

AN ECONOMIC ANALYSIS OF ARTISANAL FISHING IN EPE LOCAL GOVERNMENT AREA OF LAGOS STATE, NIGERIA

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Target Audience: Fisheries scientists, researchers and livestock economists.

ABSTRACT

One hundred fishermen from ten fishermen Co-operative Societies in Epe Local Government Area of Lagos State were randomly sampled for economic analysis of artisanal fishing in the area. Structured questionnaires and interviews were used to solicit specific responses to some socio economic indices as well as aspects of artisanal fish production. The data so gathered were subjected to statistical and gross margin analysis to determine the profitability of artisanal fishing in the study area.

Findings indicate that the main work force engaged in active fishing were in the age bracket of 30-40 years and obtained credit for their operations mostly (55 %) from informal sources. The combined average daily fish output was 21.98kg yielding an average monthly income of N19,000. On the whole, annual profits of N187,703 and N45,425 were recorded for canoe and motorized boat fishing. The motorized boat fishing operation was characterized by high operational costs, accounting for rather low returns compared with canoe fishing.

Key words: Economics analysis, artisanal fishing, canoe, motorized boat, gross margin, returns.

DESCRIPTION OF PROBLEM

Fish is a rich source of essential amino acids. Increased fish production will not only make it possible for more protein supply in our diets but, also ensure that the price is within the reach of the average person. In Nigeria, the total domestic demand for fish in 1985 was estimated at 1.45 million tonnes while the total domestic production was 1.2 million tonnes (1). This means that a shortfall exists between demand and supply. One possible way of meeting this deficiency is to sustain increase in fish production, by encouraging traditional artisanal fishing. This form of fishing is practiced by small scale fishermen operating in the coastal and brackish waters, distributories, rivers, lakes and in seas not beyond a few kilometers (2).

In Nigeria, it seems that the activities of the artisanal fishing sectors have

been largely ignored. Against the background of the importance of artisanal fisheries to an expanding economy like Nigeria, which is equally recording rapid population growth, the need arises for an in-depth socio-economic analysis of the sub-sector in order to provide a frame work for increasing the output. This research therefore, was carried out to examine the socio-economic structure of the artisanal fishing communities of Epe Local Government Area of Lagos State, Nigeria, with a view to determining the level of investment and returns.

MATERIALS AND METHODS

The study was conducted in Epe Local Government Area of Lagos State. Apart from farming, artisanal fishing is a major occupation of the people of this area, especially in the riverine parts. Artisanal fishing involves mainly the use of traditional gears (such as hooks, spears, fish traps, canoes, boats etc.). Sometimes among the affluent ones motorized boats are employed for fishing.

The primary data were obtained by the use of questionnaires administered to 10 randomly selected fishermen from each of the 10 cooperative societies in Epe Local Government Area. On the whole 100 respondent fishermen were contacted using augmented interview schedules. The data generated through these sources provided information on the age, educational background, marital status and annual income of the fishermen. Other information obtained include cash outlay, distribution of landing and gross margin. Secondary data were got from the Federal Department of Fisheries (3) and Federal Office of Statistics which gave useful information on projected fish production for 1978-1985.

The Gross margin model was adopted to specifically test the profitability of artisanal fishing in Epe Local Government Area vis-a-viz, production factors such as capital investment, cost minimization and government policies. The model is expressed simultaneously as

$$G.M. = TR - TVC \dots\dots\dots(i)$$

$$Profit (n) = G.M - TFC \dots\dots\dots(ii)$$

Where GM is Corss margin of artisanal fishing production in the area studied, TR equals Total Revenue or Gross Revenue accruing from production, while TVC is the Total Variable Cost, and TFC, as the Total Fixed Cost.

The bulk of the primary data collected was analysed using both descriptive and inferential statistical techniques such as percentages, in addition to the gross margin technique, designed to determine the relative profitability and the expected income of the fishermen in the studied area. The results obtained were tested at 5 percent Z -test significant level (4).

RESULTS AND DISCUSSION

Research findings show that artisanal fishing was carried out by people between the age bracket of 21 and 60 years, with the most active in the age

group 31 to 40 years (Table 1). Majority of the fishermen are married, primary school leavers operating chiefly with motorized boats as against few that operate with dug-out canoes, with total investment costs of N292,600 and N87,080 respectively (Table 2).

Table 1: Socio-economic characteristics of artisanal fishermen in Epe local government area

Age group (Years)	Percentage
21-30	9
31-40	42
41-50	26
51-60	23
Educational level	
No schooling	17
Primary school	81
Secondary school	2
Higher Education	-
Marital status	
Unmarried	23
Married	73
Divorced	4
Fishing system	
Dug-out Canoe	19
Motorized Boats	81

Total annual revenue is N227,962 and N228,000 for traditional dug-out canoe fishing and motorized boat fishing respectively, while operating costs (total variable costs) are N8,708 for canoe fishing and N58,060 for motorized boat fishing (Table 3). The huge fixed capital involvement for motorized boat operators, coupled with high operating costs probably accounted for the low profit of N45,425 as against N187,703 recorded as profit for canoe fishermen.

The average landing by the ten fishing cooperative societies at Epe as shown in Table 4 amounts to 21.98kg per day yielding a combined daily income of N185.71 for the ten fishing cooperatives. Making allowance for no fish caught in some days, a four-day week would yield N19,000 in a month, and a total of N228,000 in a year.

Table 2: Capital investment fixed and variable costs for Artisanal fishing enterprise

Item	No. Employed	Capital assets N	Rate of depreciation %	Total Depreciation value / year N
Hooks	21 packets	10,500	33	3465
Cork/Float	10 bundles	12,000	25	3000
Net	8 bundles	12,000	20	2,400
Canoe	1	10,000	33	3,300
Boat	1	16,000	33	5,280
Sink	5kg	40,000	33	13,200
Basket	8	1,600	100	1,600
Owin	2	500	50	250
Motor Boat engine	1	200,000	25	50,000
Paddle	4	480	33	158
Total				
Investment:				
Canoe		87,080	20	17,416
Motorized boat		292,600	20	58,520
Total Fixed cost:				
Canoe				31,589
Motorized boat				124,515
Variable cost at 192 days operation per year				8,716
Canoe maintenance at N45.40/day				
Motorized boat for maintainance at N152.40/day				29,260
Fuel and Oil at 150/day				28,800
Total for Motorized boat				58,060

Table 3: Gross margin analysis

Item N	Fishermen who Employed canoes	Fishermen who operated on boat
Total revenue	227,962	228,000
Total variable cost	8,708	58,060
Gross margin	219,292	169,940
Total fixed cost	31,589	124,515
Profit	187,703	45,425

Generally, the study revealed that the fishermen were faced with many constraints, viz; obstruction due to water hyacinth (47%), high cost of inputs (36%), as well as tug boat menace (17%). Nevertheless, artisanal fishing was generally found to be very profitable especially with traditional canoes which consumed little or no fuel. It is recommended that artisanal fishing be encouraged nationwide in both inland and coastal water areas by granting input subsidies and fishing rights to the fishermen.

Table 4: Distribution of fishing landing per trip in each community of 10 fishermen cooperative societies (Epe)

Day	Names of fishing Cooperative	Average Weight (kg)	Price per Average WT. N
1	OMOJULU F.C.S	23.12	1,272
2	OWODUNI F.C.S	19.98	1,039
3	OMILODI F.C.S	4.83	1,415
4	KAJOLA F.C.S	26.39	1,346
5	TUNWASHE F.C.S	22.06	1,058
6	OWONIGBA F.C.S	23.66	1,443
7	ALARO F.C.S	20.27	1,054
8	IREWO OWURO F.C.S	20.23	992
9	LAWENBELI F.C.S	22.04	1,235
10	OLUWASEYI F.C.S	17.26	1,004
AVERAGE		21.98	1185.7

The sampled 10 fishermen cooperative societies in Epe Local Government area as at May, 1996.

It is found from the result that the average quantity of fish supplied by the artisanal fishermen the prevailing period was 2138.4 kilogrammes, with N25,398 as the average cost of production (C), at the relative price of N118.571 (Table 5). Contrarily, an average amount of N263,808, was established as the price of close substitute (P_2) for the fish, which increased with a large difference of N145,257 of the relative price (P_1). This high increase in the price of the close substitute could be attributed to high price in the price of the fish (P_1) which affected the supply, demand and the price of meat (close substitute, P_2).

Nevertheless, a 75 percent profit of N 93, 173 was realized from the sales of the quantity of fish supplied by the ten fishing cooperative societies in the study area, attesting to the profitability of artisanal fishing.

The result of the multiple regression analysis indicate that the regression coefficient (b_1) for price of fish was negative (-3.48) but significant at 5 percent Z-test which implies that as quantity supplied decreased, the price of fish increased. This of course, was the true with respect to our 'a priori' expectation.

Table 5: Average quantity of fish supplied, price of fish, price of close substitute (meat) and cost of production of fish.

Quantity supplied (kg)	Price of fish (₦) (P_1)	Price of meat (₦) (P_2)	Cost of production of fish (₦) (C)
231.1	12,716	27,744	2,772
199.8	10,390	23,976	2,256
248.3	14,153	29,796	2,514
203.9	13,460	31,668	1,998
220.6	10,580	26,472	2,514
236.6	14,432	28,392	3,030
202.7	10,540	24,324	2,256
202.3	9,915	24,276	3,030
220.4	12,345	26,448	2,514
172.6	10,040	20,712	2,514
Total = 2138.4	118,571	263,808	25,398

Furthermore, the coefficient of close substitute (P_2) and cost of production (C) were positively signed (1.58 and 0.03 respectively), with P_2 significant at 5 percent Z-test. Both however, indicated a positive relationship with the quantity of fish supplied. The implication was that the increase in the price and cost of fish production caused a change from both supply and consumption of fish to meat, whose prices and cost of production were cheaper. Table 6, gives the result of the multiple regression analysis to show the relationship between price of fish (P_1) the cost of production (C) and the price of close substitute (P_2).

Table 6: Result of M.R.A (Multiple regression analysis)

Variables	Symbol (terms)	Coefficients
Constant term	b_0	-323.97
Price of fish (P_1)	b_1	-3.4771
Price of close substitute, meat (P_2)	b_2	1.5804
Cost of production	b_3	0.0291
Multiple coefficient of determination (%)	R^2	21.102
Number (N)	N	100
ZB/2 (Calculated)	$p < 0.05$	4.59*
ZB/2 (Tabulated)	$p = 0.05$	0.196

Finally, R^2 value showed that the variables in the model used accounted for 21% of the variation in quantity of fish supplied by the artisanal fishermen.

CONCLUSION AND APPLICATIONS

1. It is inferred from the study that the quantity of fish supplied by the artisanal fishermen determined the price of fish at Epe.
2. Increase in the cost of production and the price of fish caused a shift from the consumption of fish to meat and other cheaper protein substitutes.
3. It is expected that a better understanding of the dynamics of the cost structure of fish and fish production *vis-a-vis*, other close meat substitutes, would encourage the adoption of a favourable price mechanism for fish, thereby promoting the artisanal fishing industry for increased output.

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