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Impediments to Small Scale Artisanal Fisheries Development in Nigeria: Location and Category-Specific Evidence from Kogi and Bayelsa States

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Abstract

The constraints to artisanal fishing in Kogi and Bayelsa States, Nigeria were investigated to expose priority attention areas for the different categories (by crafts) of fisheries. The cluster sampling method was adopted in selecting 81 and 178 artisanal fisher folks respectively from the two states. Mean score analysis was employed in ranking the constraints. In both states, the need for improvements in technology, credit and extension services was compelling. On peculiarities by states, all categories of the fisher folks in Kogi state perceived poor catches and high cost of gears and equipment as serious impediments. The Craft-less Fisheries (CF) operators in Bayelsa state particularly, perceived environmental pollution as a pressing problem. Investment in crafts and funds through the provision of grants/credit is canvassed for the two states. The enterprises in Kogi State will benefit from subsidies on gears and equipment, in addition to landing-enhancing strategies like the enforcement of conservation rules. The fisher folks in Bayelsa States, especially the CF operators will benefit from the prompt cleaning up of polluted areas- and adequate compensations; motorized crafts will aid their movements beyond polluted areas. These investments should be complemented with improved extension services to aid in the transfer of improved technologies and skills.

Keywords: constraints, ranks, artisanal fisheries categories, Kogi, Bayelsa,

Introduction

Fish are mostly healthy, generally more acceptable, and contain important nutrient elements. They are also easily digestible, leading to low wastage. This is in addition to the fact that it has numerous nutritional and health benefits (Tilami and Sampels, 2017). Due to its relative cheapness on a per-weight basis, its general acceptability, and nutritional endowments, fish is sought out as a source of animal protein. Aquatic food features prominently in the dietary protein (nutrition) of billions across the globe especially the poor and plays a vital role in their overall well-being (FAO, 2018). It constitutes a substantial portion of animal protein consumed and has higher per capita consumption than any livestock products in Nigeria.

The Nigerian consumption of fish increased at an average rate of 3.5% per annum from 6.970kg in 1975 to 9.096kg in 1985 (Oladimeji *et al*, 2014). A downward trend in

total per caput consumption of about 7.52kg in 2011 was recorded in 2011 (Awoyemi & Ajiboye, 2011). By 2017, this consumption level had increased to 13.3kg per capita per year but it is still dwarfed by the world average of 20.3kg/capita/year (FAO, 2018). A huge percentage of fish consumed in the country is imported (Onuche *et al*., 2015). Thus, rapid increase in production is needed to stem the tide of foreign exchange loss and contribute more to the nation's economic development.

The fisheries Subsector contributes about 3.5% to the country's annual gross domestic product (GDP), which translates to 10% of the agricultural sector's GDP and provides jobs for millions (Bradley *et al*, 2020); the artisanal subsector accounting for more employment, in addition to being the core of local fish supply. Artisanal fishery (both coastal and inland) occupies a significant position in the Nigerian economy and constitutes the most significant sub-sector in terms of the number of people employed and contribution to total fish output in the country (Oladimeji *et al*., 2014). Thus the artisanal subsector plays a crucial role, a more crucial role than the aquaculture sector. Agbebi *et al*. (2020) reported that artisanal fishing plays a role in ensuring national food security, development of enterprises, and earning of foreign exchange.

Artisanal fishing covers the operations of small-scale canoes, fisheries operating in the coastal areas, creeks, lagoons, inshore water and the inland rivers. It is characterized by low capital outlay, low operational costs, low technology application, and is highly labor-intensive (Martinho, 2020). Artisanal fishers use the traditional dug-out canoes or pirogue ranging from 3–18 meters in length, while the gears used include cast nets, hand lines, basket traps, long lines, set gillnets and beach and purse seines. The operating range of small-scale fisheries is in shallow waters and the canoes are more often than not un-motorized (Coates, 2000). At the very least level of sophistication, it may also be void of the use of any craft, in which case fishers rely on the use of dragnet by the water-side, use of hooks and trapping of fish using baskets.

This sector provides the core of the aquatic food supply in the country (Onuche *et al*., 2015). This position of artisanal fisheries has however been witnessing a steady decline. The artisanal contribution to total fish supply has been declining- from about 98% within the 1960-1985 era to about 87% in the 2000 to 2016 period (Onuche & Ogbe, 2020). Due to this continuous decline, the sufficiency index in aquatic food has been greatly affected. The Food and Agricultural Organization [FAO] (2007) reveals that Nigerian self-sufficiency in fish production was as high as 98.8% in 1983 but dwindled between 29.4% and 40% till the year 2005, and as of 2016, only 30% of Nigerian fish demand was sourced locally (FAO, 2018; Proshare, 2016), indicating dwindling self-sufficiency status. However, the potential for the artisanal fisheries sector is huge (Nwankwoala, 2012; Onemolease, & Oriakhi, 2011).

Repositioning the sector for optimal performance requires an understanding of the issues impeding its development. While it is known at the general level that poor capitalization and the rudimentary nature of artisanal fisheries have limited the expansion of the subsector (Onuche *et al*., 2015), constraints have been documented

for specific areas. George *et al*. (2021) analyzed the socioeconomics and constraints of artisanal fisheries in some selected local governments of Rivers State. Tasie *et al.* (2020) also documented constraints to the sector in Rivers State. Similarly, Ngodigha et al. (2018) documented the status and constraints of artisanal fisheries in Ekperiama fishing area of Niger Delta. Bonjoru *et al*. (2019) in a study on the characterization and constraints of artisanal fishery in the upper Benue River basin also reported some constraints. The constraints so reported vary in type, intensity, and across the study populations taking into consideration the different craft categories. As canvassed by Onuche *& Ogbe* (2020), it becomes necessary to identify priority intervention areas for specific populations. Specifically, this study ranked the constraints to different fishing categories in the Kogi and Bayelsa States of Nigeria.

Other works lumped up constraints without consideration for the various categories of fisheries. However, it is possible that across areas, the different categories of fisheries operators perceive constraints differently. In this study therefore, we interviewed fishermen in various categories and evaluated their perceptions according to categories. This way, specific policy attention is given to specific categories of fishermen in particular areas and blanket policy engendering is avoided. The categories: Motorized Fisheries (MF): artisanal fisheries enterprises that engage the use of engine-propelled craft; Manual Propelled Fisheries (MPF): those artisanal fisheries enterprises that use manually propelled crafts, and Craft-less Fisheries (CF): artisanal fisheries operations without the use of any craft; these mainly rely on hooks and use of nets by the shores of rivers and streams.

Methodology

Sampling procedure

A 3- stage sampling technique was employed in selecting respondents for this study. The first stage involved the purposive selection of Kogi State (central) and Bayelsa State (southern) owing to the large bodies of water found within them and the high level of fishing activities. The river Niger and its major tributary in Nigeria, the river Benue form their confluence at Lokoja, Kogi State, after entering the state from various points. The resulting river Niger eventually empties into the Atlantic through its distributaries in the Niger Delta States, including Bayelsa. The next stage was the selection of Local governments with substantial fishing activities in the two states. In Kogi State, these include Omala, Ida, Kogi, Koton-karfe, Ibaji, and Lokoja, while in Bayelsa State, Brass, Yenagoa, Kolokuma/Opokuma, Sagbama, Ekeremor, Southern Ijaw, and Ogbia were identified as the local governments with substantial fishing activities. The cluster sampling technique was eventually employed owing to the absence of sample frames since the enterprises in these areas were not organized or documented. The clusters of communities with significant fishing activities were selected for questionnaire administration. Finally, the artisanal fishermen in the clusters were selected for questionnaire administration. From the selected clusters, 81 and 178 fishermen were randomly selected from Kogi and Bayelsa States respectively

Method of Data Analysis

A 5-point Likert-type scale was used to assess the perceived seriousness of constraints to artisanal fishing in the states. The scale ranged from 'Extremely serious' with a score of 5, 'Very serious'= 4, Serious= 3, 'Not serious' = 2 to 'Not a problem'=1. Factors with mean scores of ≥3.00 were considered serious.

The mean response for each item was calculated using the following formula:

Mean score= $\frac{\sum FX}{n}$

Where **F** is the frequency of responses for each level of the constraint, **X** is the scale point of that level and **n** is the number of respondents. The constraint were ranked to indicate their severity using the mean scores calculated for each. The ranking was used to identify the priority status of each constraint.

Results and Discussion

The selected socioeconomic characteristics (Table 1) show that the fisher folks in the two sampled populations do not differ significantly in terms of these characteristics aside from average age where the fisher folks in Kogi state had significantly higher value. Furthermore, there is a preponderance of male fisher folks who on average, are in their active economic ages. These fisher folks are also fairly educated and have high levels of artisanal fishing experience. Also, the fisher folks in Bayelsa State have made greater capital investment in artisanal fishing as indicated by the levels of craft engagement and sophistication. About 80% of the fisher folks in Bayelsa use a form of craft. Conversely, over 44% of the fisher folks in Kogi state do not employ any form of craft in their fishing endeavours.

Table 1: Socio-economic Characteristics of Fisherfolks in the Study Areas

	Kogi	Bayelsa	Difference
Age (mean)	40.3	35.0	5.3(t=2.06)
Sex (%)			
Male	77.8	82.0	
Female	22.2	18.0	
Size of household (mean)	9	10	1(t=0.98))
Average years of Experience in artisanal fishing	24.7	23.4	1.3 (t=1.31)
Level of formal Education (%)			
No education	8.6	11.8	
Pre-secondary education	42.2	46.6	
Secondary education	32.1	27.0	
Post-secondary education	17.1	14.6	
Fisheries category by Craft type			
Motorized fisheries	16.0	29.2	
Manually propelled fisheries	39.6	50.0	
Craft-less fisheries	44.4	20.8	

Aside from poor sales and the high cost of fuel, most of the constraints considered fall within the "serious" category. The ranks of those that fall into this category were used to indicate their severity, which in turn indicated the priority attention status. Generally, following the ranking, inadequate technology was the foremost priority attention area in the two sampled populations. Expectedly, it is the most serious among the lower categories of sophistication. This constraint was perceived as the 3rd and 5th most pressing one among the MF operators in Kogi and Bayelsa States respectively. Expectedly, it is the most serious among the lower categories of sophistication. George *et al*. (2021) identified rudimentary technology as a major constraint to fishing folks, implying that craft sophistication levels is associated with discrepancies in catches.

Table 2: Mean Scores and Rank of Constraints to Small-scale Artisanal Fisheries Enterprises in Kogi and Bayelsa States

	Mean score					
	Kogi (N=81)			Bayelsa (N=178)		
Constraints	MF	MPF	CF	MF	MPF	CF
Absence of cold room	3.6 (6th)	3.3 (9th)	3.3 (8th)	3.1 (11th)	3.1 (10th)	2.5 (10th)
Funding and credit problem	4.8 (1st)	4.5 (2nd)	4.5 (3rd)	4.7 (2nd)	4.3 (3rd)	4.3 (3rd)
High cost and scarcity of fuel	4.0 (4th)	2.6 (12th)	2.8 (10th)	2.9 (12th)	2.9 (11th)	1.8 (13th)
High cost of fishing gears and spare parts	4.6 (2nd)	4.2 (3rd)	4.0 (4th)	3.8 (7th)	3.6 (6th)	3.5 (6th)
Environmental pollution	2.9 (10th)	3.6 (7th)	3.5 (7th)	3.9 (6th)	4.0 (4th)	4.5 (2nd)
Poor extension service	4.4 (3rd)	4.1 (4th)	3.9 (5th)	4.8 (1st)	4.4 (2nd)	4.1 (4th)
Flooding	3.4 (8th)	3.0 (10th)	2.6 (11th)	3.4 (9th)	3.3 (8th)	3.2 (8th)
High cost of hired labour	3.5 (7th)	3.8 (6h)	3.1 (9th)	4.5 (3rd)	3.5 (7th)	3.4 (7th)
Tax and charges	3 (9th)	3.5 (8th)	2.2 (12th)	3.6 (8th)	3.2 (9th)	2.9 (9th)
Poor catch	4.6 (2nd)	4.2 (3rd)	4.6 (2nd)	3.2 (10th)	2.3 (12th)	2.4 (11th)
Poor sales	2.6 (11th)	2.7 (11th)	2.6 (11th)	2.0 (13th)	1.9 (13th)	2.0 (12th)
Poor fishing handling and processing equipment	3.8 (5th)	3.9 (5th)	3.7 (6th)	4.1 (4th)	3.8 (5th)	4.0 (5th)
Inadequate technology	4.4 (3rd)	4.6 (1st)	4.8 (1st)	4.2 (5th)	4.5 (1st)	4.7 (1st)

The level of technology, especially in crafts and gears is linked with access to funds. Incidentally, poor access to credit is perceived as highly pressing and was more serious for the CF especially, in Kogi State. Okeowo *et al*. (2015) identified poor access

to credit as the biggest barrier to small-scale fishermen in Lagos. Tasie *et al*. (2020), Ngodigha *et al.* (2018), Setsoafia *et al*. (2017), Oladimeji *et al*. (2014a), Baruwa *et al*. (2012) and Onemolease and Oriakhi (2011) also made similar submissions. The need for credit in developing the artisanal sector is important. For example, if fishermen have access to credit and grants, they may be able to operate at higher levels of craft sophistication. Craft sophistication on the other hand has been seen to correlate with landings, which, incidentally also perceived as a very serious constraint, for all categories of fisher folks in Kogi State. For the Bayelsans, probably due to greater access to water bodies, poor landing was not seen as a major problem. Agbebi *et al*. (2020) advocated the relaxation of the conditions for granting credit to enable easier access for the development of the sector. The aquaculture sector does not suffer so much from government policies on credits. As Bradley *et al*. (2020) noted, Nigerian aquaculture is incentivized, and thus, as Onuche *et al*. (2020) noted, is fast growing. Onuche & Ogbe (2020) reported that artisanal fisheries appear neglected in the drive towards improved fish production.

Poor extension services is also placed high in the order of priority of needs for the two sample populations, and appears as a more serious constraint for fisher-families in Bayelsa State than it is for those in Kogi State where it was least pressing among the CF. Tasie *et al.* (2020), Ngodigha *et al.* (2018), and Oladimeji *et al.* (2014) also reported poor extension delivery as a constraint to artisanal fishing. Extension delivery aids increased production and management in agriculture. The extension delivery system achieves this objective by relaying new inputs and skills, which are necessary for improved production and consequently improved livelihood. Sonjiwe *et al.* (2015) in a study of artisanal fishing in Kafue District in Lusaka, reported that the acquisition of skills like mending of nets and making of boats enabled the expansion of fishing businesses, and led to improved livelihood. Such skills could be conveyed through the extension delivery system.

Furthermore, environmental pollution was perceived as a highly pressing problem in Bayelsa State, especially among MPF and CF enterprises. This may be due to their inability to access unpolluted water bodies. Baruwa *et al*. (2012) reported water pollution as a constraint to artisanal fishing. Ngodigha *et al.* (2018) reported that crude oil pollution, including the use of chemicals to fish pose serious constraints to the artisanal fishery in the Ekperiama fishing area. The Niger Delta continues to be plagued by crude oil spillage and perennial floods. This impediment was not a serious problem for especially the MF fisher folks in Kogi state where the impact of flooding is relatively minimal and there are no incidents of oil pollution.

The high cost of materials and equipment, in the present study, was perceived as a serious problem for all the categories of fisher folks in the two populations but was more pressing in Kogi State. Onemoleases and Oriakhi (2011) reported the high cost of materials as the most pressing impediment to artisanal fisheries in some selected communities of Delta State, Nigeria. George *et al*. (2021) and Anyanwu *et al*. (2009) also found the high cost of materials like nets, as serious constraints.

The absence of cold rooms was also recorded as a major constraint in both sampled populations. Anyanwu *et al*. (2012) also found the absence of cold rooms as a constraint to artisanal fishing in Onitsha. Such facilities will assist in the preservation of fresh fish which elicits premium pricing. Baruwa *et al*. (2012) and Okeowo *et al*. (2015) also made similar findings. The absence or inadequacies of cold rooms may not be unrelated to poor power supply which also loaded as a serious problem, especially for Kogi state which incidentally had the higher loading for the absence of cold room.

Conclusion and Recommendation

This study has shown the benefits of area/category-specific analysis of enterprises like artisanal fisheries, especially where intervention is envisaged- and makes a case for further studies in other states so as to guide against blanket policy engendering and implementation. The study has shown the peculiarities of constraints to artisanal fishing enterprises and their levels of severity among fishermen across different craft categories in Kogi and Bayelsa States of Nigeria. It was noted that in both states, the needs for technology and credit among the fisher folks were compelling. Another general high-priority problem was poor extension services. On peculiarities by states, the study found that all categories of the fisher folks in Kogi State perceived poor catches as a major problem. These fishermen also perceived the high cost of gears and equipment in a similar manner. Furthermore, the CF operators in Bayelsa state particularly perceived environmental pollution as a pressing problem as well. Various forms of investments are needed to improve the lots of fisher folks across the three craft categories in the two sampled populations and by implication, the artisanal fisheries sector. The artisanal fisher folks in Kogi State will need subsidies for gears, and equipment in addition to credits/grants to purchase crafts and necessary technology. The technology might enhance catches. In addition, landing-enhancing strategies like conservation rules are canvassed. In addition to the credit/grants for advanced technology, the fisher folks in Bayelsa especially the CF will need assistance with environmental pollution mostly occasioned by spillages. Such assistance will come in the form of cleaning up of polluted areas. More sophisticated crafts may also aid their movements beyond polluted areas. These investments should be complemented with improved extension services to aid in the transfer of improved technologies, skills, and management ideas.

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