Integration of Inland Water Transport into the Multimodal National Transportation Grid for Economic Development of India

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Abstract: Inland Water Transport sector has greater economic cost benefits advantage comparing to any other modes of transports. The strategic Integration of IWT multimodal transportation system into the national transportation frameworks helps country into the building resourceful logistics networks for promoting economic trades of coastal & inland trades. India has geographical advantages to encourage IWT sector due to the presence of 14500 Km navigable rivers and these perennial rivers were emerging as logistics corridors for economic trades in India

Introduction: Multimodal transportation has played imperative role in the economic development of country that underpins for the improvements of economic trades, business and exchange in the country. The expert reflection articulates that most of the economic advanced countries have already rationalized their transportation infrastructure with IWT and deliberately they have reduced expenditure on their national logistics costs, which leads to shrink down the total budgeted share of expenditure on transportation. In frugality this may be the cause of prominently rise of their national savings. The association of logistics spectacles with economic transportation system were treated as backbone of economy, free flow of the cargo since numerous origination to destinations integrates several markets and abridge the economic trades within regions.

Multimodal transportation system with amalgamation of IWT model of transport flairs the transportation operations by using the two or additional different means of transport facility. The stakeholders of country and multimodal transport operators organizes the full transport actions by taking full accountability of shipments. The Inland Water Transportation expedite international trades within economic carriage costs and aids to established business associations by enabling the goods carriage within the economic cost & calendars. The economic multimodality of IWT multimodal transportation system assimilate various transport modes to offers door to door services and improve overall transport efficiency.

Inland water transportation arrangements propositions several economic benefits by enhancing trade competitiveness by reducing logistics costs, it has always be a cost effective mode of transportation designed for voluminous cargos, the major additional benefits with water transport mode is environmental benefits which reduces emission of Co2 gases, which rejuvenate the river flows, various river conservancy works also restore the ecological balances. IWT sector helps to resolve many social issues alone IWT sector May creates many thousands of direct and indirect employment opportunities in India

Inland waterways has emphasizes for economic development and offers regional connectivity with rural and coastal areas, it establishes connections of rural Areas with urban places such as Market, Industrial clusters, SEZ and urban cities etc.
Geographically India rich country in terms of numbers of rivers and most of its rivers having availability of sufficient water throughout the years hence it can be easily utilized for navigations. The existing policies, laws and regulations of the government has given special focus on development of Inland Water Transport sector.

National Waterways – 1 (Ganga-Bhagirathi –Hooghly river system) with their initiative of Jal Marg Vikas Project, a flagship of schemes under Sagarmala programs government has initiated theme of port led development of economy and focus to utilize existing the potential of Indian rivers in transportations of freight. These initiatives modernization the existing ports of India to cater future transport requirements. The proposal for constructions of necessary infrastructure on the National Waterways leads to increase the volume of International trades.

Literature Review: Logistics sector of India estimated to be worth of around $160 billion and expected to achieve the growth of $ 215 billion by FY 2020 in this regard the government has speeded their wings by improving investment supports in the logistics sectors. The more emphasis was given to the development of key transport infrastructure for improving efficiency of total supply chain management where IWT sector is one of them.

The Sagarmala program may help in doubling the share of Indian shipping sector and Increase the contribution of logistics services in the evaluation of countries economy, Mixed Model of compressive shipping policy optimizes country maritime assets with emphasizing focus on the development of major coastal ports and augmenting of Indian river for transportation, these infrastructure strategically creating maritime linkages and promotes port led development by setting up industrial cluster, logistics parks and manufacturing hubs along the river hinterlands and coastal plains.

The present road and railways infrastructure in India are about to saturate and they have heavy congestion which causes for rising total logistics cost and Increase thrust for searching economical logistics solutions. Thus created needed for development of river transportation corridors in the form of National Waterways, these river water transport corridor helps in promoting economic activity and generates various employment opportunity.

Regulation reforms of transportation policies in significant time bound that boost the core competencies of Indian logistics Industry and Ports, Implementation of one nation one tax policy (GST) have relaxed taxation norms and become game changer for Indian Logistics sector.

Government of India has already laid the foundations for development of IWT multimodal transportation infrastructure where these IWT infrastructure will be associated with logistics parks and special economic zones.

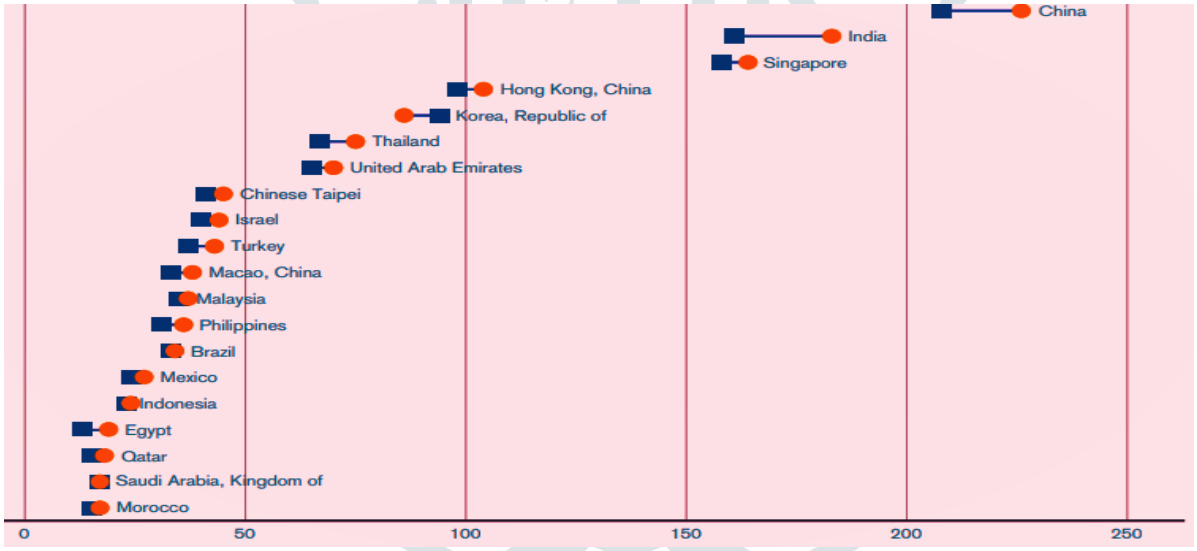
India is the world largest bigger consumption market and there are regular demand of transport to cater the needs of trades volumes, improved transportation infrastructure of IWT mode facilitates trade relations and various economic co-operations among neighboring countries of India, emergence of consumption led Indian economy it assumed that productivity of logistics sector needed to be streamlined by Implementing electronic data interchange, this targeted to achieve transport goals with IWT integrations.

Contrast of various modes of transportation systems:

Roadways	***Railways***

- *Enhanced connectivity* - *Door to Door transportation facility* - *Well-matched for smaller distances* - *Higher emission of carbon footprint* - *Accidents and hazards* - *Higher Transportation costs*	- *Offers maximum payloads for inland transportation* - *Moderate Co2 emission* - *Schedule Services, established and reliable transport mode* - *Moderate transportation cost*
Inland Waterways	***Airways***
- Environmental friendly mode of transport - Reliable and Cost effective mode of transport - Reduced emission of greenhouses gases and lesser fuel consumption - Ease congestions on road and rail links	- Fastest mode of transport - Higher Transportation cost - *Best for transportation of light weight and high valued cargo* - *Better mobility and availability of worldwide services.* - *Reliable and secure mode of transport* - *Freight were highest among all other modes of transports.*

According to the report of world trade statistical review 2018 India is second largest developing economies after china among developing economies



(WTO Website: www.wto.org)

India is the fastest growing economy in the world and poised quantum jump in the economic growth of the county, nation has created appropriate environment for growth of multiple investment opportunities, presently our country ranked second in position of largest economy by Purchasing Power Parity (PPP) and secured eleventh position on the basis of nominal Gross Domestic Productions (GDP), it is the home of more than 1.25 billion of peoples, as per the census of 2011 the median age of Indians are 30 years, that makes our country most younger in the World. The Indian government has also acknowledge the power of youths and started generating largest pool of skilled manpower through the scheme of skilling India and extended various reformations such as digital India for implementing tax policies that ranked our country as 2nd position among all other developing economies worldwide. The development of riverine ports directly linked with creations of job opportunities for Indian youths, the country has boosts industrial development by increasing investments in setting up new industrial cluster which leads to rise in the Indian export volume and results to reflecting the form of improvement of the economy

Important Economic drivers for IWT developments in India:

Being fastest growing major economy in the world with expected GDP growth rate for 7% - 8 % and as per UNCTAD India is the 4th most attractive FDI destination in the world, over last decade the seaborne trade of India was increased by 3.3% that is the twice to the double growth rate of the world trade. The India's maritime container trades are also grown by the 6.5% which was again higher with the worlds average of 5.4% over the past 10 years (FY 2005 – 2015), the export sector India has also recorded the world fastest growths hence it is expected that India will be on number one exporter by FY 2050 and all economic development parameters leading for rising of international trades in which sea shipping and Inland transportations will play critical roles.

Geographical advantages for India to develop National Waterways for IWT:

- India has presence of Longest Coast line of 7500 Km for facilitating inland vessel navigations
- 13 states of India has got the advantages for setting up of the maritime transportation infrastructure
- India has presence of 14500 Km of navigable Inland Waterways and total 111 Indian rivers are declared as National Waterways by the government
- India's 95 % of trade freight passes through the sea route
- Huge untapped potential for use of Inland Waterways and Costal Shipping for transportation of Cargo need to be achieved
- India has significant destinations for promotions of costal tourism on the hinterlands of National Waterways and approximate 13 million of cruise tourist ridership are recorded and 12 river basin in India that offers the scope for development of river cruise tourism.

Governing of Indian trade and logistics performance:

The International LPI ranks are prepared in combinations with six dimension to benchmark and compares the logistics performance of 160 countries worldwide. The major six dimensions of weighted score identifies rank of country, various parameters such as efficiency of custom clearance process, quality of trade and transport related infrastructure, ease of shipment, quality of logistics services, ability of tracking of the consignment and timely delivery of shipment etc. are the weighted sore parameters in defining logistics performance of the countries.
The logistics performance index was released by the World Bank, the interactive tool for the countries in identify various challenges and opportunities to be faced for performing trade and logistics, recently the World Bank group has released LPI index where 160 countries are listed and the countries are ranked according to their weighted logistics performance scores. Given below table recorded LPI score of India for last previous 10 years.

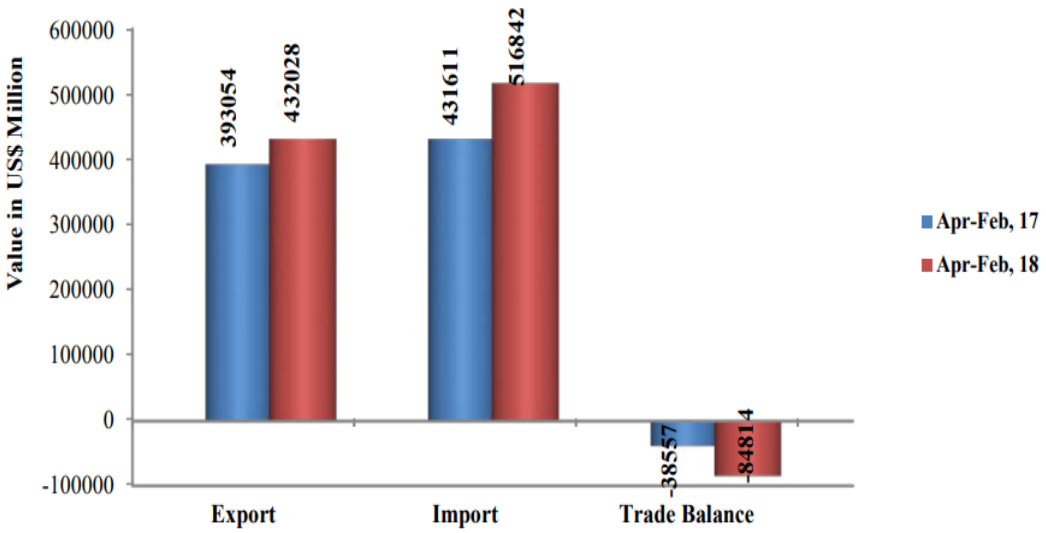
Global Logistics Performance Index of India among the global listed 160 countries worldwide.

Year	LPI Rank	Custom	Logistics Infrastructure	International	Logistics Compete	Tracking and	Timeliness Score

		Score	Score	Shipments Score	nce Score	Tracing Score	
2018	44th Rank	2.96	2.91	3.21	3.13	3.32	3.35
2016	35th Rank	3.17	3.34	3.36	3.39	3.52	3.74
2014	54th Rank	2.72	2.88	3.20	3.03	3.11	3.51
2012	46th Rank	2.77	2.87	2.98	3.14	3.09	3.58
2010	47th Rank	2.70	2.91	3.13	3.16	3.14	3.61
2007	39th Rank	2.69	2.90	3.08	3.27	3.03	3.47
Remarks: The score lies in between 1to 5, where 1 is lowest score and 5 is considered as highest scores)							
Source of data: World Bank Group (https://lpi.worldbank.org/international/global)							

India has achieved 44th rank as per 2018 LPI but in comparison with previous years rankings India's LPI rank was dropped by 9th points, previously India has scored 35th rank and in the year 2016 and now in the year 2018 rank India was slipped down to 44th position. The Government initiatives of Sagarmala "Port led development" definitely improve the LPI scores of India in coming years where development of riverine transport definitely enhance all parameters of Logistics Performance Index of India and in near future Inland Water Transportation sector of India will play major roles in reducing total logistics cost of trades and helps to improve Global LPI.

India's Overall Trade Performance from April to February for 2017 and 2018



(Source: Ministry of commerce and industry monthly bulletin issue April 2018)

The trade performance of India of previous last two years has shown positive growth of 9.92% of export and the total value of import was registered positive growth of 19.75 % in imports, overall the trade deficit of country was increased over the previous years.

If we analyses above graph of trade performances for India we can draw conclusions that country has recorded rising trading tends of approximate 14.5% in the country over the previous years in cumulative average of trades.

Hence continues record of positive growth pattern in the export and import volume the appropriate logistics facility needed to be developed in India and the government is developing the major ports and national waterways for improving the logistics performance of the country.

India has promoted various schemes for development of start-ups within the country over the period of time all the start-ups will become matured and start contributing to the economy of the county and in coming time the demand of trade and transport will be increased, hence development of effective logistics are essentially required to be developed in the India.

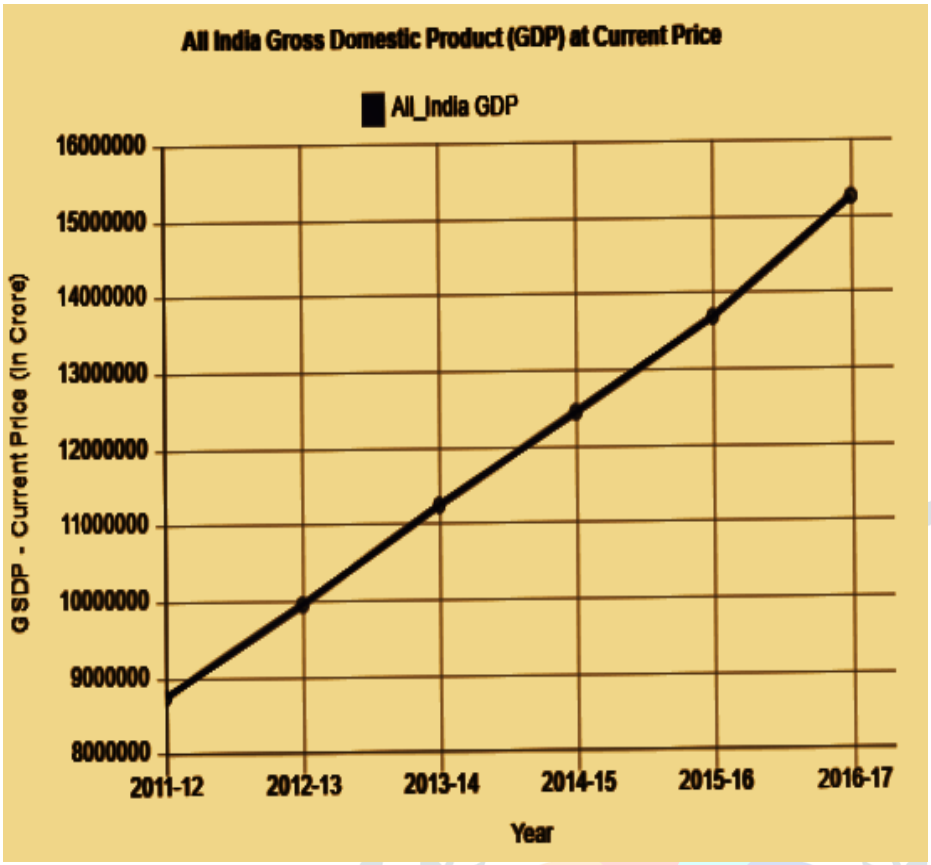
Capacity on Major Indian Ports Providing Logistics Support for Facilitation of Trades:

Port	Capacity (IN MMT) - 2011-12	Capacity (IN MMT) - 2012-13	Capacity (IN MMT) - 2013-14	Capacity (IN MMT) - 2014-15	Capacity (IN MMT) - 2015-16
Kolkata	17.14	17.14	17.44	21.1	21.1
Haldia	50.75	46.75	49.75	49.75	65.89
Paradip	80.3	102.3	108.8	119.8	126.94
Vizag	66.33	67.33	88.92	96.76	107.75
KPL	31	31	31	37	45
Chennai	83.19	85.59	86.04	86.04	93.44
VOC	33.34	33.34	42.06	44.55	59.26
Cochin	41.86	44.66	49.66	49.66	49.66
New mangalore	50.97	76.77	77.77	77.77	77.77
Mormugao	41.9	36.4	36.65	43.76	48.79
Mumbai	44.53	44.53	44.53	44.53	49.33
JNPT	64	65.88	65.88	79.37	89.37
Kandla	91.22	93.22	102.32	121.43	131.06
Total	696.53	744.91	800.52	871.52	965.36
Source of data: www.data.gov.in					

It has been observed that all major ports are continuously developing their cargo handling capacity to meet up the freight transfer demands.
India being developing economy the government has emphasis on policy to increase share of FDI almost every sectors of the country has results in continuous improvement in the GDP since last 10 years and overall country has achieved the positive growth of foreign trades.

The major Indian ports are regularly reviving their infrastructure to increase their throughput to facilitate increased foreign trades, modernized cargo handling capacity at Indian major ports mends port operations efficiency and reduces D-Well time for vessels doing such will helps ship owners to facilitate trades within greater economic millage.

Constant rise of India Gross Domestic Product at Current Price Since 2011 - 2017



Source of data: www.data.gov.in

As per the central statistics data the GDP of India at current market price is constantly at rising pace and it symbolizes India's trade, business and commercial activity in India is growing persistently, the recorded for sustainable increase in the total volume of trades for goods and services in the economy. Till the time 95 percent of foreign trade volume of India moved through maritime sectors which includes ports, shipping, shipbuilding, ship repair and Inland Waterways etc. The recent government has opened doors of many private parties for their participation into the logistics sectors of an economy. The major port traffics of India are regularly increasing of approximate 15% constant growth year by year since last 10 years of record, hence steadily handling of cargo capacity are required for future. Inland Waterways sector is now started developing as alternative mode of transportation which offers better fuel efficiency, environmental friendly mode of transportation and offers seamless connectivity to the various hinterlands of NW-1. Inland Water Transport will also help for shifting the larger volumes of cargo from congested, saturated roadways and railways networks to waterways.

The Integration of Inland Water Transport is essentially required for India to keep constant pace in the traffic handling in terms of cargo transportations with Inland Vessels. India is the 3rd largest economy after China and Japan among the Asian countries and also increasing their annual average growth rate of GDP is 6.21 percent. The accelerated growth of Indian economy leads to rise in the Industrial growth within the country and naturally it leads to rise total gross production of Indian economy and in future nation has to deal with the higher degree of massive expansion of trade's volume by 2030
Republic government of India has taken key initiative for development of Multimodal IWT Terminal and augmenting its river networks as National Waterways which made significant investments for development of multiple industrial clusters, freight corridors

cargo aggregations centers and logistics hubs etc. This step of the central and state government for massive investment to build transportation infrastructure in the form of Inland Water Transport helps the economy of country to achieving in accelerated GDP growth and rise of International trades volume keep maintaining the quantum pace of the sustainable economic growth of India

Integration of Inland Waterways Transportation System as part of Logistics Strategy:

Indian government has already prepared their integrated transport grids for catering future traffics needs and union government has already recognized the potential of Indian rivers for utilizing as transport Infrastructure.

The government has started working on development of ports and national waterways in the country under the flagship program of Sagarmala – Port led development of the Indian economy. The major initiative has taken for development of Inland waterways, the Jal Marg Vikas Project developing river Ganga for transportation purposes. At present scenario the most of Inland waterways of India is under development hence it may not be viable options during the nascent stage but if we forecast the broader picture then we can see that India is already extended their arms for reduction of their national logistics costs form its transport expenditure budget. India has recognized own strength to harness the potential of trades and business and development of various ports and shipping infrastructure caters market demands.

Sagarmala initiative of the Government has already enhanced the Indian ports infrastructures and connects every ports with railways and highways networks also taken steps to reduce total d-well time of Indian ports by improving cargo handling infrastructure and eliminated various organizational inefficiencies port operations.

The custom clearances procedure were also speedup with use of EDI systems and various trade policies are liberalized for keeping the pace of development of Indian port economy. Country has also preparing its necessary transport infrastructure to carry out time bound freight movement with using inland waterways networks.

Pricing of goods in the market varied due to addition of transportation costs in it and use of inland water transport helps to reduce the inputs cost, this model mix of multimodal transportation reduces total market price of goods to many folds and make Indian goods as more competitive in the world.

Warehouses are complimentary services for transportation Industry, the goods are initially stored into the warehouses near the transport hubs and taken further to its destinations as per requirements, and the Indian government has initiated projects for development of multimodal logistics hubs near the hinterlands of National Waterways ports.

The logistics hubs near the riverine port facilitates shippers in many ways, they store their goods near ports and easily caters to the markets, the development of warehouses optimally improve the whole supply chain process.

Container transportation through National Waterways reduced significant d-well times hence Indian government has also introduced container handling facility along the national waterways, the union government has framed central logistics development council which comprises of members from various ministries, industry representatives, financial institutions and academic institutions etc. the main aims of this council is to promote logistics & transport of India for gaining the economic Incentive.

Development of Inland Water Transport for Cost Cutting Theme

Inland water transportation is always cost effective mode of transport comparing with roadways and railways and in coming future of 2031 to 2040 the Indian ports has to handle the more than five times of the cargo then the presently handling. Majorly there will be more in demand for transportation of coal, crude oils, machinery and containers etc.

The development of riverine ports on the national waterways will be national strategic move with the visions to establish the mega ports to accommodate the larger volumes of cargo ships. The IWT framework for multimodal transportation will strategically reduce the cost of transport. India is promoting transport policies for costal movements under the Inland Water Transport however the costal shipping of bulk commodities will reduce transport cost and huge costal lines will handling the logistics traffic.

The cost of transportation of the goods with waterways the per-tons-per kilometer cost is lesser than roadways and railways, IWT incentivized with reduce fuel consumptions with lesser maintenance costs as compare the any other mode of transports.

Inland water transport is economical, cost effective and environment friendly mode of transport options which reduces overall logistics performance of India and offers comparative cost advantage

Transport Modes	***Transport cost per tons per Kilometres***
Railways	INR 1.41per tonne per kilometres
Roadways	INR 2.58 per tonne per kilometres
Inland Waterways	INR 1.06 per tonne per kilometres
Source: Press Information Bureau, Government of India	

There are significant amount of cost savings could be possible with the use of IWT mode of transport and logistics performance index of country will be improved with help of development of IWT integrated National Transportation grid

Energy & Environmental Benefits of Inland Water Transport:

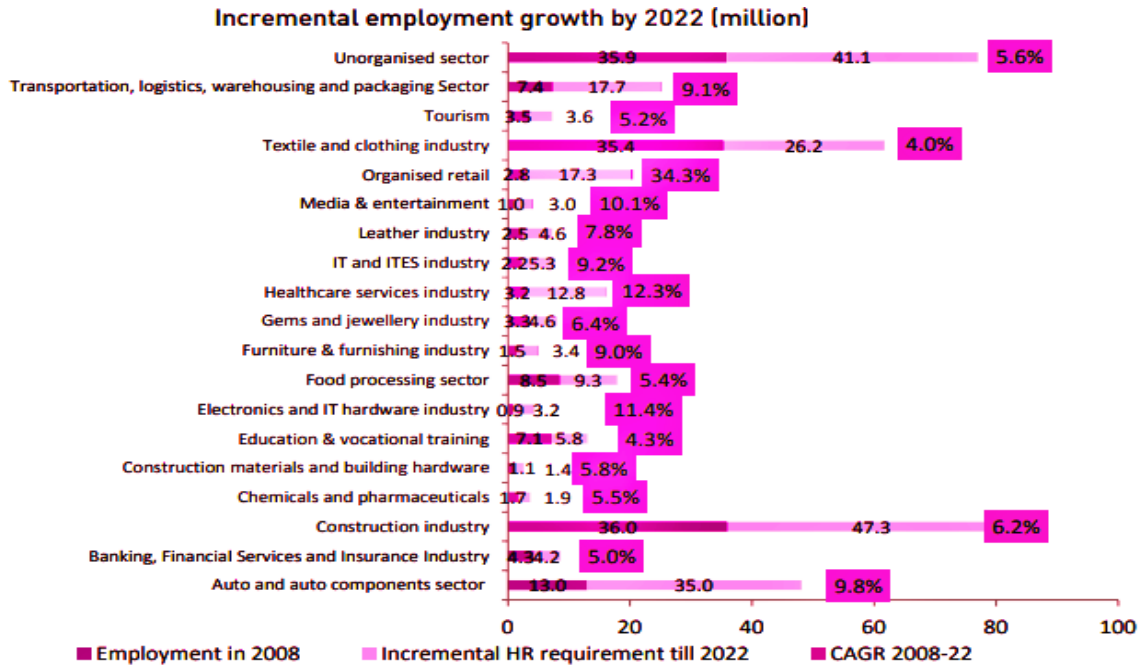
The Indian transportation system has much more rooms for developments and enforcements of regulations in preventing of environmental damages, it may shifts cargo from roadways, railways to waterways mode. This strategic shift of cargo fron other mode to IWT benefits our country for environmental cause.

Inland waterways Transport is energy efficient, safe, congestion free and silent transport mode. However due to longevity of engines used in the Inland vessels and follows strict emission standards norms which makes IWT as green transportation mode.

As in order to keep the pollution under control the government has initiated promoting green IWT carrier by designing LNG fuel vessels, Ethanol and Methanol biofuels, and electric propulsion vessels etc.

Socio-Economic befits of developing logistics sector with Inland Waterways Transport:

As per the report of Indian Brand Equity Foundations the logistics & transportation sector is one of the major job creator among 20 high growth sectors, Logistics sector alone having potential to provide 9.1 % employment opportunity in future by FY 2020



Source: IMaCS study

The above mentioned claimed figure in reports clearly represents that transportation, logistics, warehousing and packaging sector has an ability of providing 9.1% of Incremental jobs by FY 2020 in India

Indian government has already initiated their footsteps towards development of Indian Logistics sectors by declaring total 111 rivers, canals and creeks of India as a National waterways, whereas development on National Waterways 1 is taken on priority by implementing Jal Marg Vikas Project and in future other National Waterways may be developed based on same patterns.

Conclusion:

Inland Waterways has several economic advantages that provides various economic rents in the form of lower capital intensive project & eco-friendly mode of transportation, minimum land acquisition for building necessary port infrastructure on river for transportation purposes etc.

IWT sector are alternative mode of transport which provides complementary solution in multi modal transport and also helps in decongesting existing roads and railways networks. In various developed countries significant percentage of cargo volume are transported through Inland Water Transport modes, presently India is transporting approximate 1% of their total cargo with IWT mode comparing to the another modes.

The Indian Maritime Agenda 2020 would be catalyst for growth for IWT sector, India is planning to invest more than of 5000 cores for development of IWT sector and adding more of Public and Private sectors for using IWT modes. JINDAL ITF coal transportation arrangements for NTPC Farakka power plant is just beginning of the entry for private sector into the IWT.

Various other commodities are identified for transporting on Indian rivers such as Coal for power sectors, fertilizers for agriculture, over dimensional cargo for new projects,

Machinery parts for Industries, automobiles, wooden blocks, fly ash, cement, natural aggregates and food products etc.

In future IWT sector will develop the capacity for handing containers on National Waterways and advanced low draft vessel may play effectively on rivers with suiting container transportation requirements.

The shown interest of private parties and public sector enterprises lead to develop long term commitment for development of Inland Water Transport sector in India and integration of IWT sector into the national multimodal transport grid enhance the logistics performance of the country.

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