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Assessment of Fishing Gears, Crafts and Operational Challenges Among Artisanal Fishers in The Lower River Niger at Itobe, Kogi State, Central Nigeria

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ABSTRACT

This study assessed the fishing gears, crafts and operational challenges of artisanal fishermen operating in the lower River Niger at Itobe, Kogi State, Nigeria. Primary data were collected through structured questionnaires and interviews from 160 randomly selected fishermen across three communities (Kabawa, Lebrafu, and Genumazu) between June and August 2024. The data were analyzed using descriptive statistics. Findings revealed that artisanal fishing in the area is predominantly male-dominated (82.5%) and youth-driven, with most respondents aged between 18 and 30 years**.** Cast nets (68.8%) and gill nets (56.3%) were the most commonly used gears while planked canoes propelled by paddles were the dominant craft type (75.6%). The study identified critical challenges including theft, low quality, cost and limited access to fishing gears and crafts thereby making the fishermen to operate at a subsistence level. Schemes to ensure access to durable and quality gears and motorized crafts through subsidies, credit schemes, or cooperative societies should be facilitated by the government and non-governmental organizations. They should enhance security, provide support to the farmers through extension services especially on new technology in fishing gears and crafts and their operations.

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1. INTRODUCTION

Fish production is vital to ensuring global food and nutritional security. Fish is a rich source of nutrients such as protein, omega-3 fatty acids, vitamins, and minerals, and is an important component of many diets, particularly in coastal communities and low-income countries. It is also a vital source of livelihoods for millions of people across the world, and is important for the health and well-being of many coastal ecosystems (Hicks *et al.,* 2019; FAO, 2020).

Fishing gear can be described as any kind of equipment used in harvesting, cropping, or capturing fish from any water body while fishing method is how the gear is used (Du Feu *et al*. 2007 and Bankole *et al*., 2013). According to Moses (2002), fishing gears have generally undergone many modifications and improvements in consonance with advances in modern technology. Although, the basic principle of wounding, hooking, trapping, encircling, scooping and filtering can still be found. The types, designs and mode of operations of the traditional and modern fishing gear employed in Nigerian rivers have been fairly described (Bankole *et al.* 2003, Obande *et al*. 2010, NIFFR, 2012, Ohaturuonye *et al.*2015, Ibrahim and Ogueji, 2017, Binyotubo *et al,* 2023 and Ukagwu *et al,* 2024). The list includes among others, gill nets, cast nets, long line and traps. For efficient and effective use of any gear on a water body the fisherman needs mobility to access both near and distant fishing grounds. This necessitates the acquisition of a craft. Diversity in fish species habit and habitats has led to the use of different fishing equipment peculiar to water bodies. Seasonal variations in species composition and abundance also necessitate the use of specific fishing gear and craft at a particular fishing site within a particular period of time. Hence, fishers employ various fishing methods, depending on the season and period of operation (NIFFR, 2012). Like fishing gears, crafts have also passed through many developmental stages from trunk of wood, floating calabash and papyrus raft to woody dugout crafts, planked crafts and canoes made up of fiber glass. All these are attempts to increase fishing efficiency, match water conditions and types of gear engaged in fishing (Mustapha, 2013). Consequently, crafts are designed to match water crossing, shore landing, ability to keep afloat and stabilize on the water. The mobility of employed craft may also

depend on the type and size. Artisanal fisheries accounts for the major fish supply in the developing countries including Nigeria (FDF 2017). The fisheries are normally characterized by low technology, lack of modern equipment and capital, resulting in labour intensive activities with little or no opportunities to expand (Nuhu and Yaro, 2005).

Effective fishery management requires a good knowledge of fishing gear and crafts. There is great divergence in the efficiency of different forms of fishing gear and crafts in their adaptability to certain conditions, and in their desirability for specific job. Currently, numerous challenges are confronting artisanal fishers; among which are inadequate equipment such as gear and crafts, inadequate access to extension services and poor marketing of products. Several authors have reported on the general challenges of artisanal fisherfolks in many fishing communities in Nigeria (Nuhu and Yaro, 2005, Onemolease and Oriakhi (2012), Ekpo and Essien-Ibok (2013), Mohammed *et al* (2023) and Oshinmagye *et al* (2024). Onimisi *et al.* (2024) assessed sustainable fishing techniques and challenges among artisanal fishers in River Ibi, Taraba State, Nigeria. This study which is region- specific emphasizes on the assessment of fishing gears, crafts and operational challenges among artisanal fishers in the lower river Niger at Itobe, Kogi State, Nigeria. This data is necessary for effective fisheries management of the river and will also inform policy interventions to improve fishing productivity while promoting sustainable practices.

2. MATERIALS AND METHODS

Study Area

The study was carried out in the lower river Niger Itobe, Kogi State located between latitudes 7°25N and 7°40N and longitudes 6°00'E and 6°14'E. The climate of the lower River Niger in Itobe is characterized by that of the Tropical Guinea Savannah. The river is a major source of water for irrigation, fishing and transportation in the area. Itobe is a significant fishing community that relies heavily on the river's resources for its livelihood and subsistence.

Data Collection

This study utilized primary data collected through field observations, surveys, and personal interviews with local fishermen and relevant stakeholders that was aided by structured questionnaires. Survey, interviews and observations were conducted twice monthly for three months (June to August, 2024). Simple random sampling technique was utilized. The respondents, which are fishermen were randomly selected. The sampling areas selected were Kabawa, Lebrafu and Genumazu because of the high degree of fishing activities in those areas. Direct observations were made to document the different types of fishing gears and crafts used by fishermen in study areas. 160 structured questionnaires were developed and administered to a representative sample of fishermen in the study area.

The questionnaire collected information on the following:

i. Demographic characteristics of fishermen (age, gender, education level, years of experience, etc.)
ii. Types of fishing gear used (nets, lines, hooks, traps, etc.)
iii. Characteristics of fishing gear (materials, dimensions, mesh sizes, etc.)
iv. Types of fishing craft used (canoes, planked boats, motorized vessels, etc.)
v. Characteristics of fishing craft (dimensions, propulsion methods, construction materials, etc.)
vi. Fishing techniques and strategies employed
vii. Challenges and constraints faced in fishing operations

Data Analysis

The collected data were analyzed using descriptive statistics such as frequencies, percentages, standard deviations and means embedded in the statistical package for social sciences (version 2023).

3. RESULTS AND DISCUSSION

Socio-Economic Characteristics of Fish Artisans in the Lower River Niger at Itobe

The socio-economic profile of respondents engaged in artisanal fishing in the lower River Niger at Itobe reveals significant demographic patterns (Table 1).

Table 1. Socio-economic Characteristics of Fish Artisans in Lower River Niger, at Itobe,

Variable	Frequency	Percentage
Sex of respondents		
Male	132	82.5
Female	28	17.5
Total	160	100.
Age of respondents		

18-25	58	36.3
26-30	46	28.8
31-40	32	20.0
41-50	23	14.4
51 and above	1	0.6
Total	160	100.0
Marital Status		
Single	71	44.4
Married	49	30.6
Widow	13	8.1
Widower	2	1.3
Divorced	25	15.6
Total	160	100.0
Educational Status		
No formal education	29	18.1
Primary education	41	25.6
SSCE	80	50.0
Tertiary education	10	6.3
Total	160	100.0
Household Size		
1-4 members	98	61.3
5-7 members	52	32.5
8-10 members	8	5.0
11 and above	2	1.3
Total	160	100.0
Duration of Fishing experience		
1-5 years	32	20.0
6-10 years	93	58.1
11-15 years	23	14.4
16-20 years	7	4.4
21 years and above	5	3.1
Total	160	100.0
Other Occupations (Part-time)		
Farming	60	37.5
Business	55	34.4
Civil servant	33	20.6
Others	12	7.5
Total	160	100.0

Majority of the respondents were male (82.5%), while females accounted for only 17.5%, indicating that artisanal fishing in the region remains a predominantly male-dominated activity. This aligns with trends observed across many Nigerian fishing communities, where the physically demanding nature of fishing typically attracts more men (Oladoja *et al.*, 2018). Age distribution showed that the sector is largely driven by youth. Specifically, 36.3% of respondents were aged 18–25, while 28.8% were between 26–30 years. These findings support earlier reports by Sanni *et al*. (2011), Adeyemo (2011) and Kwen *et al* (2013), which also identified fishing as a youth-dominated occupation particularly among individuals aged 25–40. Only a small proportion (0.6%) of fishers were aged 51 and above, underscoring the youthful and active nature of the workforce. Marital status data showed that 44.4% of respondents were single, 30.6% married, 15.6% divorced, with 8.1% widowed and 1.3% widowers. This finding contrasts with earlier studies by Kwen *et al.* (2013) and Olaoye *et al.* (2011) which reported that the artisanal fishing population was predominantly married. The variation in this study may reflect the socio-economic realities and survival strategies specific to the Itobe area.

In terms of educational attainment, 50% of respondents possessed a Senior Secondary School Certificate (SSCE), 25.6% had completed primary education, 18.1% had no formal education, and only 6.3% had tertiary education. Compared to similar studies, such as that by Kwen *et al.* (2013) in Igbedi Creek, where most respondents had only primary education, this represents a relatively better educational profile. This fair level of literacy may enhance the effectiveness of extension services and the adoption of improved fishing techniques. Nonetheless, the low percentage of tertiary education holders points to the need for targeted educational and vocational interventions.

Household size analysis showed that 61.3% of respondents lived in households with 1– 4 members, while 32.5% had between 5–7 members. In terms of fishing experience, a majority (58.1%) had been involved in fishing for 6–10 years, indicating that artisanal fishing is a long-term livelihood for many in the area.

Additionally, 60% of respondents were engaged in part-time occupations with farming (37.5%) being the most common, followed by business (34.4%), civil service (20.6%), and firewood collection (7.5%). This supports the observation by Smith (1979), who noted that many artisanal fishers supplement their income through additional livelihoods such as farming. Such diversification helps cushion the effects of seasonal fluctuations in fishing income.

Types of Fishing Gears Used by Artisanal Fishermen in the Lower River Niger at Itobe

The analysis of fishing gear usage by artisanal fishermen in the lower River Niger at Itobe revealed a rich diversity of traditional fishing methods tailored to the riverine environment. The fishing gears used include gillnets, cast net, hooks and lines, long lines, traps, dragnets and others (improvised and innovative gears) (Table 2).

Table 2: Types of fishing gears used by fishermen

Fish Gear Type	No of Fishermen that operate gear type	% Fishermen that use gear type
Cast net	110	68.8
Gill net	90	56.3
Hook and Line	32	20.0
Traps	25	15.6
Long line	18	11.3
Drag net	12	7.5
Others	8	3.8

A total of 160 responses recorded reflected multiple gear usage per respondent. Among these, cast nets were the most commonly used, accounting for 68.8% of the responses. Their popularity stems from their affordability, ease of use, and effectiveness in shallow or moderately deep waters, making them ideal for small-scale, individual fishing operations targeting pelagic and schooling fish species. Following cast nets, gill nets emerged as the second most prevalent gear type, with 56.3% usage. Gill nets, known for their passive operation and ability to selectively capture fish based on mesh size, are particularly suited for deeper or more stagnant water bodies. This preference for cast and gill nets is consistent with historical trends, as similar patterns have been observed since the mid-1970s (Seisay, 1998). More recently, Binyotubo *et al.* (2023) reported a comparable pattern in the Escravos Estuary, Nigeria, where gill nets were also the second most utilized gear among artisanal fishers. The significant use of gill nets suggests a degree of specialization and an understanding of fish behavior among local fishers. These nets can also facilitate extended fishing durations and are frequently used in combination with other gear types to maximize efficiency.

Other gear types recorded include hook and line (20.0%), traps (15.6%), and long lines (11.3%). These methods are typically low-cost and require in-depth knowledge of species-specific behavior and habitat use. Despite their lower frequencies, these gears are particularly relevant to subsistence-level fishing, where quantities of fish catch are modest and often intended for household consumption or local markets. The use of gill nets and traps is also supported by Kingdom and Kwen (2009), who noted their prevalence in developing countries due to their cost-effectiveness and ability to capture valuable fish in substantial quantities. Less commonly used gear types included drag nets (7.5%) and a variety of unspecified or locally adapted gear types categorized as others (2.7%). Drag nets, though effective, demand greater labor and often disrupt benthic habitats, which may account for their lower usage. The category of other gears include innovative or improvised gear, reflecting the adaptive strategies of artisanal fishing communities in response to ecological or economic constraints. The allowance for multiple responses highlights the polyvalent nature of artisanal fishing in the region.

The use of various gear types by individual fishermen underscores a strategy aimed at enhancing resilience against seasonal variability in fish abundance and species composition. As observed by Bankole *et al.* (2003), the seasonal shifts in fish diversity and abundance necessitate the periodic use of different fishing gears throughout the year. Furthermore, Bene and Neiland (2003) noted

that the type and quantity of fishing gear employed often correlate with the economic status of fishing households, suggesting that gear diversity may also reflect disparities in capital availability

Fishing Craft Specifications of Fishermen in Lower River Niger at Itobe, Kogi State

The survey of fishing crafts used by artisanal fishermen in the lower River Niger at Itobe, revealed key patterns in fishing craft ownership and usage. The fishing craft specifications of the fishermen in the study area is presented in Table 3.

Table 3: Fishing Craft Specifications of Fishermen in Lower. River Niger at Itobe, Kogi State

Variable	Number	Percentage
Ownership of Fishing Craft		
Yes	123	76.9
No	37	23.1
Type of Craft		
Planked Canoe	121	75.6
Dug-Out Canoe	11	6.9
Half Dug-Out Canoe	5	3.1
Gourd	23	14.4
Propulsion Method		
Outboards Engine	37	23.1
Paddle	123	76.9
Outboards Engine Capacity		
15HP	28	75
25 HP	9	25
Craft Usage Duration		
1-3 Years	44	27.5
4-6 Years	106	66.3
7-9 Years	9	5.6
10 Years and Above	1	0.6
Fishing Craft Design		
Flat Bottom	154	96.3
V-Bottom	6	3.8
Craft Length (LOA)		
3 Meters	20	12.5
3.5 Meters	85	53.1
4 Meters	31	19.4
4.5 Meters	18	11.3
5-6 Meters	6	3.8
Reasons for Craft Selection		
Maintenance	92	57.5
Availability	31	19.4
Efficiency	21	13.1
Fishing Ground	10	16
Cost	5	3.1
Safety	1	0.6
Sources of Fishing Craft		
Cooperative Society	82	51.3
Government Donation	23	14.4
Inherited	23	14.4
Self-Fabricated	11	6.9

Borrowed/Rented	11	6.9
Non-Governmental Organization	4	2.5
Gift	6	3.8
Factors Determining Gear Type		
Targeted Species	124	78
Cost	20	13
Fish Around Season	14	9
Seasonal Factors	2	1

Most respondents (76.9%) owned fishing crafts, with planked canoes being the most common (75.6%), followed by gourds (14.4%), dug-out canoes (6.9%), and half dug-out canoes (3.1%). This dominance of planked canoes aligns with findings by Obande *et al.* (2010) and Ibrahim and Ogueji (2017), reflecting affordability and adaptability to local conditions.

Paddles were the primary means of propulsion for 76.9% of respondents, while only 23.1% used outboard engines. Of those using engines, 75% operated 15HP models, with the remaining 25% using 25HP, indicating limited access to higher-capacity engines due to cost and river depth constraints. Similar observations were made by Ago and Tafida (2005) who linked the low use of motorized craft to financial limitations.

Flat-bottomed boats were overwhelmingly preferred (96.3%) for their stability and ease of use in shallow waters. V-bottom boats were used by just 3.8%. Most crafts had been in use for 4–6 years (66.3%), suggesting long-term reliance on traditional vessels. Key factors influencing craft choice included ease of maintenance (57.5%), availability (19.4%), and efficiency (13.1%), with other considerations being cost, fishing ground suitability, and safety. These aligned with the findings of Nuhu and Yaro (2005) on functionality and affordability driving artisanal fishers' preferences.

Gear selection was primarily based on targeted species (78%), while cost (13%) and seasonal availability (9%) also played roles. Crafts were mostly acquired through cooperative societies (51.3%), followed by government donations and inheritance (14.4% each), highlighting the importance of community support systems in equipment access.

Challenges Faced by Fishermen in Lower River Niger at Itobe, Kogi State

The fishermen operating in the lower River Niger at Itobe faced a broad range of challenges that negatively impact their fishing activities. Table 4 presents the challenges faced by the fishermen in the study area.

Table 4. Challenges Faced by Fishermen in Lower River Niger at Itobe, Kogi State

Constraint	**VS**	**S**	**NS**	**NC**	**Mean Score**
High Cost of Fishing Materials	40	92	23	5	3.04*
Craft Theft	37	111	10	2	3.14*
Gear Theft	93	46	14	2	3.38*
Catch Theft	99	47	10	4	3.51*
Poor Durability of Fishing Materials	25	43	92	1	2.57
Fishing Materials Inadequacy	46	25	85	4	2.71
Gear Inefficiency	21	112	23	4	2.94
Gear and Craft repair	14	106	37	3	2.82
Credit Facilities	21	115	19	5	2.95
Tearing of Nets on Fishing Ground	92	51	16	1	3.46*

Footnote

VS: Very Serious, S: Serious, NS: Not Serious, NC: No Concern,

*Significant challenges based on mean score above 3.0

Among the most significant constraints identified were catch theft (mean score 3.51), gear theft (3.38), and the tearing of nets on fishing grounds (3.46), all of which had mean scores above 3.0, indicating widespread severity. These challenges aligned with the findings of Tagago *et al.* (2011) and Kwen *et al.* (2013) who reported similar issues among artisanal fishers in other parts of Nigeria. The high cost of fishing materials had a mean score of 3.04, reflecting the financial burden fishermen face in acquiring and maintaining essential gear. Craft theft (mean score 3.14) and gear theft (mean score 3.38) were also critical issues, highlighting a significant lack of security and protection of fishing assets. These problems not only raise operational costs but also reduce

profitability, as fishermen are forced to frequently replace stolen items. These findings are consistent with Omorinkoba *et al.* (2021), who emphasized the vulnerability of artisanal fishers to theft, especially in rural fishing communities.

Catch theft, with a mean score of 3.51, was the highest-rated constraint, underlining its significance as a direct threat to income and food security. Poor durability of fishing materials had a mean score of 2.57, suggesting that much of the gear available is not built to withstand extended use, leading to frequent replacements and increased long-term costs. Similarly, fishing materials inadequacy (mean score 2.71) and gear inefficiency (mean score 2.94) reduced fishing effectiveness and productivity. Repairing gear and crafts was also a concern (mean score 2.82), as repair downtime can disrupt fishing operations significantly.

Limited access to credit facilities (mean score 2.95) further constrains the ability of fishermen to invest in improved gear or scale their operations, keeping many trapped in low-yield, subsistence-level practices. The tearing of nets on fishing grounds, with a high mean score of 3.46, was also frequently reported as a barrier to efficient fishing, increasing costs and labor required for repairs.

These findings echo the broader struggles of Nigeria's artisanal fishing communities, as documented by Nwabeze and Erie (2013), and call for targeted interventions to improve access to durable equipment, credit facilities, and environmental management initiatives.

4. CONCLUSION AND RECOMENDATIONS

Conclusion

This study highlighted the socio-economic characteristics, gear and craft usage and the operational challenges faced by artisanal fishermen in the lower River Niger at Itobe, Kogi State, Nigeria. The findings showed that artisanal fishing in the area is largely youth-driven and male-dominated, the fishermen use diversity of fishing gears and crafts with cast nets and planked canoe as the most dominantly used. Majority of the fishermen propel their crafts by the use of paddles reflecting limited access to motorized alternatives. Frequent replacements of gears and crafts as a result of poor quality in their make can cause increased long-term costs. Similarly, fishing gears and crafts inadequacy and inefficiency reduce fishing effectiveness and productivity. Repairing gear and crafts can disrupt fishing operations significantly. The aforementioned points place the fishermen operating in that area at subsistence level of operation.

Recommendations

Government and non-governmental organizations should facilitate access to durable gears and crafts through subsidies, credit schemes or cooperative societies to reduce gear-related inefficiencies and financial burdens. They should enhance security, provide support to the farmers through extension services especially on new technology in fishing gears and crafts and their operations.

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