

Socio-economic analysis of artisanal fish production in Lower Ogun River basin areas of Lagos State, Sigeria

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ABSTRACT

The study was conducted in lower Ogun river basin areas of Lagos State to evaluate the socio-economic status of artisanal fisher folks using primary data collected with the aid of a well-structured questionnaire from 120 fisher folks randomly selected in four fishing communities. The data collected were analysed using descriptive and budgetary analysis. The results revealed that fishing in the study area was dominated by the males with a mean age of 39 years. The results further revealed that an average total cost of ₦115,406.26 was incurred per annum by fisher folks while total revenue of ₦185,990.51 was realized with a gross margin of ₦96,227.84 and a profit of ₦70,584.25. The rate of return on investment of 0.61 implies that for every one naira invested in fish production by the fisher folks, a return of ₦1.61 and a profit of ₦0.61 was made. The study concluded that fish production was profitable in the study area.

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Introduction

Fishing is an ancient human tradition. It is a traditional activity involving the hunting and gathering of aquatic products for food. Fish and marine products include freshwater and ocean fish, shellfish, ocean mammals and seaweed as well as plankton (Olaoye, et al., 2012). The Nigerian fishing industry comprises of three major sub sectors namely the artisanal, industrial and aquaculture. According to Aliu and Atolagbe (1998), Nigeria's annual production of fish is about 0.7 million metric tons which results in shortfall of about 1.0 million metric tons annually. About 95 per cent of the 0.7 million metric tons produced locally is from the captured fisheries which are dominated by the artisanal fish farmers. Artisanal fishery could be defined as the sector that employs traditional

methods in operational activities which include capturing, preservation and distribution of fish and fish products (Pauly, 2006). The small-scale fisheries sector remains the backbone of fish production in Nigeria, contributing an annual average of 81.94 per cent in 2002 and 82.10 per cent in 2003 of the total fish production in spite of the low technological development (FAO, 2004).

One of the greatest problems confronting millions of Nigerians today is lack of adequate protein intake both in quantity and quality to feed the nation's ever-growing population despite the increase in the major sources of animal protein such as livestock and poultry industry (Okoruwa & Olakanmi, 1999). This inadequacy results in a problem of malnutrition. The resultant effect of serious deficiency in the

amount of protein intake is that people's health is adversely affected leading to poor health, low efficiency, low productivity particularly the mental capability, poor standard of living and eventually, decline in the overall national economic growth (Adewuyi, et al., 2010). The significant imbalance between food production and the expanding population has resulted in an ever increasing demand for fish consumption which has been recognized to contribute about 60 per cent of the needed protein intake in Nigeria (FAO, 2000).

Fish plays a vital role in feeding the world's population and contributing significantly to the dietary intake of millions of the populace (Ajao, 2011). Fish provides essential nourishment, especially quality proteins and fats (macronutrients), vitamins and minerals (micronutrients), providing an important complement to the predominantly carbohydrate-based diet of many poor people in developing countries. Fish and fishing contribute immensely to the national economy by providing high animal food protein source, employment and poverty alleviation. Fish and fish products also contribute to the national GDP.

According to Ojo & Fagbenro (2004), fish contributed about 4.47 per cent of the Agricultural share of the Nation's Gross Domestic Product (GDP) in 2003, while Areola (2007) asserted that fish and fish products contributed an average of 60 per cent to Nigeria's GDP in 2006. However, fish consumption has undergone major changes in the past four decades. World apparent per capita fish consumption has been increasing steadily from an average of 9.9kg in the 1960s to 11.5kg in the 1970s, 12.5kg in the 1980s, 14.4kg in the 1990s, 16.4kg in 2005 and risen to above 20kg in 2016 (FAO, 2008; 2016), while Nigerian per capita consumption has been declining, from an average of 13.5kg in the 1980s to 11.5kg in the 1990s, 10kg in 2000 and 8kg in 2010 (Onuche, et al. 2015).

The fisheries sector, despite being an important source of livelihood for the majority of coastal households, has been plagued by a number of problems. These include poor and

inefficient fishing gears and vessels, lack of capital, poor fisheries management, limited access to better market coupled with poor handling facilities, poor infrastructure and high post-harvest losses, together with a lack of alternative employment opportunities and increased number of fishing households (TCMP, 2001). The above mentioned problems have been the main cause of the decrease in fish catch as well as degradation of fish stock and over-exploitation; as a result, most households continue to be trapped in poverty. The main challenge for the growth of small-scale fisheries is how to improve production performance while, at the same time, ensuring sustainable level of fisheries resources.

According to Inoni & Oyaide (2007), the capacity of artisanal fisheries to play its triple role of a food supplier, employment provider and income earner in the Nigerian economy depends on the adoption of appropriate management strategies that will ensure their sustainability in the face of intense fishing pressure. Although, artisanal fishery in the area has contributed immensely to the socio-economic conditions of the entire populace due to economic influx of people in search of fish and fish products from the adjoining communities, empirical studies on the status of the artisanal fisher folks in the study area such as those of Akanni (2010) and Olaoye *et al.* (2012) are few; this work is therefore aimed at enriching such existing scanty database. The major objective of this study, therefore, is to update knowledge on the status of artisanal fishery in lower Ogun river basin area of Lagos State with a particular emphasis on the socio-economic status of the fisher folks, profitability of fish production and constraints facing the fisher folks in the study area.

Material and methods

The study was conducted in selected fishing communities of Lower Ogun River Basin Areas of Lagos State. It is a major fishing region in Nigeria located in Ikorodu and Kosofe Local Government Areas of Lagos State. The selected

fishing communities are Agboyi-Ketu, Odo-Ogun, Ajegunle and Ibese. The study area is located around longitudes 3°22'E/ 3°39'E, and latitudes 6°31'N and 6° 39' N. It is bounded to the west by Ikeja, eastern end of Ikorodu Local Government Area to the east, and Akoka/Ilaje-Bariga in Somolu Local Government Area and the Lagos lagoon to the southeast. It also shares a boundary with Ogun State in the north.

The major water bodies, which transverse the area include the Majidun and Agboyi rivers. The area is covered with clay-sandy soil along the coastal axis in the south and clay-loamy soil at the interior part. According to 2006 census figure, the population of the area was 375,522 for Ikorodu Local Government Area (LGA) and 183,914 for Kosofe LGA. The indigenous dwellers of the selected Local Government Areas are mainly the Ijebus and the Ilajes. Farming, hunting and fishing have been the chief occupations of the local people for decades. In addition, there is sand mining activity around Majidun, Ajegunle and Oworonsoki, while firewood gathering is mostly restricted to Majidun and Odo-Ogun areas.

The study made use of primary data obtained from a cross section survey of 120 fisher folks drawn by a multistage sampling technique. In the first stage, two Local Government Areas (Ikorodu and Kosofe) were selected given that they contain the major fishing communities in the state. The second stage involved the use of simple random sampling techniques to select four fishing communities in the two Local Government Areas. The selected fishing communities are Agboyi-Ketu, Odo-Ogun, Ajegunle and Ibese. Thirty respondents were then randomly selected from each community. The data were obtained using a structured questionnaire and interview guide. Data were collected on socio-economic characteristics of the fisher folks, major constraints to fishing activities, and fish

catch data including data on resources used and fish output among others.

Analytical procedures

Descriptive statistics. This involves the use of tables, frequencies and percentages to describe the socio economic characteristics of the respondents and constraints facing fish production in the study area.

Budgetary analysis. This was used to determine the costs and return to fish production. The models used in this regard are:

$$GM = \Sigma TR - \Sigma TVC \dots (i)$$

$$TR = P_y \times Y \dots (ii)$$

$$TVC = P_x \times X \dots (iii)$$

$$TC = TVC + TFC \dots (iv)$$

$$NM = GM - TFC \dots (v)$$

where,

GM = Gross Margin (₦); TR = Total Revenue (₦);

TVC = Total Variable Cost (₦); TC = Total Cost (₦);

NM = Net Margin (₦); P_y = Unit Price of Output Produced (₦);

P_x = Unit price of input (₦); Y = Quantity of Output (kg).

Results and discussion

Table 1 summarizes the socio-economic characteristics of the fisher folks in the study area. From Table 1, 61.7 per cent of the fisher folks were below the age of 46. The mean age of approximately 39 years indicates that they are mainly within the economically active age range of between 18 and 55 years in the study area, and physically fit to paddle the canoes. The finding was in agreement with those of Olaoye (2010), who found that most of the fisher folks in Ogun State are in their economic active ages to undertake tasks associated with the fishing enterprise. This is also in agreement with Ifejika (2007), who reported that 60 per cent of the fish farmers in Borgu Local Government Area of Niger State were within the productive age group of 41-50 years and that this has positive

TABLE 1
Socioeconomic characteristics of fisher folks.

<i>Characteristics</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Mean</i>	<i>Standard Deviation</i>
Age (years) N=120				
Less than 25	25	23.3		
26-35	26	21.67		
36-45	20	16.7	39.4	13.9
46-55	30	25		
Above 55	16	13.3		
Gender				
Male	120	100		
Marital status				
Single	24	20		
Married	83	69.2		
Divorced	9	7.5		
Widowed	4	3.3		
Household size (No. of people)				
Less than 5	44	36.7		
5-10	45	37.5	8	4
11-15	31	25.8		
Educational qualification (years)				
No Formal education	38	31.7		
Primary education	24	20		
Secondary education	14	11.7		
Adult education	18	15		
Technical education	20	16.7		
Tertiary education	6	5		
Religion of respondents				
Islam	46	38.3		
Christianity	34	28.		
Traditional worshipper	40	33.4		
Other occupation				
Wage employment	20	16.7		
Self employed	64	53.3		
Artisanal fishing only	36	30		
*Sources of Capital				
Personal savings	61	50.8		
Cooperatives	56	19.2		
Friends and relatives	23	46.7		
Fishing experience (years)				
Less than 10	27	22.5		
11-20	43	35.8		
21-30	25	20.8	19.2	12.3
31-40	22	18.3		
41-50	3	2.5		

Source: Field Survey, 2015

*multiple responses

correlation with acceptance of innovation and risk taking. Dey et al., (2002) also reported an average of 43 to 52 years among Asian fish farmers. All the fisher folks sampled were males. This implies that fishing is popular among the men in the study areas.

Frequencies on marital status show that 69.2 per cent of the sampled households were married and 20 per cent were single. This implies that majority of the fisher folks shoulder a lot of family responsibilities. The study revealed that 36.6 per cent of the sampled household heads had less than 5 people as their household size while a slightly higher proportion (37.5 %) had between 5 and 10 people in their households. Only 25.83 per cent of the household heads had between 11 and 15 people in their households. The mean household size was 8 people and the standard deviation was 4. This is likely to boost the availability of family labour in the sampled communities. In fact, the intensity of artisanal fisheries has been found to have a direct relationship to household size (Akanni, 2010). This is also in line with the assertion of Adegbite & Oluwalana (2004), who opined that the higher the household size, the more likelihood for labour efficiency.

Fisher folks that had no formal education accounted for 31.7 per cent of the sampled respondents, while the remaining 68.3 per cent had formal education ranging from primary to tertiary education. This implies that respondents were relatively educated and this would have positive consequences on their capacity to exploit latent opportunities in the fishing activities and also support them in the adoption of improved technology. This is collaborated by Fawole & Fashina (2005) on association of education with the use of technology on organic fertilizer. This finding disagreed with the assertion of Olaoye et al. (2012) who reported that 60 percent of fisher folks were uneducated, and with the general opinion that most fisher folks are illiterates or semi illiterates, most of whom dropped out of school system.

Muslims constituted 38.3 per cent of the respondents, 28.3 per cent were Christians and

33.3 percent were traditional worshippers. In the study area, only 30 per cent of respondents were involved in fishing only as a means of livelihood while the other respondents were involved in other income generating activities to boost their incomes. This implies that fishery activities alone were not sufficient to meet their family financial obligations. This is corroborated by the findings of Olomola et al. (2010).

Majority (50.8%) of the fisher folks' sources their capital from personal savings, 19.2 per cent source it from cooperatives and 46.7 per cent source from friends and relatives. This implies that only 19.2 per cent of the fisher folks were members of cooperative association; this has implication on their credit mobilisation ability.

Furthermore, 22.5 per cent of the fisher folks had less than 10 years fishing experience, 35.8 per cent had between 11-20 years, while only 2.5 per cent of the household heads had fishing experience of between 41-50 years. The mean years of fishing experience was 19 years with standard deviation of 12.3, which suggests that respondents had considerable years of fishing experience in the study area. This is substantiated by the findings of Olaoye (2010), who observed that fishing experience is important in determining the profit levels of artisanal fisher folks, the more the experience, the more fisher folks understand the system, conditions, trends terrains, prices, etc. Kruase (1995) supported that experience reduces management risk. Dey et al., (2002) agreed that experience is crucial and contributes to the success of Asian fisher folks.

Table 2 shows the distribution of respondents by fishing activities. From this table, only a few (20.83%) of the fisher folks who are financially buoyant could afford the use of boats with engine which increase their fish catch level, while majority (79.17%) use boats without engine. This further confirms the low level of capital investment in artisanal fish production in the study area. Majority (54.17%) of the fisher folks use dug-out canoes i.e. canoes, made from tree trunks, 36.67 per cent use wooden canoes while 9.17 per cent use both dug-out and

wooden canoes. The result also revealed that majority (70.83%) of the sampled fisher folks engage in fishing activities both day and night. This is in line with Pauly (2006), who posited that fishing activities were carried out both day and night because some fishers are of the opinion that some fishes are nocturnal in nature while others claimed that the nature of water flow at night is more favourable for fishing. The reasonable catch at night, however, could be attributed to environmental factors. At night, the water temperature usually increases, conse-

quently, fishes usually move out of their hiding places leading to higher catch.

The study revealed the different species of fishes harvested by the fisher folks in the study area. Majority (60%) harvested tilapia and catfish. Other fishes harvested in the study area were korowo and gymnarchus. Most (56.7%) of the fisher folks employed both family and hired labour, 32.5 per cent employed only family labour while 10.8 per cent employed only hired labour.

TABLE 2
Distribution of respondents by fishing activities.

<i>Characteristics</i>	<i>Frequency</i>	<i>Percentage N=120</i>
<i>Type of fishing crafts used</i>		
Boats with engine	25	20.83
Boats without engines	95	79.17
<i>Type of canoe used</i>		
Dug-out canoes	65	54.17
Wooden	44	36.67
Dug-out and Wooden	11	9.17
<i>Time of Fishing</i>		
<i>Day</i>	7	5.8
<i>Night</i>	28	23.3
<i>Day and Night</i>	85	70.8
<i>Type of Fish Harvested</i>		
Tilapia	4	3.33
Tilapia and catfish	72	60.0
Catfish, Tilapia and Korowo	24	20.0
Catfish, Tilapia, Korowo and Gymnarchus	20	16.67
<i>Type of labour</i>		
Family	39	32.5
Hired	15	10.8
Family and Hired	66	56.7

Source: Field Survey, 2015

Fig. 1 presents the point of sale of the various types of fishes caught by the artisanal fisher folks in the study area. The figure showed that majority (59.2 %) sold their output by the river side where the prospective buyers were waiting, 23.3 per cent sold at home, while only 8.3 percent sold their fish in a designated market.

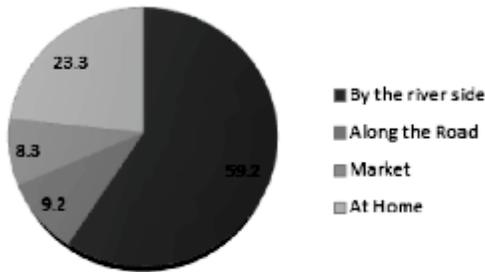


Fig. 1: Point of sales of fish catch

The costs and return to artisanal fish production is presented in Table 3. The Table revealed that an average total cost of ₦115,406.26 was incurred annually by the respondents. The variable costs constitute the majority (77.78%) of the total cost of artisanal fish production in the study area. The results further indicated that the cost of fuel (30.69%) and labour wages (19.14 per cent) were the major variable costs incurred in artisanal fish production. This clearly shows that large amount of money is spent on the purchase of fuel and payment of labour wages by the fisher folks in the study area. The fixed cost of production accounted for 22.21% of total cost of production. The result of the cost and return analysis also revealed a total return of ₦185,990.51, a gross margin of ₦96,227.84 and a profit of ₦70,584.25. The rate of return on investment of 0.61 implies that for every one naira invested in fish production by the artisanal fisher folks a profit of ₦0.61 was obtained. This implies that fish production was a profitable venture in the study area.

TABLE 3

Average costs and returns of fish production in ₦/year.

Cost items	Amount	Percentage of Total cost
<i>Fixed costs (Depreciated)</i>		
Cost of canoe	14510.03	12.57
Cost of fishing line	2977.53	2.58
Cost of fishing net	5487.65	4.76
Cost of hook	540.16	0.47
Cost of flags	382.35	0.33
Cost of spear	1744.87	1.51
Total fixed cost (TFC)	25,642.59	22.21
<i>Variable costs</i>		
Rent	2630	2.26
Labour wage	22090	19.14
Transportation cost	6201	5.37
Local government dues	316.67	0.27
Bait	21660	18.77
Cost of fuel	35420	30.69
Cost of lamp	688	0.60
Cost of paddle	758	0.66
Total variable cost (TVC)	89,762.67	77.78
Total Cost (TC)	115,406.26	100
Total Return (TR)	185,990.51	
Gross Margin	96,227.84	
Profit	70,584.25	
ROR(NM/TC)	0.61	

Source: Field Survey, 2015

Table 4 presents the constraints facing artisanal fisher folks in Lower Ogun River Basin Areas of Lagos State, Nigeria. The result showed that the entire fisher folks (100%) had problems of both inadequate storage facilities to preserve their excess catch during glut periods, and climatic conditions such as drought and flood/ erosion caused during the dry and rainy seasons. Erosion cause turbulence in the water and results in death of fishes and makes catch difficult, while 98.3 per cent encountered problems of inaccessibility of fishing grounds as a result of vegetation invasion of fishing grounds. Vegetation such as water hyacinths makes the canoe tumble during fishing activi-

ties, thereby, causing serious injury to the fisher folks. About 94 per cent of the fisher folks reported high cost of equipment as a problem, 87.5 per cent reported inadequate finance and credit facilities which pose serious threat to the adoption of fishing technologies and innovations, while 85 per cent reported inadequate power supply. The use of chemicals or other bad methods (Gamalin 20, dynamite) in fishing constituted a problem to about 81 per cent of the fisher folks. This result is in line with Anene *et al.* (2010), who reported that obnoxious fishing methods constituted a problem to 68 per cent of the fishers sampled in Oguta local government areas of Imo State, Nigeria. Other constraints encountered by the fisher folks are outlined in Table 4

TABLE 4
Constraints to artisanal fish production in the study area.

<i>Problems encountered</i>	<i>Frequency</i>	<i>Per-centage</i>
Inadequate storage facilities	120	100
Climatic conditions	120	100
Vegetation cover	118	98.3
High cost of equipment	113	94.2
Inadequate finance and credit facilities	105	87.5
Inadequate power	102	85
Obnoxious fishing methods	98	80.8
Distance to market	92	76.7
Inadequate technology	88	73.3
Poor road network	65	54.2

Source: Field Survey, 2015

Table 5 presents the results of the hypothesis testing. The results show that all the five socio-economic variables tested were significant at $P < 0.05$. This shows that a significant relationship exists between the fisher folks socio-economic variables and their profit level, the null hypothesis is, thereby, rejected.

TABLE 5
Significant difference between socio-economic variables and profit level of the respondents (T-test).

<i>Variable</i>	<i>T</i>	<i>df</i>	<i>Sig.</i>	<i>Decision</i>
Age	31.042	119	0.000	Reject H0
Marital status	16.143	119	0.000	Reject H0
Household size	11.828	119	0.000	Reject H0
Fishing experience	17.357	119	0.000	Reject H0
Level of education	15.900	119	0.000	Reject H0

Decision criterion is to reject null hypothesis when $p < 0.05$ degree of freedom.

Conclusion and recommendations

The study revealed that fishing was predominantly popular among the men in all the sampled communities. The mean age of 39 years classified the fisher folks into active age groups and also has positive correlation with acceptance of innovation and risk taking. The result of the cost and return analysis revealed a total return of ₦185,990.51, a gross margin of ₦96,227.84 and a profit of ₦70,584.25. The rate of return on investment of 0.61 implies that for every one naira invested in fish production by the artisanal fisher folks' a profit of ₦0.61 was obtained. It can be concluded, therefore, that fish production in the study area is a profitable and lucrative business capable of playing the triple roles of food security, income generation and employment creation.

Based on the findings of this study, the following recommendations have been put forward to help improve the profitability of artisanal fish production in the study area.

Adequate storage facilities should be put in place in the fishing communities to reduce the losses experienced during the glut periods and to stop the fisher folks from selling their catch at giveaway prices due to lack of preservation facilities. The cost of fishing equipment should also be highly subsidized to affordable rates by the government.

Effort should be made by government at all levels to control water hyacinth and other water vegetation to forestall water accident/boat mishap and boost fish production in the study area

Artisanal fisher folks should organize themselves in cooperative society to enjoy economies of scale in the purchase of inputs and sales of output. Various government aids such as loan and equipment could also be channeled to the fisher folks through a cooperative society

There is need for legislation against all forms of bad fishing methods such as the use of chemicals in fishing. There is also need to ensure the enforcement of such laws by the law enforcement agencies.

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