Profitability and poverty status of small-scale artisanal fishing families in fresh and brackish water communities in Nigeria

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Abstract The small-scale artisanal fishing families in fresh and brackish water communities in Nigeria were investigated. The enterprises were classified according to the level of craft sophistication/ involvement in Motorized Fisheries (MF), Manual Propulsion Fisheries (MPF), and Craft-less Fisheries (CF). The findings indicated that the heads of these fishing families had low education, were mostly active, and highly experienced. Across the categories, the average Bayelsan fisher family yielded more fish per month (MF = 739.6 kg, MPF = 553.2 kg, CF = 299.2 kg) than their Kogi counterparts (MF = 571.5 kg, MPF = 371.4 kg, CF = 200.1 kg). The profitability analysis indicates that while the MF enterprises had the highest net returns per month across the two states (₦145,803.5 for Kogi State and ₦328,600 for Bayelsa State), owing to larger catches, the CF had the highest margin per kilogram (₦477.2 for Kogi State and ₦724.2 for Bayelsa State), owing to lower production costs. Incidence of income poverty was highest among CF households, least among the MF households, and more prevalent in Kogi State. Investment in crafts may increase fish production and reduce poverty among artisanal fishing families.

Keywords: Aquatic foods, Costs, Craft-less, Returns, SDG2

Introduction

The United Nations Sustainable Development Goal (SDG) number 2, which seeks to end hunger and improve nutrition, highlights the complex linkages between food security, nutrition, rural development, and sustainable agriculture. The nutritional component of this goal is crucial in a developing country like Nigeria challenged by malnutrition and starvation (Matemilola and Elegbede, 2017). Of particular interest in the Nigerian malnutrition challenge is protein deficiency (Oladimeji *et al*., 2015). The animal protein component is however more crucial (Awoyemi and Ajiboye, 2011), but its sources are

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generally more expensive than their plant counterparts. Aquatic foods however constitute cheaper alternative on per weight basis (Satia, 1989). Aquatic foods are also healthier, easily digestible and generally acceptable. For these reasons, fish is sought out as a source of animal protein (Khan *et al.,* 2021; Petricorena, 2014).

World over, aquatic food features prominently in the dietary protein, especially among the poor (FAO, 2018), and constitutes a substantial portion of animal protein consumed in Nigeria where it has higher per capita consumption than any other livestock product. Nigeria's yearly per capita fish consumption increased from 6.97 kg in 1975 (Oladimeji *et al.,* 2014a; Awoyemi and Ajiboye, 2011) to 13.3 kg in 2017 (FAO, 2018), but is less than the world average of 20.3 kg/capita/year.

The rapid increase in Nigeria's population has resulted in a huge increase in the demand for animal protein. This has provided an opportunity for poverty reduction through increased production (Onuche, 2021), and further contribution to the economy. At the moment, the Nigerian fisheries sector contributes about 3.5 % to the country's annual gross domestic product (GDP) and provides jobs for millions (Bradley *et al*, 2020). Thus, it has been noted that fish production could be leveraged to reduce poverty (Abbas and Ahmed, 2016). This has caused aquaculture to bloom, especially due to incentives from the government (Onuche *et al*., 2020, Bradley *et al*., 2020), and has led to the reduction of poverty incidence among participants (Abbas and Ahmed, 2016). This sector has recorded tremendous growth compared to the artisanal sector (Onuche *et al*., 2020).

Traditional artisanal fishing covers the operations of small-scale canoes and is by nature rudimentary and labour-intensive (Adedokun *et al*., 2006, Bolarinwa, 2014). Traditional artisanal fisher folks mostly operate in shallow waters around coastal areas and inland waters, are not motorised in most cases (Coates, 2000), and may even be craft-less. Agbebi *et al*. (2020) reported that artisanal fishing plays a role in ensuring national food security, development of enterprises, and earning of foreign exchange.

Despite their significant contribution to national development through the provision of cheap animal protein and employment generation among others, the livelihood of fishermen remains deplorable. Ahmed *et al.* (2021) noted that these fishermen are amongst the most vulnerable as their occupation is characterized by food insufficiency, limited access to land for lasting habitation, high disease incidence and poor education/training with attendant low financial status. Most of these factors characterise the fishermen operating in Nigeria. Other factors linked to the vulnerable status of fishermen include excessive exploitation and poor administration. Consequently, low incomes and

high poverty rates have been reported among artisanal fishermen in Nigeria (Nandi *et al*., 2014, Tafida *et al.,* 2013).

Given Nigeria's potential in terms of huge water resources (Sogbesan and Kwaji, 2018)**,** growing demand and youthful population, the development of artisanal fisheries can aid sustainable fish production and poverty reduction. Oyase and Jemerigbe (2016) and Okpeke and Akarue (2015) have noted the role of aquaculture in food security and poverty reduction, indicating its profitability and job creation potentials. Similarly, increased artisanal production can further assist in the reduction of poverty since it has the potential to create jobs, improve on livelihood statuses and enhance the sustainability of water resources (Oladimeji *et al*., 2015), leading to enhanced production. In fact, its poverty reduction potentials may even be higher as for aquaculture based on the lower cost of production, length of the production cycle, and even the profitability level. Baruwa *et al.* (2012) have shown that the artisanal sector, compared to the aquaculture sector have a higher benefit-cost ratio in Lagos state. Thus, the artisanal sector holds promise in poverty reduction.

Furthermore, it is necessary to put the estimate of profitability in perspective by relating it to the poverty status of the operators in order to explore the poverty-reducing capacity of the enterprise. Abbas and Ahmed (2016), using the poverty count index proposed by Foster, Greer and Thorbecke (FGT) in 1984 have found aquaculture enterprises to be profitable and capable of reducing poverty. The available work on the poverty level of artisanal fisheries operators (Oladimeji *et al*., 2014b) is restricted to the profitability of the enterprises, lumps all artisanal fisheries enterprises in one category, pays no attention to the level of craft sophistication, and, is based on relative poverty line. A disaggregated poverty analysis for different categories of fishermen with a global perspective on the poverty line may elicit a clearer picture of poverty among fisher families.

An understanding of the estimates of profitability and poverty status among classes of crafts and between the regions will guide policy makers in the formulation of enterprise type/area-specific policy as against the blanket national policy being implemented. The study investigated the profitability of artisanal fisheries in Kogi and Bayelsa States by estimating the margin on a unit of catch (unit margin) as well as the monthly net returns for an enterprise and used the monthly net return to estimate the poverty status of the fishing households.

Materials and methods

Sampling

A 3-stage sampling technique was employed in selecting respondents for this study. In the first stage, Kogi State in North-central Nigeria having fresh water bodies and Bayelsa State in South-south Nigeria having brackish water bodies were purposively selected for the study owing to the large bodies of water found within the two states as well as the high level of fishing activities. The next stage was the selection of local governments with substantial fishing activities in the fresh water and brackish water environment. This included Idah, Ibaji, Kogi and Omala LGAs in Kogi state and Sagbama, Nembe, Brass, Southern Ijaw and Ekermor in Bayelsa State. A cluster sampling technique was thereafter employed owing to the absence of sample frames, as the enterprises in the areas were not organised or documented. The clusters of villages with significant fishing activities were selected for questionnaire administration. Finally, the artisanal fishermen in the clusters were selected for questionnaire administration. A total of 81 and 178 fishermen were randomly selected from Kogi and Bayelsa States respectively. Measurements of catches and costs/returns were based on monthly averages for 2020.

Analytical techniques

Profitability analysis

The profitability of artisanal fishing enterprises in the study populations was estimated following the Unit Margin (UM) and the Net Returns (NR) approaches. The difference between Total Revenue (TR) and Total Variable Cost (TVC) is the Gross Margin (GM) which could be obtained using the method outlined by Arene (2002). The UM which is the margin per kilogram in this case was estimated as follows: UM= TR/kg – TVC/ kg………………… i
The average total monthly profit was estimated using the Net Returns (NR) approach. NR= TR – TC …………………………. ii
Where: NR= Net Returns per month, TR =Total Revenue per month
TC =Total Cost of production per month. The TC was arrived at by adding the Total Variable Cost to the Total Fixed Cost/per month (costs of maintenance, etc). The straight-line method was used to estimate the depreciation. This is given as:

$$\frac{\text{Cost of item} - \text{ salvage value}}{Useful\ life}$$

Poverty analysis

The FGT measure of poverty index was employed in classifying the fishing families into poor and non-poor. To do this, we followed Oladimeji *et al*. (2014b). The poverty line adopted was however the international poverty

line of 1.90 USD per head per day as against the relative poverty line. The monthly Net Returns was divided by 30, and then by the household size to estimate the amount of money available for each household member per day. Those that fall below the 1.90 Dollar per day mark were classified poor. The analysis was undertaken using USD (1 USD was equal to *455.56* Naira in 2020- the period in which the research was conducted).

$$P\alpha = 1/N \sum_{i=1}^{Q} \left(\frac{Z-Y_i}{Z}\right)^{\alpha} \quad\text{.....................iii}$$

Where: N = sample size, Z= poverty line, Q = number of households below the poverty line, Y = Income of the ith person and α = the FGT parameter which takes the value of 0, 1 and 2 depending on the degree of concern about poverty. The factor in parenthesis is the proportionate shortfall of income below the poverty line. When the value of α is increased, the concern about poverty is captured. For instance,
When α = 0,

$$P_0 = \frac{1}{N}Q = \frac{Q}{N} = H \quad\text{.......................... iv}$$

Where: H is the headcount ratio. This index measures the incidence of poverty. This study only estimated the incidence of poverty; hence the use of FGT poverty measures was restricted to Eqn. iv.

In undertaking these analyses, we categorized the fisher folks according to fishing crafts used: Motorized Fisheries (MF), Manual Propulsion Fisheries (MPF), and Craft-less Fisheries (CF).

Results

Characteristics of fisher-folks in Kogi and Bayelsa States

The findings on some characteristics of the fisher folks in the sampled populations (Table 1) indicated that the bulk of the fishing families in the two study populations was male. Age-wise, there were older fisher folks in Kogi State (40.3 years) than in Bayelsa State (35.0 years). Furthermore, about 91.4% and 89.9 % of the heads of the fishing families in the two states had some formal education respectively., with 32.1% and 27% having completed secondary school in both States respectively, while a handful of them had post-secondary education. The average household sizes were 9 for Kogi State and 10 for Bayelsa

The means of the years of the fishing experience in the two states were 25 and 23 respectively. The distribution according to fishing experience indicated that the majority of the fisher folks in the two states have been undertaking artisanal fishing for around 30 years. As regards operational crafts, over 44% of the fisher folks in Kogi State do not use any form of craft. In

Bayelsa State however, only about 21% of the folks undertake craft-less fishing.

Table 1. Some characteristics of fisher-folks in Kogi and Bayelsa States

Characteristics of head of household	Kogi State (n= 81)		Bayelsa State(n=178)	
	F	%	F	%
Sex				
Male	63	77.8	146	82
Female	18	22.2	32	18
Age (yrs.)				
15 – 30	13	16	59	33.1
31 – 45	38	46.9	67	37.6
46 – 60	30	37.0	52	29.2
Mean	40.3		35.0	
Education				
No formal education	7	8.6	18	10.1
Completed Primary School	18	22.2	58	32.6
Unable to complete secondary school	17	21.0	24	13.5
Completed Secondary School	26	32.1	48	27.0
OND, NCE, Degree	5	6.2	19	10.7
Post Graduate	8	9.9	11	6.2
Household size				
1 – 5	9	11.1	33	18.5
5 – 10	48	59.3	55	30.9
11 – 15	18	22.2	47	26.4
16 +	6	7.4	43	24.2
Mean	9		10	
Fishing Experience				
1 -10	5	6.2	23	12.9
11-20	14	17.3	34	19.1
21-30	30	37.0	50	28.1
31+	32	39.5	71	39.9
Mean	24.70		23.20	
Craft used				
Motorized canoe	21	26.0	52	29.2
Non-motorized canoe	24	29.6	89	50.0
No craft	36	44.4	37	20.8

Source: Analysis of field survey data, 2020

Costs and return for artisanal fishing in Kogi and Bayelsa States

The cost and return analysis presented the estimates on catches, costs, revenue and profitability for artisanal fisher families in Kogi and Bayelsa States (Table 2). The average monthly quantity of fish caught for MF in Kogi per family was 571.5 kg. For the MPF operations, 371.4 kg was recorded while the average CF, operator landed 200.1 kg. These were far less than their Bayelsan

counterparts' respective catches of 739.6 kg, 553.2 kg and 299.2kg. In Kogi State, the costs of labour (126,000 Naira), oil/fuel (84,000 Naira) and cost of craft (60,000 Naira) were the highest cost for MF. For the MPF, the highest cost was also incurred on labour (108,000 Naira). Next to this was the feeding cost (33,600 Naira). Labour cost (54,000 Naira) and feeding cost (16,800 Naira) were also the highest cost incurred by CF enterprises in Kogi State. Among the MF in Bayelsa State, the cost of oil/fuel (102,000 Naira) was next to that of labour (150,000 Naira) while the cost of crafts (75,000 Naira) was the third highest. Among the MPF, the highest costs were for labour (120,000 Naira) and cost of canoe (45,000 Naira), followed by the cost of feeding (36,000 Naira). Among the CF, the cost of feeding (18,000 Naira) was next to that of labour (60,000 Naira). In sum, the TVC per kg of catch for Kogi State were 436.74, 443.46 and 371.80 Naira for the MF, MPF and CF enterprises respectively. The respective ATVC estimates for Bayelsa State were 401.60, 341.60 and 275.70 Naira. The fixed cost estimates for the respective categories of artisanal fishing enterprises were 89,800 Naira, 46,000 Naira and 10,800 Naira for the sample population of artisanal fishing enterprises in Kogi State. In Bayelsa State, the corresponding figures were 114,000 Naira, 68,500 Naira and 14,000 Naira. The total costs were also correspondingly higher for the different categories of fisheries in Bayelsa State.

The profitability levels for all categories of fisher families in Kogi State, the unit margin was highest (477.2 Naira) for the CF enterprises. This was followed by the MPF (412.3 Naira). In Bayelsa State, the unit margin for the CF category was 724.3 Naira being the highest, followed by that of the MPF was 658.4 Naira and that of the MF was 598.4 Naira.

The monthly NR the MF, MPF and CF for the sampled population in Kogi State were 145,803.5 Naira, 104,618.6 Naira, and 84,684.9 Naira respectively. For the sample artisanal fishing enterprise population in Bayelsa State, the respective monthly NR were 328,600 Naira, 274,700 Naira, and 202,700 Naira respectively. The analysis of poverty arising from this is presented in Table 3.

Poverty status of fishing families in Kogi and Bayelsa States

The poverty headcount ranged from 24% among MF enterprises to 94% among CF enterprises, for the sampled population of artisanal fisher families in Kogi State. In Bayelsa State, poverty headcount ranged from 0% for the MF category to 8% for the CF families.

Table 2. Monthly costs and return for artisanal fishing in Kogi and Bayelsa States

	Kogi State			Bayelsa State		
	MF	MPF	CF	MF	MPF	CF
A. Return						
Quantity of fish caught (kg per month)	571.5	371.4	200.1	739.6	553.21	299.3
Market price per kg (₦)	849	849	849	1000	1000	1000
Revenue (₦)	**485,203.5**	**315,318.6**	**169,884.9**	**739,600.0**	**553,200.0**	**299,200.0**
B. Variable Costs (₦)						
Labour	126,000	108,000	54,000	150,000	120,000	60,000
Bait	6,000	5,100	3600	9,000	6,000	4,500
Feeding during fishing operations	33,600	33,600	16,800	36,000	36,000	18000
Oil/fuel	84,000	18,000	0.00	102,000	27,000	0.0
TVC	**249,600**	**164,700**	**74,400**	**297,000**	**189,000**	**82,500**
TVC/kg	**436.74**	**443.46**	**371.81**	**401.60**	**341.60**	**275.70**
C. Fixed Cost						
Craft cost	60,000	30,000	0.0	75,000	45,000	0.0
Depreciation	9,800	1,500	0.0	11,500	2000	0.0
Repairs	5000	3500.0	2,800.0	9,500	9,500	5,400
Other fixed costs (Logistics)	15,000	11,000	8,000	18,000	12,000	8,600
Total Fixed Cost	89,800	46,000	10,800	114,000	68,500	14,000
D. Total Cost	**339,400**	**210,700**	**85,200**	**411,000**	**257,500**	**96,500**
Unit margin (AR /kg– AVC/kg)	412.3	405.5	477.2	598.4	658.4	724.3
E. Net Return, NR (TR – TC) [₦]	**145,803.5**	**104,618.6**	**84,684.9**	**328,600.0**	**274,700.0**	**202,700.0**

Source: Analysis of field survey data, 2020

Table 3. Analysis of poverty status of fishing families in Kogi and Bayelsa States

	Poverty incidence (%)	
	Kogi	Bayelsa
MF	23.8	0.0
MPF	87.5	3.4
CF	94.4	8.1
Pooled	74.1	3.4

Source: Analysis of field survey data, 2020
1 USD= 455.56 Naira, Hence 1.90 USD (poverty line) =865.56 Naira

Discussion

Findings on gender in the present study did not deviate substantially from those found in previous studies. Ngodigha *et al*. (2018) found that the

males (70.4%) dominated the sector in Ekperiama area in the Niger Delta. Anyanwu *et al*. (2009) reported that artisanal fishing enterprises are male-dominated in Onitsha North Local government of Anambra State. Bonjoru *et al*. (2019) reported male domination of the enterprise within the Upper Benue River Basin was about 90%. The domination of the enterprise by the male folks may not be unrelated to traditional gender roles and the tedious nature of the enterprise. It may also not be unconnected with the patriarchal society such as presently obtains in the country where access by women to productive resources is usually difficult.

Aminu *et al*. (2017) found a similar mean age of 39 years in a study on the socio-economics of artisanal fish production in the Lower Ogun River Basin areas of Lagos State. Tasie *et al*. (2020) in their analysis of artisanal fishing operations in Degema Local Government Area of Rivers State, also found a similar age. Ngodigha *et al*. (2018) found the majority (40%) of fisher folks to be aged 41-50 years. Bonjoru *et al.* (2019) recorded about the same percentage (36%) of fisher folks to be within the age bracket of 31-40 years in the Upper Benue River basin. The age distribution found in this study indicates that the artisanal fisher families' heads are in their active economic years. This finding indicates the existence of ample human resources needed to improve the level of animal protein supply in the country, as well as reduce the incidence of poverty. The empowerment of the enterprises of these economically viable fisher families, in addition to the enormous water bodies, will be a good combination for fisheries economic development.

Furthermore, the sampled populations of fisher folks in both states were fairly educated. The level of education found, however, does not align completely with findings in other studies. About 32% of the fishing population reported by Bonjoru *et al*. (2019) to have completed primary education is a scenario similar to the data for Bayelsa State. This estimate dwarfs the figure reported for Kogi State. Tasie *et al.* (2020) in the case of Degema LGA of Rivers State reported that the vast majority of the sample population of fisher folks had primary education. On the contrary, Ngodigha *et al*. (2018) however found a worse scenario in Ekperiama area in the Niger Delta where over 66% of the fisher folks did not complete primary school. Okeowo and Dauda (2015) reported that most of the fisher folks in Epe and Badagry areas of Lagos State were mainly illiterate. Education level has been shown to aid enterprise performance.

The household sizes for the two states were, on average, higher than that of the national average of seven. A similar distribution of household sizes has been reported by Baruwa *et al*. (2012) for fish producers in Lagos State whose dominant household sizes ranged from 6 to10. Tasie *et al*. (2020), has

reported a lower household size of 6. The size of a family can influence the level of cash and net returns in a fishing enterprise as more labour is available to cover a greater expanse of water bodies in larger families. In the absence of poor catches due to the level of craft sophistication and accessible water levels, large family sizes may be correlated with poverty. As for experience, head fisher folks in the two sampled populations were highly experienced, having spent over 30 years in the enterprise. Ngodigha *et al.* (2018) reported a similar finding in which 41.90% belonged in the experience class of 21-30 years.

The differences in catches as per the categories of craft use owes much to the fact that those with craft had the advantage of being able to access a further and deeper part of water bodies. This advantage is higher for those engaged in MF. Akanni (2008) reported an average weekly catch for MF of 64.1kg and MPF of 24.1kg and concluded that the catches were poor. The estimates in this study surpass the figures reported by Akanni, even when disaggregated into weekly catches. The large difference between these findings and the ones reported in our study may be due to the fact that our study focused on the family enterprise as against individual fishing enterprises. Location-wise, Bayelsa State fisher folks are able to obtain more catches probably due to the availability of larger water bodies around them than their Kogi State counterparts.

The TVC per kg was higher in Kogi than Bayelsa State in all the categories of enterprises except that of MF. The fact that many families in Bayelsa State are fisher folks thus creates a much bigger market for inputs, with the resulting competition leading to lower unit costs, in addition to higher catches that are able to reduce the cost per kilogram. TVC correlated positively with craft sophistication. The Total Fixed Costs followed the same pattern, but were higher in Bayelsa State for all categories, probably due to the higher volume of catches which may increase wear and tear.

All categories of the enterprise across the two states were profitable. Oladimeji *et al.* (2015) reported that artisanal fishery enterprises in central Nigeria were profitable, and showed that fishermen who imbibed motorized gears made more profit compared to non-motorised ones. Abasilim *et al.* (2020) in their economic study of the value chain of artisanal fishery noted that artisanal fishery was profitable in Lagos. In a study conducted in the Lower Ogun River Basin of Lagos State, Aminu *et al.* (2017) reported a return on investment of 0.61 with an average total cost of ₦115,406.26 per annum and total revenue of ₦185, 990.51, a gross margin of about ₦97,000.000 and profit of about ₦70,000.00. The artisanal fishery was also found to be profitable in Warri South local government area of Delta State (Okpeke and Akarue, 2015), where ₦544,528 was estimated per fisherman per annum. Baruwa *et al.* (2012)

found a margin of ₦271,175 for artisanal producers as against the ₦104,397.07 for aquaculture operators. The revenue and expenses profile of the study of Artisanal fishing operations in Degema Local Government Area of Rivers State also showed the profitability of artisanal fishery (Tasie *et al*., 2020). In a study carried out in the Westside of Ijebu, Ogun State the artisanal fishery was established to have a yearly gross margin of ₦7, 471,857.15 and a net cash flow of ₦7, 447,464.99 for the fishers involved (Kareem *et al*., 2012).

The Upper Benue River Basin study by Bonjoru *et al*. (2019) also highlighted the profitability of artisanal fisheries with 38% of the respondents making at least ₦31,000.00 monthly. Anyanwu *et al*. (2009) found a gross margin of ₦96,002.29 in Onitsha. Abasilim *et al*. (2020) reported a Benefit-Cost Ratio of 1.15 for fisher folks. Gbigbi and Osun (2014) reported a gross margin of N90,496.03, and a net return of N49, 377.18. Okeowo and Dauda (2015) estimated profits of ₦62,200 for Badagry and ₦51,750 for Epe in Lagos. The present study corroborates findings from other studies that artisanal fishing is a profitable enterprise. The profitability of this enterprise across reviewed studies as well as the present study may be due to the minimal risks it faces as a result of the fact that it is a primary extractive industry that requires low investments.

Furthermore, the monthly NR increases with the volume of fish catch which in turn, correlates positively with sophistication in crafts. This is so, even though the average variable cost increased with sophistication in crafts because of the costs of fuel/oil and maintenance, consequent upon which the unit margins indicated a negative correlation with craft sophistication. The Bayelsa fisher-families stand out in the respective categories as regards monthly NR. All profitability measures indicate that the enterprise is profitable for the different categories in the sampled populations. Further, the monthly NR is relied upon to analyse the poverty status of artisanal fishing families in the sampled populations.

Expectedly, poverty among the different categories of fishing families was more prevalent in Kogi State. The highest incidences of poverty in both cases were among the CF families The incidence of poverty within the CF and the MPF fishing families amongst the sampled population in this state was far above the national poverty rate of 40.1%, and slightly higher than the official Kogi State poverty rate of 72.5% (Nigeria-Kogi, nd). This indicates that the average fishing family in Kogi State is poorer than the average Kogi family, implying that the potential of fisheries to address poverty is not being exploited by the people in Kogi State, except MF operators, whose incidence of poverty was about 24%. In Bayelsa State, however, the incidence of poverty is just 8.1% for CF and 3.4 for MPF. The pooled poverty figure for Bayelsa State is

far less than the Bayelsan poverty rate of 47.0% (Nigeria-Bayelsa, nd). Oladimeji *et al*. (2014b) had reported a poverty rate of 53% for rural artisanal fisher folks, using a relative poverty line of 1.3 USD (or ₦202 at the time of their study). Clearly, the use of the global poverty line of 1.90 USD would have painted a worse scenario of poverty in the study.

The finding in this study indicates that artisanal fishing is a viable tool for poverty reduction. On the whole, the incidence of poverty appears, on the surface, to be negatively correlated to the level of craft sophistication. That the Bayelsan fishing families are better off in all ramifications indicates the importance of the volume of catch as well as the unit price. Findings in this study thus indicate that the viability of artisanal fishing as a poverty reduction venture is more promising for Bayelsa State than it is for Kogi State, where most of the fisher families (aside from the MF operators) are still very much affected by income poverty.

Given the obvious disparity in catches, returns, and poverty levels, approaches to artisanal fisheries development may need to be decentralized in order to address area-specific and craft category-specific needs. Hence, in order to achieve the objectives of increased fish production and poverty reduction for all, adequate investments are needed in the two populations (although more pressing for Kogi State, and among craft-less operators), to increase catches, increase income, and reduce poverty. Such investments may be in the form of grants or credit to purchase more sophisticated crafts. The provision of training on catch-enhancing skills is also canvassed.

Acknowledgements

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