

Economic Analysis of Catfish Production in Ile-Ife, Osun State, Nigeria

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ABSTRACT This study examined the economic analysis of catfish production in Ile-Ife, Osun State, Nigeria. A total of 42 respondents were randomly sampled in the study area. Descriptive statistics was used to identify the socio-economic characteristics of the respondents, constraints faced by fish farmers, and budgetary analysis was used to determine profitability of catfish farm in the area. The results of the analysis showed that majority of the respondents are males, relatively educated, had about 1-5 years of experience in business, majority acquired land through rentage, and lack of capital being the most serious problem being faced in the study area. Moreso, the result further showed that catfish farming is more profitable as the average net profit accruable per fish farmer per year is N35, 078,384.87. The benefit-cost ratio is 2.3 The study therefore recommends that the extension agents should assist the farmers in getting fingerlings at a cheaper rate; farmers are advised to form cooperative union to increase their scales of operations and government should also assist farmers in giving out soft loan in order to boost their scales of operation and their economic potentials.

1. INTRODUCTION

Fisheries occupy a unique position in the agricultural sector of the Nigerian economy. The contribution of the fishery sub-sector to Gross Domestic Product (GDP) rose from N76.76 billion to N162.61 billion in 2005 (CBN 2005). Thus, the Nigerian government has recognized the importance of the fishery sub-sector and it has made several attempts over the years to increase their productivity through institutional reforms and the various economic measures. Some of these measures provided subsidy for inputs and exemption from tax for fishermen. (Dada 2004).

Nigeria is largely a protein deficiency country. The Food and Agriculture Organization (FAO 2003) revealed that West Africa Countries, of which Nigeria is inclusive, obtain most of their animal protein needs from fish. Fish roles in improving diets is undisputed as sources of high quality protein in child nutrition and children diet as it increase their growth and prevent spread of disease.

According to FAO (2002), Nigeria is the second largest catfish producers in Africa, in 1999, Nigeria produced about 2,173 metric tonnes

(mt). This figure showed that Nigeria is still at infant stage in fish farming techniques. Nigeria with about 140 millions people still need over three million metric tonnes (mt) of fish annually to bridge the gap between deficit in supply and demand.

Catfish production has continued to increase in Nigeria as a result of high growth rate and ability of resistance with stress. Catfish has become more popular for two reasons: It provides a source of income through rapid growth and more efficient in feed conversion and it can be incorporated to local aquacultures system to diversify the production base. As a result more flexible integrated culture systems, catfish are being adopted in many regions.

Hussain and Zuandi (2002) reported that out of the 15,489 tonnes of fish produced in Nigeria by 2001, catfish production accounted for about 4,627 metric tonnes and out of this, the private sector was responsible for the production of about 3,284 metric tonnes. The contribution of private enterprise to catfish production in Nigeria reduced the fish price of captured fisheries considerably.

The protein content of most fish and shell fish is 17-20 percent, while cooked portion may have as much as 38 percent protein (FAO 2003). Fish is a rich source of lysine and sulphur amino-acids and is therefore suitable for comple-

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menting high carbohydrate diets. Fish is also a good source of thiamin, riboflavin, vitamins A and D, phosphorus, calcium, iron and high in poly-unsaturated fatty acids which are important in lowering blood cholesterol level (Tobor 1994). Consumption of fish especially seafood products was reported to amount to approximately 14kg per capita in developing countries in 2001 (Christopher et al. 2003). The more considerable and substantial contribution of fisheries worldwide is the supply of highly nutritious animal protein for human consumption and the employment and income generation in often remote coastal areas (Christopher et al. 2003).

Fish is also a good source of sulphur and essential amino acids such as lysine, leucine, valine and arginine. It is therefore suitable for supplementing diets of high carbohydrates contents. It has high content of Polyunsaturated (Omega III) fatty acids, which are important in lowering blood cholesterol level and high blood pressure. It has also been implicated to have decreased the risk of bowel cancer and reduces insulin resistance in skeletal muscles (Kudi et al. 2008).

Fish is a source of high-quality protein that can be produced more cheaply than any other animal protein for human consumption. It is also medically recommended for pregnant women, children and adults because of its high-level protein, digestibility and lack of cholesterols, preventive recipe for heart attack or failure and stroke (Ajao et al. 2006).

As the population grows and puts more pressure on natural resources, more people will probably become food insecure, lacking access to sufficient amount of safe and nutritious food for normal growth, development and an active healthy life. It is thus, pertinent to provide the poor and hungry with a low cost and readily available strategy to increase food production using less land per caput, and less water without further damage to the environment (Pretty et al. 2003).

The country has a high potential to develop fish farming through cat fish production due to adequacy of natural water endowments. What is however needed is a more dynamic approach to implement the available knowledge of economic efficiency with a view to ameliorate the performance of the fish industry. Thus, the major challenge for the fisheries sector is meeting

the current level of consumption in Nigeria (Banjo et al. 2009)

Despite the efforts of government over the years, there still a deficit in the supply and demand for fish. This might not be unconnected to the population growth rate of Nigeria (Dada 2004). Similarly, despite these considerably high potentials in Nigeria, the gap between fish demand and fish supply was reported to be very wide (Tobor and Ajayi 1992). Also, Nigerian diet is full of carbohydrate and little protein. Given this situation, the need to improve the diet of the average Nigerian as mentioned earlier calls for a thorough research, especially on the economic analysis of the cat fish production with a view to improve the life of the generality of the poor masses. A sure means of solving the demand-supply gap is by embarking on widespread investment in fish production. One of the efforts must be anchored on the economic analysis of cat fish production in the study area. The study will also shed light on the problems facing catfish farmers in Nigeria. It will also serve as a means of providing a sound and reliable data base for the formulation of policies, designing of strategies and implementation of programme for improving cat fish production in Nigeria.

The main objective of this study is to examine the economic analysis of catfish production in the area of study.

The specific objectives are to:

1. determine the socio-economic characteristic of catfish farmers in the study area
2. determine the costs and return involve in catfish farming
3. identify the various problems faced by the various catfish farmers in the study area.
4. make adequate recommendation towards solving the identified problem to the appropriate authority.

2. DATA AND METHODOLOGY

2.1 Area of Study

The area covered during the study were the catfish producing farms in Ife Land area of Osun State which include four Local Governments areas, namely: Ife central (headquarter Ile-Ife), Ife-North (head quarter Ipetumodu), Ife South (Headquarter Ifetedo) and Ife-East (headquarter

Oke-Ogbo, Ile-Ife) (Table 1). The questionnaire was divided into eight section comprising: Socio-economic characteristics of the respondents; Land resources data; Culture system; Variable cost; Fixed cost; Revenue; Marketing and Problems facing the respondents in the study area.

The area is well known for farming due to the existence of two distinct season that is, rainy and dry seasons in the areas. During the rainy season, the water level of the rivers and stream of the areas is either normal or overshoot but in the dry season the water level normally goes down.

2.2 Sample Procedure

The selection of the sample was through random sampling from the list of cat fish farmers in the local government areas. Thus, making a total of 42 farmers surveyed (Table 2).

Table 1: Distribution of selected catfish – farms by local government areas

Local government	Number sampled
Ife central	16
Ife East	10
Ife North	9
Ife South	7
Total	42

Data used in the study were collected from the two main sources: First, the primary source which was gathered through the administration of structured questionnaires distributed in the area by means of random sampling. The questionnaire was designed to collect information on: socio-economic characteristics, production Input prices and revenue accruable per season and the answers recorded immediately on the spot. In case, where the farmers do not keep records, memory estimates were used. It was corroborated with secondary data which were collected from Literature, Internet, Osun State Agricultural Development Programme, fisheries section, Osogbo, Osun State.

2.3 Data Analysis

The analysis method used include, Descriptive Statistics and Budgetary Analysis.

2.4 Descriptive Statistics

Descriptive and frequency distribution is about the representation of the levels of socio-economic activities of the farmers.

2.5 Budgetary Analysis

Budgetary analysis used to derive the profitability of entire fish farming enterprise in the area by comparing their costs with their returns. Budgetary analysis methods used include:

- (i) Gross margin = Total revenue – Total variable cost
- (ii) Break – even point = Total fixed cost / 1.00 – Variable cost / Total sales

Table 2: Directory of catfish producers by local government of the study area

S. No.	Local Government	Fish farm hectarage	
1	Ife Central	Ifiwoye Fish pond	1.0
2	Ife Central	Alex felix Fish pond (F/P)	0.1
3	Ife Central	Ife City College F/P	0.2
4	Ife Central	Ife Local Govt. F/P	1.5
5	Ife Central	Bolex fish pond	0.1
6	Ife Central	Oduduwa college F/P	0.5
7	Ife Central	Omisore F/P	1.0
8	Ife Central	Ife Grammar School F/P	0.45
9	Ife Central	Adegboye F/P	0.5
10	Ife Central	Adegbasewa F/P	0.25
11	Ife Central	Adejuyigbe F/P	0.2
12	Ife Central	Adeyera F/P	1.0
13	Ife Central	Tanimoko Fish Pond	0.2
14	Ife Central	Niger Motors fish pond	2.0
15	Ife Central	Akinbode Fish pond	0.5
16	Ife Central	Adewoyin fish pond	0.2
17	Ife East	Alaro fish pond	0.1
18	Ife East	Towo fishers	0.1
19	Ife East	Ojewumi Fish pond	0.2
20	Ife East	Farmer Oranmiyan L.G pond	0.1
21	Ife East	Dr. Adeniran	0.3
22	Ife East	Adebiyi fish pond	0.6
23	Ife East	Fasogo fish pond	0.4
24	Ife East	Fagorusi fish pond	0.2
25	Ife East	Famuyiwa fish pond	0.4
26	Ife East	Ogunlade fish pond	0.1
27	Ife North	Akinrinade	10
28	Ife North	Edunabon community	1.5
29	Ife North	Moro community	4
30	Ife North	Olabiya fish pond	0.5
31	Ife North	Ipetumodu community	0.5
32	Ife North	Obiwunmi fish pond	0.1
33	Ife North	Jobele fish pond	1.5
34	Ife North	Asipa community	0.6
35	Ife North	Ifesowopo cooperative	0.1
36	Ife South	Kajola fish pond	0.1
37	Ife South	Omisakin fish pond	0.1
38	Ife South	Ife south local government	1.2
39	Ife South	Mafoworade Community	0.4
40	Ife South	Ajebamidele community	0.5
41	Ife South	Ladele fish pond	0.2
42	Ife South	Akinfenwa fish pond	0.7

Source: Field Survey 2007

3. RESULTS AND DISCUSSION

3.1 Demographic Variables of the Respondents and Resources

3.1.1 Sex: Majority of the respondents in catfish farming in this area are mostly male, out of the forty two (42) respondents; thirty one (31) are male representing 73.8 percent of the whole distribution while females are eleven (11) representing 26.2 percent of the whole distribution. Males from these areas are more involved in the catfish farming business than the females which might be due to the fact that males are known to be the bread winner of every family.

Table 3: Demographic variables of the respondents and resources

<i>Sex</i>	<i>Frequency</i>	<i>Percentage (%)</i>
<i>Sex</i>		
Male	31	73.8
Female	11	26.2
Total	42	100.0
<i>Age range (Year)</i>		
20-29	4	9.5
30-39	14	33.3
40-49	16	38.1
50-59	6	14.3
Total	42	100.0
<i>Family Size</i>		
1	3	7.1
2	2	4.8
3	3	7.1
4	9	21.5
Above 5	25	59.5
Total	42	100.0
<i>Educational Level</i>		
Primary	2	4.8
Secondary	15	35.7
Vocational	8	19.0
Tertiary	17	40.5
Total	42	100.0
<i>Year of Experience</i>		
1-5	23	54.8
6-10	14	33.3
11-15	5	11.9
Total	42	100.0
<i>Types of Land Acquisition</i>		
Inheritance	10	23.8
Community land	1	2.4
Purchased	23	54.8
Rentage	8	19.0
Lease	-	-
Gift	-	-
Total	42	100.0
<i>Number of Pond</i>		
1-5	25	59.5
6-10	10	23.8
11-15	5	11.9
16-20	2	4.8
Total	42	100.0

Table 3: Contd...

<i>Sex</i>	<i>Frequency</i>	<i>Percentage (%)</i>
<i>Source of Water</i>		
Stream	13	31.0
Borehole	10	23.8
Spring	14	33.3
Well	3	7.1
Rainfall	2	4.8
Total	42	100
<i>Source of Fingerlings</i>		
Self breed	2	4.8
Purchased	40	95.2
Total	42	100.0
<i>Stocking Density</i>		
< 10000	19	45.2
10,000-20,000	18	42.9
20,000-30,000	4	9.5
30000 and above	1	2.4
Total	42	100.0
<i>Weight at Harvest (kg)</i>		
0.80	3	7.1
0.90	16	38.1
1.00	10	23.8
1.10	3	7.1
1.20	4	9.5
1.30	1	11.9
1.50	1	2.4
Total	42	100.0
<i>Constraint</i>		
Disease/predator	11	26.2
Lack of skill labour	10	23.8
Power failure	2	4.8
Lack of capital	19	45.2
Total	42	100.0

Source: Field survey

3.1.2 Age Distribution: The age range of 40-49 years had the highest proportion with 38.1 percent followed by 30-39 years with 33.3 percent 50-59 years with 14.3 percent, 20-29 years (9.3%) and 60 years above with 4.8 percent respectively, as shown in Table 4. The high proportion of age group of less than 50 years shows that they are in their active age; hence, more productivity of fish farming is expected because of the strength and physical ability to manage the fish pond.

3.1.3 Total Family Size: Table 3 shows the family size of 5 and above having the highest frequency of twenty five (25) representing 59.5 percent of the whole distribution followed by family size of 4 which had frequency of Nine (9) representing 21.5 percent of the total distribution, while family size of One (1) and three (3) had frequency of three each representing 7.1 percent and family size of two have the frequency of two (2) representing 4.8 percent. This has

implication on the size of the hired labour employed by the fish farmers because the higher the size of the family the lower the hired labour vice versa.

3.1.4 Educational Level: Almost everybody that is engaged in catfish farming in the area of study is literate. At least they went as high as the primary school. Seventeen (17) respondents finished from tertiary institution representing 40.5 percent, two (2) respondents had primary school certificate representing 4.8 percent, Fifteen (15) respondents had senior school certificate representing 33.7 percent while the remaining eight (8) respondents had no formal education (vocational) representing 19.0 percent of the respondents sampled. With this distribution, it will be convenient for most catfish farmer in this area to understand the management involved in the enterprise and can also easily adopt the newly innovation introduced by the State Agricultural Extension Agents (such as new improved fingerlings, feeds formulation, water management strategy etc.).

3.1.5 Years of Experience: The years of experience of the respondents having between 1-5 years has the highest frequency distribution of twenty three (23) representing 54.8 percent, follow by 6-10 years which has frequency of fourteen (14) representing 33.3 percent of the total sampled while 11-15 years has frequency of five (5) and representing 11.9 percent (table 3.5). This shows that the ability to manage fish pond efficiently depends on the year of experience and this is directly related to the total productivity of the farm.

3.1.6 Land Acquisition: Table 3 shows how the farmers acquired their land. 28.8 percent of the farmers acquired their land through inheritance while 54.8 percent purchased their land and 2.4 percent got their land through community while the remaining 19.0 percent of the whole distribution acquired their land through rentage.

3.1.7 Number of Pond Owned: Out of the forty two (42) respondents sampled, the results showed that about twenty five (25) respondents have 1-5 ponds which representing 59.5 percent of the total distribution, follow by 6-10 ponds representing 23.8 percent, follow by 11-15 representing 11.9 percent and the remaining two (2) respondents have 16 – 20 ponds and representing 4.8 percent of the distribution. Respondents fall within 1-5 ponds had the highest frequency.

This result might probably be due to lack of capital or shortage of land to expand the existing project (Table 3).

3.1.8 Water Source: The study revealed that 31.0 percent of the pond visited had their source of water from stream, 23.8 percent from boreholes, 33.3 percent from spring, 7.1 percent from well and 4.8 percent from rainfall (Table 3). Stream, borehole and spring water seem to be more dependable in that water supply is consistent and the water is usually free of disease and parasite.

3.1.9 Fingerlings Sources: Table 3 shows the sources of fingerlings to different fish farmers. But the highest number of respondents belongs to those that purchased fingerlings representing 95.2 percent of the whole distribution while those that produced fingerlings on their farm are two (2) representing 4.8 percent of the total population.

3.1.10 Stocking Density: Table 3 shows the highest frequency of catfish farmers in the study area stocking less than 10,000 fingerlings/fry representing 45.23 percent of the whole distribution followed by farmer stocking 10000-20000 fingerlings/fry representing 42.9 percent. Catfish Farmers sampled with stocking density of 2000 and above are very small. The highest number of respondents with lower stocking density might not be unconnected to the fact that most of the farmers in this area take catfish farming as secondary occupation in order to increase their household income.

3.1.11 Harvesting: Harvesting period varies from one catfish farmer to another, but all the farmers interviewed cropped twice a year. The weight at harvest ranges from 0.80kg to 1.50kg. This implies that most catfish farmers harvest at an average of 6 months.

3.1.12 Constraint Faced by the Fish Farmers: One of the most serious constraints facing the fish farmers in the study area is lack of capital with 45 percent, followed by diseases/presence of weeds and predators (26.2%), lack of skilled labour/managers with 23.8 percent, and erratic power supply through the use of diesel to run the generator during supply and drain of dug-out pond water. Lastly, biological problem is created by the presence of weeds and predator found around the ponds especially during the raining season.

3.2 Budgetary Analysis of the Catfish Farmers Per Hectare Per Year

The net income for catfish enterprise shows that it is very high in the study area. This fact is based on ₦835,199.64 per/ha/year that is accruable to an average fish farmer as gross margin, which is the value returns above all variable cost incurred in the business. In other words, it is the value of total revenue minus total variable costs. The break-even point which is the point of sales volume at which sales, income will equate costs and neither a profit nor a loss will be realized is ₦192,437.63. The cost benefit analysis gives ratio 2.3. This implies that ₦1.00 spent will yield ₦2.30 in return to an average catfish farmer.

Table 4: Budgetary analysis of the catfish farmers per hectare per year

S. No.	Description of items	Value/Cost(N)
1	Number of farms	42
2	Mean area of fish pond(ha)	1.0
3	Income	62,970,201.90
	<i>Variable Costs</i>	
4	Fingerlings	2,996,999.88
5	Lime	62,599.76
6	Feed	16,854,700.00
7	Fertilizer	285,650.00
8	Drugs	209,308.00
9	Skilled labour	1,285,000.00
10	Unskilled labour	622,800.00
11	Semiskilled labour	36,099.00
12	Transportation	21,000
13	Miscellaneous	55,000.00
	Total variable costs (4-13)	22,729,106.64
	<i>Fixed Cost (After Depreciation)</i>	
14	Land	470,000.00
15	Pond construction	1,148,528.00
16	Building	1,173,028.42
17	Fencing	1,060,500.25
18	Net	430,000.00
19	Wheel barrow	130,543.38
20	Others	750,100.34
	Total fixed costs(14-20)	5,162,710.39
Gross margin	= Total income – Total variable cost	
	= ₦ [62,970,201.90– 22,729,106.64]	
	= ₦ 40,241,095.26	
Net farm income	= Gross margin – Total fixed cost	
	= ₦ [40,241,095.26 – 5,162,710.39]	
	= ₦ 35,078,384.87	
Average net profit per farmer	= $\frac{\text{Farm income}}{\text{Total number of farmers}}$	
	= $\frac{35,078,384.87}{42}$	
	= ₦ 835,199.64 / ha/year	

Calculation of depreciation on fixed cost was done using the straight line method.

$$\text{i.e Depreciation} = \frac{\text{cost of asset} - \text{Salvage value}}{\text{Useful life}}$$

$$\text{i. Break-even point} = \frac{\text{Total fixed cost}}{1.00 - \frac{\text{Variable cost}}{\text{Sales}}}$$

$$= \frac{5,162,710.39}{1.00 - \frac{22,729,106.64}{62,970,210.90}}$$

$$= ₦ 8,082,356.66$$

$$\text{Average Break-even point per farmer} = \frac{₦ 8,082,356.66}{42}$$

$$₦192,437.63$$

$$\text{ii. Benefit- cost ratio} = \frac{\text{Total cost}}{\text{Income}} = \frac{₦ 62,970,210.90}{₦27,891,817.03} = 2.3$$

4. CONCLUSION

This study examined the economic analysis of catfish production in Ile-Ife, Osun State, Nigeria. A total of 42 respondents were randomly sampled in the study area. Descriptive statistics was used to identify the socio-economic characteristics of the respondents, constraints faced by fish farmers, and budgetary analysis was used to determine profitability of catfish farm in the area. The results of the analysis showed that majority of the respondents are males, relatively educated, had about 1-5 years of experience in business, majority acquired land through rentage, sourced fingerlings through purchase and lack of capital being the most serious problem being faced in the study area. Moreso, the result further showed that catfish farming is more profitable as the net income accruable to fish farmers is ₦ 35,078,384.87/ ha/year. The study therefore concluded that the catfish farming is a profitable business in the study area.

5. RECOMMENDATIONS

Though, the results still show a good and sound profit in the study area, but, for better production of catfish enterprise, the study hereby recommends that: (i) the fisheries department or the extension agent of the ministry of agricultural should provide catfish fingerlings to farmers at a cheaper rate; (ii) the catfish farmers should come together in group /cooperative to get those things they cannot be gotten individually from government and government should encourage the commercial banks to lend money to catfish farmers at a lower interest rate to enhance their productivity. For example, ex-

pansion of land/ponds, purchase of more fingerlings to increase their economic of scales, buying of fertilizers, lime or drug in bulk is always possible through cooperative efforts. (iii) The catfish farmer should establish a security network and proper fencing of their farms so as to prevent the frequent poaching of their farms.

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