POTENTIAL OF INLANDWATER TRANSPORTATION: INDIA

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Abstract:-

India is the 7th largest country in the world, with a total geographical area of 3,287,263 square Km, comprising of 9.92% water. Despite having an extensive network of inland waterways in the form of river, canals and creeks, with the total navigable length of 14,500 Km the share of inland water transport in the country's total transport sector is less than 0.4% whereas in most of the European countries carry over 40% of their passengers and freight through water. To improve this condition Indian Parliament has passed the National Waterways Bill (2015), the bill aims at declaring 106 additional inland waterways as National Waterways.

Benefits of Inland waterways transportation: - Cost of transport and maintenance will reduce over 1/5th times of that we are paying for road transport, More capacity and bulky goods can be transported easily at low cost with Fuel efficient and environment friendly transportation, Even at the time of natural calamity water transportation is alone available option, Fertility of land due to inland waterways, best use of natural resource which is in abandon. As a result of these benefits, overall GDP and rate of development of the country will increase. Also, there is only 6% of country's total domestic freight is accounted by coastal shipping which can be easily increased to 20% as India covers its major by oceans.

As waterways are an efficient, economical and effective mode of transport we suggest the development of inland ports, connectivity to road transport, interlinking of rivers and seas, increase use of national waterways, increase in coastal shipping, port-led Industrial development in our paper.

Since the concept of Inland and Coastal shipping has shown marvelous results in past and we can rely on it to give the best result in future. The government has to take strong action to improve condition waterway transportation in the country to get long term benefits. So we conclude with saying that India has huge scope for water transport with a large part of it covering the Indian Ocean and so many rivers in the mainland. Water transport can help increase trade a lot, increase Job opportunities and GDP of the country, therefore, it should be used to its full potential.

Keywords: Waterways transportation, Coastal shipping, inland water transportation, port management

INTRODUCTION

India is the seventh largest country in the world with a total geographical area of 3,287,263 square Km out if which 9.92% is comprised of water. The coastline of India measures about 7,517 km (4,700 mi) in length out of which 5,423 km (3,400 mi) belong to peninsular India and 2,094 km (1,300 mi) to the Andaman, Nicobar, and Lakshadweep island. According to the Indian naval hydrographic charts, the mainland coastline consists of 43% of sandy

beaches, 11% rocky shores, including cliff and 46% of marshy shores .

The inland water transport, which was an important mode earlier gradually declined after the coming of railways. Despite the fact that inland water transport is a cheap, fuel-efficient and environment-friendly mode with a higher employment generation potential and is suitable for heavy and bulky goods, the harsh reality is that the share of inland water transport in total transport in India is only around 1 per cent.

The Central Government has announced that it's resolve to “fast-track” the development of Inland Water Transport (IWT). IWT involves lower operating costs and environmental pollution than for road, rail or air options for passenger and freight movement. It could also relieve pressure on the other modes, which face their own constraints. The global experience offers interesting comparisons. In several countries, IWT accounts for a substantial share as a percentage of the total: 32 per cent in Bangladesh, 20 per cent in Germany, 14 per cent in the U.S. and 9 per cent in China. In China, much of the increase has occurred in recent decades, in along with its remarkable industrial-agricultural growth. By contrast, in India only 0.15 per cent of domestic surface transport is accounted for by IWT, compared with approximately 68 per cent for road and 30 per cent for rail. IWT in India has over the years seen very slow and little growth, except in the case of the tidal river-canal system in Goa. There are examples such as Kerala where traffic has shifted substantially from IWT to other modes over the last decade. The most significant reason is, the lack of investment for the creation of infrastructure modernization and lack of efficient operators. India has inland waterways with a navigable length of 14,500 km, but only 5,700 km is being used for navigation by mechanized vessels.

GLOBAL SCENARIO

Since time immemorial, the societies have always located near water, partly due to the fact that water enables more efficient travel compared to going over land. Waterways are critically important to the transportation of people and goods throughout the world. The intricate network of connections between coastal ports, inland ports, rail, air, and truck routes forms a foundation of material economic wealth worldwide .

Within the United States, waterways have been developed and integrated into a world-class transportation system that has played an instrumental role in the country's economic development. Today, there are more than 17,650 kilometers of commercially important navigation channels in the lower 48 states.

The historical development of water-based transportation is connected to the importance of domestic and international trade. Large amounts of natural resources such as fisheries, timber, and furs were identified in the early exploration of North America. Trade centers were established along the east coast of North

America where goods were gathered together and ocean vessel transported them to consumers in Europe, Africa and other foreign areas. The success of commercial trading companies have lead to the introduction of waterways in developing nations and are critical avenues for local and regional commerce.

Today, the whole world economy has become globalized. The economic system is changing from one with distinct local and national markets, separated by trade barriers, distance, time, and culture, to one that is increasingly converging and integrating into a global economy.

China: The navigable inland waterways in China has of total more than 100,000 kilometers and there are a large number of inland port facilities with berths for large vessels. Around 10 per cent of the total freight tonnage carried in the country is through IWT, and of that, two thirds is carried on the Yangtze river (including commodities like coal, steel, cement, containers and LPG). In particular, many steel mills are located along the Yangtze river and barges are used for the transport of material. The downstream part of the river carries barges up to 10000 T capacity. Barges move on the river for more than 3000 km, but a shift in priorities is reflected in the construction of the Three Gorges Dam, which is a 370 mile long reservoir and which will now involve a system of locks which barges will have to traverse.

Europe: It is estimated that about 7 per cent of freight traffic is carried via IWT. In the EU states with waterways, this proportion is more than 40% of ton-km in some regions. Use of rivers and canals for a variety of purposes, along with river training has been common for a number of years. IWT is seen as a complementary mode of transport, and offers an alternative as part of the environmental impacts of different modes of transport and the increasing role of multi-modal transport and containerization. The current challenges are safety and the development of information systems to harmonize IWT traffic across Europe.

North America: Freight movements on the Great Lakes and the Mississippi continue to be important modes. Leisure activities based on water movement are quite common. Studies on a variety of aspects of IWT in North America and elsewhere are published by the transportation Research Board.

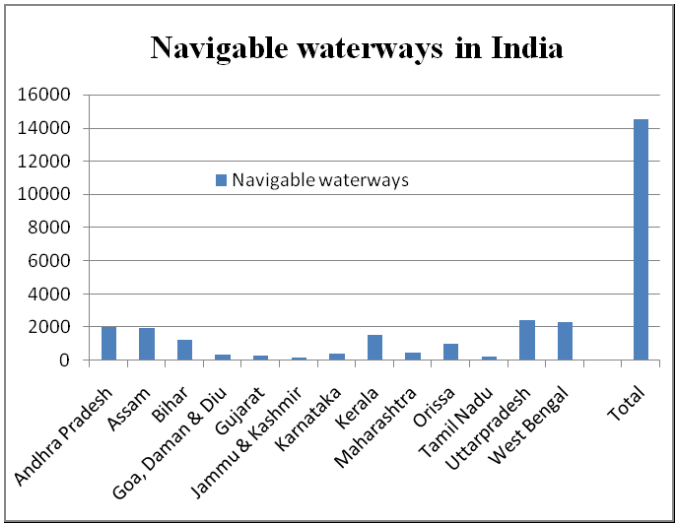
Bangladesh: A significant fraction (about 35%) of the freight movement in the country is by IWT because of the geography of the region. River line ports are well developed and competing modes (rail and road) are not as developed in comparative terms.

INLAND

WATER-TRANSPORTATION

IN INDIA

Historically, at least on some geographical sectors, it has been a viable mode of freight transport. Currently, six major waterways in the country have been designated as National Waterways:



NW-1 the Ganga-Bhagirathi-Hooghly system, from Allahabad to Haldia,

NW-2, the Brahmaputra system in Assam and

NW-3, the West Coast canal system in Kerala.

NW-4,Godavari & Krishna river canal

NW-5,Brahmani river & Mahanadi delta system, along with east coast

NW-6,River Barak

Commercially, the most important sector is the small tidal riverine system in Goa, which comprise of the Zuari and Mandovi rivers and the Cumbarjua canal. A number of possibilities do exist, in terms of in-principle navigable waterways, but the ones that offer some potential (a mix of feasibility and some traffic possibilities) are the riverine inlets along the coast, especially the ones near ports and some of the canal systems as part of larger water resource development projects. A further possibility can conceivably open up if and when the river interlinking project in the country is found viable. This last possibility is doubtful, at the moment.

National Waterway 1

The **National Waterway 1** or **NW-1** or **Ganga-Bhagirathi-Hooghly river system** is located in India and runs from Haldia (Sagar) to Allahabad across the Ganges, Bhagirathi and Hooghly river systems. It is 1,620 km (1,010 mi) long, making it the longest waterway in India. It is of prime importance amongst all the national waterways considering its location advantages. The NW-1 passes through Uttar Pradesh, Bihar, Jharkhand and West Bengal and serves major cities and their industrial hinterlands like

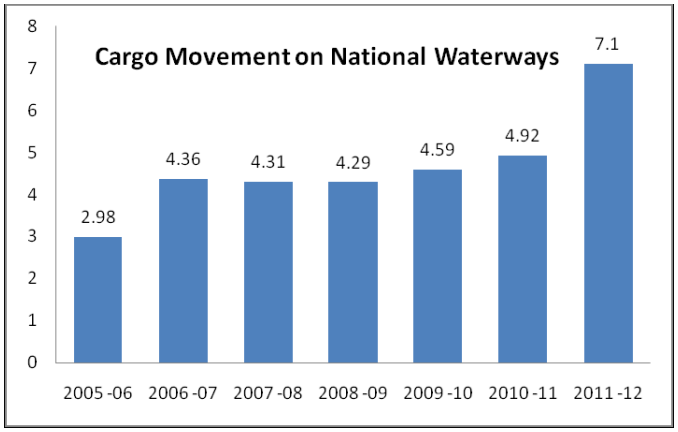
- Haldia
- Howrah
- Kolkata
- Bhagalpur
- Patna
- Ghazipur
- Varanasi
- Allahabad

It has a total cargo movement of 4 million tonnes and was declared as a waterway in October 1986. It is navigable by mechanical boat up to Patna.

National Waterway 2

National Waterway 2 (NW-2) is a section of the Brahmaputra River having a length of 891 km between the Bangladesh border andSadiya. It was declared as National Waterway No. 2 on 1 September, 1988.

It has total navigable length of 891 km with fixed terminal at Pandu and floating terminals at Dhubri, Jogighopa, Tezpur, Silghat, Dibrugarh, Jamuguri, Bogibil, Saikhowa and Sadiya. It has a total cargo movement of 2 million tonnes.



National Waterway 3

The **West Coast Canal** or **National Waterway No 3** is a 168-km stretch of this inland navigational route located in Kerala, India and runs from Kollam to Kottapuram and was declared a National Waterway in 1993. It has total length of 205 km. It is the first National Waterway in the country with 24-hour navigation facilities along the entire stretch. It has been extended to Kozhikodeas per National Waterways Bill, 2015. It has a cargo movement of 1 million tonne.

National Waterway 4

NW-4 connects Kakinada to Pondicherry through Canals, Tank and River Godavari along with Krishna River.

National Waterway 5

NW-5 connects Orissa to West Bengal using the stretch on Brahmani River, East Coast Canal, Matai River and Mahanadi River Delta.

National Waterway 6

NW-6 It is the proposed waterway in Assam state and will connect Lakhipur to Bhanga in river Barak.

Parliament has passed a crucial bill to declare 111 rivers across the country into National Waterways. Govt. will harness the country's 50,000 km of sea and river fronts as waterways. It will use innovative ways to raise around Rs. 70,000 crore to develop these stretches in the first phase. The bill paves the way for development of these stretches as transport carriers.

CHALLENGES IN INDIA

A. Technical Challenges
Lack of adequate navigation infrastructure is one of the many challenges faced by this sector .
1) Inadequate depth
Large parts of Indian waterways do not have sufficient depth for commercial movement of cargo. Sufficient depth is required to enable navigability of larger vessels, required to make inland water transport system as commercial viable through economies of scale.

2) Inadequate air draft
Bridges with low vertical clearance obstruct the passage of bigger inland water transport vessels on waterways such as National waterways No.3. There are several navigable canals in the states of Uttar Pradesh, Bihar, West Bengal, Tamil Nadu and Andhra Pradesh: Sarada canal, Ganga Canal, Yamuna Canal, the delta canal systems of the Krishna, Godavari, Mahanadi and Brahamani. But these waterways cannot be utilised for cargo movement due to air draft restriction.

3) Shortage of IWT Vessels
Vessel building is highly capital intensive and faces hurdles in obtaining project finance from banks and financial institutions. The private sector is not willing to invest in barges unless long term cargo commitments for onward return trips are made from user industries.

4) Lack of Terminals
Including those with inter-modal connectivity on inland waterways inhibit door to door connectivity to end user.

5) Lack of night navigation infrastructures
Lack of Night navigation facilities such as DGPS and RIS. Lack of availability of waterway channels round the year coupled

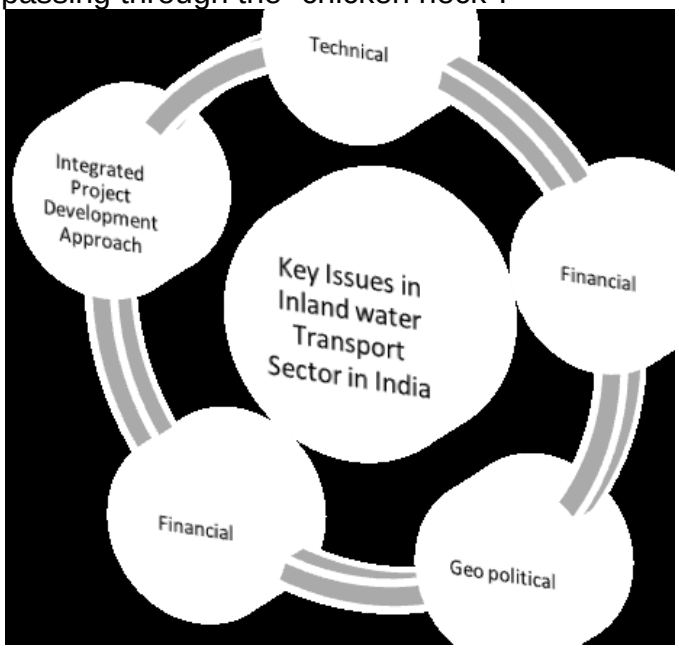
with rudimentary infrastructure with night navigational facilities and markings are also one of the major impediments in the successful operations in waterways.

6) Shortage of MRO Facilities

There is a severe shortage of MRO (Maintenance, Repair and overhaul) facilities for inland water transport vessels which further hampers the development of inland waterways transport system.

7) Inter Linking of Rivers

The river inter-linking projects are ensuring to use as waterways for navigation. The Inland water transport has a strategic importance for connectivity of north eastern regions which do not have very efficient connectivity due to its geographical position and rail/road transport passing through the “chicken neck“.



B. Financial Challenges

1) Investments by Governments

There has been under investment in inland water transport sector infrastructure as compared to investments in road and rail. While considerable emphasis has been laid on development of road and rail infrastructure, inland water transport sector has been neglected. Consequently, public investments in inland water transport mode have been far below than the levels attained by other modes.

2) Investments by Private

As a policy measure the possibility of private sector participation for the development, maintenance and regulation of some stretches of the inland waterways can be explored similar to other transport sector like road and metro rail.

3) Capacity building

There is huge demand for trained labour force for vessel operations as well as for development and management of inland water transport infrastructure since the limited resource in training and research & development for inland water transport there is need of potential investment in training and research.

OUR SUGGESTION AND THEIR BENEFITS

- Inland ports :-Many seaports have limited availability of land for expansion leading to a search for lower value locations supporting less intensive freight activities, such as transloading. A supply chain system that includes inland ports increases the inter-modal capacity for inland freight distribution. The additional capacity allows for off-site storage.**Consolidation of import and distribution functions in one location.** Rail travelling to and from an inland port uses less fuel than trucks. Among the first and largest users of inland ports, are major retailers and importers such as Walmart and Home Depot. Many of these logistics giants’ money is aved by consolidating multiple distribution centers into smaller hubs situated at

inland ports with adequate logistics capacity.

- Transportation connectivity :-Through long distance transport corridors, inland ports confer a higher level of accessibility because of lower distribution costs and improved capacity. These high-capacity inland transport corridors allow ports to penetrate the local hinterland of competing ports and thus to extend their cargo base. In such a setting, the inland port becomes a commercial and trade development tools that jointly increase imports, exports and intermodal terminal use.

- Interlinking of rivers :-As availability of water to drought area like Marathwada in maharashtra,Indira canal in Rajasthan Inland waterway transportation-raw material n labourtraportation will make easier due to interlinking project water for Domestic and industrial use-Polavaram project in Andhra Pradesh under pattiseema plan Agriculture mostly depends on irregular monsoon so that it will help to large no of farmers. reduce over flooding in north India connecting people northern and eastern rivers receive water in monsoon season when southern rivers go dry; interlinking will be progressive step in dealing with water scarcity.
  4. Interlinking will also help generating employment for nearby localites. Ultimately would help reducing poverty and unemployment.
  5. By this mechanism ,govt would also help minimising property loss due to floods in ganga-brahamputra region .
  Inspite of all these growth catalysing benefits ,river interlinking has drawn attention of environment scientists and civil societies negatively-
  It is said that rivers change their natural course after approximate 100 years ,so project cost benefit is less in long term.

- Increment of usable coastline :- The major part India is surrounded by Indian Ocean and Arabian Sea, therefore we can export the goods more efficiently and economically if we increase usable coastline.

Port-led industrial development :-**Sagar Mala project** is a strategic and customer-oriented initiative by the Government of India to modernize India's Ports so that port-led development can be augmented and coastlines can be developed to contribute in India's economic growth. It looks towards "transforming the existing Ports into modern world class Ports and integrate the development of the Ports, the Industrial clusters and hinterland and efficient evacuation systems through road, rail, inland and coastal waterways resulting in Ports becoming the drivers of economic activity in coastal areas". Main objective of the programme is to boost the competitiveness of the export sector by

cutting back the cost of logistics.Calculating logistics costs as a percentage of GDP is never a straightforward task in emerging markets, particularly those as large and unevenly developed as India. Global consulting firm McKinsey & Company estimates average logistics costs at around 14% of GDP but others, including the minister for shipping, NitinGadkari, put the figure as high as 18%. This compares with about 7% to 9% in developed economies.

WHY IT IS A TOUGH CALL?

Cargo movement

The viability of goods movement using IWT is to be analyzed from the perspectives of technological and physical viability, commercial potential and operating policy of carriers and associated agencies

It is clear from aggregate statistics that the sector has been growing very slowly in the National Waterways and other major waterways. The glaring exception is the tidal river-canal system in Goa, which saw unprecedented growth and where some 30 million tons of iron ore moved by barges on the Mandovi-Zuari-Cumbarjua system in 2003-04 In the rest of the document, we examine the technological and physical viability, followed by the traffic potential, and finally the economics of IWT.

4. Technological and physical viability

Water flow: The basic requirement for water based transport is the availability of water flow. In the main waterways, this may have decreased over the years because of increased usage arising from habitation, industrial and agricultural needs. The decrease in regular flow can also be seen because of the impact of dams on river streams.

5. Commercial potential .

Geographical advantage of water bridging: This is strongest when the movement is across the river, but can be present in some other movements. Examples of these are passenger ferry services across rivers and transport in the Sundarbans areas in India and Bangladesh.

***Large customers with regular demands*:**

Existing traffic: By far the biggest example here is the iron ore export requirement from mines in north and south Goa, which access the Mandovi and Zuari rivers.

Potential traffic:

Oil refineries in the north east: Numaligarh, Dibrugarh and Digboi.

Oil refineries elsewhere on river bank locations such as Haldia and Barauni.

Thermal power plants, for bringing in coal and carrying away fly-ash at locations like Barh and Bandel.

6. Operational viability

Costs: IWT is a capital intensive industry, even for operators, as significant investment is required in vessels, for a start. Investments required to provide and maintain the waterway and terminals are of higher scale and come under the heading of infrastructure. In today's environment, it is only IWAI which can maintain the waterway and a few large customers (e.g. project based shippers and bulk manufacturers like refineries and steel plants) who can participate in investments for terminals.

Operating costs can be categorized as below.

- Vehicle costs
- Fuel costs
- Crew costs
- Maintenance costs
- Loading Unloading costs

Fleet planning: Barge operations heavily rely on economies of scale in movement, as fixed costs of the vessel (barge) and crew are quite high. The trade offs here are as follows: Larger barges have more draft and require a larger water depth, but have less operating costs. For customers, the lower

freight costs are offset by higher inventory staging costs. The barge size is also limited by the throughput consideration, as large barges may have operating restrictions and small barges may cause too much congestion in handling the required traffic

OVERALL BENFITS OF INLAND WATERWAYS IN FUTURE

Travel time vis-a-vis the alternate land based route: While time by land routes is generally reducing, with more and more bridges being constructed, it is still sometimes quite viable and direct to have ferry based services in many parts. Faster ferries and launches are a way to encourage traffic on this node.

Cost: For passengers, the typical costs of ferry, while not high, have to be added to the costs of the subsequent mode of transport which may have to be used to achieve the end to end requirement of transport.

Interchange convenience: In the Cochin metro area suggests that IWT will play an important role in the future growth of the city and calls for integrated investments to increase complementarily with other modes, faster vessels, unified pricing, ticketing and targeted subsidies in the area.

Carriage of vehicles (preferably in the roll-on-roll-off mode): West Bengal, Kerala and Goa have significant number of these ferry services, but there is scope for much more, with faster boats, proper landing facilities and interchange with other modes.

Tourism, including stay and entertainment: This is a growing activity with economic potential. In Kerala, Alappuzha and to a smaller extent, Kozhikode arecentres of this activity, especially for houseboats. Boats that provide music and dining are becoming increasingly common in Mumbai, Goa and Kochi.

Water sports: This is a new sector that has some possibilities in the rivers in North and East India. White water rafting and trekking on iced mountainous stretches of river.

CONCLUSION

Since the concept of Inland and Coastal shipping has shown marvelous results in past few years so we can rely on it to give the best result in coming days. The government has to take strong actions to improve condition waterway transportation in the country to get long term benefits. So we conclude with saying that India has huge scope for water transport with a large part of it covering the Indian Ocean and so many rivers in the mainland. Water transport can help increase trade a lot, increase Job opportunities and GDP of the country, therefore, it should be used to its full potential so that it can play a role in making India a developed country in upcoming bright future of nation.