Profitability Assessment of Catfish Marketing In Ondo State, Nigeria

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Abstract

The study assessed the profitability of catfish marketing in Ondo State, Nigeria. Structured interviews were used to collect information from a total of 50 marketers in each selected town across four local governments using a multi-stage sampling technique. Descriptive statistics, Gini coefficient, and regression analysis were used for data analysis. The profitability analysis showed that catfish marketing is profitable with an income of ₦2,998 ($8.3) for every marketing operation. The Gini Coefficient value of 0.74 showed a high level of inequality in income distribution among the catfish marketers and also a high concentration of catfish marketers in the study area. The regression analysis showed that the total kilogram of catfish sold, the price per kilogram of catfish, experience in years, transportation cost of catfish, and age in years are determinants of income of catfish marketers and accounted for 91.2% variation in income of the catfish marketers. The problems militating against catfish marketing in the study area include; high rate of spoilage and high cost of transportation in the study area. The study recommended among others that the government should try as much as possible to organize seminars, workshops, and necessary trainings for catfish marketers on how they can reduce their losses so as to have a required and sustainable income.

Keywords:
Catfish,
Income,
Marketers,
Profitability

1. Introduction

Fishing an important aspect of agricultural activities has been a major source of food for human consumption and has put an end to different kinds of ailments and diseases due to malnutrition (Onyekuru et al., 2019). Fish farming enterprise in Nigeria commenced around 50 years ago, with the construction of a small research center in Onikan, Lagos as well as a 20-hectare commercial farm in Panyan, Plateau State by the Federal Government of Nigeria. This generated a lot of interest in fish farming with the involvement of other levels of government and some private establishments (Itam et al., 2014).

Fish farming provides employment directly and indirectly in terms of people employed in the production of fishing output and other allied business, it also generates income for all categories of people involved in fishing and thus contributed to the national income, when compared with livestock it requires less space, time, money, and has a higher feed conversion rate (Folayan and Folayan, 2017).

Out of 35grams of animal protein required for a person for each day as recommended by the Food and Agricultural Organization, less than 7grams are consumed on the average (FAO, 2002). As a result of this, many Nigerians still suffer from protein deficiency due to low protein intake. The Food and Agriculture Organization (FAO) reported in their 2002 study that Nigeria needs two million metric tonnes of fish for consumption per year. But unfortunately, only 313,231 metric tonnes of fish were produced annually from aquaculture (WorldFish, 2019). In Nigeria the market for fish still exceeds local production. Nigeria is the largest fish consumer in Africa and among the largest fish consumers in the world with over 1.5millions tonnes of fish consumed annually. Yet, Nigeria imports over 900,000 metric tonnes of fish while its domestic catch is estimated at 450,000metric tonnes/year (Ozigbo et al., 2013). FAO (2000); Oluwatobi et al. (2017) and Akinsorotan et al. (2019) has shown in Table 1 below the projected human population figures, the fish demand and supply in Nigeria from

2000–2025. The available statistics suggest that the rise in fish production is due to increased aquaculture operations, and the need for aquaculture stems from the decline in ocean supply fisheries as a result of over-fishing, habitat destruction and pollutions (Adedeji and Okocha, 2011; Ozigbo et al., 2014)

Nigeria has become one of the longest importers of fish in the developing world, importing about 900,000 metric tonnes annually (Fabian, 2016). To solve the country's high demand for fish, Nigerians must turn to their under-utilized inland water for improved fish production and aquaculture. Aquaculture expansion moreover has been a slow process as private sector fish farmers' budgetary allocation, lack of quality feed and marketing problem have been a major challenge of fish production in Nigeria (Tunde et al., 2015).

In most part of Africa, the most commonly cultured fish species include: Clarias gariepinus, Clarias lazera, Heterobranchus bidorsalis, Heteroclarias, Tilapia sp., Tilapia mariae, Oreochromis niloticus, Oreochromis mossambicus, Sarotherodon galilaeaus, etc. Many fish farms focused on catfish (Clarias gariepinus), as they can have a market value of two to three times than that of tilapia (Oluwatobi et al., 2017).

In Nigeria, the major family of catfish that is of commercial interest is the family claridae. Clarias gariepinus is mostly farmed due to its fast growth rate and other culturable characteristics (Adah et al., 2014). It constitutes a large group of primarily freshwater fish which are widely distributed through the world. Sharp tooth catfish (Clarias gariepinus) is one of the most widely spread and adaptable fish in Africa and one of the most useful to man (Ranjan, 2018). It is a fresh fish eaten by more African people than any other fresh water fish, and it's expand use in aquaculture will further increase its usefulness. The sharp tooth catfish (Clarias gariepinus), popularly called African mudfish is a popular food fish, which commands a high market value in Africa and in other continents (Emiroğlu et al., 2018).

Analysis of catfish marketing is important considering the fact that fish and fish products contributed 6% to the gross domestic product (GDP) of Nigeria in 2006 (Baba et al., 2015). About 90% of fresh fish produced in Nigeria is sold in the local markets as a cheap source of protein to the growing population. Fish often account for 40 percent of the country's dietary protein intake. Nigerian fish market is dependent on season, the ability of buyers to bargain, and the concept of demand and supply. Fisheries development depends on improved production and processing technology and also on an effective marketing system (Igoni-Egweke, 2018).

Fish and fish products are limited in supply, In other words, the demand for fish is higher than the supply in Nigeria and means of meeting up demands has to be found in order to meet the demand of the population (Irhivben et al., 2015). The supply of fish is still very low compared to the demand. There are some factors militating against proper marketing of catfish, such as price dynamics, in that there is no standard price, prices vary from one market to the other. Also, issues of overexploitation leading to the inability of aquaculturists or fishermen to catch sizeable fishes. In addition, problems of too many intermediaries which lead to high price of fish. Fish produced keep passing from middlemen and each middleman adds to cost to make selling price higher and this therefore, leads to increased price (Fulanda, 2018). It is quite unfortunate that the decline in the growth of the fish industry has continued at full strength. It is against this background that this study was undertaken to examine whether or not the profitability level of the fish industry is enough to generate income and increase the protein consumption of people in the study area. Therefore, this study is carried out to provide answers to the following research questions:

What are the socio-economic characteristics of catfish marketers?

What are the cost and returns of catfish marketing in the study area?

What are the problems encountered by catfish marketers in the study area?

The broad objective of this study is to determine budgeting and profitability assessment of catfish marketing in the central senatorial district of Ondo State, Nigeria. The specific objective was to; (i) describe the socio-economic characteristics of catfish marketers in the study area (ii) examine costs and returns associated with catfish marketing in the study area (iii) identify the marketing problems encountered by catfish marketers in the study area.

2. Materials and methods
2.1 The study area
This study was carried out in Ondo State, located within the southwest Nigeria. The majority of the population do engage in agriculture and agricultural related activities like marketing of agricultural products which accounted for the largest revenue-based of the state. Climatically, the state falls within the main forest belt of the country with vast agricultural potential. The state lies between longitude 4o3' and 6o East of the Greenwich meridian, 5o41' and 8o15' North of the equator. This shows that the state lies entirely in the tropics. The annual temperature throughout the year ranges from 21oC to 29oC, while humidity is relatively high. The

annual rainfall varies from 2000mm in the Southern parts to 1500mm in the Northern areas. The rainfall decrease in amount and distribution from coast to the inner land, Ondo State generally enjoys luxuriant vegetable. The rainy season is from November-March and nearly all farmers in the study areas are small scale farmers with an average farm size of about a hectare.

2.2 Sampling technique and sample size

A multistage sampling procedure was used to select fifty (50) marketers in the study area. In the first stage, five (5) local governments' areas were purposively selected within the State. In the second stage, Ondo town, Akure town, Igbara-Oke town, Oba-Ile town, and Owo town were selected from each local government due to the prevalence of catfish sellers in the area and the third stage involved the selection of ten (10) catfish marketers from each town using random sampling. A primary source of data was employed in the course of this study with the aid of a well-structured questionnaire.

2.3 Data collection and analytical techniques

The data obtained from the respondents were subjected to descriptive and inferential statistics. Descriptive statistics were used to describe the socio-economic characteristics while inferential statistics such as ordinary least square multiple regression function which was employed to determine the influence of independent variable on the income realized from catfish marketing and Gini Coefficient for estimation of catfish marketer's concentration in the study area. It was also used to measure the relative degree of income distribution among the catfish sellers. The closer the value to unity, the greater the degree of inequality, and therefore, the higher the level of concentration and vice-versa. It is calculated as follows;

Gini Coefficient = 1-$\sum XY$

Where X = the ratio of cumulative percentage of catfish sellers.

Y = the ratio of cumulative percentage of their income.

Multiple regression function postulated to isolate factors affecting catfish marketers in the study was implicitly represented by the equation:

$Y = f(X_1, X_2, X_3, X_4, X_5, \varepsilon)$

Y = income from catfish marketing in Nigeria

X_1= total kilogram of catfish sold

X_2= price per kilogram of catfish

X_3= marketing experience

X_4= the transportation cost of catfish

X_5= age of respondents in years

ε = error term

The market function of catfish sellers was assumed to be specified by three functional forms which were fitted into the data using Ordinary Least Square techniques.

Linear function

$Y_1 = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + \mu_i$

Semi-log

$Y_1 = a + b_1 \log x_1 + b_2 \log x_2 + b_3 \log x_3 + b_4 \log x_4 + b_5 \log x_5 + \mu_i$

Double log (Cobb Douglas)

$\log Y_1 = a + b_1 \log x_1 + b_2 \log x_2 + b_3 \log x_3 + b_4 \log x_4 + b_5 \log x_5 + \mu_i$

a's and b's were parameters estimated while ε represent the error term associated with data collected from the catfish marketers. The error term was assumed to be normally distributed with zero mean value and constant variance ~ (0.δ2, N). The lead equation was selected based on the following criteria:

A priori expectation

The magnitude of the R^2 – coefficient of determination

The significance of the explanatory variables.

The essence of this regression analysis is to determine resource-use efficiency in catfish marketing as well as the profitability of catfish marketing.

3. Results and discussion

3.1 Socio-economic characteristics of catfish marketers

The socio-economic characteristics of the respondent are presented in Table 2. The result shows that average age of the catfish marketers is 41 years. The implication of this is that the respondents are young and are within the active labour force. This age bracket would favour fish marketing activities because the respondents would have enough strength to carry out fish marketing activities. The result of this study is in line with the findings of Adedeji et al. (2019), they reported that the majority of the fish marketers were in active middle age. The result of the gender distribution of the respondents shows that the majority of 98% of the respondents are female. It indicates that fish marketing is females dominated enterprise. This result corroborates the findings of Agbebi and Adetuwo (2018) that catfish marketers are more dominated by female gender than male and that women play a central role in fish processing and marketing and also have better bargaining power than men. At the same time, it is not restricted to any particular gender; both males and females can participate actively depending on the asset each possesses. The results of marital status in Table 2 show that 82% of the respondents were married with just only 2% and 16% of them are single and divorced respectively. This deduces that the majority

of the respondents is "responsible" and can take marketing decisions that are crucial jointly with their spouse (Onubuogu et al., 2014). The distribution of the respondents by educational status shows that all the fish marketers had acquired either primary or secondary education. Their literacy level would positively influence the marketing activities as observed by Folayan and Folayan (2017). The years of marketing experience of the respondents in the study area reveals that more than half (60%) of the fish marketers were having between 2-5 years of experience in marketing activities with a mean of 4.49 years of experience in catfish marketing. This is an indication that the marketers had quite appreciable years of experience in catfish marketing in the study area as confirmed by Onyekuru et al. (2019). The study also found that nearly all the respondent (80%) has household sizes within the range of 3-5 persons with a mean of 4.28. Onyekuru et al. (2019) affirmed that larger households normally tend to have higher productivity as a result of the availability of more labour, which most times are free, thus increasing the profitability of the marketing business. The distribution based on major occupation shows that more than half (60%) of the respondents were deeply involved in catfish marketing without any other occupation attached to it while others add one form of occupation or the other to their marketing operation. This implies they are likely to be more efficient than those who had other occupations. The findings also showed that 26% of the respondents start their catfish marketing with initial capital based of N4001-5000 ($11-14) while 20% started with a capital base of N1001-2000 ($3-6). The implication is that to start the business of catfish marketing, it does not require large capital. It means that as many that have an interest in the business of catfish marketing can venture into it due to the fact that it only needs small capital to start.

3.2 Cost and returns associated with catfish marketing

From Table 3, it could be seen that catfish marketing is profitable with an average profit of N2,998 ($8.3) for every marketing operation or trip. Moreover, Table 3 revealed that zero naira was recorded as the average cost of water, feed, and preservation partly because little or no storage is required and partly there are no needs for feeding before the sale.

Profit = ATR – ATC= N (12,000 ($33.1) - 9002($25)) = N2,998 ($8.3)

3.3 Gini coefficient result

From Table 4, the Gini Coefficient value range from 0-1, the greater its value, the greater the level of income inequality. The closer to unity it would be and thus the higher the concentration of catfish sellers. The Gini Coefficient of catfish sellers shown in Table 4 above is 0.74. This indicates a high level of income inequality and the concentration of catfish sellers in the study area.

Gini Coefficient = 1- $\sum XY$ = 1-0.2603 = 0.74

3.4 Regression analysis result

As contained in Table 5, the linear functional form was chosen as the lead equation because it has the highest R^2 of 0.912, number of significant variables and the correct signs of the variable based on apriori expectation. The lead equation is as shown below;

$Y = 1456* + 3.0462X_1 + 300.242X_2* + 150.170X_3* + 0.4262X_4 + 284.372X_5$

$R^2 = 0.912$
F-Value = 84.416
Standard Error = 1900

From the lead equation, it could be seen that the explanatory variables accounted for 91.2% variation in the income of the catfish marketers with the significant variables being:

Total kilogram of catfish sold (X_1), price per kilogram of catfish (X_2) and experience of the catfish marketers in years (X_3)

Table 1. Projected human population, fish demand and supply in Nigeria (2000- 2025)

Year	Population (Million)	Fish demand (Million tonnes)	Fish supply domestic production (Million tonnes)	Shortfall (Million tonnes)
2000	114.40	0.87	0.53	0.34
2005	131.50	1.00	0.73	0.27
2010	151.20	1.15	0.93	0.22
2015	173.90	1.32	1.12	0.20
2020	199.90	1.52	1.32	0.20
2025	229.80	1.75	1.52	0.23

Source: FAO 2000 & Oluwatobi et al., 2017; Akinsorotan et al., 2019

Table 2. Distribution of respondents based on socio-economic characteristics (n=50)

Socio-economic characteristics	Frequency	Percentage	Mean
Age			
21-30	2	4.0	
31-40	22	44.0	40.5
41-50	25	50.0	
51-60	1	2.0	
Gender			
Male	1	2.0	
Female	49	98.0	
Marital Status			
Single	1	2.0	
Married	48	82.0	
Divorced	1	16.0	
Household Size			
1-3	12	24.0	4.28
4-6	38	76.0	
Educational Status			
Primary Education	27	54.0	
Secondary Education	23	46.0	
Marketing Experience in years			
2-5	30	60.0	
6-9	8	16.0	
10-13	8	16.0	4.49
14-17	2	4.0	
> 17	2	4.0	
Major Occupation			
Catfish Marketing	30	60.0	
Catfish Marketing and Catering	13	26.0	
Catfish Marketing and Farming	6	12.0	
Catfish Marketing and Trading	1	2.0	
Initial capital base			
< ₦1000 ($2.8)	9	18.0	
₦1001-2000 ($3-6)	10	20.0	
₦2001-3000 ($6-8.3)	8	16.0	2,560.36
₦3001-4000 ($8.3-11)	5	10.0	
₦4001-5000 ($11-14)	13	26.0	
> ₦5000 ($14)	5	10.0	

Source: Field survey, 2019; Naira to US dollar conversion rate: ₦362 to $1 US dollar

Table 3. Cost and returns associated with catfish marketing

Items	Value in Naira/Dollar
(a) Costs	Value in Naira/Dollar
Average cost of purchase	6,708 ($19)
Average cost of feed	0
Average cost of water	0
Average cost of preservation/storage	0
Average cost of transportation	1,544 ($4.2)
Average miscellaneous expenses	750 ($2.1)
Average total cost	9,002 ($25)
(b) Revenue	Value in Naira/Dollar
Total kilogram of catfish bought	34kg
Total kilogram of catfish sold	30kg
Total kilogram of catfish consumed	3kg
Total kilogram of catfish given as gift	1kg
Average price per kilogram of catfish	400 ($1.1)
Total revenue (Average price per kilogram × Total kilogram of catfish sold)	12,000 ($33.1)

Source: Field survey, 2019; Naira to US dollar conversion rate: ₦362 to $1 US dollar, ATR=Average total revenue, ATC=Average total cost

Table 4. Computation of Gini Coefficient for catfish marketing in the study Area

Income range (₦/$)	F	%	Ratio of % marketers (X)	Income/sales	% Income/sales	Ratio of % sales (Y)	Cumulative % of the sales	∑XY
< ₦5,000 ($14)	2	4.0	0.04	9,700 ($28)	1.63	0.0163	1.63	0.0006
₦5,000-9,999 ($14-28)	21	42.0	0.42	164,970 ($456)	27.70	0.277	29.33	0.1116
₦10,000-14,999 ($28-41)	13	26.0	0.26	155,700 ($430)	26.20	0.262	55.53	0.068
₦15,000-19,999 ($41-52)	11	22.0	0.22	185,100 ($511)	31.10	0.311	86.63	0.068
< ₦20,000 (($52)	3	6.0	0.06	79,940 ($221)	13.40	0.13	100.00	0.0077
Total	50	100.0		595,410 ($1,645)	100.00			0.2603

Source: Computed from Field survey, 2019, *Significant at 5% level of significant figures in parenthesis are the standard error of the coefficient, Naira to US dollar conversion rate: ₦362 to $1 US dollar

Table 5. Estimates of the Marketing function for catfish

Variables	Linear	Semi-Log	Cobb-Douglas
Content	1456.00** (600.20)	113825.53** (52027.068)	-1.280 (5.108)
Total kilogram of catfish sold (X_1)	3.0462** (1.1061)	785.143** (67.658)	0.069** (0.007)
Price per kilogram of catfish (X_2)	300.242** (101.150)	-280.374** (129.757)	0.024 (0.013)
Experience in years (X_3)	150.170** (70.1240)	-102.24 (76.463)	-0.011 (0.008)
Transportation cost of catfish (X_4)	0.4262 (0.3251)	0.242 (0.194)	0.00003 (0.000)
Age in years (X_5)	284.372 (170.124)	224.305 (489.242)	0.038 (0.048)
R-Square (R^2)	0.912	0.904	0.843
F-Value	84.416	82.408	47.420
Standard Error	1900	1864.95	0.18309

Source: Computer from Field Survey, 2019.
**Significant at 5% level of significance.

4. Conclusion and recommendations

It could be concluded from this study that marketers do operate on a small scale basis with low capital base incurring little or no cost on feeding, water, and market stall. In addition, catfish marketing is a profitable enterprise with a profit of N2,998 ($8.3) for every marketing operation or a trip.

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

The catfish sellers should ensure that the water being used for the preservation of the catfish is constantly checked to avoid contamination and dirtiness in order to prevent death and spoilage

The sellers should be encouraged to form associations and societies in order to reduce the problem of unavailability of credit.

More roads should be constructed and the damaged ones should be repaired to reduce the high cost of transportation during marketing trips.

The government should try as much as possible to organize seminars, workshops, and necessary trainings for catfish sellers on how they can reduce their losses so as to have a required and sustainable income.

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