



## Sustainable Inland Ports in Nigeria: An Opportunity for Growth of Nigerian Nation

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**ABSTRACT:** This paper discusses the factors that militate against the growth and sustainability of the Nigerian Inland waterway ports from secondary data and inductive research perspective. The Nigerian nation has adequate coverage of major inland waters that are either navigable at present or potentially navigable if a waterway clearing and dredging is implemented. Generally speaking, Nigeria has enormous inland water potential that is capable of maximally reducing the pressure on other modes of transportation especially road, in the transportation of heavy equipment and bulk goods both solid and liquid. Sustainable Inland waterway ports and transportation are undoubtedly a panacea for job creation and promotion of commerce at local and riverine community levels through boat building, fabrication, and transport.

DOI: <https://dx.doi.org/10.4314/jasem.v27i5.12>

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**Cite this paper as:** OSUJI, J. N; AGBAKWURU, J (2023). Sustainable Inland Ports in Nigeria: An Opportunity for Growth of Nigerian Nation. *J. Appl. Sci. Environ. Manage.* 27 (5) 965-973

**Dates:** Received: 17 February 2023; Revised: 08 April 2023; Accepted: 16 April 2023  
Published: 31 May 2023

**Keywords:** Sustainable; Inland Waterways Ports; Opportunity; Growth

Water transportation is vital in moving goods, services, and people from one coastal point to another globally (Ibama *et al.*, 2015). The main tool for both economic and social development in any country is the port because of its industrial and commercial developmental prowess (Arbia and Sami, 2017). Ports are entirely regarded as an area connecting waterways which are attached to an ocean, river, or sea with the required infrastructure and professional provisions which serve as an intermodal transport node link (Ivan *et al.*, 2013). The location of the port of entry was originally between countries both coastal and land borders (Sara and Robert, 2001). Ports contribute to the socioeconomic development of host communities as it is the bedrock of the maritime supply chain (Hossain *et al.*, 2021). However, ports are rated and classified based on features and operational requirements. Ibama *et al.* (2015), proposed Deep-water Seaports, River ports, Harbor, Jetty or Wharf, Port terminals, offshore terminals, and canals as types of ports in their study. Although River ports, canals, or

lakes are referred to as inland waterways ports, they may not necessarily be linked to the sea due to their location in the inland waterway. Currently, Nigeria has six major ports which include Apapa Port (seaport), Tin Can Island Port (seaport), Warri Port (coastal port), Port-Harcourt Port (coastal port), Calabar Port (coastal port), and Lekki deep seaport that just started operation in July 2022. To provide certain port services, such as terminal operations or nautical services (such as pilotage and towage), a government or port authority will give a port concession to a private operator. However, the port concession has improved the nation's maritime sector efficiency and effectiveness by lowering operating expenses, vessel turnaround times, and port congestion. Furthermore, it is observed that the nation's ports still under-perform due to insufficient deep seaports, inefficient cargo inspection methods; poor means of cargo evacuation, congestion, and insecurity are the major reasons why Nigeria's seaports have not been performing optimally (Amaka, 2021). Therefore, the objective of this paper

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is to determine the factors that militate against the sustainability of the Nigerian Inland waterways ports which is a panacea for economic growth and development.

**MATERIALS AND METHODS**

The paper is a quantitative review of secondary data acquired from the National Inland Waterways Authority and Nigeria Port Authority, published journals, newspapers, and other sources of data. An inductive research method is used in other to compare and ascertain other countries with matured inland waterways ports with what is presently obtainable in Nigeria.

**RESULTS AND DISCUSSIONS**

Figure 1 is a map of Nigeria showing the highly connected inland water that can be harnessed for national development. Figure 4 is a presentation of the possible locations of inland ports in Nigeria based on navigable water or potentially navigable water per the 36 states of Nigeria. About seventy-four (74) inland ports were identified. Potentially navigable water means that the waterway can be cleared and dredged to support navigation or water transportation activities.



**Fig 1:** A highly connected inland water for Nigeria National Development. Source: (Ezenwaji et al., 2015) and (Taiwo et al., 2012)

Comparing figures 1 and 2, it is obvious based on the water network in the 36 states of the country that a lot needs to be done. And that indeed, inland ports can compete favorably with land transport and create huge opportunities in the maritime industry in Nigeria. The following points are noted as other concerns that must be sorted out to ensure sustainable inland port development.



**Fig 2:** Seventy-four (74) sustainable inland ports suggested for Nigeria’s National Development. Source : (Umar et al., 2019)

*Agencies’ Conflict in Management of Nigeria Inland Waterways:* Conflicts of interest have been reported among the three notable maritime agencies of the Nigerian Maritime Administration and Safety Agency (NIMASA) and the Nigeria Ports Authority (NPA) and the National Inland Waterways Authority (NIWA) (Nwannekanma, 2022). These conflicts are majorly in the control of inland waterways activities such as wreck removal, infrastructural development, etc., and this has led to multiples taxation (Nwannekanma, 2022). Though, NIWA has recently made a submission to the National Assembly on the speedy amendment of the NIWA Act, which can help to handle the sister agencies’ conflicts and involvement of other levels of government in waterfront infrastructural development (<https://thenationonline.net/when-niwa-board-members-toured-rivers/>). To further eliminate conflicts among agencies in the maritime sector, it is suggested that all heads of Maritime Agencies meet monthly to look at issues of maritime security and safety and enforce the protocols to reduce the carnage on the nation’s waterways. In the U.S However, on a practical level, the management of the ports and waterways is largely divided among the multiple agencies with specific roles as illustrated in Table 1.

Comparing the conflict among maritime agencies in Nigeria and the operations of U.S maritime agencies, it is important to note that duplication of functions should be expunged from the act establishing them. The authors propose as follows:

- a. NIMASA should be unbonded to have Coast Guard Department for overseeing maritime law enforcement, port safety and security, and search and rescue.
- b. While NIWA collaborates with Nigeria Navy hydrological department with an attached department for the maintenance of all federal navigational channels within the inland waters
- c. And NPA handles all port-related operations both seaports and inland ports.
- d. NIMASA will still hold the class and non-class registration of all watercraft as well as a database of watercraft operating in the Nigeria territorial water and as well as inland waterways.

**Table 1:** U.S Agencies involved in waterways transportation and their functions. *Source: National Research Council (1996).*

Agencies	Function
National Oceanic and Atmospheric Administration (NOAA)	Maintenance of accurate nautical charts
U.S. Army Corps of Engineers (USACE)	Maintenance of federal navigation channels
The U.S. Coast Guard	Oversees maritime law enforcement, port safety and security, and search and rescue

*Lack of Private Sector Participation:* The private sector has not been fully involved in the Nigeria waterways revamping. However, the National Inland Waterways Authority (NIWA) signed MOU with the Sealink Consortium and the Nigeria Export-Import Bank (NEXIM) for harnessing the Nigeria Inland Waterways for regional economic facilitation among the ECOWAS (Economic Communities of West African State) subregion (Onyekwelu, 2019). Sealink Consortium is coming as an infrastructural bridge builder to promote bulk cargo through waterway operations for the hinterland, transit, and coastal trade with the capacity of making annual non-oil export revenue between \$ 500 million and \$ 1.2 billion. NEXIM is taking its place as a trade policy bank enhancing trade connectivity objectively with government diversification of the economy (Onyekwelu, 2019).

However, the essence of the grant is for the completion of the Bathymetric survey of the lower Niger- Benue River in collaboration with the Hydrological Department of the Nigerian Navy which when completed will lead to the Sealink project that will take advantage of African Countries Free Trade Agreement (AFEFITA) to facilitate regional transit through providing an alternative to road and rail transport with the capacity of moving bulk commodities through the inland waterways (NIWA Newsletter Issues 33.)

According to Jesutomi (2022), the bathymetric survey of the lower Niger and Benue Rivers is 50% completed as stated by the Nigerian Navy hydrographer during the 2022 hydrology day celebration? There is a need for NIWA and indeed the government to liberalize the inland waterways through the incorporation of the private sector. The United States of America is operating an economically sustainable inland waterways transportation which ferries over 60% of exported grain, 22% of domestic petroleum products, and 20% coal for electricity generation with 28,769.486 miles commercially viable and maintained by the government out of 12,000 miles with over 3,008 businesses and 24,908 employed and an annual turnover of \$8b (Eromosele 2022). Also, in India, the study indicates that in West Bengal and Assam, with 4,500 km and 2,000 km of navigable inland rivers, respectively in 2021–2022, cargo traffic on national rivers reached a new high of 108.8 million tons, growing by 30.1% from the previous year (<https://infra.economictimes.indiatimes.com/news/ports-shipping/ecosurvey-development-on-14-most-viable-inland-waterways-initiated/97486954>) While in Europe, inland rivers have a 40,000 km network that is clear of traffic congestion and transported more than 558 million tonnes in 2017 (Obeta, 2014). In comparison, Nigeria's seaports received a total of 4,298 and 72,358,342 vessels and commodities respectively in 2017 (Nigeria Port Authority website) as illustrated in Figures 4 and 5 respectively. The authors noted that the inland waterways ports are yet to tap into the huge inflow of vessels and cargoes in the Nigerian seaport to move cargoes to the hinterland and generate revenue for the nation. Figure 3 is an indication of Nigeria Seaports Vessel Traffic (2011 – 2021). Figure 4 is the Nigeria Sea Port container traffic from 2011 to 2021. Figure 5 shows the Seaport cargo throughout 2011-2021.

Furthermore, the public-private partnership policy of NIWA has led to the concession of the Onitsha River Port which is been targeted to generate N23bn in the next 30 years (<https://punchng.com/fg-eyes-n23bn-in-onitsha-river-port-concession/>). The concession will increase the revenue generation of the nation considering Onitsha and its neighboring environment are commercial centers that will promote trade not only among Nigerians but West Africa at large considering that Onitsha has the largest market in the West African Sub-region. With the concession of the river ports especially Onitsha more cargo will be moved off the roads thereby reducing pressure on the highways and the frequent accident on our roads. It will increase the revenue of the river ports and create the needed employment therefore reducing the unemployment level.

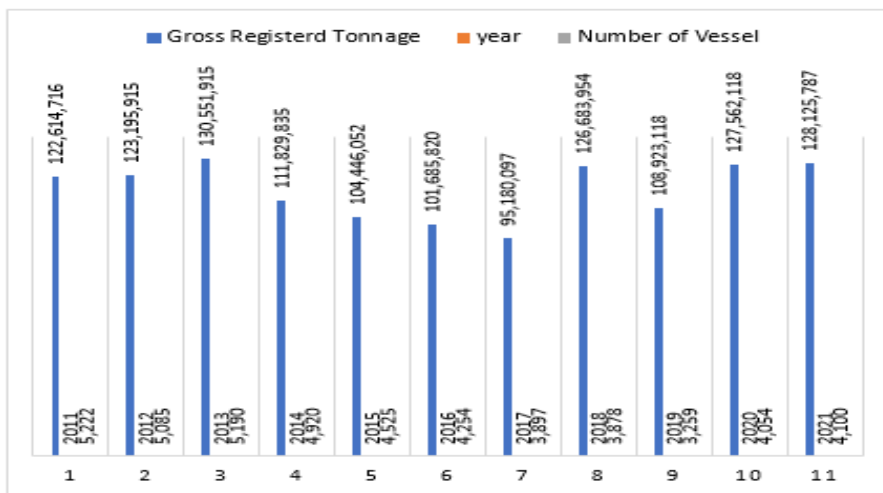


Fig 3: Nigeria Seaports Vessel Traffic (2011 – 2021). Source: Chat by authors adopted from (Nigeria Port Authority website)

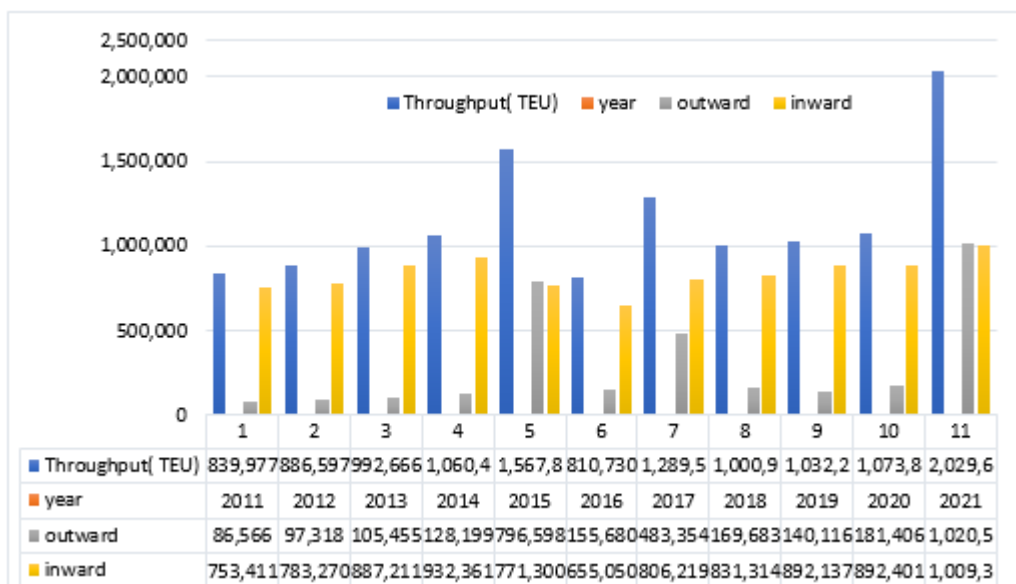


Fig 4: Nigeria Sea Port Container Traffic (2011 – 2021) Source: Chat by authors adopted from (Nigeria Port Authority website).

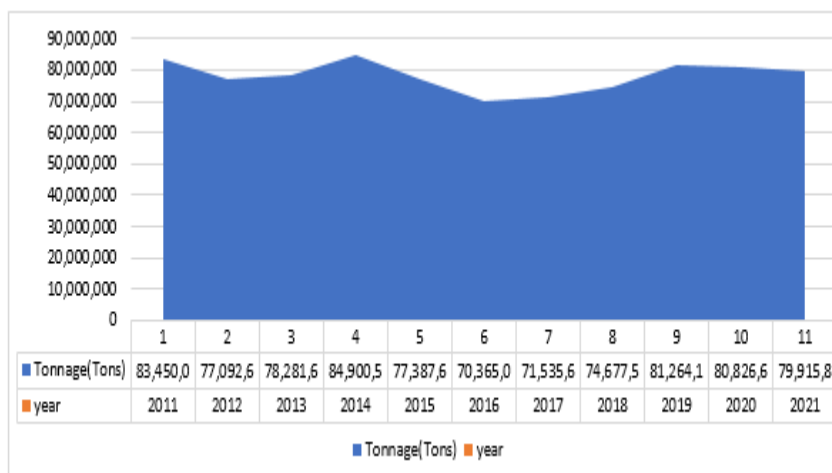


Fig 5: Nigeria Sea Port Cargo Throughput (2011 – 2021). Source: Chat by authors adopted from (Nigeria Port Authority website).

Since after concessioning, Onitsha River port received the first-ever cargo by the last quarter of 2022 as 22 trailer worth of ceramic tiles with a barge from a ceramic-producing company in Kogi state with a backload worth 27 trailers to Ajaokuta (<https://leadership.ng/niwa-begins-movement-of-cargoes-to-onitsha-river-port-with-badges/>).

*Poor implementation of the Cabotage Act:* The findings of Onwuegbuchunam *et al.*, (2020), acknowledged the non-achievement of shipbuilding in Nigeria which is one of the pillars of the cabotage act which states that vessels must be built in Nigeria by Nigerians. The lack of capacity to satisfy the shipping market was illustrated when an operator declared that bulk passenger boats that can carry up to 250 passengers are not available in the waterways (Nwannekanma, 2022). Cashing in 2 million passengers that use the Lagos inland waterways Kazeem, (2016), our local boat builders need to be encouraged with the required funds as enshrined in the Cabotage Act. This will go a long way to creating employment and generate revenue for the country.

*Government transport policy:* Government policy is to integrate private sector participation in the inland waterways transportation. However, this can be achieved if government promotes a pricing policy that will drift traffic to inland waterways, and eliminate the physical constraints to navigation on the inland waterways. It extends to, NIWA restructuring to be financially viable instead of large dependency on government grants to be operational. In 2020, 82.7% of the NIWA budget was released with a total budget of N6,349,843,548.00 while recurrent expenditure at N877,941,048.00 and capital expenditure at N5,471,893,500.00 (Usman, 2020). According to (<https://tribuneonline.ng.com/amcon-payment-will-increase-lagos-revenue-to-n573m-niwa/>), the Internally Generated Revenue of NIWA has had a drastic increment from 2010 to date with N100million in 2010 to N472million by 2017 while as of October 2018, the revenue is at N412, 425,485.03 making it over 300% increment. The major revenue source of NIWA is from pipelines/utility crossings, dredging/reclamation, use of the right of way, and registration of watercraft/vessels. The authors agreed that liberalization policy by both NIWA and the Government of the inland waterways through the incorporation of the private sector is the way to go. Japan incorporated the private sector into her inland water investments that increased the country's growth through job creation in so many sectors (Naoyuki *et al.*, 2019). Nigeria can take advantage of the two rivers which cut across other neighboring West African countries like Guinea, Benin, and Mali, Benin

and have tributaries to the Gulf of Guinea to develop both tourism and regional trade hub in the continent for a positive index on the Gross domestic product (GDP) (Onyema *et al.*,2017). It is noted by Onyema, *et al.*, (2017), that 225 rail wagons or 870 tractor-trailer trucks are taking off the road with just a single 15-barge tow which will further reduce the cost of agricultural produce from the agro-rich north of Nigeria through cheap mode of transportation. However, it will further reduce the pressure on the Nigeria road thereby reducing frequent road accidents. Although NIWA has been developing the river ports in phases. The first phase was the Onitsha, Baro, Lokoja, and Oguta rivers ports. Moreover, the Warri to Baro dredging contract signed for N35bn referred to as the Lower Niger project covering 572km has been completed Onyema, *et al.*, (2017), which lead to the construction and completion of the Baro River Port. Presently, NIWA has inspected and registered 332 barges and 264 tugs with a projection that in the next three years more than 50,000 vessel fleet, tugs, and barges will be on the Nigerian waterways with over 2 million containers moved and 8 million metric tonnes of cargoes with daily trips of about 500 vessels to and from the ports. This will certainly introduce over 2 million manpower employment directly or indirectly (Onyenucheya, 2022). For the sustainability of the river ports through inland waterways transportation, the Inland waterways authority has been revamped in the area of its regulatory functions while it concessions other areas (<https://guardian.ng/business-services/policy-inconsistency-infrastructure-deficit-others-stunt-growth-of-inland-waterway-transport/>). The revamped regulatory functions are stated below according to (Onyenucheya 2022).

1. Design ferry routes
2. Undertake capital and maintenance of dredging.
3. Ensure the development of infrastructural facilities for a national inland waterways network, connecting the creeks and the rivers with economic countries, using the river ports and nodal points for intermodal exchange.
4. Grant designs for private watercraft.
5. Approving designs and construction of Inland River crafts
6. Surveying, removing, and receiving of derelicts, wrecks, and other obstructions from inland waterways among others.
7. Issuance and control of licenses for inland navigation, piers, jetties, and dockyards.
8. Undertaking hydrological and hydrographic surveys
9. Providing regulation for inland navigation.

**Dredging technology:** The present, the method of dredging for the development of inland ports in this part of the continent, in the opinion of the authors is a concern. The rivers Niger and Benue are basically basins of large silt, sand, and sediments of benthic settlements through rain wash of ground surfaces and tributary rivers and streams. Experience has shown that the dredged-out materials, especially those with low market values are not used off the riverbank. The consequence is that rainfall drains and washes the dredged material back into the river basin. The consequence is that dredging must be continuously done year in, and year out of the season. The requirement of continuous dredging is very capital-intensive and could make the inland waterway transportation as planned by NIWA largely unsustainable in the long run. Therefore, in the opinion of the authors, a sustainable means of dredging has to be advised. It could take the form of ensuring that the product of dredged material can pay the cost of regular dredging or using modern technology to install sand traps at the river basin to continuously maintain river depth against additional settlements. Sand trap technology is well developed and utilizes minimal energy in the maintenance of waterway-safe depth for vessels.

**Boat building technology:** Boat-building technology in Nigeria is another area of necessary improvement for inland waterway transport and sustainability. Nigeria and indeed West Africa lack the capacity for steel production which is a key material required for watercraft production. Of recent, in global terms, one has seen improvement in the development of non-metals and composites for boat building. Again, the maritime sector in Nigeria is yet to key into the material development for boat building. Nigeria has intelligent naval architects and competent mariners but lacks the raw materials to build its craft. In the opinion of the authors, NIWA should support and enable Nigerians to build Nigerian ships by providing grants for research and development into materials for boat building through the various Universities and research institutes in the country. Port sustainability has three dimensions which are environmental, economic, and social (Nergis and Gamze, 2018). These are components of the port sustainability performance index (Hakam, 2015). Based on economic sustainability, the inland port is situated where multiple activities like trade, and multiple modes of transportation can be carried out in a particular area (Sara and Robert, 2001). According to Sara and Robert (2001), Inland ports should be the support base for international trade operations if the accessibility of trade zone amenities is certain and as an investment window due to its ability to moderate heavy vehicles

on the road, rail, air, or waterways (Sara and Robert, 2001). Furthermore, inland ports are cost-efficient at the point of entry based on their ability to facilitate trade and logistics operations and employment creation (Sara and Robert, 2001). Moreso economic sustainability of inland ports will boast a nation's economy and security as it can employ the active population, especially the host communities. Nigeria is blessed with 10,000 kilometers of waterways with only 3,800km (i.e. 38%) navigable periodically and the 28 states in the country can be accessed through water out of the 36 states (<https://niwa.gov.ng/>).

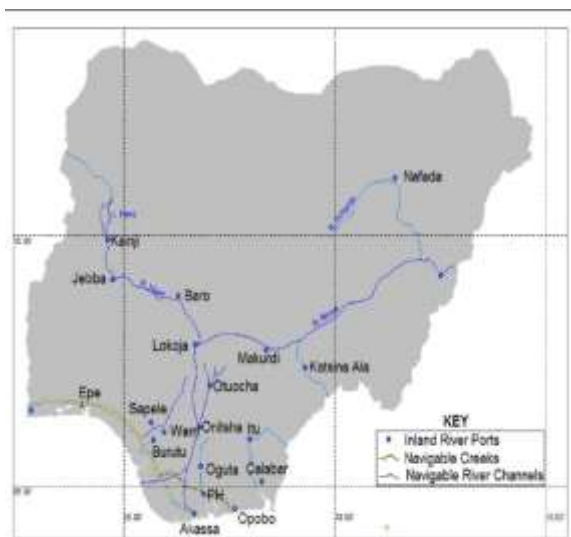


**Fig 6:** The Nigeria transportation masterplan as proposed in 2008.  
Source: (<https://niwa.gov.ng/>)

The five countries that share international boundaries with Nigeria can be accessed by water, for example, Chad, Niger, Cameroun, Benin, and Equatorial Guinea while the major river channels in Nigeria for navigational activities are River Niger, River Benue, and the numerous creeks in the Niger Delta and Lagos; Escravos channel, Lekki and Lagos Lagoons, Port Novo- Badagry-Lagos waterways, Ogun-Ondo waterways, Benin river, Nun River, Imo River, Cross River, Orashi river, Ethiope River, Oguta lake and Lake Chad (<https://niwa.gov.ng/>) and also seen in Figure 6. However, 77.8% of Nigerian states can be accessed through the water while the remaining 22.2% cannot be accessed through the water. With 77.8% of accessible navigational inland waterways routes, Nigeria has enormous inland water potentials that are capable of minimally reducing the pressure on other modes of transportation, especially roads in the transportation of heavy equipment and bulk goods both solid and liquid.

Rivers Niger and Benue are the two major rivers in Nigeria which have the following river ports along their corridors, Ajaokuta, Aboh, Asaba, Baro, Makurdi, Onitsha, Sapele (Onokala and Olajide,

2020), the confluence river port Lokoja and Oguta river port in Imo state. Since 1980, little has been done to facilitate inland water transportation due to conflict among agencies saddled with the responsibility of managing the Nigerian waterways, lack of private sector participation, and policy issues (Eromosele, 2022). Air pollution, traffic jams, and mishaps have presently characterized the Nigerian road travel transport system. In comparison, inland waterway transit is a reasonably priced and ecologically sound substitute for driving. When choosing a freight delivery method, the cost is typically the most important consideration (Lu and Yan, 2015).



**Fig 7:** The navigable creeks and channels with adjoining inland river ports. Source: (Chukwuma 2014)

However, most of Nigeria's inland water ports are not linked by other modes of transportation like rail lines, and road transportation. The Director General of NIWA while opening the Baro inland water port stated that he will link the port with train lines and NIWA as an agency is prepared to work with all government agencies, municipal and state governments, and the private sector to connect the harbor with roadways and rail network (<https://guardian.ng/business-services/niwa-mulls-linking-baro-port-by-rail-road-network/>). In Nigeria, the three levels of government have not given the needed attention to the development of water transportation in the coastal communities. Land transportation has been the lead priority (Ibama *et al.*, 2015). Nigeria as a major international trading hub in Africa should be a major driver in the development of our inland waterway's transportation Nsan-Awaji (2019), not only because of the earnings it brings but also because of the other opportunities that abound with it. According to Ndikom (2013), Nigeria's Inland waterways are still

not maximally tapped and underutilized despite the numerous advantages of natural resources such as natural gas, hydrocarbons, columbite, tin, etc. EkpenyongNsa (2018), citing Calabar inland waterways as an example suggested that poor maintenance, poor funding, lack of dredging, poor infrastructural development, and training together are the main reasons for the poor underutilization. According to Ibama, *et al.*, (2015), Port Harcourt creeks and waterways challenge ranges from non-safety compliance of boat drivers and passengers, sea piracy, water hyacinth, and debris causing navigation impediments together with narrow and shallow creeks. Owoputi and Owoputi (2019), identified the problems with the inland waterways development in Nigeria as un-dredged waters, government policy restricting individuals from having jetties, insufficient jetty facilities, and political influence. However, political influence, insufficient jetty facilities, jetty congestion and financial constrain were identified as factors constraining the development of the inland waterways in Nigeria (Owoputi *et al.*, 2018). According to Onyenucheya (2022), Nigeria's inland waterways are underperforming due to the following: Human capital development, poor implementation of the Cabotage Act, government transport policy, and lack of interest by the private sector. Other identified challenges that impede inland waterway transportation include substandard barges and boats, insufficient jetties equipment, high operating costs, currency depreciation, and underutilization of the waterways transportation industry (<https://guardian.ng/business-services/policy-inconsistency-infrastructure-deficit-others-stunt-growth-of-inland-waterway-transport/>). However, from 2020 to 2021 inland waterways transportation in Lagos increased from 0.8% to 2.8% (Nwannekanma, 2022). Which is a more than 200% increase in the use of waterways transportation in Lagos state. It is very important to review the factors for this impressive waterway transportation activity in Lagos viz- a'-vis the constraints presented in (Ndikom, 2013), (EkpenyongNsa, 2018), (Ibama, *et al.*, 2015), (Owoputi and Owoputi, 2019), (Onyenucheya, 2022), and (Owoputi *et al.*, 2018).

**Conclusion:** Boat builders in Nigeria should take advantage of the gap in watercraft with high passenger capacity to cash in thereby relieving the road transport system as well as offering a total implementation of one of the cabotage act pillars (i.e., encouraging watercraft building in Nigeria and by Nigerians). Unmanned Aerial Vehicles (UAVs) should be deployed on our waterways to give a real-time security report on our inland waterways to the Nigerian Maritime Security can swing into action if there is any security threat. Also, NIWA can contract the security

of the inland waterways to a security company that is community-based and understands the terrain just as Nigeria National Petroleum Company Limited contracted pipeline security to a private security company.

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