Determinants of Output of Artisanal Fishers in Oguta, Imo State, Nigeria

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ABSTRACT

The objective of the survey is to determine the variables that affect the output of artisanal fishers in Oguta Local Government Area of Imo State, Nigeria. Data used for the study were obtained from primary and secondary sources using a multi-stage random sampling technique. In the first stage, 10 villages out of the 27 villages in Oguta were selected at random. In the first second state, 4 fishers were selected from each of the villages making a total of 40 respondents in Oguta Ameshi. Similarly, 60 respondents were selected from Ubi, which is made up of 27 farm settlements (Egwes). This brought the total to 100 respondents. Instrument of data collection was via well-structured and pre-tested questionnaires. The lead equation (linear form) shows that values of fixed cost invested (X_1), depreciation value of fixed assets (X_4) and area of the lake fished (X_5) were significantly and positively correlated with the value of outputs. The linear equation explained 51.5% of the variation in the output of artisan fishers Imo State, Nigeria.

Key words: *Socio-economic, Determinants, Artisanal fishers*

INTRODUCTION

Fish has an important role in world protein supplies, particularly in developing countries. Besides protein, fish provides energy, essential fatty acids, vitamins and minerals. Globally fish accounts for about 16% of animal protein consumed (Matthews, 1999). Fishers and shellfish are among the important items of food that are commonly found on the dinning table of Nigerians. Between 1986 and 1998, this category of food items contributed as much as 29 – 35% of the animal protein in the diet of people in the West African region of Africa including Nigeria. Per capita fish consumption in Nigeria has been estimated at 8.8 kg/caput/annum (FAO, 2002), while consumption for the same commodity for the rest of Africa is estimated at 7.1 kg/caput/year (Matthews, 1999).

Fish production in Nigeria is either by capture fishers, artisanal fish farming (fish farming) or by importation. Capture fisheries involve the harvesting of naturally existing stocks of wild fish. This can be done either by small-scale/artisanal fishers or by industrial/commercial trawlers. In artisanal fishers, production is achieved by individual or by small groups by the use of labour intensive gears. Characteristically artisanal fishers operate from dug out, wooden canoes that are more often than not unmotorized (Coates, 2000).

Traditional definitions of what constitute the artisanal fishery sector have emphasized characteristics like simple technologies, low level of productivity and socially and geographically constrained systems of distribution. A classical definition (Smith, 1979) states that artisanal fishers are normally carried out by small scale fishing units, often consisting of kin groups using, small occasionally powered boats or none at all.

Roedel (1977) defined artisanal fishers as those "rural inland and coastal fishers" in the poorest of the developing countries whose catch goes largely for human consumption, who themselves are poor and who fish relatively unsophisticated gears and vessels in near shores. He suggested a number of general ways in which the economic level of small-scale fishers can be raised. These include increasing the catch, reducing costs improving catch efficiency and improving the utilization of catch.

One of the major nutritional problems faced by the developing countries including Nigeria is insufficient dietary protein. This has over the years contributed to incidents of malnutrition, diseases and deaths in most of these developing countries. The average total protein consumption of 53.8 grams per head per day in Nigeria is well below the FAO/WHO recommendation of 67kg per day (FAO, 1992). The situation is even worse when one considers the level of animal protein as a percentage of total protein intake. Olayinde (1976) reported that only 8.4 grams (15.65%) of the 58.9 grams of protein available in Nigerian diet come from animal source. This is well below the recommendation of 35 grams minimum level (FAO, 1992). A major solution to this dietary protein is increased fish production.

At present, fish production by artisanal fishers dominates this sector. Between 1994 and 1998, the contribution of this sector to fish production ranged between 36 – 47% (Federal Office of Statistics, 1999). The productivity of these fisher are being hampered by a litany of problems amongst which are, relative high cost fishing gears, use of dangerous chemicals to kill fish under capacity utilization, inadequate and faulty planning with attendant short-lived policies by government, lack of finance, lack of storage facilities and marketing problems (Olayinde, 1976).

Despite the significant contribution of artisanal fishers to local fish production in Nigeria, there is little empirical analysis on the socio-economic variables that affect production in this sector of our economy. This work is motivated by the need to supply information on the socio0economic determinants of output of the fishers in Oguta Local Government Area of Imo State, Nigeria in which there is paucity of information.

METHODOLOGY

Study Area

The study was conducted in Oguta Ameshi and Ubi Oguta in Oguta Local Government Area of Imo State. The research spanned a period of 7 months i.e. from May to November 2005. Oguta is bounded between longitude 6^0.41" and 6^0.50" East and Latitudes 5^0.41" and 5^0,44" North of the equator. Oguta land mass is approximately 2,025.75 km^2 (Nwadiaro, 1989). This landmass is distributed as follows:

1. Ameshi Town: 63.75 km^2
2. Osemotor: 46.50 km2
3. Kalabari Beach: 30.50 km2
4. Ubi (Farmlands) 1888.00 km2

This region is located within the equatorial rain forest belt with an average annual rainfall of 3,100mm. Oguta is bounded on the north by Ogwu-Aniocha Anambra State. It shares its northeastern border with Egbuoma, Mgbidi and Egwe in Imo State. On the south to the eastern flank, Oguta is limited at approximately latitudes 5^0.38" and 5^0.39" north of Egbema community. The western, northwestern and southeastern boundaries of Oguta are defined by the Niger, from upstream of Okpai to beyond Abo, Kwale and Umuoru (River Niger) (Nwadiaro, 1989).

Multi-stage random sampling technique was used in this study. First, 10 villages out of 27 villages in Oguta were selected at random. In the second state, 4 fishers were selected from each of the villages making a total of 40 respondents in Oguta Ameshi. Similarly, 60 respondents were selected from Ubi, which is made up of 27 farm settlements (Egwes) (Nwadiaro, 1989). This brought the total to 100 respondents.

The reason for the 60/40 by proportion of the respondents is due to the fact that there are more artisanal fishers in Ubi than Oguta Ameshi (Nwadiaro, 1989). The sample frame for each of the villages (Oguta Ameshi) and Egwes (Ubi) were supplied by the Chiefs (Okparas) of all the 10 villages in each case.

Data used for the study were obtained from primary and secondary sources. The primary data included a cross sectional data obtained through the administration of a set of structured questionnaire which was administered on the respondents. This was used to elicit information on the socio-economic characteristics of the farmers which include family size, age distribution, gender, educational background, fishing inputs, fishing experience, cost and return parameters. The secondary data were obtained through published and unpublished literature, thesis, journals, proceedings, magazines, newsletters and bulletins. The study lasted from May to November, 2005.

The various analysis carried out include the use of mean, frequency counts and multiple regression analysis. The economic analysis adopted in this paper followed that of Ezeh (2003, 2006) in which he estimated the functional model response implicitly thus:

$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, ei)$ ……. (1)

Where Y = Quantity of Output (kg)
X_1 = Fixed cost of inputs (canoes, nets, hooks, spears, etc.) (₦)
X_2 = Value of variable inputs (₦)
X_3 = Labour (mandays) (₦)
X_4 = Depreciation value of fixed assets (₦)
X_5 = Area of lake fished (ha)
X_6 = Value of other inputs (₦)
ei = Stochastic term

The regression coefficient such as value of variable inputs, labour and area of lake fished are expected to have x positive signs. The regression model was run in three functional forms – the linear, semi-log and double log forms. The linear functional form was selected based on the number of regression coefficients that are significant, with higher level of coefficient of multiple determinations (R^2) and F-ratio.

RESULTS AND DISCUSSION

Socio-economic Characteristics Artisanal Fishers

Distribution of artisanal fishers according to age

The result in Table 1 shows that majority (29.0%) of the artisanal fishers fell within the age range of 31 and 40 and between 41 and 50 years respectively.

Table 1: Distribution of Artisanal Fishers According to Age

Category of ages (years)	Frequency	% of the total population
10 – 20	-	-
21 – 30	25	25.0
31 – 40	29	29.0
41 – 50	29	29.0
51 – 60	15	15.0
61 – 70	2	2.0
70 and above	-	-
Total	**100**	**100.00**
Mean age	**39.5 ± 10.82**	

Source: Field Survey Data, 2005

Those within the age bracket of 21 and 30 years of age constituted 25.0% of the sampled population while 15.0% of the fishers were in the age range of 51 and 60 years. Those within the range of 61 and 70 years comprised 21% of the sampled population. The result indicated

a rather decreasing number of the very old and the aged population among the artisanal fishers. Perhaps, the younger fishers fall within the segment of the population that can effectively withstand the rigours and strains involved in artisanal fishing.

Educational Background of Artisanal Fishers

The result (Table 2) shows that majority (75.0%) of the artisanal fishers attempted or finished secondary school education while 25.0% of the respondents attempted or finished primary school education. None of the fishers lacked formal education.

It was expected that higher education would enhance improved technology adoption and hence increased income (Njoku and Odii, 1991). Furthermore, ability to read and write would enable the fishers to better utilize effectively and efficiently whatever resources in the area. Gradually the country is advancing with more educated fishers who do not find it difficult to pick information relevant to the improvement of their management decisions from the literature. A well-educated fisher is likely to be more responsive to innovation than illiterates. Human capital development in agriculture holds the key for highly productive and sustainable agriculture and fisheries (Awoyemi, 1999).

Table 2: Distribution of Respondents According to Educational Levels

Educational level	Frequency	% of the total population
Nor formal education	-	-
Primary education or its equivalent	25	25.0
Secondary education or its equivalent	75	75.0
Tertiary education or its equivalent	-	-
Total	**100**	**100.0**

Source: Field Survey Data, 2005

Marital Status of Artisanal Fishers

The result in Table 3 shows that majority (59.0%) of the artisanal fishers were married, while 27.00% of them were not married. However, 9.0 of the fishers were widowed and 5.0% of them were divorced. It implies that fishing in the study area is used as a medium of family sustenance and embraces all marital status.

Table 3: Distribution of Respondents According to Marital Status

Marital Status	Frequency	% of the total population
Married	59	59.0
Widowed	9	9.0
Divorced	5	5.0
Not married	27	27.0
Total	**100**	**100.0**

Source: Field Survey Data, 2005

Family size of Artisinal Fishers

The result in Table 4 indicates that majority (68.0%) of the artisanal fishers had family size of between 11 and 15, while 27.0% of the fishers had family size of between 6 – 10 and 10.5% of them had family size of between 1 and 5 persons.

Table 4: Distribution of Respondents According to their Family Size

Family Size	Frequency	% of the total population
1 -5	5	5.0
6 - 10	27	27.0
11 - 15	68	68.0
16 - 20	-	-
Total	**100**	**100.0**

Source: Field Survey Data, 2005

It has been shown that Fishers in the past married many wives and had large household sizes to be above to provide enough labour for fishing activities. Although Christianity restricts the number of wives in the household, many rural household size are still relatively large. This situation has posed serious problems in recent times due to the present economic crisis and is responsible for the high rate of malnutrition, illiteracy and unemployment especially in the rural economy (Nnanyelugo, 1980, Ryan *et al.,* 1986; Olusanya, 1980 and Okorji, 1999).

Occupational Status

The result in Table 5 indicates that 44.0% of the artisanal fishers were engaged in fishing as their primary occupation. Fishers in this category are those who do not have any other source of revenue apart from fishing. Twenty-three percent (23.0%) fishers combined fishing with crop farming. This may be attributed to the presence of arable land, which is usually free of charge for those fishers in Ubi area of Oguta. It is worthy to note that none of the fishers engaged in any form of animal husbandry. This may likely be due to the fact that it is both time consuming and capital intensive. However 16.0% of the artisanal fishermen were involved in craft works like net making, net mending, basket making and mat making. This study shows that fishers engaged more in craftwork during the off fishing seasons.

Meanwhile 8.0% of the artisanal fishers were civil servants and fished mostly on weekends. Motorcycle taxi operators constituted 4.0% of the entire sampled population and they engage in fishing as a secondary occupation to augment income from taxing with motorcycle. The participation of civil servants is not worthy. This set of fishers engages in fishing to augment their salaries as a stopgap measure to supplement their income (Njoku and Odii, 1991).

Multiple occupations of fishers as observed in this survey have also been observed in artisanal marine fishers in Ghana (Mensah and Antwi, 2002).

The occupational status of fishers in this investigation portrays artisanal fisheries as one of the income generating opportunities in the locality including some outside the fisheries sub-sector. The 44% of the fishers do not engage in other forms of occupation is indicative of the fact that artisanal fisheries is not a "last resort employment" for people in Oguta locality. These observations tally with those made by Tietze (2000) for coastal fishing communities in Philippines, Malaysia, Bangladesh, India, Tanzania and Senegal.

Table 5: Occupational Status of Artisanal Fishers

Category of fishers	Frequency	% of the total population
Fishing alone	4	44.0
Fishing/crop farming	23	23.0
Fishing/animal production	-	-
Fishing/civil service	8	8.0
Fishing/motorcycle taxi	4	4.0
Fishing/training	-	-
Fishing/craft work	16	16.0
Fishing/land and water transport	5	5.0
Total	**100**	**100.0**

Source: Field Survey Data, 2005

Income Level of Artisanal Fishers

The monthly income distribution of artisanal fishers is shown in Table 6. It reveals that fishers who earn income in the range of ₦40,001 and ₦50,000 represent 30.0% of the respondents, while fishers earning income between ₦10,001 and ₦20,000 represents 19% of the respondents. However, 16.0% of the respondents earn income in the range of ₦20,000 and ₦30,000.

Table 6: Distribution of Artisanal Fishers According to Monthly Income Level

Level of income (₦)	Frequency	% of the total population
Below 10,000	-	-
10,001 – 30,000	16	16.0
20,001 – 30,000	16	16.0
30,000 - 30,000	15	15.0
40,0001 – 50,000	30	30.0
50,000 – 60,000	12	12.0
60,000 and above	8	8.0
Total	100	100.0
Mean income	37,400 ± 4,884	

Source: Field Survey Data, 2005 US $1 = N134.00

In the same vein, 15.0% of the respondents represented fishers who earned monthly income of ₦50,000 and ₦60,000 and above respectively. This implies that the mean income of the respondents is ₦40,000, but according to Okorji (1999) monthly income earners of less than N50,000 are regarded as low-income earners. The relatively low-income status of the fishers has implication for household welfare and fishing productivity. Mensah and Antwi (2002) similarly observed that artisanal fishing households are characterized by low incomes, which also translate to low savings and investment capacity, resulting in low outputs and further lowering of income. This is a typical vacious poverty cycle reinforced by producing a little beyond subsistence.

Marginal Physical Product of Artisanal Fishers as Estimated with three Regression Models

The model estimation of artisanal fishing is presented in Table 7. The linear regression function was chosen as the lead equation based on econometric and statistical reasons such as the number of regression coefficients that are significant, the value of R^2 and the significant level of the F-ratio. The result shows that the linear function, explained 51.5% of the total variations in the values of output of artisanal fishers.

The lead equation (linear form) shows that the coefficient of the values of fixed cost invested (X_1) is positive (4.82) contrary to a priori expectation with a standard error of 1.331 and the variable is statistically significant at 1.0 percent level. The result also shows that the coefficient of the depreciation value of fixed assets (X_4) is also positive (1.971) contrary to apriori expectation with a standard error of 0.990 which is significant at 10.0% level of probability. However, area of late fished (X_5) has a positive relationship with the output of Artisanal fishers in the study area. The coefficient is 3322.539 with a standard error of 1741.24 and is statistically significant at 10% level. Fish output is directly related to size of lake (Akinola and Young, 1991). All the significant variables (value of fixed cost, depreciation and area of lake fished) and some variables that are not significant (value of variable inputs and value of other inputs) had positive relationship with the value of outputs. This implies that as their quantities used increased, the revenue accruing to the artisanal fishers world increase. It shows that the output of artisanal fisher would depend on the extent the new fishing lakes are identified and utilized, considering the constraints imposed by nature. It also indicates that the other inputs used had negative influence on the value of output, implying the more they were used, the less the output that would accrue to the artisanal fishers.

Table 7: Estimation of Artisanal Fishers Using Three Regression Models

Variables	Linear	Semi-log	Cobb-Douglas
Constant	-140354.7	11.148	0.868
	(102540.44)	(0.318)***	(2.174)
Value of variable invested (X_2)	4.872	$1.266E^{-05}$	0.794
	(1.331)***	(0.000)***	(0.258)***
Value of variable inputs (X_2)	0.146	8.061^{-17}	$-1.487E^{-02}$
	(0.598)	(0.000)	(0.173)
Labour (X_3)	-9339.06	$4.206E^{-06}$	$5.048E^{-02}$
	(16543.62)	(0.051)	(0.111)
Depreciation value of fixed assets (X_4)	1.971	$5.206E^{-06}$	0.153
	(0.990)*	(0.000)*	(0.122)
Area of lake fished (X_5)	3322.539	$9.141E^{-03}$	0.409
	(1741.27)*	(0.005)*	(0.218)
Value of other inputs (X_6)	1631.599	$1.283E^{-02}$	$7.504E^{-02}$
	(4237.882)	(0.013)	(0.097)
R^2	0.515***	0.483***	0.462
F-ratio	16.482***	14.490***	13.306***

*** Significant at 1%. *Significant at 10%. Figures in parenthesis are standard error

The non-significance of value of variable inputs, labour and value of other inputs may be attributed to the level of use. Most artisanal fishers use traps and cast nets instead of baited hooks. It is believed that encircling nets have the tendency to catch more fishes than baited hooks.

Conclusion and Recommendations

Based on the findings of this study, it is worthy to conclude that all the significant variables (value of fixed cost depreciation and size of lake) and some variables that are not significant like value of variable inputs and value of other inputs, had positive relationship with the value of outputs. This implies that as the value of the significant variables increase, the output of the artisanal farmers would also increase. If further showed that the output of the artisanal fishers would depend on the extent new fishing lakes are identified and utilized considering the constraints imposed by nature. It also indicated that the non significant value of variable inputs such as labour and other inputs may be attributed to the level of use.

For fishers to be more productive, it is recommended that:

i. The government at all levels (Federal, State and Local government) should subsidize the cost of fishing gears and other inputs used in Fishing. This will help to address the problem of high cost of fishing gears.

ii. Loan facilities should be made available to the fishers especially through the Agricultural Cooperative and Rural Development Bank in the area.

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