land Acquisition completed Construction under progress EIA, EMP, SIA, RAP completed All environmental clearances obtained Completion Deadline: May 2019 Project Cost: INR 359.19 crore Tender awardee: M/s Larsen & Toubro Ltd.
5.	IMT Kalu*ghat* under JMVP in NW-1	Land Acquisition decision pending Detailed Project Report (DPR) under progress
6.	IMT Ghazipur under JMVP in NW-1	Land Acquisition decision pending Geotechnical investigation under progress
7.	Ro-Ro Terminals under JMVP in NW-1	DPRs of five pairs Ro-Ro terminals under progress

Sr. No.	Projects in NW-1, NW-2 & Northeast States	Progress
		Feasibility studies for another five terminals under progress
8.	Integrated Vessel Repair & Maintenance Complexes under JMVP in NW-1	Feasibility study under progress for Kolkata
9.	Ferry Terminals in NW-1	18 ferry terminals planned to be constructed by IWAI in six cities DPRs under preparation Techno economic feasibility studies undertaken by MIT and Thomson Group
10.	Dhubri Ro-Ro Floating Terminal in NW-2	Construction completed Project Cost: INR 46 crore Tender Awardee: M/s Tribeni Construction
11.	Jogighopa Terminal in NW-2	Presently an operational floating terminal Requisition for conversion to permanent terminal under progress
12.	Pandu Terminal in NW-2	Presently an operational floating terminal with a low level jetty and two godowns
13.	Hatsinghimari Ro-Ro Terminal in NW-2	Land acquisition completed DPR under preparation Construction not started
14.	Pandu Ship Repair Complex in NW-2	Repair complex under construction Project cost: INR 52.94 crore
15.	LAD of 3m and bottom channel width of 45m on the Farakka-Kahalgaon stretch (146 Kms) in NW-1	Proposal Appraised by West Bengal State Finance Commission (SFC) Consultants: Joint venture of M/s Howe Engineering Projects (India) Pvt. Ltd., M/s HR Wallingford Ltd and M/s PMC Projects (India) Pvt. Ltd. Project Cost: 163.93 crore
16.	LAD of 3 m and bottom channel width of 45m on the Sultanganj-Barh (145 kms) stretch in NW-1	Tender process in progress Project Cost: Not determined
17.	LAD of 2.5 m and bottom channel width of 45m on the Barh-Doriganj stretch (109 kms) in NW-1	Tender process in progress Project Cost: Not determined
18.	LAD of 2.5m and bottom channel width of 45m on the Doriganj- Ghazipur stretch (178 kms) in NW-1	Tender process in progress Project Cost: Not determined

Sr. No.	Projects in NW-1, NW-2 & Northeast States	Progress
19.	LAD of 2.2m and bottom channel width of 45m on the Ghazipur- Varanasi stretch (133 kms) in NW-1	Tender process in progress Project Cost: Not determined
20.	LAD of 2.5m depth in Dhubri – Neamati stretch in NW-2	Maintained by IWAI in regular intervals
21.	LAD of 2m depth in Neamati –Dibrugarh stretch in NW-2	Maintained by IWAI in regular intervals
22.	LAD of 1.5m depth in Dibrugarh - Sadiya stretch in NW-2	Maintained by IWAI in regular intervals
23.	IWT in river Gumti/Gomati at Tripura under CSS	DPR completed Estimated Project Cost: INR 12.59 crore Construction in progress under full CSS subsidy
24.	IWT in Loktak Lake at Manipur under CSS	DPR completed Estimated Project Cost: INR 7.88 crore Constructed completed in March 2014 under full CSS subsidy
25.	17-metre-long floating terminals at 20 places on the Brahmaputra river in Assam under CSS	Completed under full CSS subsidy
26.	17-metre-long floating terminal pontoons at 15 places on the Brahmaputra river in Assam under CSS	Completed under full CSS subsidy

Annexure 2
Other Relevant Policies, Acts, Rules and Regulations

Sr. No.	Act/Policy/Rule/Regulation	Description	Status
1.	Bengal Ferries Act, 1885	This Act lays down rules and procedures of operating ferries/boats on inland waterways in the States of West Bengal, Bihar and Odisha. Under the power conferred to the state governments to amend the clauses of the Bengal Ferries Act, the State Government of Orissa in 2004 implemented the Orissa Boat Rules, 2004 while the Government of Bihar in 2011 implemented the Modal Rules, 2011 with lays down procedures for boats/ferries registration and licencing	Enacted
2.	The Northern India Ferries Act, 1878	This act lays down rules and procedures of operating ferries/boats on inland waterways in Uttar Pradesh, Punjab, the Central Provinces, Assam, Delhi and Ajmer (regions before India's independence)	Enacted
3.	The Regulations on Cargo & Traffic in Inland Ports on National Waterways, 2012	The documents lays down several regulations on non-dangerous and dangerous cargo and traffic operating on inland ports of National Waterways	Enacted
4.	Prevention of Collision on National Waterways Regulations, 2002	These regulations lays down several rules for prevention of collision of inland vessels in National Waterways	Enacted
5.	National Waterways, Safety of Navigation and Shipping Regulations, 2002	These regulations lays down several rules with regards to the safety of vessels plying in National Waterways	Enacted
6.	Major Port Authorities Act, 2016	Replacing the Major Port Trusts Act, 1963, this act lays provision to provide full flexibility and working autonomy for 12 major ports in India namely Chennai, Cochin, Jawaharlal Nehru Port, Kandla, Kolkata, Mumbai, New Mangalore, Mormugao, Paradip, Chidambaranar, and Vishakhapatnam. The Major Port Authorities Bill, 2016 was introduced in the Lok Sabha on December 16, 2016 with an aim to provide more autonomy and flexibility to the above mentioned 12 major ports	Pending

Sr. No.	Act/Policy/Rule/Regulation	Description	Status
		with regard to power of boards, tariff collection and other financial power, penalties and so on.	
7.	The Merchant Shipping (Second Amendment Bill) 2013	This amendment adds new provisions to the Merchant Shipping Act, 1958 to comply with the International Convention for the Control of Harmful Anti-Fouling Systems on Ships, 2001. The Convention is aimed at protecting the marine environment and human health from adverse effects of anti-fouling paints used to coat the ships' surfaces.	Passed
8.	Central Road Fund (Amendment) Bill, 2017	This bill has been introduced in the monsoon session of Lok Shabha on July 24, 2017 and seeks some amendments in the Central Road Fund Act, 2000. The bill proposes to allocate 2.5 per cent of Central Round Fund (CRF) for the development and maintenance of national waterways	Pending
9.	The Multimodal Transportation of Goods Act, 1993	This Act lays down regulation of the multimodal transportation of goods (through road, rail, air, inland waterway, sea) from any place in India to a place outside India, on the basis of a multimodal transport contract.	Enacted
10.	NW-1 Allahabad to Haldia stretch of Ganga-Bhagirathi-Hooghly river Act 1982	Before the enactment of the National Waterway Act, 2016, this Act declared the stretch from Allahabad to Haldia as NW-1	Repealed and replaced by National Waterway Act, 2016
11.	NW-2 Sadiya Dhubri stretch of river Brahmaputra Act 1988	Before the enactment of the National Waterway Act, 2016, this act declared the stretch from Sadiya to Dhubri in Assam as NW-2	Repealed and replaced by National Waterway Act, 2016

A compendium of relevant act, policies, rules and regulations prepared by IWAI can be accessed by clicking at the following link: https://dtf.in/wp-content/files/The_IWAI_Act_1985_As_on_IWAI_website-04.08.2014.pdf

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

CUTS International

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.

CUTS Centre for International Trade, Economics & Environment
D-217, Bhaskar Marg, Bani Park, Jaipur 302 016, India
Ph: 91.141.228 2821, Fax: 91.141.228 2485
Email: cuts@cuts.org, Website: www.cuts-international.org
Also at Delhi, Calcutta and Chittorgarh (India); Lusaka (Zambia); Nairobi (Kenya); Accra (Ghana); Hanoi (Vietnam); and Geneva (Switzerland).