ANALYSIS OF FISHING TECHNOLOGY AND FISH PRODUCTION BY WOMEN IN SMALL-SCALE FISHING ENTERPRISE IN OGUN WATERSIDE LGA, OGUN STATE, NIGERIA

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ABSTRACT

This study was conducted to evaluate the productivity, profitability and level of technology of artisanal women in small scale fishing enterprises in Ogun Waterside Area, Ogun State, Nigeria. A well-structured interview guide was used to collect primary data from one hundred and twenty respondents from five fishing communities (Iwopin, Idaleketa, Makun-omi, Agbalegiyo and Ode-Omi) based on their fishing activities. The information collected was analyzed using descriptive statistics. The result revealed that (74.2%) were in the active age distribution of 30- 50 years, 33.3% have no formal education while 45.0% were in the bracket of 21-30 years fishing experience, 83.3% of the respondents were married and 91.7% were not members of any fishery society. The result also showed a gross margin of ₦29,989.44 and a net income of ₦2,431.93 which could be attributed to their performance. There was a significant relationship between constraints faced by the fisher women and the size of the business. Implications of these findings were critically examined, and pertinent recommendations were proffered based on the salient findings in the study.

Keywords: socio-economic, enterprise, small scale fishing, Ogun waterside

INTRODUCTION

The fisheries sector is an important source of livelihood, food security, income and employment for millions of people around the world (FAO, 2009). In Nigeria, there is a short supply of fish and its resources with an increase in human population which has put a combined effect on the fishing activities at the coastal areas or fishing localities (Adegbite *et al*., 2008).

Fishing settlements represent one of the oldest forms of community living known to mankind. In these settlements, fisher-folks including children, men and women have evolved over time, different crafts, skills and technologies for fishing and for day to day survival (FAO, 2009). This is, in addition, to those associated with the preservation and processing of fish catch. In the capture fisheries of the coastal and riverine areas in Nigeria, men, women and even children play diverse roles (Adebayo and Pitan, 2001). These include fish collection in the wild, and fresh fish preservation and marketing. The extent and nature of the involvement in the capture fisheries in Nigeria however varies by locality, religion, level of education and form of fish sales, among other factors (Ogungbadejo *et al.*, 2007).

Several forms of fishing technology are being used in Nigeria. The coastal artisanal fishers use the traditional dug-out canoes ranging from 3–18 metres in length, while the fishing gear used include cast nets, handlines, basket traps, longlines, set gillnets and beach and purse seines. The operating range of small-scale fisheries is around the 20 metres depth contour, with operations extending occasionally to a maximum depth of 40 metres (George *et al*., 2011).

In typical fishing settlements (or landing sites), men are predominantly the harvester of wild fish species (Olubanjo *et al.*, 2007). They are thus the ones that voyage in Lagoons and or on high seas and along river networks in wooden boats or in dug-out canoes to catch a variety of fish species. The fish are sold in the fresh state to local women at the fishing ports or landing sites. The sales are, however, usually carried out in an indirect manner - with the fishermen's wives acting as the intermediary or dispersion agents. Women, fisher-folks have thus developed skills and knowledge in performing transformation (i.e. processing and marketing) activities of unsold fresh fish catch and in carrying out the sales of processed fish in the market place.

Despite the dominance of women in fish marketing and processing, it is sad to say that the living conditions of rural women have not changed significantly (Mafimisebi, 2004). The per capita income of an average rural dweller is considered to be too low. This is because between 70-80% of Nigeria's population is still engaged in subsistence

agriculture. It is a fact that over 50% of rural populations are female (George *et al*., 2011). They are engaged on a continuous basis in home-related and income-generating activities. Based on the aforementioned, this survey focused on the involvement of fisherwomen in fish production in Ogun water-side Local Government Area of Ogun State. The study set out to describe the socio-economic characteristics of the fisherwomen, type of fishing technology used, amount of fish produced, profitability and constraints faced by the women.

MATERIALS AND METHODS

The study area

The geographical location chosen for this study is the Ogun waterside area of Ogun State, Nigeria. This area is closely associated with other maritime states of South-western Nigeria. It comprises over 50 towns and villages with Headquarters at Abigi at 6°29′N 4°24′E / 6.483°N 4.4°E (www.wikipedia.com), with an area of 1,000 km² and a population of 72,935 (2006 census). The choice of the local government is because of its close proximity to the Atlantic Ocean and its relative endowment with a complex network of streams, rivers, brackish water and the extension of the Lagos (Lekki) Lagoon to the area. It is the only area of the State with a coastline on the Bight of Benin and also borders Lagos lagoon.

Sampling Procedure and Sample size

Purposive and simple random sampling techniques were used in selecting respondents from the administrative zone of Ogun State Agricultural Development Programme (OGADEP), one block (Ibi-Ade) and five (Makun-Omi, Agbelegiyo Ode-Omi, Iwopin, and Idaleketa) fishing communities, this selection was purposively carried out based on the high degree of fisher women in the area.

Source of data

The data used in this study were sourced from both primary and secondary data. The interview guide was designed in line with the objectives of the study which contained open ended and closed ended questions so as to allow the respondents express their opinion freely about the specific situation. The secondary data were sourced from internet and relevant publications.

Data Analysis

Descriptive statistical tools

Tables, frequencies, bar charts and percentages were used to describe the socio-economic characteristics of the respondents and constraints faced by fisher women in fishing enterprises. The characteristics included the ages of the women, marital status, educational level, marketing experience, etc.

Gross margin analysis

The budgetary technique was used to determine the gross margin income of the fisherwomen using t-test for two sample assuming unequal variances.

A model that was used in estimating the gross margin was:

$GMI = \Sigma TR - \Sigma TVC$…….. (i)

$TR = Py.\ Yi$ ……..... (ii)

$TVC = Pxi\ X$ ……..... (iii)

$TC = TVC + TFC$ ……..….... (iv)

$NI = GM - TFC$ ……...….... (v)

Where,

GMI = Gross Margin Income (₦)

TR = Total Revenue (₦)

TVC = Total Variable Cost (₦)

TC = Total Cost (₦)

NI = Net Income (₦)

Py = Unit Price of Output Produced (₦)

Y = Quantity of Output (kg)

RESULTS

Socioeconomic characteristics of the respondents

The result of the analysis showed that only 39.1% of the respondents were within 41 and 50 years of age while 4.1% were found to be greater than 60 years of age. Most (83.3%) of the respondents were married as against the few (4.1%) that were divorced. Many (33.3%) of the artisanal fisher woman had no formal education as against a percentage of 9.2 who were unable to complete their secondary school education. A larger (62.5%) of the respondents had an household size of 1 to 5 while only 4.2% of the respondents had over 30years of fishing experience. 1.7% of their income came from mat making while a greater (93.3%) part of their income came from capture fisheries; with an average monthly income of ₦36,266.67 as indicated in Table 1.

Table 1: Percentage age distribution of the respondents

Variable	Frequency	Percentage	Mean	S.E.
Age				
30 – 40	42	35.1		
41 – 50	47	39.1		
51 – 60	26	21.7		
Above 60	5	4.1		
Total	**120**	**100.0**	**45.32**	**0.795**
Marital Status				
Single	2	1.7		
Married	100	83.3		
Divorced	5	4.0		
Widow	13	14.0		
Total	**120**	**100.0**		
Level of Education				
No formal education	40	33.3		
Completed Pry. Sch.	35	29.2		
Unable to complete pry school	13	10.8		
Completed secondary school	21	17.5		
Unable to complete sec school	11	9.2		
Total	**120**	**100.0**		
Household size				
1-5	75	62.5		
6-10	8	6.6		
11-15	25	20.8		
16-20	12	10.0		
Total	**120**	**100.0**	**9.65**	**0.305**
Fish farming experience				
0-10	28	23.3		
11-20	33	27.5		
21-30	54	45.0		
Above 30	5	4.2		
Total	**120**	**100.0**	**18.44**	**0.721**
Sources of income				
Capture fisheries	112	93.3		
Mat making	2	1.7		
Trading	6	5.0		
Total	**120**	**100.0**		
Income from occupation				
15, 000- 30, 000	49	40.8		
31, 000- 45, 000	48	40.1		
46, 000- 60, 000	22	18.3		
61, 000- 65, 000	1	0.8		
Total	**120**	**100.0**	**₦36266.67**	**987.437**

Source: Field survey, 2013

Fishing technology

The respondents revealed that most (52.0%) of their fishing craft were boats without engine and many (43.3%) of the artisanal fisher women normally fish to a distance of 2km on the water. 41.6% of their crafts were dug-out canoe and most (67.6%) of the respondents use a combination of nets, traps and hook for fish harvesting (Fig 1). Many (31.7%) of the fisher women normally hunt for *Heterotis* sp and most (71.7%) of the respondents sell their harvested fish in both fresh and smoked form (Table 2).

Table 2: Respondents fishing technology information

Variable	Frequency	Percentage	Mean	S.E.
Fishing craft				
Raft	38	32.0		
Boat without engine	62	52.0		
Boat with engine	20	16.0		
Total	**120**	**100.0**		
Distance (Km)				
1.00	50	41.7		
2.00	52	43.3		
3.00	16	13.3		
4.00	1	0.8		
5.00	1	0.8		
Total	**120**	**100.0**	**1.76**	**0.071**
Fishing craft				
Wooden and dug-out	30	25.0		
Dug-out canoe	50	41.6		
Wooden	40	33.3		
Total	**120**	**100.0**		
Species harvested				
Tilapia	42	35.0		
Catfish	24	20.0		
Heterotis	38	31.7		
Others	16	13.3		
Total	**120**	**100.0**		
Forms of fish sale				
Fresh	32	26.7		
Smoked	2	1.7		
Fresh & smoked	86	71.7		

Source: Field Survey, 2013

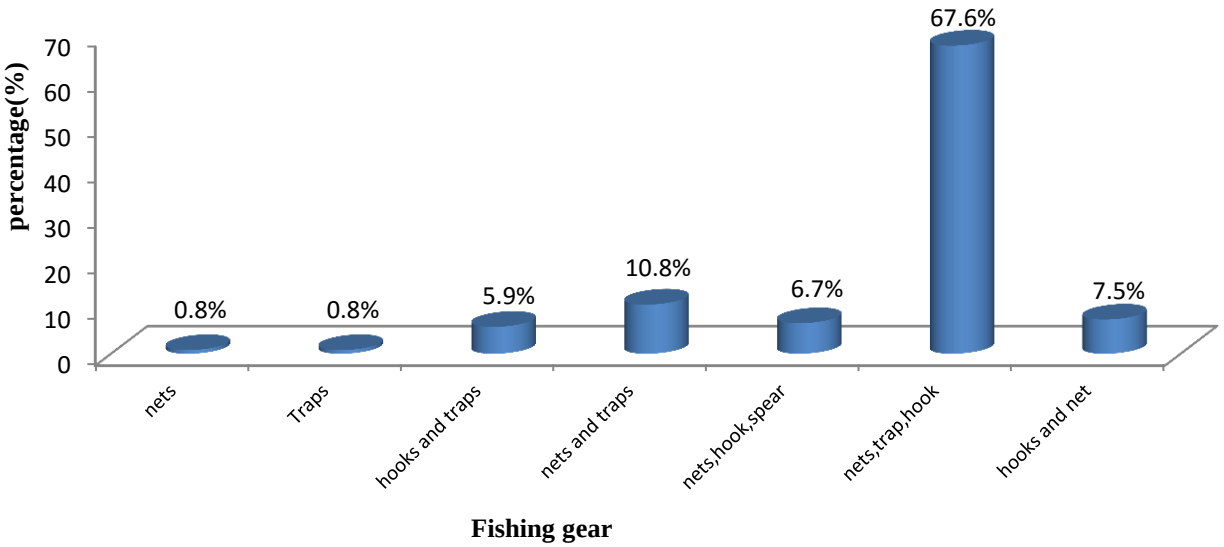

Fig. 1: Common fishing gear used by fisherwomen

Production Information

Table 3 shows that many (62.5%) of the fisher women sourced for their capital from personal savings, almost (92.5%) all the respondents make use of family labour and a larger (83.3%) percentage of the respondents revealed that they are operating on a small scale fish business. Most (90.0%) of the fisher women confessed that they have a ready market for their fish product and many (63.3%) of the respondents sold their fish product per 'Idi' with an average monthly revenue of ₦19, 649.14.

Fisher women cost structure

The cost structure of the respondents as presented in Table 4 revealed that most (81.4%) of their total cost of production was incurred on the fixed cost while a few (18.56%) was used for the variable cost with a net income of ₦2,431.93.

Table 3: The production information of the respondents (n = 120)

Variables	Frequency	Percentage	Mean	S.E.
Source of capital				
Assistance from husband	9	7.5		
Cooperative society	10	8.3		
Esusu	13	10.8		
Loan	2	1.7		
Personal savings	75	62.5		
Relatives/friends	11	9.2		
Labour				
Family	111	92.5		
Hired permanent labour	3	2.5		
Hired casual labour	6	5.0		
Level of fish catch				
Medium	20	16.7		
Small	100	83.3		
Ready market for fish				
Yes	108	90.0		
No	12	10.0		
Method of sale				
Per Kg	10	8.30		
Per "Idi"	76	63.30		
Per Unit	25	20.50		
Per "Hand"	9	8.30		
Fish species harvested				
Tilapia sp.	42	35.0		
Catfish	24	20.0		
Heterotis niloticus	38	31.7		
Others	16	13.3		
Revenue (₦)				
Below 5, 000	37	30.83		
5, 000-10, 000	36	30.00		
15, 000-20, 000	9	7.50		
25, 000-40,000	19	15.83		
Above 50,000	19	15.83		
Total	**120**	**100.0**	**19649.14**	**2088.800**

Source: Field survey, 2013

Table 4: Cost and returns structure

	Amount (₦)	Percent Total cost	Percent Total (TVC+TFC)
Cost of fishing net	5,465.98	16.15	
Cost of boat	18,431.01	54.47	
Cost of hook	933.87	2.76	
Cost of line	892.78	2.64	
Cost of trap	1,833.87	5.42	
Total Fixed Cost (TFC)	**27,557.51**	**81.44**	**81.44**
Cost of Styrofoam	4000	11.82	
Cost of paddle	553.23	1.64	
Cost of lamp	493	1.46	
Cost of kerosene	1,231	3.64	
Total Variable Cost (TVC)	**6,277.23**	**18.56**	**18.56**
			100
Total Cost (TC)	**33,834.74**		
Gross margin	29,989.44		
Net income	2,431.93		

Source: Field survey, 2013

Constraints to fish production in the study area

The result of the constraints to fish production in the study area revealed that inaccessibility to credit was (72.5%), scarcity of fish inputs (71.7%) and infestation of lagoon by floating aquatic weed (69.2%) are some of the constraints faced by the fisherwomen in the study area (Table 5).

Table 5: Constraints affecting women involvement in fishing in the study area

Problems	Very-severe		Severe		Not-severe	
	Freq.	%	Freq.	%	Freq.	%
Inaccessibility to credit	87	72.5	26	21.7	7	5.8
Scarcity of fish inputs	86	71.7	29	24.2	5	4.2
Distance to market	14	11.7	9	7.5	97	80.8
Poor maintenance	9	7.5	8	6.7	103	85.8
Unavailability of parts	2	1.7	25	20.8	93	77.5
Difficulties of access	12	10.0	17	14.2	91	75.8
Menace of trawlers	8	6.7	13	10.8	99	82.5
Climatic conditions	68	56.7	33	27.5	19	15.8
Inadequate power supply	68	56.7	48	40.0	4	3.3
Infestation of lagoon by aquatic weeds	83	69.2	11	9.2	26	21.7
Poor gear design	8	6.7	29	24.2	83	69.2
Poor storage	48	40.0	65	54.2	7	5.8
Inadequate technology	9	7.5	82	68.3	29	24.2
Difficulty of access of the fisherwomen	17	14.2	14	11.7	89	74.2

Source: Field survey, 2013

DISCUSSION

The survey analysed the fishing technology and fish production by women in small-scale fishing enterprises in Ogun Waterside Local Government, Ogun State, Nigeria. Most of the respondents were between the age of 41 and 50years; an age in which they are considered highly productive and active to undertake strenuous task associated with farm work. This is in line with the assertion of Bello, 2000; Ashaolu *et al*., 2006; Olaoye and Odebiyi 2010; that age has positive correlation with acceptance of innovations and risk taking. Majority (83.3%) of women interviewed were married. Education is an important factor which can influence farm productivity and determine farmer's access to loan and repayment, level of education according to the study showed that 33.3% of the respondents had no form of education. This is in line with the general opinion that most farmers are illiterates or semi-illiterates; most of whom have dropped out of the formal school system, as evidence from the studies of Lahai *et al*.(2000) and Delgado *et al*.(2003).

The average household size in the locality was found to be 10 persons.The implication was that the relatively large household size may decrease the number of labour needed, this agrees with the findings of Adegbite and Oluwalana (2004) and Adegbite *et al.* (2008) that the larger the household size, the more the likelihood of sustainable labour efficiency on farmer's farm given the constant labour.

The respondents' mean fish farming experience was found to be 18 years; a larger percentage (93.3%) of the respondents chose fisheries related business as their primary source of income with an average income of ₦36, 266.67 while only 1.7% of the respondents opted for mat making as additional source of income to compliment what they have in fisheries.

In the study area many (52.0%) of the sampled fisherwomen used boats without engine as a means of transportation, they covered an average distance of 2.0 km on the water due to their crafts that were without engines, thus they were not be able to go far to fish.

Aside the boats been used by these fisher women during fishing, they made use of various fishing gear (Figure 1) comprising mostly nets, trap and hook (67.6%) which were used to catch different types of fish species such as Tilapia (*Tilapia zilli*), Catfish (*Clarias gariepinus*), slap water (*Heterotis niloticus*) among others. The fish harvested were mostly sold fresh and smoked (71.7%), so as to reduce level of spoilage as there were no adequate storage systems.

Findings in the survey revealed that 62.5% of the respondents sourced their capital from personal savings. Majority (83.3%) of the respondents operated on a small scale level. Most (90.0%) of the respondents said that there were ready market for theirproducts, 63.3% sell per "idi"(15 pieces) while 8.3% sell per hand (200 pieces) with different price range depending on the size and quantity. 35% of their catch was found to be *Tilapia sp* with an average monthly income of ₦19, 649.14.

From the survey the costs and returns structure had a total fixed cost of ₦27,557.51 while the total variable cost was₦6,277.23 having a total cost of ₦33,834.74, a gross margin of ₦29,289.44 and a net income of ₦ 2,431.93. The boat cost was the highest fixed cost used that will enable the fish women to fish in a little distance in the water bodies and this will reduced fishing concentration.

The major constraint which remains one of the reasons for low participation of women in small scale fishing enterprise in the study area was a combination of inaccessibility to credit, lack of storage facilities and high cost of fishing inputs. The result revealed that inaccessibility to credit was (72.5%), scarcity of fish inputs (71.7%) and infestation of lagoon by floating aquatic weed (69.2%) were some of the constraints faced by the fisherwomen in the study area.

CONCLUSION

In, Nigeria, the role of women in contributing towards the socio-economic livelihood of their households in fishing communities was grossly undermined and their potentials were not fully harnessed. This study has shown that women have fishing potentials, as they were being used in the artisanal fisheries who were seen to be active in processing and marketing of fish. There was great potentials for more women to freely participate in actual fish catch if the socio cultural constraints such as lack of access to basic social amenities are technically and skillfully handled by the extension workers. The fisherwomen should be supported by the Federal, State and LGAs in provision credit in supply of fishing inputs, social amenities provisions and processing tools. Financial supports should be made available timely and fishers should be encouraged to form themselves into cooperative societies for pool fishing inputs purchases and credit supplies.

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