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## Opportunities and Challenges for Inland Waterways in India

Government of India has recently taken several initiative and policy decisions aimed at promoting domestic movement of cargo utilizing Inland waterways. With the increased focus on country's inland waterways transport system, cargo traffic through IWT is expected to increase substantially.

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**Inland waterways** have been accorded a central role in maritime development in India. A well-coordinated inland waterways network could bring a fundamental alteration in the logistics scenario of the country.

Inland waterways have vast potential to act as an alternate and supplementary mode of transportation for handling certain bulk commodities in India. Underutilization of (IWT) sector in India is a great opportunity loss for the country. Although it continues to be the cheapest mode, it had lost its importance because of poor maintenance of waterways.

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**Early signs of success in inland waterways transport is expected to accelerate with improved facilities in terms of infrastructure and vessels.**

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# On the cusp of opportunities

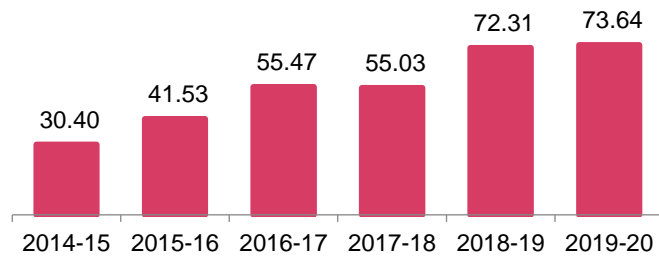
India has approximately 14,500 km of navigable waterways (out of which about 5,200 km of the river and 4,000 km of canals can be used by mechanized crafts) with significant potential to be developed as a mode of transportation. Still, these inland waterways are un-utilized in India as compare to other countries in the world.

Recognizing the benefits and importance of inland waterways and to increase its modal share, IWTs have been accorded a central role in maritime development in India. The National Waterways Act (Amendment) 2016, has declared 111 rivers or river stretches, creeks, estuaries in India as National Waterways (NWs).

Despite having several advantages of IWT, freight transport by inland waterways in India is highly underutilised, compared to other large countries.

## Year-wise traffic along IWT in India (in MTPA)

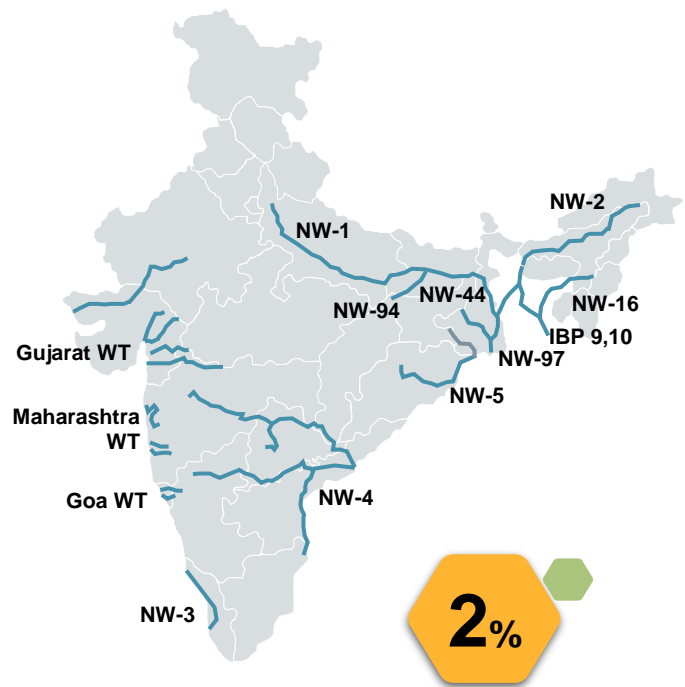
Source: Inland Waterways Authority of India (IWAI), GoI



Growth in the sector is marked by the increase in number of operational NWs to 16 in FY-20, against 13 in FY-19. The total freight movement on NWs in FY-20 was recorded as 73.64 MTPA, against 72.3 MTPA in FY-19, thereby registering marginal 2% year-on-year growth in freight traffic.

## Operation National Waterways in India

Source: Inland Waterways Authority of India (IWAI), GoI



Y-o-y growth of freight traffic along IWT, in 2020

## Key recent developments and opportunities

Inland Waterways Authority of India (IWAI), along with the Ministry of Shipping, Government of India, has been working on initiatives to promote the use of Inland Waterways for passenger and cargo movement.

### Proposed developments under PIWTT

Government of India, under the 2<sup>nd</sup> Addendum to Protocol on Inland Water Transit and Trade (PIWTT) in May 2020, proposed development of 10 additional Indo-Bangladesh Protocol (IBP) routes. These routes majorly connect Badarpur, Sonamura, Kolaghat, Maia, and Jogighopa in India, and Ghorasal, Daudkandi, Sultanganj, Aricha, and Bahadurbad in Bangladesh.

### Multimodal Terminal at Haldia, West Bengal

With the commencement of Multimodal Terminals (MMT) at Varanasi in Uttar Pradesh and Sahibganj in Jharkhand, Government of India is now developing a MMT at Haldia, under Jal Marg Vikas project (JMVP). The project is likely to enhance connectivity of NW-1 with industrial areas of West Bengal and Odisha.

### Project Arth Ganga along NW-1

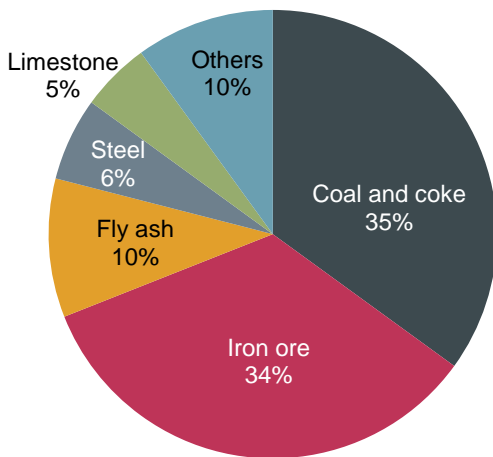
With 'Project Arth Ganga' under JMVP, the Government of India aims to develop NW-1 for safe and reliable navigation. The project is to be implemented with the technical and financial assistance of the World Bank, involving the local community, with a focus on economic activities in and around the Ganga river.



## Key highlights

### Commodity profile of IWT traffic in India

Source: IWAI, GoI



Gujarat Waterways and Maharashtra Waterways constituted more than 75% of the overall IWT traffic in 2019-20.

Predominantly, bulk commodities including coal & coke, iron ore, fly ash, steel, and limestone are transported using the IWT mode in India. Collectively, they constituted to more than 90% of the overall IWT traffic in 2019-20.

### Challenges of Inland Waterways

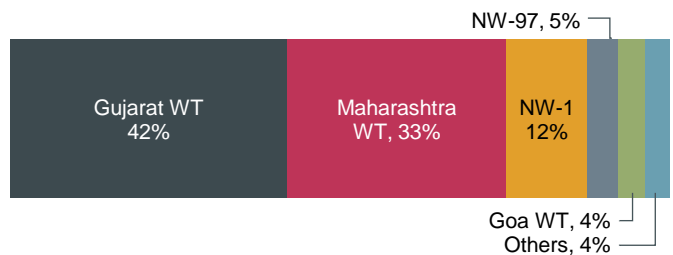
Despite having an extensive network of inland waterways in the form of rivers, canals, backwaters and creeks; and several advantages of Inland Water Transport, freight transport by inland waterways is highly underutilised in India compared to other large countries. Despite the inherent advantages, the share of IWT mode in India is currently witnessed to be around 2%, compared to figures of 20% and 32%, in Germany and Bangladesh, respectively.

Inland waterway network, in general, lacks continuous coverage and connectivity. It requires a multimodal network comprising water bodies and roadways, including culverts, bridges etc. to serve the end users. This often involves investment in a large number of ancillary activities. Some of the port/terminals, such as recently operational MMLP at Varanasi, are planned as multimodal hubs that connects rail, road and waterways.

Waterways in India are also proposed to be linked to the eastern and western Dedicated Freight Corridors (DFCs), as well as the Sagarmala Project, which aims to promote port-led direct and indirect development. The linkages are being planned such that cargo can be swapped/ shifted from and to waterways, DFCs, and road transport. The 'Integrated National Waterways Transportation Grid' also plans to link many of the national waterways to each other and also to roads, railways, and major ports.

### Percentage share of traffic along various IWT routes

Source: IWAI, GoI



IWT advantages are several. Among all the transport modes, it is the least capital-intensive, is environment-friendly, can supplement rail and road transport, help in the decongestion of roads, has least fuel consumption per tonne-km, requires minimum land acquisition and has low infrastructure costs. As per a World Bank study, IWT mode has the least operational cost of USD 0.015/ ton-km, compared to USD 0.033/ ton-km for road and USD 0.02/ ton-km for rail.



Image credit: Texas A&M Transportation Institute (TTI)

**Globally,** authorities are implementing various development strategies to improve and optimize IWT connectivity, drawing up a well-coordinated strategy between the national IWT network, and other transportation modes, including roadways, railways and other waterways.

An effective waterways network would necessitate drawing up a well-coordinated strategy on lines of complementarity between the national network and other waterways, as well as between waterways and roadways/railways.

### Waterways in the Netherlands

IWT accounts for 46.6% of the total freight traffic in Netherlands, with around 40% of container traffic along national inland waterways.

Availability of efficient infrastructure, including handling facilities for large vessels and barges, and container storage facilities, has resulted in increased competitiveness and has attracted several private investments. The ongoing barge transports in the Belgian and Dutch areas are mainly line network operations, where the seaport terminals are connected to terminals along the river Rhine. Port of Rotterdam in the Netherlands and port of Antwerp in Belgium are two of the largest ports in Europe for both bulk and container cargo. The regions close to these seaports have a strong network of waterways; largely because of geography of the river Rhine. Port of Amsterdam is also connected to Rhine and due to the network between the three large seaports, the river and surrounding waterways have become important barge corridors.

### IWT network in Netherlands

Source: UNECE



### Waterways in the US

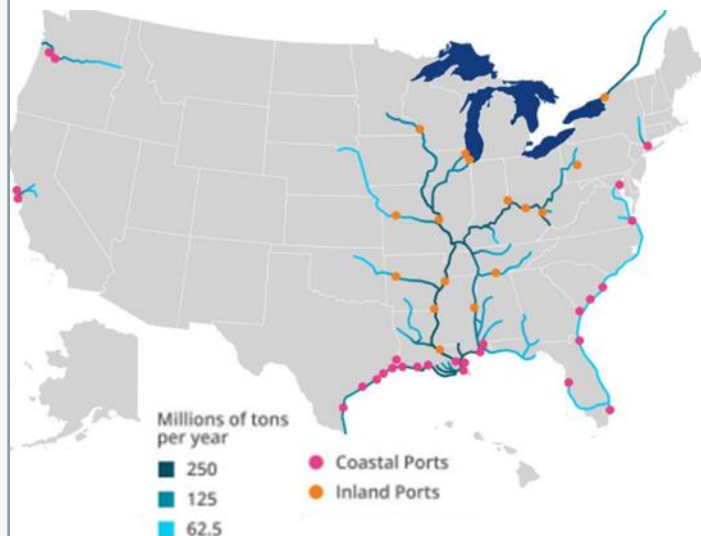
The US has around 25,000 miles of inland waterways and 239 locks forming the freight network's "water highway". Inland waterways are shared by only 38 states, where the Atlantic Intercostal Waterway serves ports along the East Coast, such as the Port of Virginia. In the Pacific Northwest, the waterway system leads to the Port of Seattle and other ports in the area. These waterways connect to inland and ocean ports, providing direct access from the international markets.

Barges along the waterways are largely used for transportation of agricultural goods, accounting 60% of grain exports. Similarly, in the energy sector, more than 22% of domestic petroleum and petroleum products and 20% of coal used to generate electricity are moved on the inland waterways.

Inland waterways' construction and rehabilitation costs, including for locks, are shared by the federal government through general funds and by users through the Inland Waterways Trust Fund on a 50-50 basis. Operation and maintenance costs for inland waterways are covered in full by the federal government.

### IWT network in the US

Source: UNECE



## Key Inland Waterways in India

### Year-wise cargo traffic (in MTPA) along various IWT routes in India

Source: IWAI, GoI; ASCELA Analysis

2014-15 2015-16 2016-17 2017-18 2018-19 2019-20



NW-1	NW-4
Traffic along <b>NW-1</b> was recorded as 9.12 MTPA in FY20. Other than regular traffic movement on IBP (protocol) route and traffic bound for Kolkata Port, this also included Ro-Ro traffic in Sahibganj-Manihari area and longitudinal traffic between Haldia and Varanasi.	Traffic movement on <b>NW-4</b> is through Ro-Ro operations from Ibrahimpattam to Lingayapalam using Ro-Ro inland vessels. In FY20 traffic reduced to 82,226 TPA due to suspension of capital city construction works in Amravati.
NW-2	Maharashtra and Goa Waterways
In case of <b>NW-2</b> , movement of stone chips/ boulders originating from Bhutan and going to Bangladesh via the IBP route has gained traction. More than 10 shipments took place from IWAI's Dhubri (Assam) terminal using shallow draft vessels in FY20 and these movements are expected to become regular. Additionally, five movements carrying coal and containerized cargo were successfully completed between Haldia and Guwahati during FY20.	Traffic along <b>Maharashtra</b> Waterways has reduced in FY20 due to reduction in import/export traffic. Other jetties/ Ports on the Maharashtra Waterways, including Revdanda Salav jetty, Jaigad, and Dighi, have seen a decrease in traffic handled over the same period in the past year.  Traffic on <b>Goa</b> waterways has reduced significantly in last few years due to ban on iron ore mining in the State.
NW-3	Gujarat Waterways
Approx. 0.55 MTPA traffic was moved on <b>NW-3</b> in FY20. Most of this traffic was raw materials belonging to Fertilizers and Chemicals Travancore (FACT) from Cochin port to jetties at FACT factories.	Along <b>Gujarat</b> Waterways, Magdalla based jetties have collectively seen an increase in the loaded and unloaded traffic handled. Similarly, Dahej based jetties have also seen a drastic increase in the traffic handled.

## State Waterways

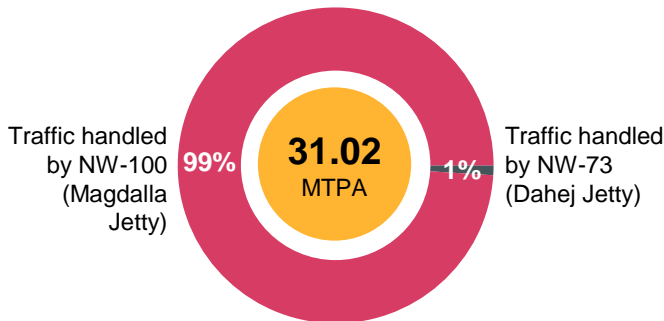
### Gujarat Waterways

Gujarat has 2 operational National Waterways i.e. NW-73 (River Narmada) and NW-100 (River Tapi). With 31.02 MTPA traffic. Gujarat waterways constituted 42% of the total traffic on all National Waterways in FY20. Industries have set-up their private and captive jetties for handling their raw material and finished goods along Magdalla and Dahej jetties.

In FY20, Magdalla based jetties have collectively seen an increase of 17% and 5% in the loaded and unloaded traffic handled, respectively. Similarly, Dahej based jetties have also seen an increase in the traffic handled.

#### Traffic handled at Gujarat Waterways (2019-20)

Source: IWAI, Gol



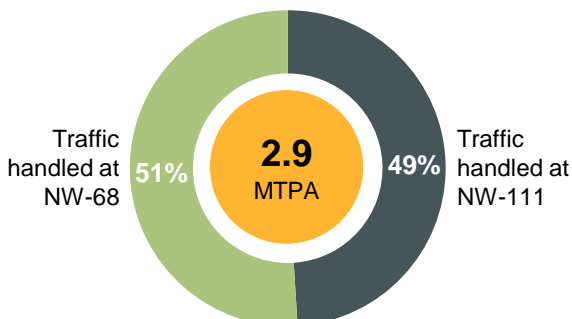
### Goa Waterways

Post the ban on iron ore mining in the state, traffic on the Goa waterways has decreased significantly in the recent past. The traffic declined from approx. 3.7 MTPA in FY19 to approx. 2.9 MTPA in FY20. Although iron ore has been the key commodity moving on Goa Waterways, there are various other industrial commodities that use the IWT mode in Goa.

The Goa government is planning to revive the inland waterway passenger ship service connecting rural areas to cities in the coastal state. Recently floating jetties are being planned and constructed at Panaji and Morjim, to strengthen tourism in the state.

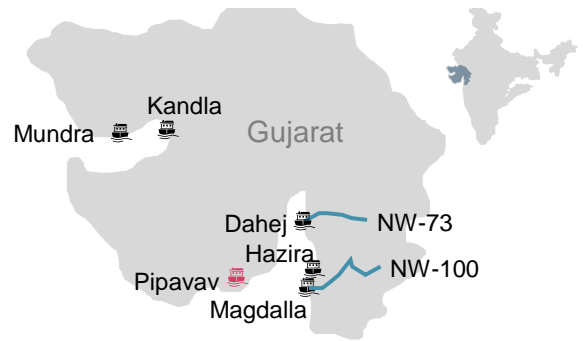
#### Traffic handled at Goa Waterways (2019-20)

Source: IWAI, Gol



#### Gujarat Waterways and Industrial zones

Source: IWAI, Gol



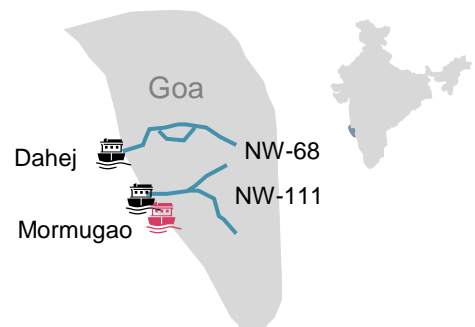
#### Gujarat Waterways- Commodity Profile

Magdalla based jetties handled more than 99% of the total traffic of Gujarat Waterways. Iron Ore and Coal form 71% of the total traffic moving on NW100, with respective share of 42% and 29%. These are followed by hot rolled coils, limestone, coke, clinker, and cement. Majority of these commodities are received through costal route from Vizag port and Paradip port.

Dahej based jetties handled less than 1% of the total traffic on Gujarat Waterways. The traffic at the ports primarily outward movement of Ethylene and inward movement of Propylene.

#### Goa Waterways and Industrial zones

Source: IWAI, Gol



Goa has 2 operational National Waterways i.e. NW-68 (River Mandovi) and NW-111 (River Zuari).

#### Goa Waterways- Commodity Profile

Iron ore and coal are the major commodities accounting for 54% and 27% of the traffic, respectively. Most of the Iron Ore is exported to foreign countries from Mormugao Port, whereas coal is imported from foreign ports to Mormugao Port. Amongst the other commodities, Bauxite is imported from foreign ports by Aluminum manufacturers such as HINDALCO.



## Maharashtra Waterways

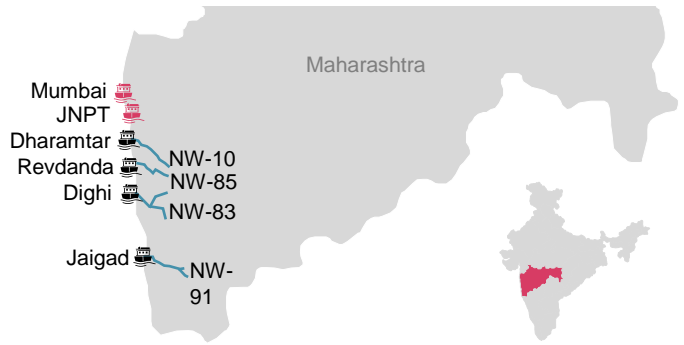
Maharashtra has 4 operational NWs which are NW-10 (Amba River), NW-83 (Rajpuri creek), NW-85 (Revdanda creek/ Kundalika River), and NW-91 (Shastri River/ Jaigad Fort Creek). Maharashtra Waterways constituted 33% of the total traffic handled on all National Waterways in the country in the FY-20.

### Maharashtra Waterways- Commodity Profile

Coal accounted for majority of the traffic loaded at Jaigad (NW-91), followed by Iron Ore. Both these commodities were predominantly transported to Dharamtar port (NW-10). Revdanda Salav Jetty (NW-85) has been mainly used as a loading point for Iron Ore fines shipments to Dharamtar port. Dharamtar port had limited traffic movements of Iron Ore to Revdanda. Dighi (NW-83) and Sanegaon (NW-85) did not load any cargo in FY-20, and were only used for unloading.

## Maharashtra Waterways and Industrial zones

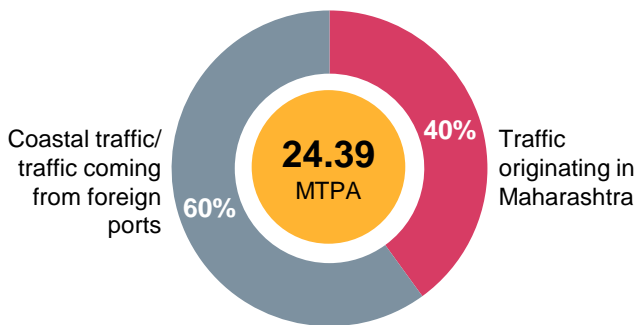
Source: IWAI, GoI



Of the total traffic moving on the Maharashtra Waterways, 99% goes to jetties present on the Maharashtra Waterways while the remaining 1% is destined for coastal ports of India. Of this 99% which is destined for the Maharashtra IWT, Dharamtar handles 90% share of the traffic.

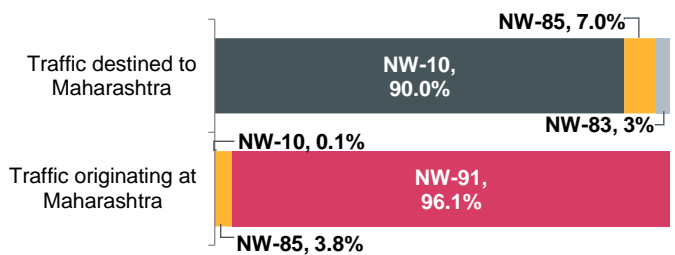
## Traffic handled at Maharashtra Waterways (2019-20)

Source: Press Information Bureau, GoI



## Inbound and Outbound Traffic at Maharashtra WT

Source: Press Information Bureau, GoI



## Other newly operational National Waterways

With the inclusion of traffic on NW-16 (River Barak), NW-44 (River Ichhamati) and NW-94 (River Son), the number of operational NWs in India increased to 16 in FY20. These new NWs collectively accounted for 1.7 MTPA of total IWT traffic in FY20. IWAI has further identified 20-25 new NWs through conducting techno-economic feasibility studies and is in process of undertaking technical interventions to make these waterways navigable.

### NW-16 (River Barak)

**0.004 MTPA**  
freight traffic in MTPA

In FY-20, approx. 4,400 TPA of traffic consisting of Ginger and fruits (Orange, Pineapple, Grapes) moved on NW-16. This traffic was moved on small country boats, which ply between Karimganj (Assam, India) and Zakiganj (Bangladesh) through the Indo Bangladesh Protocol (IBP) route.

### NW-44 (River Ichhamati)

**0.9 MTPA**  
freight traffic in MTPA

In FY-20, approx. 0.9 MTPA of traffic consisting of construction material such as bricks, stone chips, sand and cement moved on NW-44. This traffic originated from Basirhat and travelled to multiple destinations on NW-1 and in and around Basirhat Brick kilns on NW-44.

### NW-94 (River Son)

**0.8 MTPA**  
freight traffic in MTPA

In FY20, approx. 0.8 MTPA of traffic (mainly sand) moved on NW-94. This traffic movement using mechanized/ non-mechanized boats was recorded to be taking place in Bihar region from Koelwar (confluence point of River Ganga and River Sone in Bihar) to multiple destinations located along the Ganga (NW1).



**Arth Ganga Project**

Jal Marg Vikas project (JMVP), aimed to develop river Ganges as a safe mode of navigation, is being implemented with technical and financial assistance of the World Bank. ‘Project Arth Ganga’ envisages to re-engineer the JMVP by involving the local community with a focus on economic activities in and around the Ganga river.

“Project Arth Ganga” is aimed to catalyze economic development in the Ganga basin to generate economic benefits in the states of Uttar Pradesh, Bihar, Jharkhand, and West Bengal. About 40 floating jetties and 10 pairs of Ro-Ro terminals are being planned on River Ganga in the four states in the Gangetic belt.

**Sonamura-Daudkandi route**

A new route Sonamura – Daudkandi – Sonamura, as IBP route 9 and 10, was added in the 2<sup>nd</sup> addendum to PIWT&T in May 2020 with Sonamura (Tripura) and Daudkandi (Bangladesh) declared as additional ports of call for vessels plying on IBP routes. The inclusion, of this 93 km stretch of Gumti River in the protocol, was a landmark step to enhance the connectivity of Tripura & adjoining North East States with Mainland India as well as Bangladesh via IWT mode.

IWAI has constructed a floating HDPE jetty adjacent to the Sonamura LCS. This jetty has the potential to attract small haul trans-boundary trade including commodities like bagged cement, horticulture, consumer products and other local goods transported via road between India and Bangladesh.

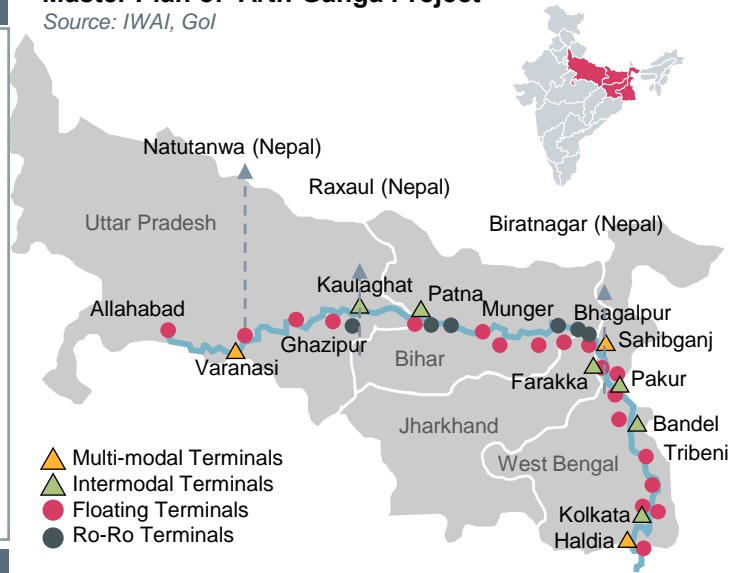
**Development of MMLPs along NW**

Government of India is developing MMLPs at Haldia, Sahibganj, and Varanasi (already operational) to strengthen inland navigation system under Jal Marg Vikas Project (JMVP). The terminals are likely to improve the balance in India's transport modal mix, favouring inland waterways. Operation at MMLP Varanasi (capacity 1.26 MTPA) has already commenced in November 2020.

IWAI is in the process of handing over its terminals on all NWs to private operators on PPP basis. The newly constructed Multimodal Terminals (MMTs) at Sahibganj (capacity 3.03 MTPA) and Haldia (capacity 3.18 MTPA) on NW-1 under JMVP are in the process of being tendered out private operators on PPP basis for operation and maintenance. However, the project are delayed a bit due to lack of responses from bidders.

**Master Plan of ‘Arth Ganga Project’**

Source: IWAI, Gol



**Sonamura-Daudkandi route along North-east India**

Source: IWAI, Gol



**MMLPs proposed along NW-1 under JMVP**

Source: IWAI, Gol



## IWT opportunities in NE States

River Brahmaputra between Dhubri and Sadiya over a length of about 891 km was declared as NW-2 in 1988. Because of its connectivity with NW-1 through protocol route via Bangladesh its catchment area is extended up-to the state of West Bengal, thereby establishing its connectivity with Haldia and Kolkata ports.

### NW-2: 891 km

#### Brahmaputra River

#### Dhubri to Sadiya

Section	Length	Draft
Dhubri-Pandu	260 km	2.5 m
Pandu-Neamati	369 km	2.5 m
Neamati-Dibrugarh	139 km	2.0 m
Dibrugarh-Sadia	123 km	1.5 m

### NW-16: 121 km

#### Barak River

#### Lakhipur to Bhanga

Section	Length	Draft
Bhanga-Lakhipur	121 km	2.0 m

The NE region of the country is connected via rail and road. However, significant improvement is required in terms of augmenting the existing logistics infrastructure. At present, the commodities moved by rail are unloaded at good sheds managed by Indian Railways which are fraught with infrastructural constraints like unavailability of round-the-clock services in terms of handling, inadequate warehousing facilities and issues pertaining to safety and security of cargo.

### MMLP at Jogighopa

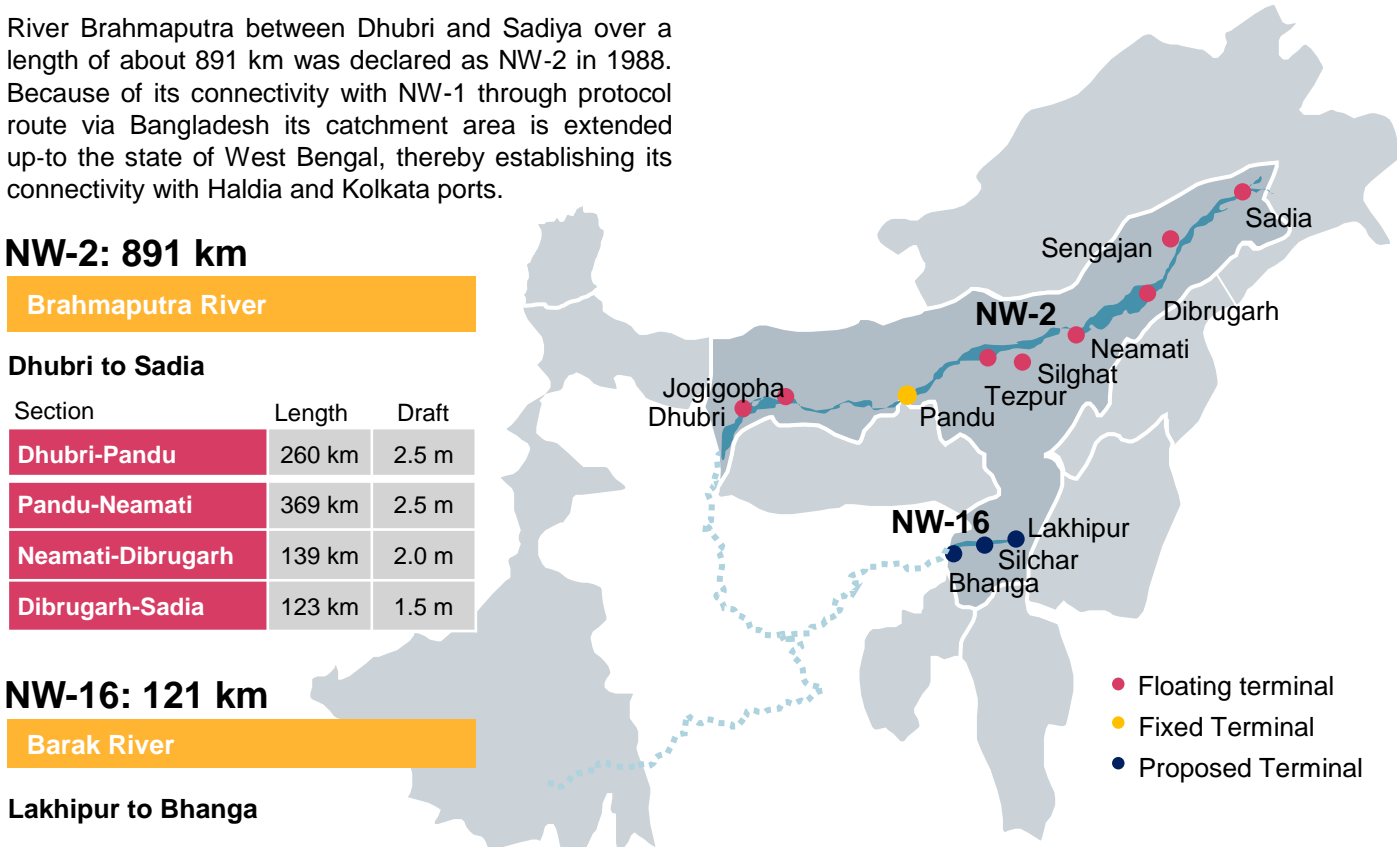
MMLP at Jogighopa in Assam is now the country's first international MMLP under the Bharatmala Project of the Ministry of Road, Transport and Highways, Government of India.

Jogighopa is well placed in terms of its connectivity to other parts of Assam and the nearby industry areas. Bongaigaon is the nearest industrial area which is known for the presence of an IOCL refinery; also the largest in the region. MMLP Jogighopa is project envisioned to drive economic growth and trade competitiveness of the country through a truly integrated, and cost-effective logistics network. It is aimed to improve the logistics efficiency and facilitate the Domestic and Export-Import trade in the region.

Overall logistics facilities and services are inadequate in the region, in comparison to other parts of the country. One of the key reasons for same is fragmented nature of cargo and cargo players. There is a need in the region for consolidating cargo, provide modal exchange points, value added services like warehousing, specialized handling for certain commodities like food grains, tar coal/bitumen, coal, edible oil, PoL products, fertilizers/FRM, automobiles etc.

### Advantages of MMLP Jogighopa

- MMLP Jogighopa is also linked to the Eastern-Western Corridor via the Tulungia- Hapachara Highway, a project awarded for improvement to a 4-lane highway.
- The Park, with an overall investment of INR 3,000 crores, would likely generate direct and indirect employment opportunities. Ancillary and downstream industries, townships and markets in the vicinity of the Logistic Park would also generate a lot of economic activity.
- The MMLP may also strengthen market connections with ASEAN countries, including Myanmar, Iran, Japan, South Korea and Bangladesh.



### Inland Waterways Infrastructure in NE region

Source: IWAI, Gol

## Issues and Challenges

India's inland water transport sector is relatively under-developed, compared to other large economies due to matrix of reasons.

### Inadequate Draft

Large sections of Indian waterways have inadequate depth for commercial movement of cargo. Moreover, Indian rivers (especially in the northern plains) face severe problems of siltation round the year. The river bed rises impedes movement of cargo during non-monsoon months.

### Shortage of IWT vessels

Vessel building is highly capital intensive and faces difficulties in obtaining project finance from banks and financial institutions. The private sector seems reluctant to invest in barges unless long-term cargo commitments for onward/return trips are made from user industries.

### Modal Integration

Lack of potential multimodal corridors and detailed mapping of waterways and industrial clusters in inland water transport corridor is the major hindrance. There is a need to develop a feeder routes on the waterways and integrate the inland water transport with coastal shipping operations, in order to integrate and accommodate hinterland coastal and international maritime traffic.

### Lack of night navigation infrastructures

Indian IWs have been suffering due to lack of night navigation facilities, such as DGPS and RIS. However, Government of India is now developing multiple infrastructure projects to allow night navigation in NW-1 and NW-2. State authorities have also realized the need for night navigation in the successful implementation of waterways.

## Key recent initiatives

To enhance the utilization of NWs for transportation of cargo and passengers, IWAI has proposed various development initiatives, pursuing multiple consultations with different stakeholders in the sector.

### 1 PPP for operation and maintenance

IWAI is in the process of handing over its terminals on all NWs to private operators on PPP basis. The newly constructed Multimodal Terminals (MMTs) at Sahibganj, and Haldia on NW-1 under JMVP are in the process of being tendered out to private operators on PPP basis for operation and maintenance. Similar exercise is in progress for IWAI's terminals at Gaighat (Patna) on NW-1 and Dhubri, Pandu (Guwahati) on NW-2. Subsequently, IWAI's terminals on NW-3 and NW-16 are also planned to be handed over for O&M to private players.

### 2 Relaxation of Customs procedures

To further facilitate use of the IWT mode for movements of goods to/ from North East states of India via the IBP route (under PIWT&T), Central Board of Indirect Taxes and Customs (CBIC), along with IWAI, has issued Transportation of Goods (through Foreign Territory), Regulations, 2020 on 21<sup>st</sup> February 2020. These regulations delineate the procedures to be followed by the trade for transit goods passing through the IBP route and have also dispensed with the requirement of Cross Border Certificate for the purpose of the subject regulations.

### 3 Development of Private jetty/ terminal

IWAI has proposed to permit the private sector to develop their own jetties and operate them on commercial basis. Recently IWAI has permitted RO-RO operations by private operators on NW-1 using their land on banks as landing points on temporary basis. Allowing private entities to build, operate and manage the terminals will enable rapid development of terminal network on NWs. This initiative is expected to bring in participation of private sector in augmenting the infrastructure and modal shift of cargo in favor of IWT.

### 4 Indo-Nepal trade treaty

Inland waterways mode has been agreed for inclusion in the trade treaty between India and Nepal. This will allow Nepal bound cargo (coming from 3<sup>rd</sup> country via Kolkata port and India's exports) to take waterway up to Sahibganj MMT (Jharkhand), proposed Kalughat terminal near Patna (Bihar) and Varanasi MMT (UP) and further movement to Nepal via road. The IWT route will provide an alternate option to the traffic, which currently faces significant challenges such as congestion and delays on the rail and road mode currently.



IWT is one of the most cost effective and environment friendly modes of transportation. Movement of goods and passengers through IWTs would necessitate setting up large number of landing and loading/unloading points. This has the potential to open up large and accessible hinterland for supply of goods which can be transported at a lower cost. The accessible hinterland can also open up new markets. Further, the provisions of the Indo-Bangladesh and Indo-Myanmar protocol permitting transshipment of goods through Bangladesh and Myanmar waters – which, in many cases, are a continuum of India's inland waterways – gives the necessary Right of Way, enabling quicker shipments and deeper market penetration in India's North East.

### 1 Privatization along National Waterways

The Indian Inland Waterways are proposed to be linked to the Eastern and Western Dedicated Freight Corridors (DFCs), as well as the Sagarmala Project, which aims to promote port-led direct and indirect development. This could be a great opportunity of several big infrastructure facilities and service providers along these routes. With the recent policy, IWAI has been promoting private players to build their jetties/ terminals along these NW routes. This would have a positive impact on direct and indirect economies.

### 2 Port automation

The industry is shifting towards optimum efficiency, space utilization, and reduction of costs. Safety is also seen as a major concern. Users are vying for low energy usage and zero-emission ports. Also, the shortage and cost of trained and skilled labor are pushing terminals to automation.

### 3 Consolidation at regional level

Consolidation of terminal authorities, and regulators can be aligned at a strategic planning level. This would likely help strengthen the collective position of the inland supply chains. Regional alignments and coordination on policy would help ensure competitiveness and proper allocation of resources along inland waterways, while protecting the interest of the supply chain users.

### 4 Integrated supply chain development

Carriers are increasingly eyeing growth prospects associated with a wider range of services, including landside operations. Ports and shipping interests are focusing attention on inland logistics with additional revenue-generation potential. Also, ease of restrictions on river-sea movement, by utilizing a single vessel for both inland and coastal waters, would further lower transport costs as well as reduce handling charges.

### 5 Growth of tourism industry

Development of inland waterways in India offers a huge potential for the growth of Tourism sector in the country. Planning of coastal tourism industry should be integrated with the development of NWs for economic benefits of both the sectors.

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## About ASCELA

ASCELA is a Management Consulting firm established to provide independent strategic insights to organizations and individuals in Infrastructure development space. We assist our clients in anticipating, innovating, and creating sustainable solutions.

ASCELA was established with a vision to provide independent strategic insights in Infrastructure and build environment. ASCELA's founder members have rich multi-sectorial experience, including skill sets in sectors comprising Infrastructure, transportation, management, economics, and design and build solutions. Our combined knowledge assists clients in providing a holistic perspective and comprehensive business solution.

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## About ASCELA Infrastructure Advisory

ASCELA's Infrastructure Advisory practice helps clients develop and leverage core competencies to deliver sustainable and tangible returns. We define strategies that help clients in gaining market share, enter new markets, regions, and products, improve bottom-line and reconfigure organizational/ operational structures. ASCELA is well placed to provide accurate and strategic inputs and analysis for assessing potential development opportunities in Infrastructure design and development space. Our in-depth knowledge of our focus transportation sectors, backed by intensive research and rigorous analysis into our clients' specific contexts, helps define superior strategies, framework, and implementable action plans. ASCELA formulates a strategy that is strategically structured to achieve the right project outcomes.

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