SAFETY ON THE WATERS: EVALUATING COMPLIANCE AND CONDITIONS IN BAYELSA STATE'S INLAND WATERWAYS

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Abstract

This study sought to examine the safety conditions and compliance level of inland water transportation in Bayelsa State, Nigeria**.** Purposive sampling was used to select three waterways and six waterfronts (two in each senatorial district of the state) where Questionnaire, personal interviews and physical field observations were used to gather data from the field. The rivers sampled include; Forcados, Nun and Brass rivers. Multiple regression, t-test as well as simple statistical techniques were employed in analysing the data. The findings revealed that most of the drivers do not use alcohol and drugs during work hours. The results of the study also revealed that little or no training is usually conducted by regulatory agencies for the drivers. This poor state of training thus justifies the fact that the boat drivers were not aware of the safety practices and regulations placed by authorities in the study area and this has drastically affected their level observation of safety practices. The study revealed a high frequency of use of water transport by the respondents which indicates that, this mode of transportation has great potential of being widely adopted, if greater attention is given to its development by both the government and private sector. However, despite this level of patronage, the results of the study indicated that most of the boat operators are not aware of the safety procedures and regulations placed by authorities in the study area and this has drastically affected the observation of safety practices as compliance is seen to be low. The study recommends that NIWA and the maritime unions should ensure proper monitoring and enforcement of penalties to riders that carry beyond the capacity of their boats and ferries. Stringent fines and sanctions should also be imposed on riders that are caught sailing during bad weather and thunderstorms. Government can also partner with private companies and multinationals operating within the area in providing more comfortable house boats (covered boats) in order to reduce the inconveniences encountered if sailing and rain starts falling.

Keywords: **Transportation, safety condition, Security, compliance level, Inland, Waterways, Safety index**

Introduction

From ancient times, various means have been explored to facilitate transportation of people and goods from one place to another. This has led to the invention of trains, airplanes, ships, cars, and many more but the most dominant modes are road, water (marine and inland waters), air, rail, pipeline and cable. The water transportation mode uses ships and ferries to transport goods from one place to the other, and about 90% of the global cargos are transported through this mode (Sekimizu, 2013 as cited in Boadu *et al.,* 2021). Aside from being the oldest means of transporting goods and services, inland waterways have been associated with facilitation of commerce, provision of employment and wealth creation among many other benefits (Christodoulou *et al.,* 2019; Dai *et al.,* 2019; Wiercx *et al.,* 2019; Tanko *et al.,* 2019; Hossain *et al.,* 2019).

According to Hofbauer and Putz (2020), thirteen European Union countries offer an interconnected waterway system that allows for the transport of goods throughout Europe. The dominant European waterway is the Rhine-Main-Danube corridor, which connects the Black Sea with the North Sea (i.e., the port of Rotterdam). In the Netherlands, IWT handle 46% of the nation's inland freight, 32% in Bangladesh, 14% in the United States and 9% in China. There are as many as 5000 rivers within China territory with total length over 400,000 kilometres, including more than 100,000 kilometres navigable waterways. After construction in recent years, the total length of navigable waterways reached 122,800 kilometres until the end of 2008, among which, the ranked waterways is 61,100 kilometres and accounts for 49.8% of the total. There are 836 ship locks and 42 ship-lifts on the navigable rivers as well as 1803 units of navigation obstructing dams and locks (Asia-Pacific Economic Cooperation, 2011).

In inland water transportation, the compliance of vessel operators to safety rules is important. In the light of this statement, Isiaka and Olusoga (2019) examined the impact of manpower development on organizational efficiency in national inland waterways authority of Nigeria (NIWA). They opined that manpower deficiency in NIWA, an organization that requires the competence not only to run a profitable transport outfit but also regulate the activities of private operators using the Nigeria Inland Waterways, has been a source of concern to the government over the years more so that the organization is supposed to be a 'cash cow' to the Federal Government. Their study focused on the skill-gaps and how they impact on efficiency and specifically interrogated the relationship between staff development and job performance in NIWA. In addition, according to National Inland Waterways Authority (NIWA, 2020), accidents on waterways will be reduced to a barest minimum if boats/ferry operators and passengers comply with its cardinal guidelines. NIWA stated that majority of accidents leading to loss of lives and properties of waterways were as a result of violations to safety guidelines. Examples of such violations are sailing without permits, sailing at night, overloading of boats and ferries, the use of old and rickety boats (boats beyond 5yrs), drink-sailing, sailing without life jackets, over speeding, sailing during bad weather etc.(NIWA, 2020).

Also, according to India's National Disaster Management Authority (NDMA) guideline for boat safety (2017), it was highlighted that factors such as understaffing/unqualified crew, severe overcrowding, and ageing vessels, lack of regulatory standards as well as faulty boat designs and stability are the prime factors contributing to accidents on the waterways of India. In another study carried out by Neil (2018), on fatal ferry accidents, their causes and how to prevent them, it was discovered that about 88% of the accidents investigated and 98% of deaths are directly attributed to human error. He stated further that this is mainly in the form of unseaworthy vessels, poor lookout, over speeding/overloading, general negligence and poor seamanship.

In order to enhance the safety of seafarers, the International Maritime Organization (IMO) was developed (of which Nigeria is a member of) and saddled with the responsibility of developing and maintaining a comprehensive regulatory framework for shipping and its job includes safety, environmental concerns, legal matters, technical cooperation, maritime security and the efficiency of shipping. However, the compliance of seafarers to IMO standards in the developing world is poor and in some cases no compliance at all (Toffoli*et al.,* 2005). To support this, Nwoye *et al.* (2019) examined prevalent safety hazards and safety practices in maritime transportation in selected states in Southern Nigeria. The study showed that a wide range of maritime safety hazards and practices bedevilled the inland water transportation sector in Nigeria. The findings of the study showed that the use of incompetent boat operators was the most prevailing maritime hazard in the study area, because it ranked highest while non-

compliance to alcohol and drug policies by operators, no use of journey management forms and safety briefs rarely conducted before departure were the highest ranked unsafe practice. Relevant authorities, such as Nigerian Maritime Administration and Safety Agency (NIMASA) and Nigerian Inland Waterways Authority (NIWA) should provide competent and trained boat operators, construct standard jetties, ensure standard and routinely maintained boats are used and ensure maritime safety standards and regulations are adhered to by boat operators and maritime workers to prevent incidents and breakdown of boats along waterways in the study area (Nwoye *et al.,* 2019). Commuter's perception of poor safety of water transport predicted a significant 78·1% of reluctance to travel by water within Lagos metropolis (Femi and Clement 2021)

Furthermore, another study by Boadu *et al.* (2021) examined inland waterway transportation (IWT) in Ghana using the Volta Lake Transport as a case study. The study stated that water bodies have been an amazing mode of transport for carrying people and/or goods within and across regional, national and continental borders. Hitherto, a lot of countries still depend on inland water transport for the transportation of bulk and general cargo across lakes/rivers over long distances. Similarly, Ghana's Inland Water Transport (IWT) system managed by Volta Lake transport Company (VLTC) has been in operation for decades. Regardless of the long years of operational activities, the IWT system in Ghana is faced with numerous constraints grouped under administrative, market, logistics and technical constraints which impede smooth operations and growth of the industry (Boadu, *et al.* 2021). In this regard, some recommendations such as institutionalization and proper regulation of IWT, dredging or periodic maintenance of navigational channels, improvement of logistics and infrastructural development and also promotion of integrated transport planning, to boost IWT system in Ghana and other countries with similar constrains were presented. As encouragement approach, some benefits of improved IWT as enjoyed by many countries with competitive IWT were also discussed in comparison with Ghana and other countries where IWT is not very competitive.

Also, Usman *et al.* (2020) examined Inland Water Transport and Urban Mobility in Ikorodu-Ebutte-Ero Route, Lagos, Nigeria. The authors opined that Lagos city has abundant navigable inland waterways which if fully harnessed would help minimise road traffic congestion, pollution and provide low cost means of long distance travel within the city. Based on this information, their study examined inland water transport services on Lagos lagoon focusing on Ikorodu-Ebutte-Ero route. Primary data for the study were obtained using structured questionnaires. While, secondary data were sourced from relevant government and private agencies. Data were analysed using descriptive techniques including frequency counts, tables and graphs. The results of the study revealed an inadequate provision of terminal facilities and vessels in the area. It was also found that most (67.3%) of the trips via water transport in the area were mainly for work purpose. In addition, low patronage was observed and it was found to be mostly due to comparatively high cost of fares and passenger safety concerns, as indicated by 67.4% and 58.7% of the respondents respectively. Furthermore, high income earners were found to patronise this mode than low income earners. The high frequency of use of water transport by the respondents (71.3% travel by water every day) indicates that, this mode has great potential of being widely adopted, if greater attention is given to its development by both the government and private sectors. There is, therefore, a need for more investment in water transportation in the area through the provision of modern infrastructure and vessels. To support this finding, Akinbamijo *et al.* (2016) also examined transportation as an essential need for humanity, be it land, air or sea and as such it should devoid of operational handicaps. However, in Lagos State, Inland water based transportation encounters various kinds of impairments ranging from human induced to natural cause. To this end, their study explored the challenges encountering Inland water based transportation

system in Lagos state. Adopting survey research design, both secondary and primary data were employed for the study. Secondary data were sourced from libraries, journals and relevant institutions such as Lagos State Waterways Authority (LASWA) wherein patronage data was gotten, while primary data were gotten through field observations, interview and structured questionnaires. Total of 228 (0.05%) users in three most patronized jetties, one each in a local government were purposively sampled, and administered a set of questionnaires, using accidental sampling technique. The study hypothesized that Inland water based transportation varies significantly between the Local governments areas. However, they encountered similar challenges according to findings. The study revealed that 34.6% of the respondents complained of the presence of water hyacinth. 44.3% of the respondents complained of poor safety measures. 26.8% of the respondents suggested clearing of the water hyacinth. 25.0% of the respondents suggested that the obstacles can be resolved through adequate funding and investment on Inland Waterways Transportation. The study recommended an integrated control method which is the biological and mechanical removal of the water hyacinth for easy navigation on the waterways (Akinbamijo *et al.,* 2016).

Other studies such as that of Oluyinka (2019) assessed the complementary role of water transport travel along Ikorodu Lagos Island areas of Lagos metropolis. The author stated that Inland waterways are made up of navigable rivers, lakes, coastal creeks, lagoons and canals and advantageous in terms of cost of moving heavy freight. The aim of the research was to assess the complimentary role of water transportation to commuters travelling along Ikorodu-Lagos Island area of Lagos metropolis. The research however revealed that underdevelopment of the inland waterways mode of transport and the stunted growth of inland waterways in the study area can be attributed to lack of funding for the proper provision of infrastructure and appropriate maintenance of Lagos water ways, which plays a significant impact in attracting the commuters to the transportation system (Oluyinka, 2019).

In the same light, Obamiro *et al.* (2018) examined inland waterways transportation system and promotion of business activities in Lagos State, Nigeria. They were of the view that there was a pressing need to move people and goods from one point to another, with the least possible energy expenditure, their study examined the inland waterways transportation system in Lagos state, Nigeria, in promoting business activities. It was discovered that the integration of inland waterways transportation system in Lagos which cuts across all location where there are waterways could reduce the heavy traffic congestion on the roads. The study concluded that investment in the water transport system could unlock a host of energy and cost savings as well as act as a sustainable solution to infrastructural needs. The study also recommended a long-term gestation investment in the sector as well as more collaboration between public and private investors within the subsector to enhance continued business activities in Lagos State.

Owoputi and Owoputi (2019) examined the impact of inland waterways transportation on socio-economic development of Ogun State Coastal Area of Nigeria. The study examined the impact of inland waterways transportation and challenges of Ogun State coastal area of Nigeria and it revealed that inland waterways have high potential in Ogun State coastal area. The basic morphometric confirmed that the area is riverine in nature yet water transportation is still underdeveloped and underutilized, the report of ridership shows a low use of inland waterways due to lack of facilities. The factors underlying the challenges at the jetties vary from one jetty to another, in Ogun State water jetties; five factors explained 78.9% of the variance, Four (4) major problems impacted on the inland waterways developments. These are financial constraints, insufficient jetty facilities, political influence and government policy that did not allow individual to own jetty and the un-dredged waterways (Owoputi and Owoputi, 2019). The study

recommended stronger policies and the need to encourage private/public participation in waterway development in Ogun State coastal area of Nigeria.

The safety condition of boats and ferries used for inland water transport is an essential factor to consider. Apart from boat operator's factors which contribute to several cases of accidents on our waterways, the safety state or condition of the boats or vessels used in the transportation of passengers and goods is another very crucial area to be investigated if accidents must be brought to a barest minimum. This is because an operator may abide by safety regulations such as "do not drink and drive", "do not over speed", "do not sail at night" etc. but may not give attention to the safety condition of his boat. There is a total of around 120,000 sea-going commercial vessels of over 100 dead weight tonnage (dwt) sailing around the world (Kelvin *et al* 2014). With an increasing awareness of environmental protection and safety issues, Maritime Authorities around the world have been making more rigorous efforts than ever before to promote safety and security at sea. In this light, Lawal (2012) reported that about 55 people who died when a boat attempted to rescue another boat that had first layer leakage also developed engine fault at the middle of River Nano carrying primary school children at the Nigeria-Benin border. This showed that the safety conditions of the two boats were compromised by the operators of the boats. Ironically, these incidences keep on occurring despite the fact that Section 40 of the Nigerian Maritime Administration and Safety Agency (NIMASA) Act 2007 empowers the Agency to detain any ship that is considered unfit to proceed to sea due to defect in the ship, its machinery or equipment or any part; or because of under-manning, overloading, unsafe or improper loading.

Section 41 of the NIMASA Act 2007 also stipulates a fine of up to the sum of one million naira on conviction against a person who uses, causes or permits navigation of any defective lighter, barge or like vessel which endangers human life. These provisions of the law should have reduced cases of boat mishaps in the country if they are being fully enforced. And where the accidents occur, Section 1 sub-section 2b requires NIMASA to make enquiries as to the shipwrecks or other casualties affecting ships or as to charges of incompetence or misconduct on the part of seafarers in relation to such casualties (Lawal, 2012). The study by Danny and Shariman (2018) where survivors of various accident boats were closely monitored in Indonesia revealed that majority of the dead falls during the accidents were as a result of insufficient tool safety on board ships and boats. This shows that the safety condition of the boats in terms of provision of sufficient safety tools such as life jackets and life buoys were neglected by the operators of these vessels or boats.

Study Area

This study is limited to Bayelsa state. Six jetties (Swali, Ayama, Onuebum, Nembe, Aleibiri and Sagbama) cutting across the entire state and the three major rivers (Forcados, Nun and Brass) were sampled for the study. Bayelsa state is geographically located between latitudes 04° 15′ North, 05° 22′ South and longitude 05° 22′ west and 06° 45′ East. It is one of the major oil producing States in Nigeria contributing over 40% of the daily production in the country. It is one of the six states that make up the south-south geopolitical region of Nigeria and has boundaries with Rivers State in the east, Delta State in the west and Gulf of Guinea in the south. It has a population of 1,121,693 spread over a land area of 12,000 square kilometre most of which is water or wet lands (John 2013).Mean temperature is generally 28.0°C. The State has eight local government areas (LGAs), namely; Brass, Ekeremor, Kolokuma/Opukuma, Nembe, Ogbia, Sagbama, Southern Ijaw and Yenagoa and has developed in many sectors since its creation in October 1, 1996 (Bayelsa State Government, 2008).

Vegetation is mainly the mangrove and salt water swamps, but a major part had largely been destroyed by oil exploration. (Ezenwaji *et al.*, 2013) The state is made up of mangrove and tropical rain forest with more than three quarter of this area covered by water. In the North, it has a thick forest with arable lands for cultivation of various food and cash crops (Clement & Ekio, 2020).

Transportation in the state is mainly water transport owing to the fact that over 70% of the state is covered by water. As such majority of the communities within Ekeremor, Southern Ijaw, Brass, Nembe and parts of Sagbama and Ogbia LGA's of the state can only be accessible by water. Road network is basically concentrated within Yenagoa, Kolokuma/Opokuma and parts of Ogbia LGAs of the state (Olowoyo, 2011).

The state is drained by so many rivers which are at their advanced stage and such rivers include Orashi which forms the State's eastern border with Rivers State, Forcados which forms the western border with Delta State, Nun, Brass, Apoi, Kugba and numerous creeks which drain the state's hinterland (Ezenwaji *et al.*, 2013). Annual rainfall amounts range from 2,500 mm in the northern parts of the State to 4,000 mm in its southern areas, while mean temperature is generally 28.0°C (Olowoyo, 2011). Its topography is that of a moderately lowland which lies almost below sea level stretching from Ekeremor to Brass with a maze of meandering creeks and swamps which all flow southwards into the Atlantic ocean via major rivers such as Forcados, San Bartholomew, Brass, Nun, Ramos, Santa babara, St. Nicholas, Sangana, Fish-town, Ikebiri creek, Middleton, Digatoro creek, Pennington and Dobo (Clement and Ekio, 2017)

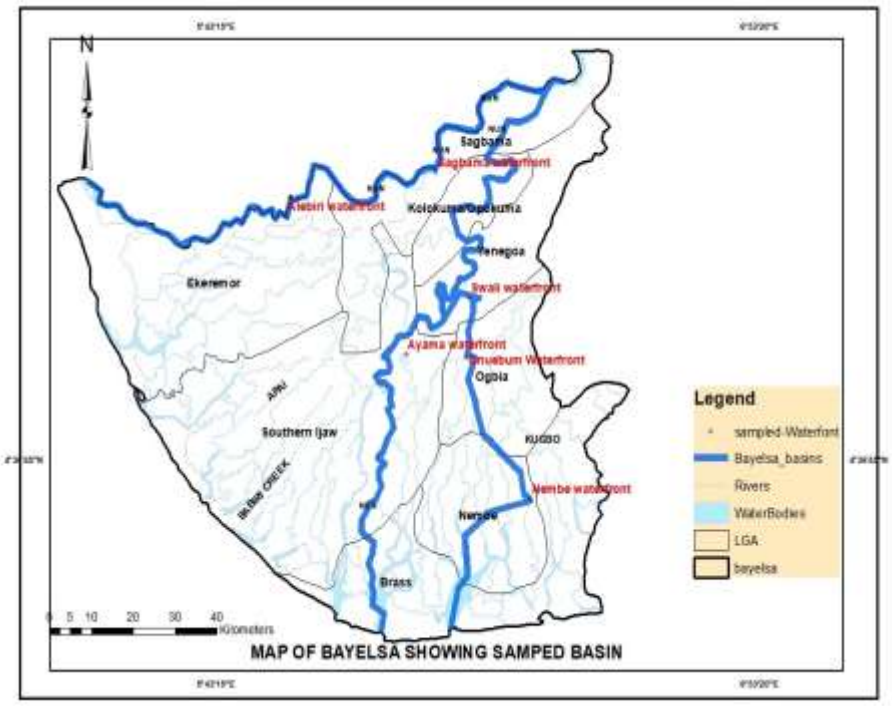

Figure 1. Study Area Map

Materials and Methods

In terms of methods, the research design adopted a quantitative design using purposive and simple random sampling techniques. The researcher employed a structured questionnaire which was administered to boat and ferry operators, commuters and regulators of the inland waterways to assess their perception, knowledge and awareness of the navigability and security condition of waterways in the state. The type of data used for this study is the primary data. Primary data was collected by the researcher at the six jetties sampled across the state. This data was sourced via the researcher administering copies of the research questionnaire on targeted respondents in the study area. To understand the target population of registered

boat and ferry operators in the state, the researcher embarked on a reconnaissance visit to the Maritime union offices using simple random sampling technique and got a figure 800 registered boat and ferry operators and 25% of this population was therefore used as a representative sample giving the sample size as 200.In determining the sample size based on the percentage, the formula used was:

Sample size = (percentage/100) × population size
Where:
Percentage = 25%
Population size = 800
Calculation:
Sample size = (25/100) × 800 = 0.25 × 800 = 200
Thus, the sample size of 200 was derived by taking 25% of total population of 800 registered boat and ferry operators. This method ensures that the sample represents a proportionate fraction of the entire population.

The data obtained via the questionnaire were presented in tables and statistical diagrams. For the purpose of data analyses, multiple regression Analysis using the equation y= mx+b was used where y is dependent variable, x is independent variable, m is estimated slop and b is estimated intercept. This equation was used to calculate the relationship that existed between the dependent variable and the various independent variables in the study. Simple statistical techniques such as bar chats, pie charts and histograms were also used in analysing responses from questionnaires. Multiple regression analysis and student's t-test were used in calculating and computing the IWTSI of the sampled rivers and the state in general. The table below shows a summary of the

Table 1 Summary of objectives and method of Analysis

Objectives	Method of analysis
Evaluate boat riders level of compliance to NIWA's safety guidelines	Simple statistical techniques
Determine the safety condition of boats and ferries in the state	Multiple Regression Analysis

Data gathered from the administration of questionnaire, interview and field work is presented using tables, pie charts, bar charts, histograms, maps and pictures while analysis of the data was carried out using multiple regression, student t-test as well as simple statistical techniques.

Demographic Information of Inland Waterway Transporters

The demographic information of a group of people helps researchers to understand issues that surround problems in any society. The study considered the demographic information of the respondents regarding inland waterway transportation in Bayelsa state and discovered that the sector is more of a male dominated sector as all the respondents were males. The study also came up with the following demographic information;

Table 2 - Demographic Characteristics of Inland waterway transporters

Demographic Information		Frequency	Percentage
Age	18-25	68	35
	26-35	68	35
	36-45	22	11
	46 and above	38	19
Education	No formal	71	36
	Primary	73	37
	Secondary	16	8
	Tertiary	36	19
Marital status	Single	66	34
	Married	108	55
	Divorced	20	10
	Widower	2	1
Number of Children	1-3	70	36
	4-6	90	45
	7-10	32	17
	>10	4	2
Monthly Income	<N20,000	29	15
	N20,000 – N50,000	65	34
	N51,000-N100,000	88	44
	>N100,000	14	7
Religion	Christians	196	100
	Muslims	0	0
	Traditional	0	0
	Others	0	0

The demographic information of the respondents indicated that the respondents were mostly in their active ages and they were able to work in the inland water transportation business in the region. Among the respondents, 35 per cent (68) were within the ages of 18 – 25, 35 per cent (68) were within the ages of 26 – 35, 11 per cent (22) were within the ages of 36-45 and 19 per cent (38) were 46 years and above. The ages of the respondents were within the active age of 18 – 60 and it is an indication that the respondents are productive and have the physical stamina to take part in the inland transportation business in the community.

The respondents were mostly people without any form of formal education and those with only primary education. Among the respondents, 19 per cent (36) had tertiary education, 8 per cent (16) had secondary school education, 37 per cent (73) had primary school education and 36 per cent (71) had no formal education. These figures are an indication that the educational attainment of the boat drivers was low. The educational status of the respondents is a major factor in the movement of people, in the obedience of transport laws and in the registration with NIWA.

In the aspect of marital status, 34 per cent (66) of the respondents were single, 55 per cent (108) were married, 10 per cent (20) were divorced while only 1 per cent was widowed. The data indicated that it was easier for married people to go into this business because they had families to take care of from the income made from the business.

Figure 2: Researcher with community members

Results

The level of compliance to the safety guidelines were examined by the responses obtained from the officials of NIWA and Maritime Unions

Table 3: Safety Compliance Guidelines

Variables	SA	A	I	D	SD
The boat drivers are competent(licenced)	0%	6%	0%	44%	50%
Some of the drivers use alcohol and drugs	0%	11%	39%	39%	11%
We provide journey management forms	5%	11%	28%	28%	28%
We conduct safety briefs before departure	11%	22%	22%	11%	34%
We train boat operators	6%	0%	33%	39%	22%
Boat operators obey safety regulations	0%	6%	11%	61%	22%
Boat operators are aware of safety practices	0%	0%	6%	72%	22%
Boat operators observe safety practices	0%	11%	0%	83%	6%

The results of the study indicated that most of the boat operators were not licenced and competent. Despite the unlicensed state of the drivers, the study revealed that most of the drivers do not use alcohol and drugs during work hours. The results of the study also revealed that little or no training is usually conducted by regulatory agencies for the drivers. This poor state of training thus justifies the fact that the boat drivers were not aware of the safety practices and regulations placed by authorities in the study area and this has drastically affected their level observation of safety practices. The study further looked at the constraints faced by NIWA in ensuring safety among inland water transporters.

Table 4: Constraints faced by NIWA

Variables	SA	A	I	D	SD
Administrative	5%	22%	34%	34%	5%
Market	17%	56%	22%	5%	0%
Logistics	11%	33%	28%	28%	0%
Terminal constraints	6%	11%	17%	33%	33%
Low patronage due to fares	39%	33%	11%	11%	6%

Funding	17%	22%	17%	39%	5%
Political constraints	0%	11%	0%	22%	67%
Government policy	0%	22%	50%	22%	6%
Financial constraints	0%	22%	17%	61%	0%
Insufficient jetty facilities	6%	22%	11%	22%	39%

Source – Fieldwork (2022)

Safety Condition of Boats and Ferries used for Inland Water Transportation

One of the major objectives of the study was to look at the safety conditions of the vessels used for inland water transport and several variables were used to ascertain this.

Figure 3: Photograph showing boats with bad seats used for transport at Onuebum waterfront

The results of the data collected indicated that more than half of the boat men (76 percent) went for only one round trip (to and fro). The number of trips was used to determine the level of usage of the vessels. The result showed that 24 percent of the boat men really used their vehicles and this might affect the strength of the vessel.

In order to also determine if boatmen drive at night, the time of the first trip and the time of closure for the day were also determined;

Table 5: Timing of Trips

Time of first trip		Frequency	Percentage
	Before 6am	69	35
	After 6am	127	65
Closing time for the day			
	4 – 5 pm	2	1
	5-6 pm	137	70
	6-7 pm	57	29
	7pm and above	0	0

The results from the study indicated that most of the boatmen resume their daily activities after 6am in the morning (65 per cent). However, 35 per cent of the boat riders agreed to take their first trips before 6am depending on the availability of passengers for the trip. The timing of their trips is related to the issue of brightness which involves the ability to see while sailing and also security issues as it is easier to manoeuvre through security situations in broad daylight. The results also indicate that the main closing

time from their jobs is between 5-6 pm (70 per cent) and 6-7 pm (29 per cent). These are hours of a little daylight and security concerns are at minimal at these hours. This showed that majority of the boat drivers were compliant with the first safety guideline which states "do not sail at night". In order to ensure the true safety situation in the study area, the study also looked at the availability of life jackets for the passengers;

Out of the one hundred and ninety six responses, 140 of the boat men agreed that they gave life jackets to their passengers while only 56 did not give the life jackets. This is an indicator that the boat men on their own made efforts to ensure the safety of the passengers. Also it shows that the lives of passengers were important to their business as recurrent deaths may lead to a decline in their business. This shows that majority of the boat drivers were compliant with the fifth safety guideline that states always put on your life jacket before entering the boat". This study also looked at the passenger capacity carried by the boatmen to ensure safety;

Figure 4: photograph of passengers safely boarded with life jackets at Ayama

Table 6: Passenger Capacity of vessels

Passenger Capacity of vessels	Frequency	Percentage
Five passengers	27	14
Ten passengers	2	1
Fifteen passengers	103	53
Twenty passengers	22	11
>twenty passengers	42	21

The results of the study indicates that a large proportion of the boat drivers carry fifteen and above number of passengers. The research went further to ascertain if the drivers also took trips during the rains and the following results were obtained; Even though weather and climate are considered important variables in the inland water transport, the results of the study indicate that the boat drivers still take trips during the rains especially as the waterways are located in a humid environment. This issue shows that the rains do not stop the drivers from taking trips and as such, the lives of the passengers may be endangered during such trips.

To further ascertain the level of compliance to safety guidelines, the age of their vessels was examined. The age of the boat determines the strength of the vessel and its capacity to carry passengers;

Table 7: Age of vessels

Age of vessels	Frequency	Percentage
1-5 years	36	19
6-10 years	83	42
11-15 years	59	30
>15 years	18	9

The results of the study indicated that a greater number of the boat men used vessels that were above five years old. This means that the wood or fibre used in constructing the boats will be weak and as such the safety of the passengers was not guaranteed. It also shows that the comforts of the passengers were not guaranteed as the seats of the boats were as old as the body of the vessels. The age of the vessel also determined its speed. The result indicated that the vessels may also be slow and trips delayed due to the age of the vessel. This result showed non-compliance to the third safety guideline that states "do not use old and rickety boats (any boat beyond 5yrs of usage should be overhauled)"as 81 per cent of all the boats and ferries used in the study area were old and rickety. However, only about 10 per cent of these old and rickety boats and ferries have been overhauled at one time or the other which further shows non-compliance. The study further looked at the routine maintenance of the vessels as a safety indicator in the study area and the following results were retrieved: Routine maintenance was a major indicator of the safety of vessels used in inland transportation. The results of the study indicated that only a small portion of the drivers maintained their vessels monthly (18 per cent) and a large proportion maintain their vehicles quarterly (45 Per cent). These indicated that the vessels were not maintained as they should be, endangering the lives of clients.

The research went ahead to show results on the major safety issues that are experienced in using the vessels and the following results were generated

Table 8: Safety Issues in the Use of Vessels

Safety issues in the use of vessels	Frequency	Percentage
Ageing	16	8
Faulty engines	51	26
Leakages	28	14
Bad seats	43	22
Faulty brakes	42	22
Others	16	8

The major safety issue as it relates to the vessels was faulty engines (26 per cent). This indicated that more than a quarter of the vessels used along the waterways had faulty engines. The others whose impacts were felt were faulty brakes and bad seats. These issues made the passengers uncomfortable and endanger the lives of passengers.

Table 9: Reaction to Emergency Breakdown of Vessels

Reaction to emergency breakdown of vessels	Frequency	Percentage
Towing to the terminal	30	15
Calling the mechanic	2	1
Self-repair	138	71
Discharge the cargo in the boat	26	13
Others	0	0

Many of the drivers (71 per cent) try to fix their vessels by themselves when there is an emergency or a breakdown along the waterways. This is an indicator that self-help is a major technique that the drivers fall back on when they are stranded on the waterways. Others resort to towing the Fvessel back to the terminal and others discharge their cargo or passengers into other boats. The study further tried to ascertain the problems faced by the boat drivers and the following results were generated;

Table 10: Problems faced in the inland water transportation business

Problems	Frequency	Percentage
Financial Problems	29	15
Piracy	72	37
Excessive Rainfall	27	13
Problematic Passengers	28	15
Inadequate Government Support	38	19
Others	2	1

The major problem faced by the vessel handlers was the problem of piracy as the vessels were usually harassed and robbed along the waterways. Another problem was the inadequate government support received by the drivers as seen in the community and individuals participating in the dredging and the maintenance of the waterways. Excessive rainfall and problematic passengers also posed a problem.

Finally, under the safety issues, the study tried to ascertain if the drivers were registered with the National Inland Waterways Authority (NIWA) and the Maritime union workers and the responses from the drivers indicated that many of them (64 per cent) are registered with NIWA.

Figure 5: Unsafely loaded ferry with goods and passengers at Swali waterfront

Discussion of Findings

The study revealed a high frequency of use of water transport by the respondents which indicates that, this mode of transportation has great potential of being widely adopted, if greater attention is given to its development by both the government and private sectors. However, despite this level of patronage, results of the study indicated that most of the boat operators are not aware of the safety procedures and regulations placed by authorities in the study area and this has drastically affected the observation of safety practices as compliance is seen to be low. This result agreed with the study of Nwoye *et al.,* (2019) who examined prevalent safety hazards and safety practices in maritime transportation in selected states in Southern Nigeria. His study showed that a wide range of maritime safety hazards and practices bedevilled the inland water transportation sector in Nigeria. The findings of their study showed that the use of

incompetent boat operators was the most prevailing maritime hazard in the study area, because it ranked highest, with 72.6% of respondents in agreement. It also agrees with the results of Usman *et al.*, (2020) who examined Inland Water Transport and Urban Mobility in Ikorodu EbutteEro Route, Lagos, Nigeria. The results revealed an inadequate provision of terminal facilities and vessels in the area. In addition, low patronage was observed and it was found to be mostly due to comparatively high cost of fares and passenger safety concerns. The study also revealed a high frequency of use of water transport by the respondents which indicates that, this mode has great potential of being widely adopted, if greater attention is given to its development by both the government and private sectors.

Out of the one hundred and ninety-six responses, 140 of the boat men agreed that they gave life jackets to their passengers while only 56 did not give the life jackets. This is an indicator that the boat men on their own made efforts to ensure the safety of the passengers. Also it shows that the life of passengers was important to their business as recurrent deaths may lead to a decline in their business. This study also looked at the passenger capacity carried by the boatmen to ensure safety. The results of the study also indicated that a greater number of the boat men used vessels that were above five years old. This means that the wood used in constructing the boats will be soft and that the safety of the passengers is not guaranteed. It also shows that the comfort of the passengers is not guaranteed as the seats of the vehicles will also be as old as the body of the vessels. The age of the vessel also determines its speed. The result indicates that the vessels may also be slow and trips delayed due to the age of the vessel. These results agree with the study of Basu and Bhattacharya (2001) who opined that apart from boat operator's factors which contribute to several cases of accidents on our waterways, the safety state or condition of the boats or vessels used in the transportation of passengers and goods is another very crucial area to be investigated if accidents must be brought to a barest minimum. This is because an operator may abide by safety regulations such as "do not drink and drive", "do not over speed", "do not sail at night" etc but may not give attention to the safety condition of his boat.

Conclusion

With regards to the security status of the waterways in the state, the study concludes that despite the presence of security patrols and few check points within the waterways, security induced accidents as well as piracy within the waterways is still prevalent. This conclusively reiterates that the security status of the waterways within the study area is low or below average.

With regards to the boat drivers level of compliance with NIWAs safety guidelines, the study concludes that there is a high compliance not sailing at night, not taking alcohol and drugs before and during boat rides, the use of life jackets before entering the boats, avoidance of over speeding as well as being properly registered with NIWA and their Maritime unions. An average or moderate compliance on not carrying passengers and goods beyond the capacity of the boat was observed while a low compliance level was observed in guidelines such as not sailing during bad weather conditions, sharing safety briefing with passengers before sailing, and cargoes discharge in case of emergency. The study therefore concludes that the level of compliance to safety guidelines is above average.

Recommendations

i. With regards to the boat rider's level of compliance to safety guidelines, the study recommends that NIWA and the maritime unions should ensure proper monitoring and enforcement of penalties to riders that carry beyond the capacity of their boats and ferries. Stringent fines and sanctions should also be imposed on riders that are caught sailing during bad weather and thunderstorms. Government can also partner with private companies and multinationals

operating within the area in providing more comfortable house boats (covered boats) in order to reduce the inconveniences encountered if sailing and rain starts falling. Regular and proper trainings should be conducted for the boat rider in order to intimate them on safety issues as well as how to carry out safety briefings before sailing. The study also recommends that a minimum of 50% of life jackets to be used by passengers should be provided for the boat riders by the government in order to reduce the burden of drivers buying them.

ii. With regards to the safety condition of boats and ferries used in the study area, the study recommends that regulatory agencies should ensure that boats and ferries meet safety standards before allowed to operate. The study also recommends that yearly routine boat safety check should be carried out by the regulatory agencies in order to identify boats that were not safe anymore for transport.

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