Economic Analysis of Catfish Marketing in Oluyole Local Government, Oyo State, Nigeria

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ABSTRACT

The study examined the marketing of catfish in the local government of Oluyole, Nigeria. In order to choose the 110 catfish merchants for the study, a multistage sampling technique was used. The selected catfish marketers were given a structured questionnaire to complete in order to collect data. The data were then subjected to descriptive statistics, the Gini-coefficient, cost and return analysis, and regression analysis. The majority of respondents were male, had tertiary education, and had 1-5 years of experience, according to the results. Cost and returns were structured to show an average cost of production of ₦82 558. 69, an average revenue of ₦217100.87, and a gross margin of ₦173396. 04. The Gini-coefficient was 0. 0389, indicating a higher degree of market structure concentration. The regression results showed that age (-0. 199; p≤0. 1), year of experience (0. 050; p≤0. 05), and education (0. 147; p≤0. 05) were statistically significant in determining the profit level of the fish marketers in the study area.

The main limitations were the inconsistent supply of catfish from farms (67.7%) and the quick spoilage of fresh catfish (46.6%). The study concluded that catfish marketing is lucrative and not sex-restricted, and it advised catfish marketers to establish cooperative societies in order to pool resources for group purchases.

(Keywords: catfish marketing cost, return, Oluyole local government)

INTRODUCTION

Nigeria has a lot of potential for fish farming. Due to its maritime nature, a population of over 200 million, and a coastline of over 853 kilometers, the fish industry has the potential to contribute significantly to the agricultural sector (Ajibabe, *et al.,* 2020; Akanni, 2010).

Fish is a significant source of animal protein for many families in Nigeria and other countries. According to the (FAO, 2018; Ume, *et al*., 2016) fish account for more than 60% of the protein in the world, particularly in developing countries. Fish are traditionally gathered from their natural habitat, which includes bodies of water. People eventually came to the conclusion that the fish that live in these environments are disappearing as a result of their depletion and overharvesting.

Intensive management using artificial production methods is thus a necessary substitute. Described as a large process, fish production entails cultivating or rearing fish in an environment that mimics their native habitat (Iruo, *et al*., 2019; Idris-Adeniyi, *et al*., 2018; Kehinde, 2022).

The fisheries subsector accounted for 4. 0% of Nigeria's agricultural GDP in 2007, while agriculture, as a whole, contributed 40% of the GDP (FAO,2018). The Food and Agricultural Organization of the United Nations (FAO, 2007) identifies Nigeria as a protein-deficient nation. The primary way to address a protein deficiency in one's diet is to consume protein-rich plants or animals, such as catfish.

Fish is widely regarded as a crucial source of animal protein due to its high nutritional content. It includes a variety of vitamins, calcium, phosphorus, fat, and other minerals that are vital to human growth and health. It has been found that fish protein is rich in essential amino acids that complement carbohydrate-rich diets. In addition, they have a high nutrient content that includes thiamine, riboflavin, vitamin A, and vitamin D (Akanni, 2010; Onyekuru, *et al.*, 2019; Effiong, *et al*., 2012). Additionally, fish have a lot of minerals. Fish provide Nigerians with around 41% of their total protein intake, which is far less than the average global consumption of 13.3 kg per person per year. Even if production is minimal, this suggests that the nation has a significant need for fish. The increasing demand for fish has demonstrated that the catfish marketing and production sectors in the United States are promising (Ashley-Dejo and Adelaja, 2022; Balami, *et al.*, 2019).

Catfish farming is one of the most important aquaculture industries in Nigeria, and it is also widely regarded as a lucrative business. Catfish farming has the potential to create jobs, increase income, alleviate poverty, and improve food security in developing nations like Nigeria, where the population is constantly rising to about 200 million people (FAO, 2018; Wuyep and Rampedi, 2018).

Due to its high protein content and the fact that it contains vital nutrients that support the health of people suffering from diseases like cardiovascular disease and others, fish is a staple food in every household in Nigeria. According to (Akanni, 2010; Asa and Obinaju, 2014) it has a high concentration of polyunsaturated fatty acids, which are necessary for decreasing blood cholesterol levels. Since catfish is farmed across Nigeria, eaten by the majority of tribes, resistant to harsh environmental conditions, fetches a good price, is delicious, and may live for days while being sold, it is the main fish farmed there Akanni, 2010; Ugwumba and Okoh, 2010).

Currently, the country produces about 253,898 metric tons of *Clarias gariepinus* per year (FAO, 2018). For a number of developing nations in Africa, catfish is one of the most economically important freshwater fish. Its commerce offers local producers a large number of jobs and aids in alleviating food insecurity among the populace (FAO,2017).

According to Alawode and Oluwatayo (2019), the majority of Nigerians are unable to meet their protein requirements due to their socioeconomic circumstances. Due to its high cost, the animal protein did not provide enough of the protein needed for growth, particularly in children. The only way to make up for the protein deficiency at a lower cost is to get it from local fish supplies.

When compared to the enormous market potential for production and marketing, catfish farming and marketing is still in its infancy, despite its popularity (Nwiro, 2012). Imported frozen fish, aquaculture, industrial trawlers, and artisanal fisheries are the four main sources of fresh catfish (Akinrotimie, *et al*., 2019). The marketing of fresh catfish involves determining consumer demands and needs and then supplying acceptable food and services that meet those demands and needs in a way that benefits both consumers and business managers.

MATERIALS AND METHODS

The Study Area

The study was carried out at Oluyole Local Government Area. The headquarters of the local government is located at Idi Ayunre. It has an area of 629 km^2. According to National Bureau of Statistics 2016, the population of the area was estimated to be 285,900. It shares boundary with Ogun State through Obafemi Owode and Ijebu north Local Government Area. Prominent crops grown in that area include maize, yam, cassava, cocoyam, plantain, and also catfish production and marketing is a viable and popular enterprise in the study area.

Sampling Procedure

A multi-stage sampling technique was used for the study. The 1st stage involved a purposive selection of Oluyole Local Government Area of the state, because of the high prevalence population of fresh catfish marketing in this area. The second stage involved random selection of four (4) markets Oluyole local government area, which are Akorede market, Orita-market, Orisunbare market, and Elebu market. The final stage involved the selection of 50% of marketers from each market. The sampling frame consists of registered catfish marketers.

Table 1: Sampling Size.

Market	Sampling frame	Sample (50%)
Akorede market	80	40
Orita market	60	30
Apata market	40	20
Omi-Adio market	40	20
Total	**220**	**110**

Source: Author's Computation, 2025.

Methods of Data Analysis

The data collected for the study were analyzed using descriptive and inferential statistics. Descriptive statistics such as, mean, table, percentages and frequency were all employed for data analysis while gross margin, Net profit, Gross margin ratio, Operating ratio and Return on investment were all employed to assess the profitability and viability of catfish marketing and Gini coefficient (GC).

Pseudo Profit function:

Profit (π) = Total Revenue – Total Cost.

Gross margin (GM) = Total Revenue (TR) – Total variable cost (TVC)

Net Profit (NP) = GM – TFC (depreciated value)

GMR = GM x 100 TR

Operating Ratio (OR) = TVC x100 TR

ROI = GM x 100 TVC

Where;
TR = Total Revenue,
TVC = Total Variable Cost,
TFC = Total Fix Cost
GM = Gross Margin
GMR = Gross Margin Ratio
OR = Operating Ratio
ROI = Return on Investment
NP = Net Profit

The GC was used to measure the level of marketer's concentration. This was helpful in determining the degree of competition or monopoly in the fish market.

The Gini Coefficient (GC) is presented as follows;

(i) GC = 1 - ∑XY (i) where:
∑-summation sign
X -Proportion of fresh/dried fish sellers
Y -Cumulative percentage of the sales

The GC has the possibly of values ranging between 0 and 1 expressing the extent to which the market is concentrated.

Linear regression model was used to determine the factors affecting the profitability among the fish marketers. The implicit function was expressed thus:

$$Y = F (X_1, X_2, X_3, X_4, X_5, X_6, X_7, e_i) \qquad \textbf{(1)}$$

Where;

Y =Profitability of fish marketers;
X_1= Gender
X_2=Age(years)
X_3= Educational level of respondent (Years);
X_4=Marital status
X_5= Household size; (numbers)
X_6= Occupation
X_7= Years of working experience(years)
X_8=Cooperative membership
X_9=Member of association

RESULTS AND DISCUSSIONS

The socioeconomic characteristics of the respondents are displayed in Table 2.

Sex of the Respondents

Sex influences the ability to perform some physical work. It is generally believed that men are more efficient in certain physical activities than woman. This is in fact, the basis for comparing the sex of the respondents. The distribution of respondents according to their sex is show in Table 2. There is a gender imbalanced involvement of fish farmers in the study area, with male and female scoring 62.6% and 37.4%, respectively. By implication, there were more males in the study area than females. This result also agreed with the findings of (Mohammed, *et al*.,b2015; Ume, *et al*., 2016; Idris- Adeniyi, *et al*., 2018) in which they found that majority of catfish farmers in Lagos and Anambra States, respectively, were male This is in line with the findings of (Aloysius, *et al*., 2020), who posited that majority (72.1%) of catfish business in Anambra State were dominated by males.

Table 2: Socioeconomic Characteristics of the Respondents.

Socioeconomic Characteristic	Frequency	Percentage
Gender		
Male	72	62.3
Female	43	37.4
Age		
21-30 years	14	12.2
31-40 years	68	59.1
41-50 years	20	17.4
Above 50 years	13	11.3
Educational Level		
Primary	22	19.1
Secondary	30	26.1
Tertiary	63	54.8
Marital Status		
Married	75	65.2
Single	27	23.5
Widowed	9	7.8
Divorced	4	3.5
Household Size		
Below 3	44	38.3
3-5	29	25.2
6-10	23	20.0
Above 10	19	16.5
Occupation		
Farming	61	53.1
Trading	38	33.0
Formal employment	13	11.3
Casual work	3	2.6
Years of Working Experience		
1-5 years	47	40.9
6-10 years	26	22.6
Above 10 years	42	36.5
Total	**115**	**100.0**

Source: Field Survey 2024

Age of Respondents

The age of the respondents is an important factor that affects their level of productivity and overall coping ability within the business. Age is believed to influence the level of physical work. Table 2 showed the age distribution of the respondents. The age of the marketers ranged between 21 and above 50 years. Majority of the marketers were within the age bracket of 31-40 years and this indicates that they were still in their active age. This means that the respondents are within active productive age bracket that could easily adopt new techniques for Production. This is in line with the findings of (Akanni, 2010), who revealed that most of the catfish farmers in Nigeria were young people within the productive age of 40-49 years.

Educational Status of Respondents

Formal education is a widely known avenue for improving knowledge and rate of skill acquisition Formal education is also important in business because it determines the degree of level of adoption of innovation and new technologies. It also determines the degree of excellence in any activity the distribution of education status of the respondents is shown in Table 2. Educational attainment of respondents does not only raise productivity but also enhances respondents' ability to understand and evaluate information on new techniques and processes. Majority of the marketers were highly educated with 54.8%, 26.1% and 19.1% having tertiary, secondary and primary education respectively. This implies that catfish farmers in the study area had one form of education and therefore are literate to understand and adopt any innovation on catfish production that would increase their productivity and income. This confirms the findings of (Akanni, 2010; Balami, *et al.,* 2019) when they posited that catfish farmers are literate and understand catfish management.

Marital Status of Respondents

The marital status of respondents helps to reduce labor costs especially when the respondents are married in which they can supply labor from their household. This in turn increases their income considerably. The distribution of the marital status of respondents is presented in the Table 1. This Table shows that 65.2% of the marketers were married This implies that family labor will be more and readily available for them. This is in agreement with the findings of (Dokuboba and Joseph, 2019) who showed that the majority (74%) of catfish farmers were married people. By implication the respondents were married having enough family labor which offset the cost of family labor and hence boost productivity.

Household Size of Respondent

The total household size of the respondents comprises the head of the home, the wives, children as well as all other dependents. Table 2 shows the household size of the respondents. One of the most important factors affecting production level and productivity among respondents is the composition and size of the family; As regards household size, 38.3% had less than 3 persons per household. This shows that majority of the marketers had relatively low household size which might be good economically in terms of the households welfare as there would be less pressure on the output and invariably income, but on the other hand respondents would be forced to hire labor and pay for hired labor as they are enlightened enough to send their wards to school. This shows that a lot of hired labor will be needed to supplement the insufficient family labor they have which will result in increased cost of production. This is not in line with the findings of Dokuboba and Joseph (2019) who revealed that 52% of catfish farmers had household sizes between 6-10 persons.

Main Occupation of Respondents

The primary occupation distribution was analyzed to show the different primary occupations the respondents are involved. The result shows that larger percentages (53.1%) of the respondents were farmers by occupation. However, respondents engage in other income generating activities in the study area. The result further revealed that 33.3 percent of the respondents were traders.

Years of Experience of Respondents

The number of years in which the respondents have been involved in marketing could be used to measure their efficiency. Experience is expected to have a significant positive impact on the managerial ability of the respondents. Therefore, the more experienced they are with *Ceteris paribus*, the more efficient they would be in management because the acquired experience over the years would be brought to bear on their activities. The range and mean values of experience of the marketers was between 1 and 10 years with majority (40.9%) having 1-5 years of experience. This implies that marketers in the study area have had long years of experience in catfish marketing and hence are knowledgeable and will adopt catfish production technology that will boost their income. This is in line with the results of (Filli, 2011) who revealed that catfish farmers have long (7.8) years of experience in the business.

Gross Margin Analysis of Fish Marketing in the Study Area

To determine the cost return structure of the fish marketing Table 3 presents the costs, including both variable and fixed costs of production. The overall cost structure for an average fish marketer in the study area is presented in the Table 3. The total cost of production amounted to ₦ 82538.69. Out of this amount, the variable cost accounted for ₦ 69822.33. Fish production in the study area generated a total gross margin of ₦ 173396.04 during the production period. Gross margin is the difference between TR and TVC. The average net income was estimated to be ₦ 160846.92 thus further confirming the profitability of catfish marketing in the study area.

This is in agreement with the findings of Ikechukwu (2023) who revealed that catfish production was profitable in Anambra State with return on investment of ₦1.11 for every capital invested. Thus, also agreeing with the work of (Kudi, *et al.*, 2008; Asa and Obinaju, 2014; Filli, 2014) who reported positive profit margins associated with fish farming.

Table 3: Gross Margin Analysis of Fish Production in the Study Area

Variables	Mean
Fish cost	992.98
Nylon/polythene bag	715.04
Transportation cost	4988.60
Storage cost	1334.00
Tax	6535.96
Union cost	2242.28
Preservation cost	1711.40
Feed cost	47335.96
Cost of packaging	2525.88
Advertisement cost	2155.26
Total Variable Cost	69822.33
Basket/sack bag cost	1902.65
Drum/bowl cost	1751.75
Shop rent	9395.61
Total Fixed Cost	**13765.79**
Total Cost	**82538.69**
Total Revenue	**217100.87**
Gross Margin	**173396.04**
Net Income	**160846.92**

Source: Field survey, 2024

Table 4: Market Structure for Fresh Fish (Result of Gini–Coefficient Analysis).

Income earn/month	Number of sellers (N)	Proportion of sellers (X)	Cumulative frequency	Cumulative Proportion of Sellers	Total sales/day	Proportion of sales (X)	Cumulative Proportion of sales (Y)	ΣXY
25,000-50,000	44	38.3	44	11.7	1, 650,000	21.7	21.7	0.083111
51,000-100,000	63	54.1	107	28.4	4, 756,500	62.5	84.4	0.460574
101,000-150,000	4	3.5	111	29.4	502,000	6.6	90.8	0.03178
151,000-200,000	4	3.5	115	30.5	702,000	9.2	100	0.035
Total	115	100	377	100	7,610,500	100		0.610465

Source: Field survey, 2024 **GC=1- ΣXY; GC=1-0.610465 = 0.389**

Table 4 shows the market structure in the study area. Gini-coefficient was applied to measure the relative degree of income distribution among the fresh catfish marketers the value of Gini Coefficient greater than (0.389) high indicating inequitable distribution of income /sales. The Gini coefficient fresh catfish marketers in the study area are 0.0389. This value indicates higher level of concentration and consequently high in the market structure.

Linear Regression Analysis of Determinants of Profit among Fish Marketers

From the table (R^2) was 0.512 which implies that about 51.2% of the variation in output of catfish marketers (Y) explained by the variable X1-X9 included in the model while the remaining 49.8% is as a result of non-inclusion of some important explanatory variable as well as errors in estimation.

Out of 9 variables included in the model, only 3, namely education level, year of experience, and age, were statistically significant. The coefficient of education was 0.147 which is positive and significant at 5% probability level in determining the profit level of the fish marketers in the study area. This implies that there is a positive relationship between education and profit of the fish marketers in the survey area. This implies that increase in education of the fish marketers will lead to increase in their profit.

The coefficient of years of experience was 0.050 which is positive and significant at 5% probability level in determining the profit level of the fish marketers in the study area. This implies that there is a positive relationship between years of experience and profit of the fish marketers in the survey area. This implies that increase in year of experience of the fish marketers will lead to increase in the profit.

On the other hand, the coefficient of age of the fish marketers was 0.199, statically significant at 10% but negative in determining the profit level of the fish marketers in the study area. This means that there is an inverse relationship between age of the marketers and their profit. This implies that increase in age of the fish marketers will lead to decrease in their profit in the study area.

Table 5: Determinants of Profit among Fish Marketers.

Variable	Coefficients	T-value
(Constant)		1.091
Gender	-0.091	-0.832
Age	-0.199*	-1.830
Educational level	0.147**	2.398
Marital status	0.100	0.894
Household size	0.089	0.741
Occupation	-0.166	-1.375
Years of working experience	0.050**	2.383
Cooperative membership	-0.002	-0.023
Member of association	-0.037	-0.346
F-value		4.854
R-square		0.569
Adjusted R square		0.512

Note: ***Significant at 1% level, **Significant at 5% level, *Significant at 10% level
Source: field survey 2024

Table 6: Challenges Faced by Catfish Marketers in the Study Area.

Constraints	Strongly Agreed	Agreed	Undecided	Disagree	Strongly Disagree
Irregular supply of catfish from farm	59 (53.0)	33 (28.4)	4 (3.4)	9 (7.8)	9 (2.8)
Rapid spoilage of catfish	19 (16.4)	77 (67.2)	7 (6.0)	11 (9.5)	1 (0.9)
Inadequate credit facilities	52 (44.8)	53 (46.6)	2 (1.7)	8 (6.9)	
High cost of material	6 (5.2)	107 (93.1)	2 (1.7)		
High cost of transportation	8 (6.9)	104 (90.5)	3 (2.6)		
High cost of labor	9 (7.8)	91 (79.2)	8 (6.9)	6 (5.2)	1 (0.9)
Inadequate storage facilities	5 (4.3)	94 (81.8)	8 (6.9)	7 (6.0)	1 (0.9)
Inadequate extension services	23 (19.8)	45 (39.6)	34 (29.3)	11 (9.5)	2 (1.7)
Unstable market price	31 (26.7)	65 (56.8)	12 (10.3)	6 (5.2)	1 (0.9)
Lack of marketing linkage	7 (6.0)	99 (86.1)	9 (7.8)		

Field survey, 2024

The results of the analysis in table showed the constraints limiting the fresh catfish marketers' participation in the study area: Irregular supply of catfish from farm and rapid spoilage of fresh catfish (67.2%) and (46.6%) inadequate credit facilities are one of the major constraints facing catfish marketers in the study area. The perceived constraint limiting fresh catfish marketers are unstable market price (56.8%) and high cost of labor (79.2%) in the study area are considered as severe problem or constraints by fish marketers in the study area. The combined effect of these problems on the marketing system could bring about a distortion in the structure, conduct and performance of the marketing process. Hence, it leads to the reduction in output of the fish marketers

CONCLUSION

The study concluded that catfish marketing is profitable and not sex restricted. It requires a moderate level of education and is mostly undertaken by middle-aged, strong and energetic people due to the rigor of processing. Practitioners of the business lack funds for effective marketing, and they require government intervention. The catfish market has high profitability index.

RECOMMENDATIONS

Based on the findings from this study the following recommendations were made:

i) Catfish marketing is an enterprise that can be explored and be entrepreneur because it is profitable.

ii) Governments at all levels should focus on the repairs of local roads and enhance rural infrastructures to reduce cost of transportation.

iii) Catfish marketers should form cooperative to pool resources together for group purchase of inputs required for their operations in order to reduce costs.

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