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Economic status of artisanal fishermen in Ondo and Ogun States, Nigeria.

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Abstract

The performance of the artisanal sector of Nigeria's fishing industry, accounted for between 96 percent in 1981 and 87 percent in 1984 of the total domestic fish production. Primary data collected revealed that fishing costs were quite high in Ondo State compared to Ogun State, estimates being ₦7,178 and ₦2,559 for Ondo and Ogun States respectively. Incomes estimated were from ₦1,850 to ₦15,200. Estimated averages were ₦12,097 and ₦3,944 for Ondo and Ogun States respectively. Fifty-six percent of the fishermen in the study area earned incomes between ₦1,300 and ₦2,900 annually. Incomes so obtained can be considered to be low for a family of seven. Thus, the fishermen engage in secondary occupation to supplement their incomes. Further studies are suggested to determine how to help the artisanal fishermen to achieve better fish catches that would result in higher income for them; and also to determine the productivity of the artisanal fishermen and its impact on the national economy.

Introduction

A study of small-scale fisheries is justified by a number of reasons. Firstly, fish is an important source of protein which previous studies have shown to the critically deficient in a typical Nigerian diet (FAO 1966; Anthonio 1968; Olayide 1983). Secondly, with Nigeria's exclusive rights to more than 256,000 square kilometers of marine water including a coastline which measures 800 kilometers, and an exclusive economic zone of 321.4 kilometers, it is natural to expect the supply of fish to increase when the fishing industry is efficiently developed and managed. Thirdly, it is useful to understand the economic behaviour of the small-sacle fishermen as it relates to the forces influencing the quantity and quality of domestic fish production. This aspect of the study is essential to policy makers with respect to the needs of artisanal fishermen and in particular regional development in general.

The Fishing Industry in Nigeria – General Setting:

The Nigerian Fishing industry is of two major types: Small-scale or Artisanal fisheries and the Large-scale or Commercial fisheries. The small-scale fisheries are predominant in the fishing settlements scattered all around the coastal riverine areas with narrow inlets of streams, rivers and creeks. The large-scale fisheries operate largely in the lagoons and creeks adjacent to the Atlantic Ocean.

Artisanal Fisheries:

In Nigeria, efforts of government fishery advisors are concentrated in three areas: Coastal and Brackish waters, Rivers and Lakes, and Commercial (Industrial) fisheries. It is only in the last five years that fish farming is being given greater awareness, interest and importance. Therefore, the potential of the Nigerian waters as a supplier of fish has to be appraised within the context of the domestic demand for fish.

Olayide (1983) estimated fish demand projections for 1984/85 to be about 1.26 million metric tonnes which would increase to 2.8 million metric tonnes by the year 1994/95. This means that demand will more than double in 10 years time. The increasing demand and the present economic situation in the country point to the fact that demand for fish will have to be met by expanding domestic fish production. This is so particularly as government policy is in the direction of limiting importation of good, including fish and fish products.

Table 1 summarises Nigeria's fish supply by sector from 1974 to 1984. As shown in the table, catches from the artisanal sector (that is, coastal and brackish waters, rivers and lakes) have been responsible for the largest share of domestic fish output in Nigeria during the period under investigation. The artisanal fisheries sector accounted for 96 percent of total fish production in 1981 and 87 percent in 1984.

Gnanadoss and Aderounmu (1982) estimated that there are about 250,000 local fishermen in the whole country. They are resident in the numerous fishing settlements operating about 50,000 traditional dug-out wooden boats (canoes). Approximately, 4,000 of these canoes are fitted with outboard engines of different horse power ratings. In general, the system of artisanal fishing is labour intensive and because of the limited capabilities of the crafts and gear, fish output is relatively low. Deficits in the demand for fish in the country have been met by heavy fish imports in the form of frozen fish (Table 2).

Table 1: DOMESTIC FISH PRODUCTION IN NIGERIA BY SOURCES 1974–1984 IN METRIC TONNES

Year	Coastal & Brackish Water	Rivers & Lakes	Commercial	Fish Farm Ponds	Total
1974	226,004	239,350	7,866	---	473,220
1975	229,854	226,208	10,174	---	466,236
1976	245,336	238,942	10,488	---	494,766
1977	247,858	240,164	15,992	---	504,014
1978	255,426	245,986	17,155	---	518,567
1979	264,495	259,632	11,308	---	535,435
1980	266,935	194,432	16,432	---	479,706
1981	317,779	164,004	14,438	---	496,221
1982	369,750	127,460	18,577	---	515,787
1983	370,040	131,887	15,947	20,476	538,350
1984	227,659	99,552	24,532	22,012	373,753
Total	**3,021,136**	**2,167,614**	**162,819**	**42,488**	**5,394,057**
Percent	**56.00%**	**40.19%**	**3.02%**	**0.79%**	**100.00%**

Source: Computed from the Federal Department of Fisheries Statistics of Nigeria 1981 and 1985

Table 2: PROPORTION OF TOTAL FISH SUPPLY IMPORTED INTO NIGERIA FROM 1974 – 1984 IN METRIC TONNES

Year	Domestic Fish Production	Fish Imports	Total Fish Supply	Fish Inport as a % of fish supply
1974	473,220	74,905	548,125	13.7
1975	466,236	114,186	580,422	19.7
1976	494,766	133,977	628,743	21.3
1977	504,014	164,449	668,463	24.6
1978	518,567	202,208	720,775	28. 0
1979	535,435	218,000	753,435	28.9
1980	479,596	202,502	682,098	29.7
1981	496,221	245,000	741,221	33.0
1982	515,787	244,400	760,195	32.2
1983	538,350	238,854	777,204	30.7
1984	373,755	137,717	511,472	26.9

Source: Computed from the Federal Department of Fisheries Report (FDF). Fisheries Statistics of Nigeria, 1981.

The table reveals a substantial shortfall of domestic fish production in Nigeria compared with the total national demand for supply of fish from 1974 to 1984. The proportion of fish imported increased steadily from about 14 percent in 1974 to 33 percent in 1981. Imports gradually decreased between 1981 and 1984, not because there was less demand for fish but rather because of the marked depression in the country's economy. Consequent on this, prices of fish sky-rocketted, a situation that was forecast by Ladipo, *et al* (1981).

Materials and Methods

The data for the study was coilected in 1984 using a structured questionnaire to interview artisanal fishermen in Ondo and Ogun States. In all, one-hundred and seventy-four fishermen were interviewed from six selected fishing settlements namely: Ayetoro, Araromi, Orioke-Iwamimo in Ondo State, and Iwopin, Makun-Omi and Irewolede-Okun in Ogun State respectively. The data were analysed by the use of simple statistical tools like frequencies, cross tabulations and regression techniques.

Results

General Information About the Respondents' Age:

In Ondo State, the average age of artisanal fishermen was 42 years as compared to 50 years recorded for Ogun State. This implies that artisanal fishermen in Ondo State are relatively younger than their counterparts in Ogun State. The age range was from 30 to 69 years in both States.

Education:

The mean number of years spent in school was 2 years in Ondo State and 3 years in Ogun State. Fishermen in the study area were generally uneducated as the range of their years of education was from 0 to 6 years, indicating low level of education. It means that fewer fishermen in the study area either did not attend school or those who attended did not complete even the primary school.

Size of Household:

The arithmetic mean numbers of children per fisherman were six and five for Ondo State and Ogun State respectively. The number ranged from zero to fourteen in the two states.

The arithmetic mean number of adults per fisherman's household was three for Ondo State and two for Ogun State. The range is from one to seven.

Fishing Experience:

Experience in artisanal fishing was measured in number of years in the fishing trade. Fishermen in Ondo State recorded a mean of 26 years of fishing experience as compared to an average of 36 years recorded for Ogun State. This showed that fishermen in Ogun State have been longer in the trade and therefore more experienced. The correlation coefficient for fishermen's age and years of fishing was 0.68 for Ondo State and 0.84 for Ogun State, implying that the older the fisherman, the greater his fishing ability borne out of experience more clearly observed in Ogun State where fishermen tend to be older than in Ondo State.

Costs and Returns:

Fishing Costs

The variables used in computing fishing costs are replacement costs of boats (canoes) and outboard engines, cost of nets, cost of sink/floats, and cost of other fishing equipment. A summary of costs is presented in Table 3.

Table 3: FISHING COSTS IN THE STUDY AREA IN NAIRA

Variable	State	Mean	Range (₦)
Cost of Vessels	Ondo	5,200.56	500 – 96,000
	Ogun	737.45	600 – 850
Cost of outboard engines	Ondo	2,990.00	1,200 – 4,000
	Ogun	1,195.51	800 – 1,200
Cost of nets	Ondo	2,755.63	0 – 6,000
	Ogun	520.43	300 – 600
Cost of Sinks/Floats	Ondo	553.89	145 – 180
	Ogun	163.44	75 – 1,200
Cost of other Equipment	Ondo	646.10	0 – 1,500
	Ogun	---	----
Total Fishing Cost	Ondo	7,177.84	Not computed
	Ogun	2,559.47	

Source: Field Survey, 1984.

Average total fishing cost for Ondo State was estimated to be ₦7,177.84 while it was ₦2,559.47 for Ogun State. In general, fishermen in Ondo State were observed to have invested more heavily in their fishing activity compared with Ogun State.

Incomes.

The level of profitability of artisanal fishing in the study area were also computed. The average annual revenue was found to be ₦12,097 (ranging from ₦2,800 to ₦15,200) and ₦3,944 (ranging from ₦1,850 to ₦6,825) for Ondo State and Ogun State respectively. Given the estimated costs incurred by the fishermen as shown in Table 3. above, annual net profit stood at ₦4,919 and ₦1,385 in Ondo State and Ogun State respectively. Only fishermen owning trawlers or relatively medium to large outboard engines (44 percent) ventured out to sea. For such ventures, they earned for themselves incomes above ₦4,900.

The majority (56 percent) of the artisanal fishermen in the study area earn between ₦1,300 and ₦3,900 annually. The fishermen in the lower strata of the income bracket engage in secondary occupation such as tailoring, shoe repairing, building and carpentry. Their wives add food selling, petty trading and sale of textiles to their fish marketing.

Fish Type Landed:

Frequencies of volume of catch in the study area are presented in Table 4. The fishes are arranged in descending order according to the value of eta*. The four most significant fish types in explaining variability in fishermen's income are: Catfish, Croaker, Bonga, Sardinella. The frequencies (percent) are calculated as a proportion of total sample that catch a particular fish type. The computed frequences for each fish type are used to classify the latter using a scale from A to L in ascending order of popularity of fish types among fishermen.

Catfish had the highest frequency of about 67.8 percent in the study area followed by Croaker (50.6 percent). Bivalve was least popular among

* eta also referred to as the correlation ratio is a measure of association used when the independent variable (fish types) is nominal level and the dependent variable (annual income) is interval level. Eta like the coefficient determination ranges between 0 and 1.

fishermen in the study area. The economic implication of this kind of popularity of the various fish types is that the fishing grounds must be replenished with fish seed on a continuous basis to improve the fishermen's production level.

Table 4: FREQUENCY OF CATCH IN THE STUDY AREA (N = 174)

Fish types	Frequency	Percent	Eta	Classification** by frequency
Synodontis	37	21.3	0.86	I
Tilapia	45	25.9	0.83	H
Mullet	30	17.2	0.73	J
Catfish	118	67.8	0.70	A
Barbus	22	12.6	0.65	K
Silverfish	22	12.6	0.65	K
Croaker	88	50.6	0.50	C
Sole	57	32.8	0.42	G
Bonga	65	37.4	0.39	F
Heterotis	25	14.4	0.38	K
Gymnachus	16	9.2	0.27	L
Crabs/Shrimps	43	24.7	0.24	I
Sardinella	51	29.3	0.21	H
Shark	17	9.8	0.20	L
Shining nose	7	4.0	0. 2	L
Baraouda	15	8.6	0.08NS*	L
Other types of fish	12	6.9	0.09NS	L
Bivalves	9	5.2	0.01NS	L

Source: Field Survey, 1984.

* NS = not significant.

** Scale (% Frequency) L = 5–10; K = 11–15; J = 16–20;
I = 21–25; H = 26–30; G = 31–35;
F = 36–40; E = 41–45; D = 46–50;
C = 51–55; B = 56–60; A = 61–70.

Fishermen Organization

Membership of fishing or fishmongers' cooperative thrift and credit societies in the study area was not a precondition for entry into the fishing industry. However, it is a major means of obtaining credit at ease and at

reasonable terms especially in Ondo State.

One hundred and fifty-one fishermen (or 87% of total) in the study area were cooperative members. Chi-square test for association between cooperative membership and fish income ($x^2 = 18.392$) was significant at 5 percent level of probability but the eta value of 0.047, is rather too low, implying that belonging to a cooperative society does not guarantee a better income for the fishermen. The fishermen could join the cooperative for other reasons especially social solidarity.

About 83.6 percent of the fishermen claimed they have some form of assistance from their cooperative societies. A chi-square test of association between acquisition of help from the cooperative and fish income was significant at 5 percent ($x^2 = 17.43$) level of probability, but the eta value is even much smaller – 0.009, implying that such help may not be directly income increasing.

Regression Analysis

An attempt was made to find out the degree of influence of selected explanatory variables such as hired labour, family labour, years of fishing, age of respondent, fishings a week and respondents' educational level on the amount of income accruing to the fisherman. The results of the multiple regression analysis ran stepwisely, are presented in Table 5 (Ogun State) and Table 6 (Ondo State).

From the tables, it could be seen that variable X38 (expenditure on fixed items such as fishing vessels, boat engines etc.) is highly significant (1% significance level) in explaining variable X38 alone explains about 44% of the variability in the incomes of the fishermen; the degree of variability in income explained by X38 in Ondo State is about 14%.

On the basis of the values of adjusted R^2 obtained, equations 4 and 11 turn out to be the lead equations for Ogun and Ondo States respectively. Equation 4 incorporates the following explanatory variables: depreciation on fixed equipment, number of fishing trips made per week, fisherman's educational level and number of children helping in the fishing operations. Of the variables, fixed cost expenses turned out to be the most important followed by the number of fishing trips made per week. Unexpectedly however, X6 carries the wrong sign showing that the fishermen make too many trips than necessary at present.

Understandably, the more trips the fisherman makes, the greater his chances of bringing to share more fishes up to a certain extent. Also, the more advanced his educational level, the better his level of alertness and the higher his capability to decide on business issues that can enhance his income. Noteworthy is the fact that in the same equation (equation 4), the contribution of family labour (children) is not significant.

Table 5: LINEAR REGRESSION RESULTS BETWEEN ANNUAL INCOME AND SELECTED VARIABLES, OGUN STATE

Equation	Constant	Dependent Variable	Independent Variables							R^2	R^{-2}	F
			X_{38}	X_6	X_4	X_8	X_7	X_3	X_5			
1.	−1287.41445	X10	2.03487***									
			(0.24424)							0.43819	0.43187	69.41542
2.	877.75183	,,	1.97297***	−474.31571***								
			(0.22637)	(118.24604)						0.52503	0.51424	48.63762
3.	872.14945	,,	1.85343***	−428.05600***	42.85028*							
			(0.24258)	(122.74138	(32.16039)					0.53453	0.51848	33.30250
4.	794.46988	,,	1.76250****	−439.90797****	48.04566*	68.85198						
			(0.25208)	(122.66361)	(32.30655)	(54.15552)				0.54312	0.52187	25.55798
5.	891.63004	,,	1.69779***	−452.16649***	51.45622*	73.19063	43.90786					
			(0.27655)	(124.93894)	(32.96030)	(54.87749)	(75.67835)			0.54492	0.51815	20.35595
6.	991.64188	,,	1.74523***	−455.23372***	51.37009*	80.21288	43.87833	−4.92225				
			(0.29679)	(125.70706)	(33.11572)	(57.25684)	(76.03397)	(10.82372)		0.54604	0.51361	16.83947
7.	1085.57563	,,	1.74880***	−446.23495***	52.52191*	75.28848	39.26861	−19.51018	17.10898			
			(0.29804)	(127.17209)	(33.30818)	(58.11745)	(76.75599)	(27.54739)	(29.68799)	0.54780	0.50971	14.36651

Note: * = 10% significance level; *** = 1% significance level.

X_{10} = Annual Fish Income
X_{38} = Fixed Cost (depreciation on Fixed Equipment)
X_6 = Fishings a week
X_4 = Education in years
X_8 = Family Labour (Children)
X_7 = Hired Labour
X_3 = Age in years
X_3 = Years of fishing

Table 6: LINEAR REGRESSION RESULTS BETWEEN ANNUAL INCOME AND SELECTED VARIABLES, ONDO STATE

Equation Number	Constant	Dependent Variable	Independent Variables							R^2	$\bar{R}^2$	F
			X_{38}	X_9	X_6	X_5	X_7	X_8	X_3			
8.	12524.89040	X10	–0.06443*** (0.01951)							0.13823	0.12555	10.90692
9.	10932.46916	,,	–0.06588*** (0.01887)	494.26259* (205.60869)						0.20665	0.18297	8.72607
10.	9273.66875	,,	–0.07184*** (0.01971)	396.98949* (225.84772)	327.59644 (315.58879)					0.21940	0.18391	6.18329
11.	9861.01390	,,	–0.07311*** (0.01963)	369.55680* (225.62859)	446.31175 (326.80565)	–47.93276 (36.69586)				0.23936	0.19255	5.11365
12.	9788.70289	,,	–0.07798*** (0.02182	324.96061* (242.32531)	453.14355 (328.90262	–48.01405 (36.90263)	100.22375 (191.20888)			0.24261	0.18344	4.10022
13	9923.39222	,,	–0.07725*** (0.02200)	287.56641* (255..50908)	443.06115 (331.51902)	–61.87049 (46.71548)	101.20635 (192.36678)	67.28041 (137.69004)		0.24547	0.17361	3.41600
14.	10197.85754	,,	–0.07759*** (0.02220)	293.03494 (258.25253)	451.65416 (335.58318)	–55.37266 (53.13335)	102.25266 (193.84411)	80.16983 (147.09033)	–14.02949 (53.24279)	0.24632	0.16122	2.89467

Note:

$X_{10}, X_{38}, X_6, X_5, X_7, X_8, X_3$, are as given in table 5;
X_9 = Adult Family Members.

Adult family labour, however, turns out to be significant (at the 10% level of significance) in the Ondo State case (see equation 11 in Table 6). As shown in the equation, the following variables are affected: fixed cost expenses, adult family labour, fishings a week and years of fishing. This time X_6 carries the positive sign showing that the more the number of trips Ondo State fishermen make to the seas the greater their incomes.

Years of fishing as a variable bears the negative sign indicating that the lower the number of years a particular fisherman has been in the fishing occupation the greater his income level. This may connote the fact that diminishing returns have started to set in on a number of fisherman in the state. In making this point however, it has to be borne in mind that the said variable (X_5) is not one of the significant (not even at the 10% level) variables in the lead equation.

In general, the results show that improvements in the annual income of fishermen in Ondo or Ogun States should be concentrated on providing adequate and low-cost capital equipment which would facilitate greater fish catches and enhance the fishermen's productivity.

The attitude to invest more financial resources in order to earn more income poses enourmous problems in the small-scale fish industry in Nigeria just like in many other developing countries because many of the input subsidies are now being withdrawn due to economic problems facing the developing countries. In this respect, the present study reveals that efficiency may be achieved through individual decision-making in which the fishermen are motivated by the urge to increase their personal and family incomes.

Summary and Conclusions

The present study indicates that fishermen in the study area were middle-aged. They had limited schooling. The mean number of children of the interviewees was six while the mean number of adults in the household was three. The respondents were observed to have been engaged in fishing for the most part of their life with mean number of years of 26 and 36 for Ondo and Ogun States respectively. The correlation between age and years of fishing was positive and significant implying that the older the fisherman the more experienced he is in fishing and the greater his fishing potentialities.

Fishing costs were quite high in Ondo State compared to Ogun State, estimates being ₦7,178 and ₦2,559 for Ondo and Ogun States respectively. Incomes estimated were from ₦1,850 to ₦15,200. Estimated averages were ₦12,097 and ₦3,944 for Ondo and Ogun States respectively. Fifty-six percent of th fishermen in the study area earned incomes between ₦1,300 and ₦2,900 annually. Incomes so obtained can be considered to be low for a family of seven. Thus, the fishermen engage in secondary occupations to

supplement their incomes.

The four most significant fish types landed were the Catfish, Croaker, Bonga and Sardinella. Membership in cooperative organization in the study area did not seem toimprove incomes of the fishermen. Hence, the study has highlighted the low economic status of the artisanal fishermen in Nigeria.

By way of conclusion, it is suggested that the availability of fish continuously in the fishing grounds need to be examined. An efficient method of fishing needs to be developed. Also better records of costs and returns need to be kept to enable the individual fisherman evaluate his method in comparison to his earning ability.

Government should also provide incentives and encouragement to research testing and evaluation of various strategies that would enable the small-scale fishermen to be economically viable. This will be a better way of encouraging rural development that will enable artisanal fishermen to expand the scale of their operations and earn a decent living.

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