STUDY ON INLAND WATERWAYS OF INDIA

Submitted to the School of Maritime Management, Indian Maritime University in partial fulfilment for the requirements for the award of degree in MBA- International Transport and Logistics Management

Submitted

By

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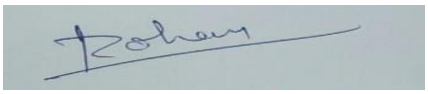
DECLARATION

I, **ROHAN MOHAN SARWADE (Reg. No. 2003305028)**, student of School of Maritime Management, Indian Maritime University –Chennai Campus, hereby declare that this project report titled **Study of Inland Waterways** submitted in partial fulfilment of the requirement for the degree of **Master of Business Administration in International Transport and Logistics Management is** my original work carried under the guidance of my project guide. It has not formed the basis for the award of any Degree/Diploma of any University/Institution. The information submitted is true and original to the best of my knowledge.



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CERTIFICATE

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INDIAN MARITIME UNIVERSITY, CHENNAI.

This is to certify that the project report entitled "**STUDY ON INLAND WATERWAYS OF INDIA**", submitted to the School of Maritime Management, Indian Maritime University, Chennai Campus., in partial fulfillment for the award of the degree of Master of Business Administration in Port & Shipping Management/ International Transportation and Logistics Management, is a record of work carried out entirely by **ROHAN MOHAN SARWADE**, Reg. No. **2003305028**.

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CHAPTER – I
INTRODUCTION

1.1 Background

Inland conduits of India has around 14,500 km of flexibility and possibly safe conduits out of which around 5,200 km of the stream and 4,000 km of waterways can be utilized by motorized specialties. India's Inland Waterways are un-used contrasted with different nations in the World. The all payload moved (in ton-kilometers) by the inland conduit was only 0.5% of the complete inland traffic in India. The Inland Waterways Authority of India (IWAI) appeared on 27th October 1986 for improvement and guideline of inland conduits for transportation and route. Its base camp is situated in Noida, Uttar Pradesh. The IWAI pronounced five National Waterways in India and furthermore proposed the 6th one. India has around 14,500 km of traversable conduits including waterways, trenches, backwaters, brooks. This is notwithstanding the coastline of 7,517 km covering the territory, Lakshadweep Islands, and the Andaman and Nicobar Islands. Directly, Inland Waterways activity is limited to a couple of stretches in the Ganga-Bhagirathi-Hooghly Rivers, the Brahmaputra, the Barak River, the streams in Goa, the backwaters in Kerala, inland waters in Mumbai and the deltaic districts of the Godavari – Krishna River.

On ninth March 2016 Parliament ordered The National Waterways Act, 2016 which got the consent of the President on 25th March 2017, and came into power from 12 April 2017 according to the warning of the Government of India. This demonstration has pronounced 111 streams or waterway extends, rivers, estuaries as National (inland) Waterways. The entry of this enactment empowers the Central Government to control these conduits for improvement with respect to delivery, route and transport through precisely pushed vessels. Before this Act there were five national conduits, each pronounced all things considered by their own different enactment.

The conduit's stretch among Kolkata and Delhi goes through a standout amongst India's most thickly populated regions. As indicated by a World Bank ponder, a sizeable 40 percent of all India's exchanged merchandise either start from this asset rich locale or are bound for its overflowing markets.

While the area is evaluated to create around 370 million tons of cargo yearly, just a modest division of this roughly 8 million tones at present travel by water. Inland Waterways in India are created and controlled through the Inland Waterways Authority of India (IWAI) from October 27, 1986.

These long conduits give a decent method of transport over the urban communities just as towns, similar to backwaters of Kerala, Canals in Gujarat and couple of conduits in Goa, West Bengal, and Assam. Cargo transportation by conduits is exceedingly under-used in India. The all out freight moved (in ton-kilometers) by the inland conduit was less of the absolute inland traffic in India, contrasted with the 21% figure for the United States. Indian water transportation is accepting critical consideration as of late since coordination's cost in India is one of the most elevated among real nations – according to the reports it is 18% in India versus 8-10% in China and 10-12% in European Union.

The obligation of improvement of these conduits rests with the Inland Waterways Authority of India (IWAI). This expert, alongside Central Inland Water Transport Corporation (CIWTC) as the vital administrator, are the two Central offices occupied with the nation. The endeavors of these associations are enhanced and upheld by inland water associations of different States and private administrator. In mainland Europe, out of 26,000 km of traversable conduits, 17,000 km length is having profundity more than 2.75 m.

The European Union (EU) has propelled a particular modular move program called "Marco Polo" in 2003. In China, out of 119,000 km of safe conduits, 5000 km length is having profundity more than 2.75 m. Also, 2000 inland ports exist in China. In USA, out of 41,000 km of traversable conduits, 24,000 km length is having profundity more than 2.75 m. The IWT modular offer in Netherlands is 42%, France 15%, Hungary 15%, Germany 14%, Belgium 13% and in US 15%. India has 14,500 km of safe conduits, of which around 5700 km is traversable by motorized vessels, anyway the modular offer of IWT in India is 0.28% as it were.

1.2 Significance of my Study:

My project is regarding “Inland Waterways of India”, the Indian government has given priority to the development of National waterways with the objective of making them “Robust and Sustainable mode of transport. But the study is all about how this mode of transport change the Indian economy as well the cost effective in comparison to other mode of transport.

Moving cargo across the country is little difficult and cost of moving the cargo on 1st mile to last mile is increasing day by day, so the trade started exploring other modes of transport to move cargo. The support of the government of IW-1, IW-2, IW-3, IW-4, IW-5 very successful for transporting the cargo and critical analyse of movement of cargo.

All the Data relating to the project is been referred from statics of Inland Transport.

All data on entire study is secondary in nature and this could be useful document for researcher who wants to study on inland waterways in India.

Over the years, the potential of inland transportation has been undeniable, and it now accounts for a major portion of global ton-kilometer movement. A well-functioning transportation system, particularly for the transportation of bulk items, is critical for every country's economic prosperity. Railways, highways, inland waterways, pipelines, and coastal shipping are all key forms of bulk goods transportation. In a liberalised economy like India, where the private and public sectors are expected to contribute a large share of GDP, the government must take adequate measures to develop all of these modes of transportation so that industries can provide the lowest cost of production to consumers by utilising an optimal mix of transportation networks that takes advantage of the strengths of each of these modes on a case-by-case basis.

Rail and road (the main modes of transportation for bulk goods in India) are overcrowded and saturated, making large-scale capacity expansion problematic. IWT is a fuel-efficient, environmentally friendly, and cost-effective method of transportation that has the potential to supplement overcrowded rail and congested highways.

Extent of the Inland

Waterways The subtleties of every one of the 111 national conduits, including the scope longitude directions of the begin and end focuses, are given in the National Waterways Act, 2016. These conduits go through 24 states and two association domains, with an inexact all out length of 20274 km. These conduits will go through about 138 waterway frameworks, streams, estuaries and related channel frameworks of India.

The National Waterways Bill, 2015 was presented by Shri Nitin Gadkari, Minister of Road Transport and Highways and Shipping, on 29th April 2015. This Bill was exchanged to the Parliamentary Standing Committee on Transport, Tourism and Culture for study and comments12. This Bill had recommended 101 new national conduits not withstanding existing 5 national conduits. The Standing Committee prescribed some more conduits to be included and furthermore solicited the legislature to take comprehension from complaints raised by some state governments on certain national conduits. In the wake of considering every one of the proposals made by Standing Committee the Bill was altered and 13 proposed conduits were evacuated and 18 conduits were included. The subtleties of these are given in Annexures 2 and 3. Annexure 3 additionally records the conduits which the Parliamentary Committee had recommended for option. The Bill was passed by Parliament with 111 conduits announced as National Waterways.

1.3 Inland Waterway of India

- **National Waterway 1:** Allahabad –Haldia stretch of the Ganges–Bhagirathi–Hooghly River system having a length of 1620km with expected cargo movement of 4 million tonnes.
- **National Waterway 2:** Sadiya-Dhubri stretch of Brahmaputra River system having a length of 891km with expected cargo movement of 2 million tonnes.
- **National Waterway 3:** Kozhikode-Kollam stretch of the West Coast Canal, Champakara Canal and Udyogmandal Canal having a length of 205km with expected cargo movement of 1 million tonnes.

- **National Waterway 4:** Kakinada-Pondicherry stretch of canals and the Kaluvelly Tank, Bhadrachalam – Rajahmundry stretch of River Godavari and Wazirabad – Vijayawada stretch of River Krishna having a length of 1095km.
- **National Waterway 5:** Talcher–Dhamra stretch of the Brahmani River, the Geonkhali – Charbatia stretch of the East Coast Canal, the Charbatia–Dhamra stretch of Matai River and the Mangalgadi – Paradip stretch of the Mahanadi River Delta having a length of 623km.

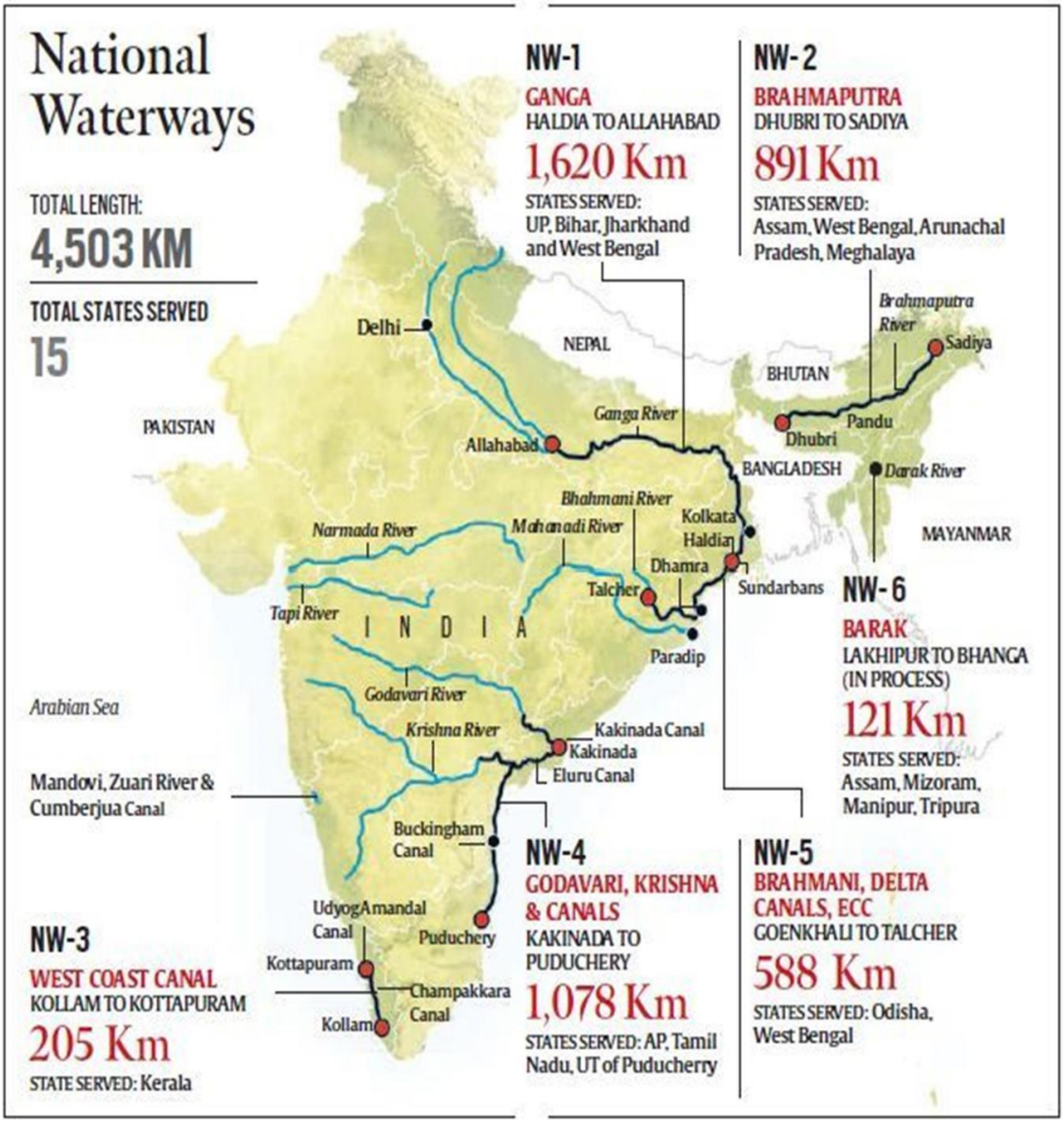


Fig. 1.1 Inland Waterways Map

1.4 Imperative things for National Waterway

The National Transport Policy Committee (1980) recommended the accompanying standards for affirmation of a national conduit.

- It ought to have capacity of route by precisely moved vessels of a sensible size.
- It ought to have around 45 m wide channel and least 1.5m profundity.
- It ought to be a ceaseless stretch of 50 kms. The just exception to be made to conduit length is for urban conglomerations and intra-port traffic.
- It should go through and serve the enthusiasm of more than one State (or).
- It ought to interface a tremendous and prosperous hinterland and Major Ports (or).
- It should go through a vital district where improvement of route is viewed as important to give strategic help to national security (or).
- It ought to interface places not served by some other methods of transport.

1.5 Benefits of Inland Waterways

- As the acquisition of land for national and State highways becomes scarce and the cost of construction of roads, flyovers and bridges goes up, the government is now exploring using water as a means of public transportation.
- Water transport is not only environment-friendly but also cheaper than other modes of transport.
- It takes lesser time to transport cargo by waterways in some areas and the chances of congestion and accidents on highways are eliminated.
- There is a huge potential for domestic cargo transportation as well as for cruise, tourism and passenger traffic.
- There is huge potential for public-private partnership (PPP) led investments in dredging, construction, operation and maintenance of barges, terminals, storage facilities, and navigation, as well as tourism.

- It will help in the generation of millions of job opportunities.
- It will boost the maritime trade of the states and augment their economies.
- It provides much more flexible service than railways and can be adjusted to individual requirements.

1.6 Objective of the Study:

- To study the impact of IWT on cargo movement in comparison with other modes of transportation.
- To analyze the role of other modes of transport on the cargo movement during summer seasons.
- To study how far SCI is prepared for IWT movement in terms of the challenges and opportunities lie before IWT.

1.7 Research Methodology:

It is the framework or a blueprint which guides the collection and analysis of data. This is being done in order to achieve the objective of the study. It is an expression what is expected from the research and what input is needed to convert data into research, finding, planning the instruments used for research.

Type of data: Secondary research on IW-1,2,3,4,5 further to that both the finding will be thoroughly examine and analysis is made on the future trend of all the national waterways potential.

Data collection method- Data is collected from multiple locations. Some of these are articles, journals, research papers, and websites. Some data will come from questionnaires mailed to businesses.

1.8 Chapterisation:

Chapter 1 contains an introduction to my topic that is Introduction to inland waterways of India. The main aim of my project is to study the impact of inland water transport on cargo movement in comparison with other mode of transportation and to study how far SCI is far is prepared for IWT movement in terms of challenges and opportunity before it. It also enhances the Benefits of inland waterways and Research Methodology used for my study.

Chapter 2 covers a literature review of five studies pertaining to study of National Waterways of India. After the study of reports, it helps me to identifying the key areas of interventions for promoting waterways as a mode of regional transport connectivity.

Chapter 3 describe an overview of National waterways of India. The description include a

NW-1,NW-2,NW-3,NW-4,NW-5.

Chapter 4 deals with a Comparative study of National Waterways, it also describes the Economic and social benefits of water transport and major freight products carried through this National Waterways, Further it covers the scope of inland waterways in India.

Chapter 5 is the Summary of my topic it contain a crisp details about the findings from each chapter and I have come up with certain suggestions for betterment of Inland waterways in India by Analysing an comparative research on my topic.

CHAPTER II
LITERATURE REVIEW

This chapter covers a literature review of five studies pertaining to study of National Waterways of India. After the study of reports, it helps me to identifying the key areas of interventions for promoting waterways as a mode of regional transport connectivity. The major challenges which i found in Inland navigations are maintaining minimum depth for year-round navigation, high sedimentation rate, competitions from other modes of transports, infrastructure challenges. The study also finds that instead of promoting large- scale infrastructure developments for navigation in India, government has to critically analyze what are the immediate gains for the local communities so that they can also benefit and be part of the development paradigm. Boosting the unorganized 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.

2.1 Business Line (2016):

In the report two issues found: **first,** the rights of States and local communities over water resources and **second**, the ecological consequences of movement of heavy vessels in particular. The impact of dredging and barrages on river flows (Farakka being an example) and direction, aquatic life and the livelihoods of citizens dependent on the river is an important aspect. A Standing Committee report has pointed to the need to regenerate rainfed rivers and take into account the rights of States with respect to irrigation and provision of drinking water. It rightly suggests a regulator with both Central and State government representatives to address a gamut of concerns.

2.2 Working Group Report on Shipping & IWT:

In report there is no major policy related or resource related constraint that come in the way of the banking system or insurance company for providing assistance to viable projects in the shipping sector. Indian shipping sector should look competitive vis-vis the international shipping companies operating out of other countries. It is necessary that there is a fiscal regime conducive for encouraging and attracting investment in the sector. Shipping sector is global by nature.

2.3 IRS Systems South Asia Pvt. Ltd. & Abnaki Infrastructure Applications

Jal Marg Vikas Project involves navigation capacity augmentation of the NW-1 so as to ensure the navigation through IWT mode throughout the year in entire NW-1. NW-1 is natural waterway, extends from Haldia (Sagar) to Allahabad and spans 1620 km crossing the states of Bihar, Jharkhand, Uttar Pradesh & West Bengal. Project area includes entire reach NW-1 (Haldia to Allahabad) including the areas proposed for development of project related facilities & infrastructure, i.e. terminal sites, lock site, Ro-Ro jetty sites and sites for other planned development. NW-1 stretch traverses through various major cities and towns which are well connected by roads and railways. existing cargo movement across the stretch of NW-1 through road & rail is 121426130 tonnes. Forecasted cargo studies are carried out by the survey consultant and cargo generation potential across NW-1 (Haldia to Varanasi) by year 2045 is expected to be 4,80,11,367 tonnes.

2.4 Shripad Dharmadhikari, Jinda Sandbhor (March 2017):

Massive intervention are being proposed in Odisha in the Mahanadi and Brahmani basins and the delta though the expansion of the National Waterway 5 and the creation of the new National Waterway 64. These are likely to have severe impacts on the ecology, livelihoods and communities of this entire area, which is highly eco-sensitive at the same time which provides livelihoods to lakhs of people. The EIA processes do not inspire much confidence and it is not clear if the economic benefits will outweigh the many costs. We would suggest that this unilateral push to go ahead with the waterways must be put on hold. A full and comprehensive exercise of assessing the desirability of the waterways, along with their impacts must be carried out with the full involvement of the people and civil society before taking a final decision on the waterways.

2.5 In JV with IRG System South Asia Pvt.Ld. Abnaki Infrastructure:

Jal Marg Vikas" is beneficial for the economic development of country by increasing the freight transportation and is beneficial for environment by shifting freight load from road/railway to waterways and cutting down carbon emission. However, project development will have many impacts on social and environmental parameters. Mitigation measures and management plans are prepared in line with impacts anticipated.

CHAPTER III
OVERVIEW OF NATIONAL WATERWAYS OF INDIA

3.1 National Waterway 1

Ganga-Bhagirathi-Hooghly stream framework from Allahabad to Haldia was proclaimed as National Waterway 1 (Allahabad-Haldia stretch of the Ganga Bhagirathi-Hooghly waterway) Act 1982 (49 of 1982). This national conduit is the longest inland conduit in India. It begins from Haldia port on waterway Hoogly and running along the stream Ganga closes at Allahabad city. This conduit goes through the conditions of West Bengal, Jharkhand, Bihar and Uttar Pradesh.. It ended up employable from 27th Oct 1986 after the development of the IWAI. The conduit stretches out from Haldia to Allahabad for a separation of 1620 km.

Fig. 3.1 Map of National Waterways 1(Source: IWAI)

3.1.1 Cargo Movements

The transportation of Coal for NTPC Power Plant is being embraced since November 2013 from sand heads (Bay of Bengal) to Farakka through National Waterway–1. Amid FY 2017-18 about 1.60 lakh huge amounts of imported Coal (up-to July, 2017) has been transported effectively by M/s Jindal ITF Ltd. utilizing the freight ships of 1500 – 2000 tons limit.

In addition, around 30 lakh tons payload including fly cinder, nourishment grains and general freight moved among India and Bangladesh through National Waterway - 1 and Indo-Bangladesh Protocol Route under Inland Water Transit and Trade. Furthermore, the preliminary development of 240 tons of stowed bond from Kolaghat situated on stream Rupnarayan (NW-87) to Bhagalpur on stream Ganga (NW-1) and 300 tons of sacked fly fiery debris from Kahalgaon (NW-1) to Kolaghat of M/s Dalmia Bharat Cements has been finished by IWAI's shallow draft load vessel MV VV Giri under consultancy administrations for plan and execution support for commercialization of National conduits 1.

As of late, without precedent for India's history, a compartment vessel was utilized for coordination's transportation on the National Waterways-1 along the River Ganga. A compartment freight having a place with PepsiCo (India) transported 16 holders of sustenance and drinks from Kolkata to Varanasi. The IWAI vessel, MV Rabindranath Tagore, transported 16 holders comparable to 16 truckloads of sustenance and snacks and came to Varanasi on November-12-2018. It made its arrival venture with manures from IFFCO.

3.1.2 Fairway Development

A fairway with focused insight and width has been created/kept up on NW-1 with the end goal of smooth and safe route. This was accomplished by attempted River Conservancy estimates like bandalling, digging and so forth in Tribeni-Chunar (1226 Km) stretch of NW-1. The stretch between Haldia (Sagar)–Tribeni (196 km) is tidal and the Least Available Depth (LAD) of more than 3.0 m is kept up normally. IWAI was not undertaking any River Conservancy works past Chunar to Allahabad stretch with the exception of day channel stamping as the dredgers claimed by IWAI being utilized in lower stretches of NW-1 because of more traffic request. In spite of the fact that, the day navigational guide being given in whole stretch of NW-1 from Haldia (Sagar) to Allahabad (1620 km).

Amid 2017-18, Bandalling works of 3,900 m in Tribeni-Rajmahal (399 km) extend and 18,300 m in Rajmahal-Chunar (827 km) extend were executed for creating and keeping up the route

channel (fairway), other than some channel adjustment. Further, 1.46 lakh m3 digging in Tribeni–Rajmahal and 7.24 lakh m3 digging in Rajmahal-Varanasi/Chunar stretches were completed by conveying IWAI's dredgers. Some appealing photos of the bandalling and digging works and so forth can be viewed as under. The detail of Least Available Depth (LAD), which was maintained for various stretches of NW-1 during 2017-18 is given below:

Fig 3.2 Transportation of Over Dimensional Cargo (ODC) on NW-1

Fig 3.3 Dredging in progress on National Waterway-1

Haldia – Farakka stretch	560 km	2.5 m to 3.0 m
Farakka – Barh stretch	400 km	2.0 m to 2.5 m
Barh – Ghazipur stretch	290 km	1.5 m to 2.0 m
Ghazipur - Chunar/Allahabad	370 km	1.2 m to 1.5 m

Table 3.1 NW-1 Length & Draft (Source: IWAI)

3.1.3 Project description

The all out assessed cost of the venture is ₹5,369.18 crore, which will be similarly shared between the Government of India and the World Bank. Proposed Project-Jal Marg Vikas goes for development of route in whole stretch of 1620 km. of NW-1 (Haldia to Allahabad) . NW-1 is the Ganga - Bhagirathi - Hooghly waterway framework. NW-1 is being nourished by different tributaries at various areas. Significant tributaries of waterway Ganga in NW-1 between Haldia to Allahabad are Tons, Gomti, Ghagra, Son, Gandak, Punpun and Kosi. This undertaking crosses through 4 States name Uttar Pradesh, Bihar, Jharkhand, and West Bengal. The accompanying mediations have been proposed and arranged under the Jal Marg Vikas Project.

- Maintenance dredging to provide the required LAD in this waterway channel and also for various proposed terminal facilities.
- Improved Navigation Infrastructure & Navigation Aids.
- Construction of 5 Ro-Ro crossings & ferry passenger jetties. Locations of these jetties are yet to be identified.

- Construction of 6 terminals: Site identification and planning for 3 terminals sites at Sahibganj, Varanasi and Haldia is accomplished. Besides 2 more potential sites for development of terminals are also identified at Ghazipur and Kalughatand 1 site, i.e. at Kalyani in Tribeni is under consideration.
- Construction of one new navigation lock at Farakka, West Bengal.
- Provision for tow barges, inland vessels, survey vessels including rescue boats andsurvey equipment. Development of low draught vessel.
- Development of navigation aids along NW-1 for facilitation of day & night time navigation.
- Development of efficient River Information System with all hardware & software.
- Provision for bank protection / slope protection and river training works for critical locations.

The project also envisages the creation and improvement of integration opportunities with other surface transport modes such as roads and railways, so as to improve the overall efficiency of the logistics chain by linking the waterways through various well-equipped terminals and jetties.

Cargo proposed to be transported in NW-1 includes cement, fly ash, iron ore, iron ore fines, coal, steel shed, tyres, iron fines, iron ingots, Galvanized steel plain sheets, stone chips, furnace oil, high Speed diesel (HSD), lube oil, boulders, pulses, aluminum block, sand, chips, ship blocks, food grains, manganese ore, petroleum products, coke, cooking coal, rock phosphate, timber, peas, slag oil, and non-cooking coal. As per the survey traffic, current traffic transported via rail & road between Haldia & Varanasi is 121426130 tonne. Traffic projection studies are carried out and as per the study, projected traffic for year 2045 is 4,80,11,367 tonne. Under NW-1, 6 nos. of terminals are proposed out of which planning for 3 terminals is completed.

3.1.4 Bank Protection and River Training Works

Erosion of banks is natural phenomenon in the alluvial rivers. However, erosion is aggravated due to construction of any structure like bridge, terminal and jetty on the river. Thus, river training works includes the engineering works carried out in river to prevent the erosion of the banks, control and guide the river. It is proposed to carry out bank protection works of total 48.168 km. in the areas where erosion is observed and where civil interventions are planned to be carried out and details of the same are given at

Table 3.2 Bank Protection Works as per Current Planning (Source: World Bank)

Sr. No.	Location	Approx. length(km)
1	Varanasi	0.35
2	Sahibganj	1
3	Farakka Navigational Lock	0.75
4	Three new terminals	2.5
5	Farakka Feeder Canal	9.438
6	Farakka to Tribeni	27.43
7	Barge Repair and maintenance facility	2
8	Existing Terminals & Jetties	4.6

Facilities yet to be planned

- One similar terminal site (Kalyani at Tribeni)
- 5 Nos. Ro-Ro Crossings and Passenger Ferry Jetties
- Development of low draught vessel
- River Training Works at Critical Locations like bends and civil interventions under planning Bank/slope & scour protection works
- Equipment of tow barges, inland vessels, survey vessels including rescue boats and survey equipment
- Barge maintenance and repair facility.

3.1.5 Development in tourism

Inland traveler vessels – RV Bengal Ganga, Ganga Voyager-I and Ganga Voyager-II of M/s Heritage River Cruise Pvt. Ltd., ABN Rajmahal and ABN Sukapha of M/s Assam Bengal Navigation Co. Pvt. Ltd. are employing on NW-1 in the State of West Bengal, Jharkhand, Bihar and Uttar Pradesh since numerous years on an expanding pattern. The developments of these traveler vessels with outside visitors were kept amid 2017-18 and finished their business trips effectively according to plan. One hundred seven (107) no. to and fro voyages between Kolkata to Hazardwari/Farakka and six (06) no. to and fro voyages between Kolkata to Bateshwarsthan/Munger/Patna has been performed by these vacationer vessels. UP Chief Minister Yogi Adityanath has introduced a five-star extravagance voyage dispatch on Ganga. Being worked by Nordic Cruise line, the twofold decker 2,000 sq. feet extravagance vessel has a seating limit of 125 visitors. The name of the voyage vessel in Alaknanda kasha.

Fig 3.4 Tourist Vessel RV Bengal Ganga on NW-1

Fig 3.5 Tourist Vessel Ganga Voyager on NW-1

3.1.6 Terminal Facilities

The low-level and high-level jetties at Patna (Bihar), which are capable of mechanical cargo handling, have been operational since 2008 and 2012, respectively. At this terminal, there is also a bunkering and storage facility.

Since November 2013, a permanent terminal for general cargo has been operating at GR jetty-2 in Kolkata. This jetty was recently handed over to M/s Summit Alliance under a contract with IWAI for PPP mode operation.

Fig 3.6 Permanent Terminal at G R Jetty-2 Kolkata

The locations of these 20 floating terminals are as under:

- Haldia, Budge-Budge, BISN, Botanical Garden (Kolkata), Shantipur, Swaroopganj, Katwa, Hazardwari, Downstream (D/s) Farakka and Upstream (U/s) Farakka in West Bengal
- Rajmahal (Manglahat) and Sahibganj (Samdaghat) in Jharkhand and Bateshwarsthan, Bhagalpur, Munger, Semariaand Buxar in Bihar
- Ghazipur / Rajghat, Ramnagar (Varanasi) and Allahabad terminals in Uttar Pradesh.

This floating jetty can be moved to several locations along National Waterway-1, depending on the need and availability of road-waterway connectivity.

3.1.7 Description of Upcoming Project:

It is planned to develop terminal at Tribeni. Planning is at initial stage and site selection & finalization is undergoing at present. Two locations are considered for development of terminal. First site is located on left bank of River Hoogly upstream of Road Bridge on SH-6 at Tribeni, west Bengal. Site is well connected with road & railways. Kalyani Samanta is nearest railway station. App. 40 ha of agricultural land is identified for development of terminal at this site. Some brick kilns also exist at the site. One more site is considered for development of the terminal. Site is located on the right bank of the River downstream of the road bridge at SH-6. This site is located near the thickly populated area. Out of both the options alternative 1, i.e. site located upstream if SH-6 is considered for development of terminal.

Fig 3.6 Location map- Tribeni Terminal (Source: World Bank)

3.1.8 Barge Maintenance & Repair Facility

Barge maintenance and repair facility is essential component of Jal Marg Vikas Project. At present no location has been finalized for the purpose but this development is under planning.

Slipway: It is a ramp, which helps in moving the barge/ship to and fro from water to land. Slipway will be provided in deeper water conditions so as design vessels can be taken in docking conditions.

Winch House: It should be provided in straight-line to main slipway. It is generally a single room like structure and should have adequate space for winch and electrical equipment

Repair bay for large & small vessels: Repair bay for vessels should be inclined so as the vessels can slide towards the river on its own after repair under control of winch.

Transfer bays: To transfer small vessels between slipway and repair bay

Winches and trolleys: Winches should be provided at winch house and at transfer bay. Trolleys should be provided to receive the vessels on main slipway.

Workshops and buildings with all basic utilities like water, electricity, storm water management system and waste management system.

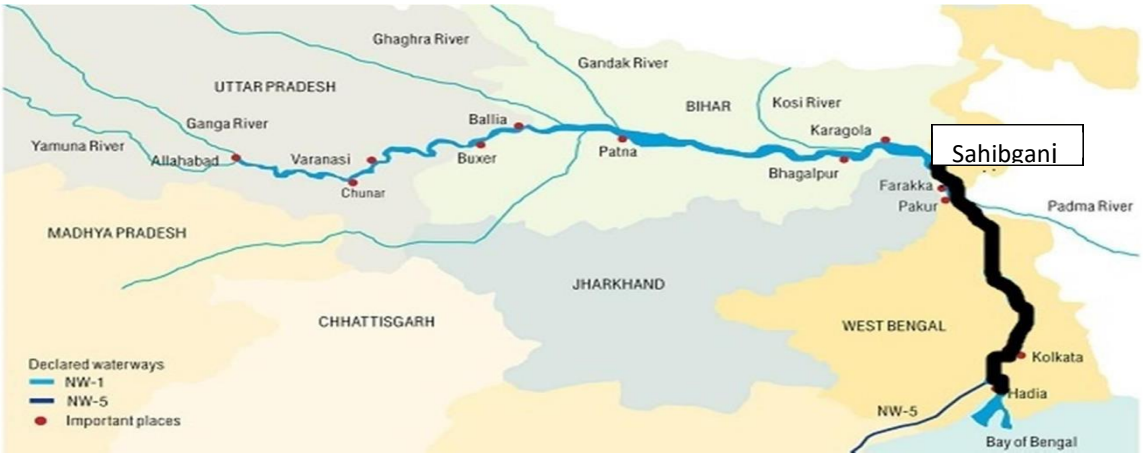


Fig 3.8 Haldia to Sahibganj (Source)

3.2 National Waterway 2

On September 1, 1988, the river Brahmaputra, which runs for 891 kilometres between Bangladesh's border and Sadiya, was designated as National Waterway No. 2 (NW-2). According to the IWAI Act of 1985, IWAI is working on numerous development projects on the waterway to improve its navigability (82 of 1985).

IWAI is responsible for developing the canal for navigation, according to the IWAI Act of 1985. IWAI maintains a navigable depth of 2.5 metres between B'Border and Neamati (629 kilometres), 2.0 metres between Neamati and Dibrugarh (139 kilometres), and 1.5 metres between Dibrugarh and Sadiya (Oriumghat). Currently, vessels from the Assam government, CIWTC, Border Security Forces, Tourism organisations, and various private operators use the canal. Long cruise tourist vessels travel between Sivsagar, near Dibrugarh, and Manas, near Jogighopa, on a regular basis. ODC (over dimensional cargo) is occasionally moved through the waterway. This river was also used to transport POL (petroleum, oil, and lubricants) from Silghat to Budg-Budg (West Bengal) and Baghmari (Bangladesh).

Fig 3.9 Map of National Waterways II(Source: RITES)

3.2.1 Fairway Development

A navigable fairway of minimum 45 m width and 2.5 m Least Available Depth (LAD) is maintained in Dhubri-Pandu (255 km) and Pandu-Neamati (374 km) stretch. In Neamati-Dibrugarh stretch, 2.0 m LAD was maintained for 350 days. In Dibrugarh-Sadiya (Oriumghat) stretch, LAD of 1.5 m was maintained round the year navigation. To maintain this LAD, 21,000 m of bandals were erected at 54 locations and the same was maintained. In addition to above, 1,44,333 m3 of dredging were carried out at 8 locations using two departmental CSDs namely CSD Mandovi and CSD Brahmani.

Multiple canals exist at Buraburi, making maintaining a navigational channel connecting Dhubri terminal problematic. To address this issue, the Water Resource Department of the Government of Assam completed a project for 21.69 crores to channelize the river at Buraburi (u/s of Dhubri) in order to stream the navigational channel via the Dhubri terminal.

Fig 3.10 Typical Picture of Bandal

3.2.2 Permanent Terminals

The most important location on NW-2 for the establishment of a multimodal river port is Pandu (Guwahati). As a result, a master plan for the progressive development of the Pandu terminal was created, and construction began. In 2009, a low-level jetty was completed at a cost of 40.02 crores. During 2014-15, a high-level jetty was built at a cost of 43.89 crores for year-round operation with mechanical handling facilities, including containers.

NF Railway constructed a broad-gauge railway siding linking Pandu port to Kamakhya railway station (Guwahati) at a cost of 16.46 crore and launched it for commercial service in 2013. IWAI has negotiated a contract with NF Railway to use the BG Siding for third-party cargo transit. The permanent terminal in Dhubri was finished in 2017 at a cost of Rs. 47.00 crores and is now operational.

Construction of permanent terminal at Dhubri has been completed during 2017 at a cost of 47.00 crores and was operationalized.

This has offered direct IWT access to Meghalaya from Dhubri via Hatsingimari (29 km by river route), eliminating a 220 km road detour via Jogighopa bridge. The CPWD started work at Hatsingimari, but the river has eroded practically all of the area chosen for the terminal, making it impractical to build any permanent building under the current conditions. At this site, the Brahmaputra Board is working on a project to preserve the bank for roughly 5 kilometres. However, implementation and subsequent bank stabilisation will take time.

Fig 3.11 Ro-Ro Terminal at Dhubri

3.2.3 River Tourism

The existence of wild life sanctuaries at Kaziranga and Orang, as well as other tourist destinations such as Sualkuchi, Sibasagar, and Kamalabari on the banks of the Brahmaputra (NW-2) has aided in the internationalisation of river tourism in this magnificent river. Three tourist vessels, the MV Chairaidew and MV Chairaidew-I of Assam Bengal Navigation Pvt Ltd, the MV Mahabaahu of Adventure Resorts & Cruises Pvt Ltd, and the MV Manasputra of Brahmaputra Cruises, make regular voyages between Dhubri/Pandu and Neamati, with an increasing number of foreign tourists every year. This is evident in the number of successful voyages on the Brahmaputra River, where operators conducted 39 excursions in 2019-20.

Fig 3.12 Cruise Vessel M V Charaidew on its voyage to Neamati

3.3 National Waterway 3

With the announcement of the National Waterways Act, 2016, the NW-3, which included the West Coast Canal between Kottappuram and Kollam (168 km), Udyogmandal canal (23 km), and Champakkara canal (14 km) [total 205 km], was expanded by 165 km to the north from Kottappuram to Kozhikode. The creation of a two-stage DPR for the additional route is currently underway. The following are some of the major projects completed this year for the development and maintenance of fairways, terminals, and navigation aids on the original lengths of NW-3:

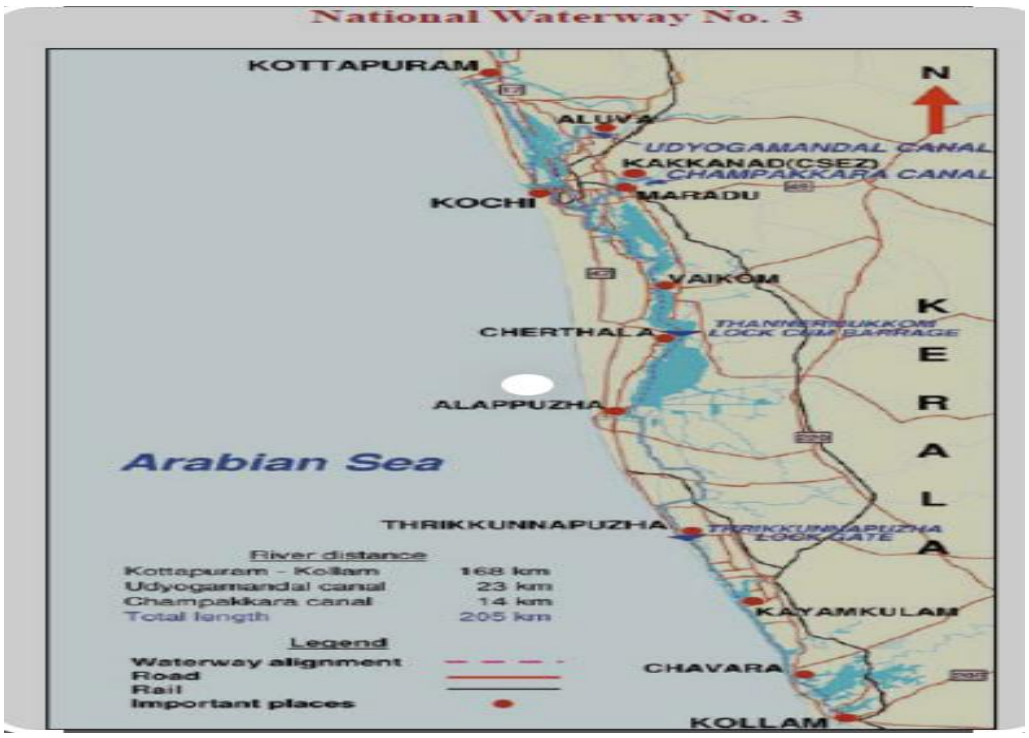


Fig 3.13 Map of National Waterways 3

There are mainly 3 requirements for successful navigation on Inland Waterways. These are

- Navigable fairway for movement of inland vessels
- Aids to navigation for safe navigation
- Terminals for loading/ unloading of cargo at various locations along the waterway.

3.3.1 Fairway Development

To create the navigation channel with the prescribed dimensions, a total volume of 40.16 L. M in capital dredging has been completed in all segments until 31.03.2020, with the exception of a 1.00 km long shoal in Kayamkulam Kayal and 1.10 km in the Edappallikotta - Kollam stretch. The Edappallikotta – Kollam section is now under contract as of 31.3.2020.

Another key operation for safe navigation in NW-3 is the erosion protection of canal banks. IWAI has so far protected 15.97 kilometres of canal banks in the Champakkara and Udyogmandal canals. Wherever canal widening was done between Alappuzha and Kollam, bank protection was installed for a total length of 12.44 kilometres.

Government's Irrigation Department At a cost of Rs.38 crore, the Kerala government was entrusted with the restoration of a new navigational lock at Thrikkunnapuzha (with dimensions of 61 metres long, 14.75 metres broad, and 6 metres (above HFL) vertical clearances), and IWAI released a total of Rs.23 crore to the Kerala government. Kerala, India The Irrigation Department of the Government is building a lock-gate. on a deposit basis in Kerala.

Fig 3.13 Piling work for Thrikkunnapuzha Lock construction is in progress

3.3.2 Aids to Navigations:

The entire length of NW-3 has been equipped with navigational aids to allow for 24-hour navigation.

IWAI maintained a total of 312 solar-powered lighted buoys and 17 number beacon lights along NW.3 to ensure safe passage at all times.

Fig 3.15 Solar Powered FRP Buoy installed in NW-3

Fig 3.16 Beacon lamp in NW-3

New National Waterways in Kerala:

In addition to the extension of NW-3, three more NWs were proclaimed in Kerala in April 2016:

- Alappuzha - Changanassery Waterway (NW-8) - 28 km
- Alappuzha – Kottayam - Athirampuzha Waterway-(NW-9) - 38 km
- Kottayam - Vaikkom Waterway (NW-59) - 28 km

3.3.3 Terminals:

Out of total 11 locations envisaged for setting up of terminals, eight have already been constructed at Kottapuram, Aluva, Maradu (Kochi), Vaikkom, Cherthala (Thanneermukkom), Thrikunnapuzha, Kayamkulam (Ayiram Thengu) and Kollam. Construction of one terminal at Alappuzha is in progress at a cost of Rs.9.04 crores and 88% works have been completed as on July 2014.

Terminals at remaining two locations namely Kakkanadu and Chavara are proposed to be constructed in the next phase after firming up the cargo availability. For effective utilization and to encourage private sector participation, operation and maintenance of IWT terminals at Aluva, and Vaikkom have been outsourced to KSINC (A Govt. of Kerala Undertaking).

In addition, for decongesting the Kochi city by providing an alternate transport route for the Vallarpadam container terminal, IWAI has set up a pair of Ro-Ro terminals at Willingdon island and Bolghatty jointly with the Cochin Port Trust. The transportation of containers along this route is being carried out successfully since February 2011.

Important projects on NW-3:

(i) Container terminals with Roll on - Roll off facilities: Two IWT container terminals, one at Bolgatty and the other at Willingdon island with Ro-Ro facilities have been constructed by IWAI through Cochin Port Trust to provide connectivity with ICTT Vallarpadam due to which trucks/trailers bound for Vallarpadam need not pass through the congested roads of Kochi city. These terminals are in operation since February 2011.

(ii) Construction of terminal at Alappuzha: The project comprises of construction of RCC Jetty of size 30 m X 10m, Godown (400 sqm.) and office Building, approach road, hard standing area (4000 sq. m.) compound wall, bank protection and utilities. Construction of compound wall and sentry post is completed. Construction of office cum storage shed, bank protection and jetty is in progress. for which the roof for administrative portion is completed. As on July 2014, over all physical progress of the terminal is 88%. Ro-Ro terminal at Bolgatty Alappuzha – construction in progress.

3.4 National Waterways 4

The Kakinada – Puducherry stretch of canals and the Kaluvelly Tank, the Bhadrachalam – Rajahmundry stretch of River Godavari, and the Wazirabad – Vijayawada portion of River Krishna were all declared as National Waterways in 2008 of length 1,078 km. The stretch has also been increased by the NW Act-2016, which includes new portions of the Krishna River from Wazirabad to Galagali (628 km) and the Godavari River from Bhadrachalam to Nasik (1184Km). NW-4's total length after extension is 2890 kilometres. In Phase-I, a project worth Rs. 96.0 crore has been approved to develop the Krishna River length between Vijayawada and Muktyala (82 km).

Fig 3.17 Map of National Waterway 4

The following are the major projects in the Phase-I stretch this year:

- Dredging work is completed at critical shoal location.
- Land acquisition for permanent terminals at Muktyala, Harschandrapuram & Ibrahimpatnam are in Progress.
- Construction of four floating terminals is in progress.

In Phase II of NW – 4, a comprehensive hydrographic and navigation study in Vijayawada – Kakinada and Rajahmundry – Polavaram has been completed.

Cargo movement between Ibrahimpatnam and Lingayapalam on the Krishna River began in 2019-20, with 0.82 million tonnes of cargo (construction material) has moved.

Fig 3.18 Floating Terminals

3.5 National Waterways 5

M/s WAPCOS conducted a study for several waterway sections that were evaluated for NW5. The canal part and the river section make up the waterway. The old Hijli Tidal Canal and the Orissa Coast Canal, collectively known as the East Coast Canal, make up "the canal portion" (ECC). The ECC goes from Geonkhali on the right bank of the river Hooghly (about 34 nautical miles or 68 kilometres downstream from Kolkata Port) to the Charbatia lock, where it meets the river Matai, and then through the river portion to the port at Dhamra. The following is the waterway's lengthwise distribution:Geonkhali to Charbatia : 217 km

- Charbatia - Dhamra : 39 km
- Dhamra - Mangalgadi :28 km
- Mangalgadi - Paradip :67 km
- Talcher - Jokadia :131 km
- Jokadia -Mangalgadi :106 km

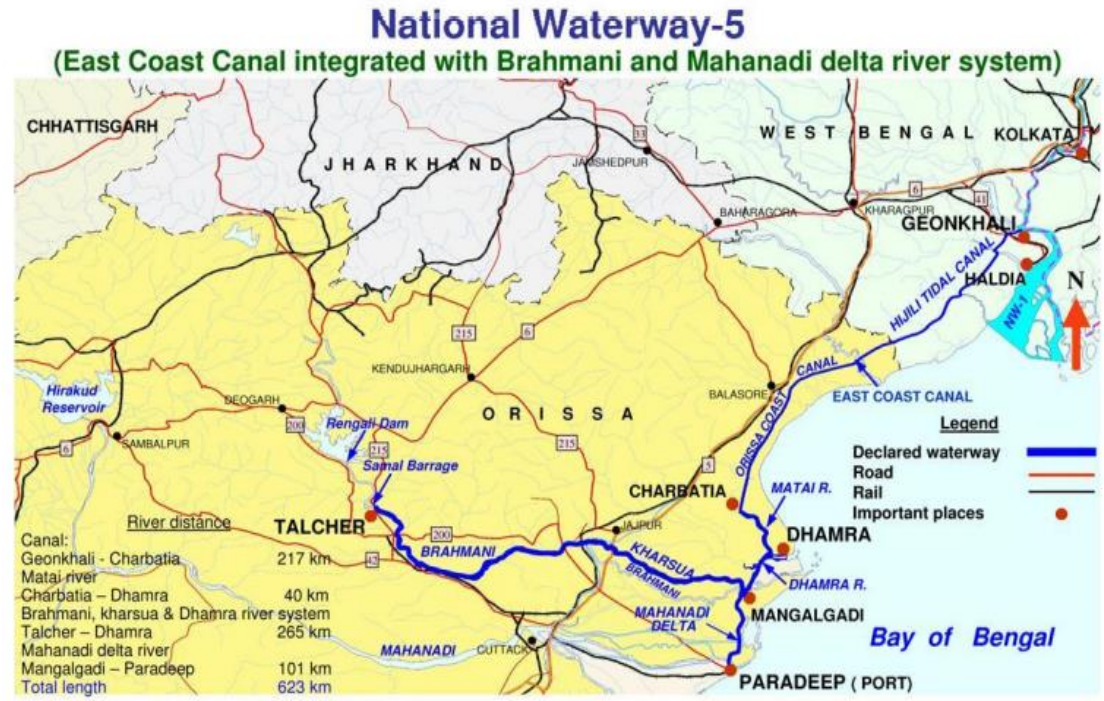


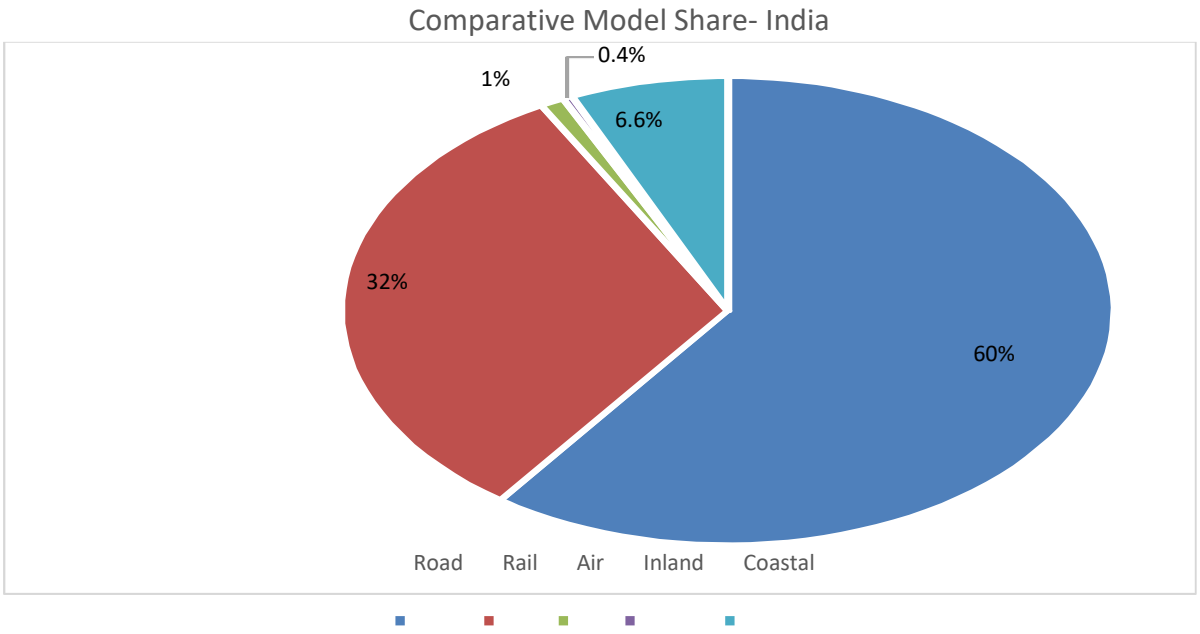
Fig 3.19 Map of National Waterway 5

CHAPTER IV

COMPARATIVE STUDY OF NATIONAL WATERWAYS

4.1 Comparative Model Share:

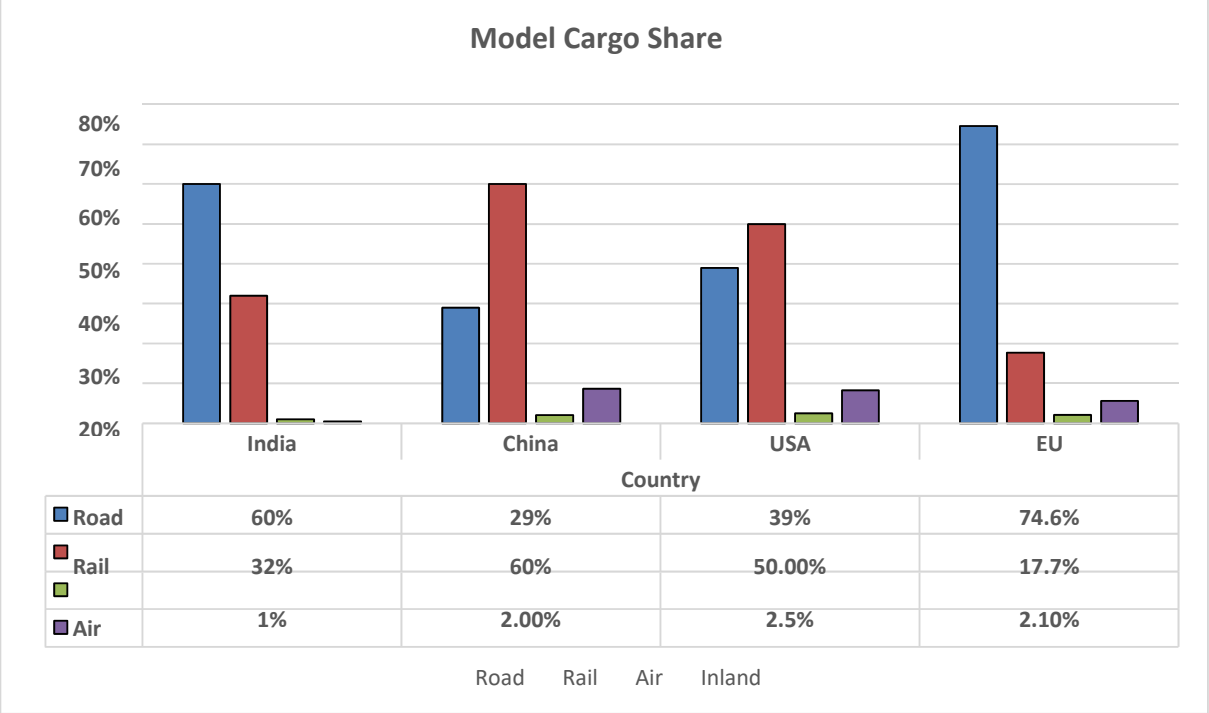
In the event that we characterized all the development of freight in India by various methods of transportation then we will locate that real segment of development of load is being finished by the street (60%) which comprise National interstates, State parkways, and so on., trailed by rail (32%) which is next most utilized mode after street, and pursued by Coastal (6.6%), at that point Air (1%) and last is Inland that is (0.4%). In the long run the thought process behind this "Jal Marg Vikas Project" is to build the offer of inland development of payload since this mode is relatively less expensive, more secure, ecological well disposed, and advantageous in contrast with different methods of transportation.



Model Cargo Share of India (Source: iaspreperation.com)

The above pie graph demonstrates the calculated situation of India, yet when contrasted with other huge nations like the United States, China, and the European Union, Freight transportation by conduits is exceptionally under-used in India.

The complete payload moved (in ton- kilometers) by the inland conduit was less of the absolute inland traffic in India, contrasted with the 21% figure for the United States. Indian water transportation is getting huge consideration as of late since coordination's cost in India is one of the most astounding among real nations – according to the reports it is 18% in India versus 8-10% in China and 10-12% in European Union. When we contrast the Indian situation and the other Developed Country then the outcome are very surprising, some nation underscored more on street transport, some are on Rail, and some are on Inland/Coastal. Here we are setting off to some similar investigation between India, China, United States of America, and furthermore we will talk about Inland Waterways Scenario in Thailand and Bangladesh. Structure this examination we will attempt to make sense of what are the things India ought to gain from other nation.



Comparative study between India and Developed country (Source: Report, Sustainable Development of inland waterway transport in china)

North America: In the United States with its water transport infrastructure over the Missouri-Mississippi and the inter-coastal traffic, together accounts for over 630 million tons of cargo per annum. Freight movements by IWT on the Great Lakes and the Mississippi continue to be important modes.

Europe: IWT is estimated to carry about 7% of freight traffic which in fact is in a growing stage in the European Union (EU) states. The Rhine and the Danube are major IWT Rivers in Europe.

A network of 30,000 km of waterways linking the North Sea to the Black Sea carried 425 million ton in the EU.

Thailand: IWT is estimated to transport about 20 million ton of cargo annually, representing 4.5% of total inland cargo volume better then rail, which has a share of only 1.9%, and well below road, which has a commanding share of 96.6%.

China: IWT accounts for almost 10% of the total freight tonnage carried in the country, and for that, two third is carried on the Yangtze River (including bulk cargo like coal, steel, cement, containers and LPG).

Bangladesh: Inland waterways are estimated to carry approximately 14% of the country's annual passenger's volume and about 35% of its annual freight volume.

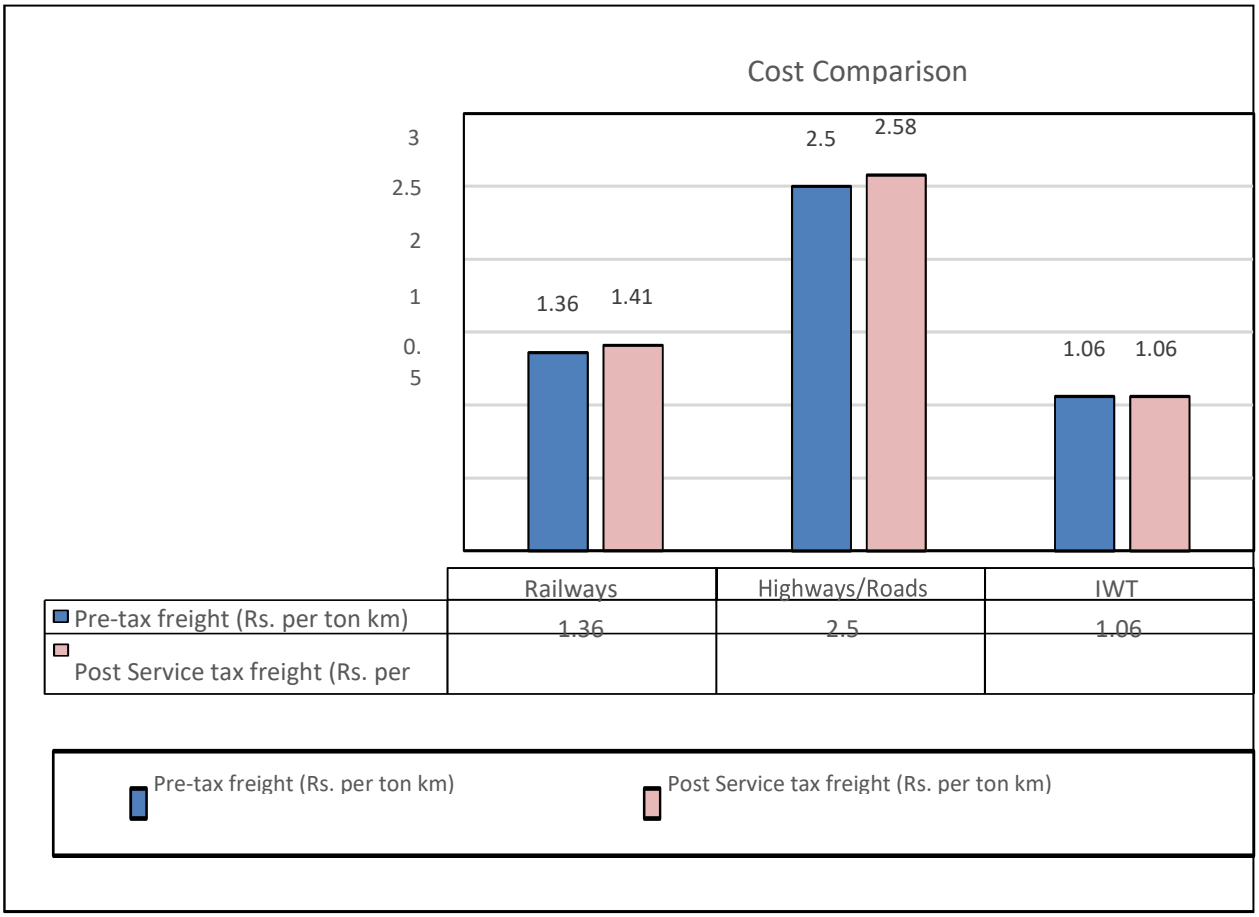
4.2 Cost Comparison between different modes

As per the RITES Report on Integrated National Waterways Transportation Grid (INWTG) the Cost comparison between Inland Water Transport (IWT) mode and rail and road transport is given below.

Mode	Pre-tax freight (Rs. Per ton km)	Post Service tax freight (Rs. Per ton km)
Railways	1.36	1.41
Highways/Roads	2.50	2.58
IWT	1.06	1.06

Table 4.1: Cost comparison between IWT mode, rail and road transport (Source: RITES)

Thus, in theory, every kilometer that a ton of cargo moves on water can save Rs. 1.52 as Compared to the same cargo moved on road, and Rs. 0.35 if the same cargo was moving on rail. But cost of transport is only one aspect. There are several other aspects that constitute the Advantages (or disadvantages) of any mode of transport. On the one hand road is comparatively costlier mode of transport when vehicle operating costs alone are compared, but it has an edge over other modes i.e. rail and IWT, as road transport offers door to door services, reducing local terminal costs. Similarly, rail has its own operational advantages of carrying bulk cargo on longer leads.



Cost comparison between IWT mode, rail and road transport (Source: RITES)

4.2.1 Comparison with Road and Rail Transport:

The cost figures given above indicate that the cost advantage of waterway transport is significantly low if compared to rail transport. This factor - whether it provides an alternative to road or rail – is important when assessing the viability of waterway transport. For example, the RITES report estimates how traffic would be diverted to various national waterways (NW 1 to 5, and what at that time was called NW 6, in Barak River) 47, drawn from the report shows that close to 40% of the traffic that the waterways are expected to carry would be a shift from rail, where cost advantages (and fuel saving, environmental benefits) are not that high.

Waterway	**Estimated Divertible Traffic in million tons**			**% of WW Traffic Coming from Rail**
	From Rail	**From Road**	**Total**	
NW 1	25.9	17.44	43.34	60%
NW 2	2.31	19.48	21.79	11%
NW 3	0.91	11.18	12.05	8%
NW 4	14.96	27.09	42.05	36%
NW 5	14.64	8.61	23.25	63%
NW 6	0.36	3.71	4.07	9%
Total	59.08	87.51	146.59	40%

Table 4.2: Divertible Traffic within National Waterways (Source: World Bank)

4.3 Economic and Social Benefits of Water Transport:

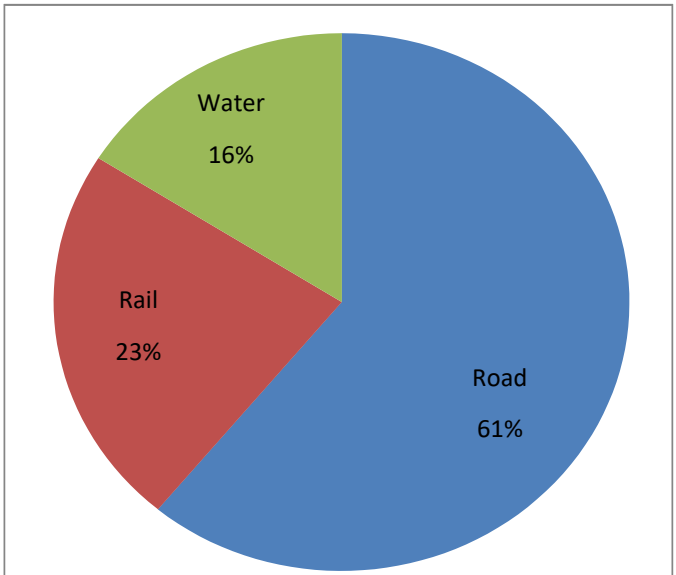
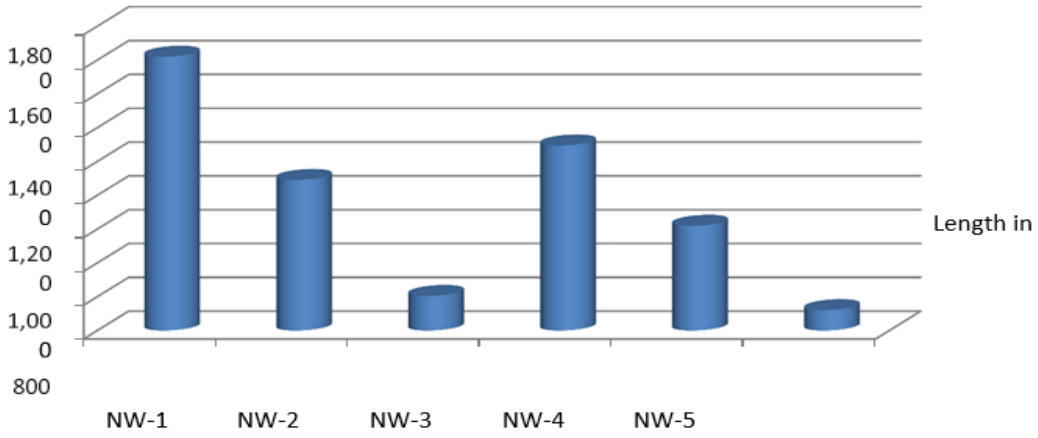


Figure 4.4 CO2 Emissions

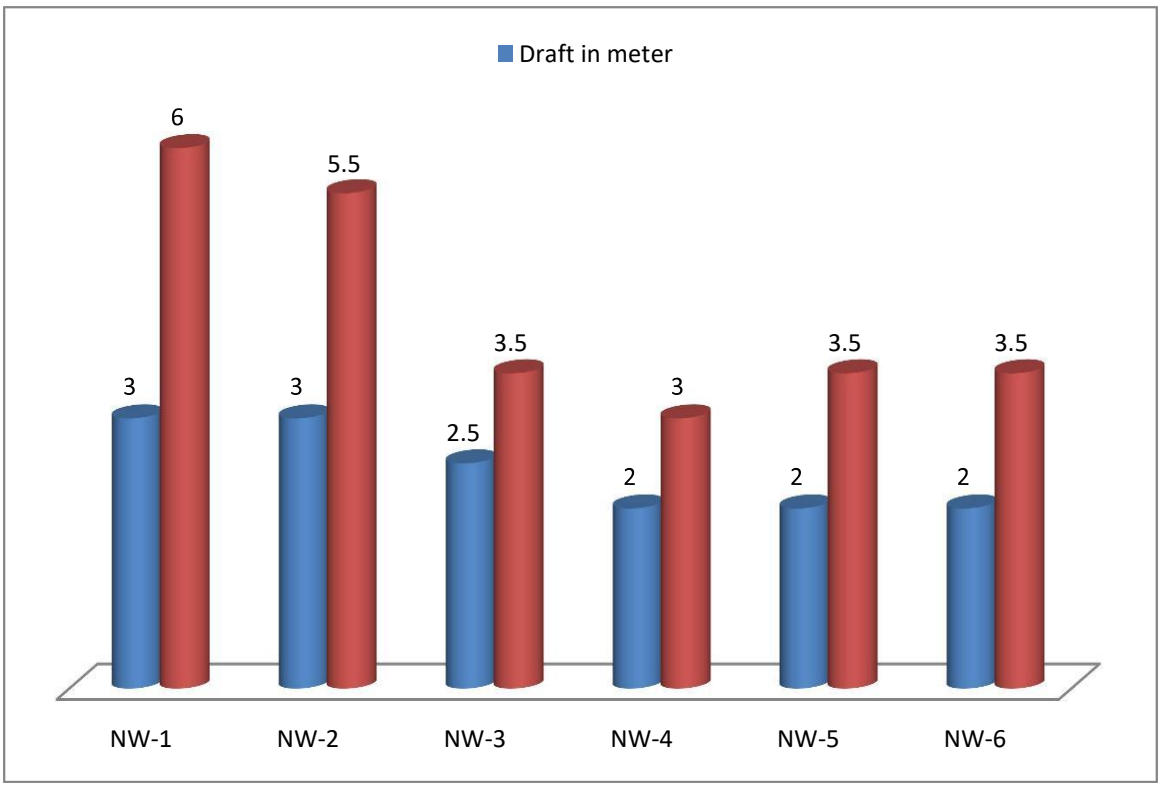
- For each tonne of goods carried, water transport produces just a quarter of the co2 emission created by road and a third less than rail transport.
- Per tonne, road transport uses three times more energy than water, with rail using 50% more.
- The cost of accidents and noise pollutions on waterways is negligible.

4.4Length of National Waterways of India:



National Waterways of India the NW-1 is the longest waterways, which is connected by the multi states of India (UP, Bihar, Jharkhand and West Bengal) with the length 1620 k m.

4.5 Vessel Draft



Vessel Draft of all the NWT. (Source: IWAI)

In India for the National Waterways -1 which has a deepest river draft at the river Ganga which vary from 3-6 meter, in comparison to the other NWT. For other route the draft vary between 2-3.5 meter.

4.6 Major Freight Products:

SR	National Waterways	Major Freight
1	NW-1	Coal, Agro products, Fertilizers, Petro products, Mineral ores.
2	NW-1I	Petro products, Agro products, Fish, Tea, Fertilizers.
3	NW-1II	Coffee, Agro products, Marine products, Rubber, Spices.
4	NW-1V	Rice, Cotton,Mineral Ores, Fish, Petro Products, Chemicals.
5	NW-V	Coal, Minerals ores, Iron & Steel, Aluminum, Timber, Jute
6	NW-VI	Tea, Agro products, Rice.

	National Waterway 1	National Waterway 2	National Waterway 3	National Waterway 4	National Waterway 5
Year of declaration	1986	1988	1993	2008	2008
Rivers and Path	The Ganga - Bhagirathi - Hooghly river system between Haldia (Sagar) & Allahabad	The river Brahmaputra between Bangladesh Border and Sadiya	168-km West Coast canal (Kottapuram-Kollam) segment, the 23-km Udyogmandal canal-Kochi Pathalam bridge portion and the 14-km Champakara canal (Kochi-Ambalamugal)	This consists of the Kakinada-Puducherry stretch of canals, the Kaluvelly tank-Bhadrachalam-Rajahmundry stretch of the river Godavari and the Wazirabad-Vijayawada stretch of the river Krishna.	The Talcher-Dhamra stretch of river Brahmani, Geonkhali-Charbatia stretch of East Coast Canal, Charbatia-Dhamra stretch of Matai river and Mangalgadi-Paradip stretch of Mahanadi delta rivers
Length in KM	1620	891	205	1027	623
States in passes through	UP, Bihar, West Bengal	Assam	Kerala	Andhra Pradesh, Tamil Naidu, Pondicherry	West Bengal and Orissa
Least Available Depth in meters	Haldia (Sagar) - Farakka (560Km) - 3m Farakka - Barh (400KM) - 2.5m Barh - Ghazipur (290KM) - 2m Ghazipur – Chunar/Allahabad (370KM) - 1.5m	Bangladesh Border - Pandu (255 km) - 2.5m; Pandu-Neamati (374 Km) - 2.5m; Neamati-Dibrugarh(139 km) - 2m; Dibrugarh-Oriumghat (92 Km) - 1.5m	2 meters has been provided in the entire NW-3	Under Development	Under Development. To maintain LAD of 2 m in the Brahmani river all through the year.

Aids to navigation	The day navigation is provided in entire stretch of NW-1 all-round the year. The night navigational is available on large part of NW1.	Day navigation marks with bamboos and navigational lights fixed on country boats / beacons have been provided from Bangladesh Border to Dibrugarh	The entire route length of NW-3 has been provided with aids to facilitate 24 hours navigation		
Terminals	Floating terminals at 20 locations and four permanent terminals a Kolkata, Gaighat Patna, Farakka and Pakur.	One fixed terminal at Pandu and 10 floating terminals	Total 11 locations envisaged. Nine have already been constructed. Remaining two locations under construction.		
Type of cargo moved	Cement, Fly Ash, Iron Ore, Coal, Tyres, Steel Plain Sheet, Stone Chips, Petroleum Products, Grains Aluminium block, Coke, Cooking coal, ODC.	Bamboo, Bamboo products, Coal, Plant & machinery, Cement, Building material, fertilizer, Food grains, Milk & other essential commodities	Phosphoric Acid, Sulphur, Zinc, Furnace oil, Rock Phosphate, Various commodities in containers, Furnace oil-bunkering, POL(bunkering to ships), Potable water		
Cargo movement in Million MT in Year 2013-14	31.72	24.53	9.58	Under Development	Under Development

Table 4.3 : A comparison of 5 National Waterways

4.7 Scope of Inland Waterways in India:

- **Vessel Making Industry:**

  Due to the extension of National Waterway 1, there is immense potential for pontoon/vessel making industry between Haldia to Allahabad. There is 'N' number of artesian who are occupied with making and fixing pontoons and ships in Kolkata yet they are not building vessel having 1500-2000 DWT. Today just IWAI boats are working in Ganga however there is an immense open door for a private gathering to put resources into vessel making industry. It won't just build the quantity of the vessel yet in addition give work chance to nearby individuals. Alongside vessel development, there is potential in Inland water transportation hardware producing industry, fixing and support industry, etc.

- **Enhancing monetary open doors/Employment:**

  Water transport is significant for direct work, for example, vessel building and angling jobs, too in a roundabout way, enabling destitute individuals to get to work in the urban communities while living in more affordable areas. Expanded portability likewise assumes a key job in supporting occupations by giving country makers, for example, ranchers and angler, a way to get to their end-markets. For instance, in Bangladesh somewhere in the range of four million individuals are thought to gain their living transporting nourishments and travelers along the nation's conduits, giving an expected 60% of all work in the vehicle area. IW transport will give more opening for work to marine drifting staff because of increment in the quantity of the armada, for port and harbors task Executive port chiefs who can direct the organization, activity, and support of an inland port.

- **Trade prospects along the India-Bangladesh convention course:**

  The following best open door which we can distinguish under the National Waterway 1 is that its ideal usage can assist India with increasing its exchange connection with Bangladesh. As we as a whole realize that National Waterway 1 extend from Allahabad (Uttar Pradesh) to Haldia (West Bengal) which offer its outskirt with Bangladesh, and furthermore India has another conduit task called National Waterway 2 which will go through Bangladesh and interface North Eastern conditions of India with rest of the State of India.

ADVANTAGES OF IWT

The advantages of IWT mode of transportation over other modes are enormous. Few important a dvantages are given below:

(i) Cost savings:

- Cost of developing waterways much lower than rail & road
- Reduces transportation losses

(ii) Environment friendly:

- Least fuel consumption per tonne- km
- CO_2 emission is 50% of trucks
- Negligible land requirement
- Safe mode for hazardous and over dimensional cargo

(iii) Supplementary mode:

- Reduces pressure on road and rail
- Reduces congestion and accidents on road

PROGRESS MADE IN IWT SECTOR IN THE RECENT PAST

- Transportation of another 30 lakh tonnes per annum for Barh Thermal Power Station (1040 km) being finalized.
- Fly Ash transportation on Indo- Bangladesh Protocol Routes.
- Pilot movement of fertilisers on NW-1 by IFFCO and TATA Chemicals.
- Pilot Project for movement of food grains to North East via Protocol route finalised by Food Corporation of India.
- Frequent Over Dimensional Cargo Movement on NW-1 and NW-2.
- Liquefied Ammonia transportation by FACT on NW-3.
- Substantial container movement on Ro-Ro Jetties at Kochi.
- Project to develop South Buckingham Canal on NW4 is approved and preliminary works under progress since March 2014.
- Kaladan Multimodal Transit Transport Project being implemented in Myanmar.

CHAPTER V
FINDINGS, SUGGESTION & CONCLUSION

5.1 Finding

- The Inland Waterways of India has about 14,500 km. of maneuverable & potentially navigable waterways which are well connected with the other modes of transport like: Road & Rail connectivity.
- The government of India as well as state government taking initiative to increase the trade of India using Inland Waterways, with help of that macro as well as micro industries will get benefited.
- After the study this mode of transport will be the cheapest mode of transport in comparison to road & rail mode of transport.
- The least impact on environment among other modes of transport (less carbon emission).
- The Shipping Corporation of India (SCI) has not a sufficient number of vessel to operate in Inland Waterways of India.

5.2 Suggestions

India is creating nation and need to examine the feasibility and intends to pull in more assets to the IWT area. The improve dimension of immersion of private area in IWT that presently been started as welcome advance. More quantities of conduits ought to be distinguished for the advancement, and those reserved given a push. IWT as a method of transportation ought not be considered in separation. It ought to be coordinated with different modes to accomplish ideal advantages for the national economy.

- Need sufficient budgetary help for operationalizing these conduits.
- The government should develop passenger terminal development, offer financial support to ferry operators to improve safety, and facilitate insurance coverage to boost passenger transport.
- Interlinking Waterways and Ports with seaside shipping – for instance Ganga, Brahmaputra-Sunderbans stream framework can be joined with Haldia and Kolkata Ports, this will have a dominant impact of advancement of that region and furthermore it will reduce weight on the land based modes.

- These National Waterways additionally can be utilized for the voyage shipping, to produce more income.
- Digital GPS and necessary infrastructure for night navigation and need for better berthing facilities.
- The terminal ought to be found closest to the mechanical territory for simple treatment of cargos.
- IWT as a mode won't economically productive for administrators except if we apply more than 100 DWT which requires a base draft 2.5 – 3 mtr. round the year with night route offices.

Payload transport through inland conduits ought to be boosted. Following measures can be taken:

- The Government can command/boost businesses closed to national waterways to utilize this mode for a bit of their shipments.
- Higher road taxes can be levied on transportation of coal and inflammable material over longer distance.
- The government ought to create traveler terminal advancement, offer money related help to ship administrators to improve security, and encourage protection inclusion to support traveler transport.
- Keeping at the top of the priority list the worries, it is essential to evaluate the ecological and social effect of the improvement of inland waterways and related framework to deny potential harm.
- Proper dredging and maintenance of waterways to provide good passages for cargo movements through ships.

5.3 Conclusion

IWT is the method of transporting cargo over rivers, backwater and canals. It provide a cost effective, logically efficient and environmental friendly mode of transport and whose development as a supplementary mode would enable diversion of traffic from over congested road and rails. This will decrease the huge logistics cost in India significantly and Hence, the waterways project deserves better regulation and development across the country.

Below is the list of the table of major freight products which are transported through National Waterway 1.

Company Name	Cargo Name	Multimodal	NW - 1
Carpet petals	Carpet	✓	✓
Global Amigo Exporters	Silk Saree	✓	✓
Varanasi Silk Saree Industry	Silk Saree	✓	✓
IIFFCO	Fertilizer's	✓	✓
NTPC	Coal	✓	✓

Table 5.1 : Major Freight Products Via NW-1 (Source: IWAI)

Traders View

Below data is according to traders view about their business, the cargo they are trading, location where their business is active and the modes of transportation they are using. Then I came to national waterway 1 how efficiently it is helping them to carry forward their business and the stumbling blocks coming in between their way to transport cargo through NW-1.

- Absence of marketing of the Multi modal terminal results in complete interference of facilities provided by this terminal to the traders.
- Till now the terminal is in its construction stage though it's a multimodal terminal but currently it is only providing maritime transportation and traders are mainly interested in door-to-door service.
- The project in its initial stage so the cargo handling facility at different terminal in different ports is not cost effective.
- Demand and Supply gap between fleet availability results in inefficiency of the project.
- As the project is in its growth stage, so government should take some initiative like subsidies in tariff given to the traders so that they will get attracted towards the terminal.
- Absence of proper navigational facilities in channel water at night.
- Pontoon bridges in between the navigational water acts as a barrier.

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