

PROFITABILITY ANALYSIS OF CATFISH FARMING IN EDO STATE, NIGERIA.

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ABSTRACT

The study examined the profitability of catfish farming in Edo State, Nigeria. A total of 180 respondents were selected for the study through a multistage sampling technique. Data for the study were collected from these respondents through the administration of questionnaire. The collected data were analyzed using the descriptive, budgetary and profitability analysis. The result indicated that the cost of feed had the highest proportion of total cost (TC) of production and was 67.70%, followed by hired labour 22.84% and cost of fingerlings 5.51%. The study further showed that variable cost (VC) accounted for 97.31% of the TC while the fixed cost (FC) accounted for 2.69% of catfish farming in the area of study. The profitability analysis showed that the gross margin per unit of output is ₦102.34. The validity analysis revealed that the business was highly viable, despite major constraints to it such as inadequate capital, high cost of feed and high cost of pond construction. The study recommended that the government should encourage catfish production in the area by subsidizing factors inputs as well as providing credit facilities to catfish farmers in order to increase their production, thereby increasing profits.

Key words; *Catfish Farmers, Constraints, Input subsidizing and Viability,*

INTRODUCTION

The global production of fish has grown steadily in the last fifty years with the supply of food fish increasing at 3.2% average annual rate, which is actually more than the world population annual growth rate positioning at 1.6% (Food and Agriculture Organization (FAO), 2014). This increase is largely accounted for by major fish producing nations including Chile, China, Norway, Myanmar, Thailand, Indonesia and others. However, African nations has been making their own contributions to aquaculture over the years, contributing 1,485,367 metric tonnes to global aquaculture production of about 66,633,253 metric tonnes as at 2012, which represents only 2.23% (FAO, 2014). Nigeria is one of the top fish producing nations in Sub-Saharan Africa (SSA). In 2013, the country produced more than 400,000 metric tonnes of farm fish (Mohammed et al., 2014). In view of the importance of fish to the country, the government made a number of efforts over the years to increase

its production. These include the creation of colleges and research institutes, institutional reforms as well as subsidy for fish farming inputs among others. In spite of these efforts, fish supply is yet to meet up with the increasing fish demand by the populace in Nigeria (Dada, 2004).

Fish farming is a sub-set of aquaculture that focuses on rearing of fish under controlled or semi-controlled conditions for economic and social benefit (Oladejo, 2010). Fish contains high quality protein needed by man. In fact, the protein from fish has a higher biological value (B.V) than meat and chicken, high digestibility and low cholesterol level. According to Anyanwu *et al.* (2001), fish has a very high nutritive value having up to 60 percent protein and rich in calcium, phosphorus, vitamins A, D and B12. The importance of protein in the diet of man cannot be over-emphasised. Idodo-Umeh (2004) stated that proteins are needed for reproduction, growth and repairs of worn-out or damaged tissues, adding that proteins are also used in the production of enzymes, white blood cells and anti-bodies.

Catfish can easily be raised in warmer climates both in fish ponds and tanks. The cultivation of catfish generally is becoming more popular by the day as a result of its high market demand and health benefits. Raised catfish can be matured for harvesting at four months of age, ensuring a quick business. Catfish without doubt, is a popular fresh fish consumed globally. The production of catfish is given much attention today in most countries of the world as a result of its capability to fill the demand and supply gap. Furthermore, it is known for its fast growth, high disease resistance, high prolificacy, omnivorous feeding and relatively cheap production cost (Ologbon, *et al*, 2013). There are different species of catfish but the three most famous ones are channel catfish, blue catfish and flathead catfish.

As a result of the afore-mentioned importance of protein which can be obtained from catfish, the need for increased catfish production which has been in short supply when compared to market demand in Edo-State then arises. The state is blessed with all the resources needed for a productive and profitable catfish farming business, hence the problem of insufficient protein can be solved through catfish farming in Edo State.

The overall objective of the study was to determine the profitability of fish production in Edo State. The specific objectives were to:-

- i. examine the socio-economic characteristics of catfish farmers in Edo State
- ii. determine the profitability of catfish production in the study area.
- iii. examine the constraints to catfish production in the study area

MATERIALS AND METHOD

Area of Study

The work was carried out in Edo State of Nigeria. Edo State was created from the defunct Bendel State on 27th August, 1991. It has population of 3,218,332 people (NPC, 2006), a total land area of 19,281.93 square kilometers and lies approximately between latitudes 05^o44'N and 07^o34'N and between longitudes 05^o4'E and 06^o45'E. The state is bounded by Kogi State in the North and East, Ondo State in the West and Delta State in the South. Edo State has a tropical climate characterized by two distinct seasons viz:- the wet and the dry season. The wet season occurs between April and October with a break in August and an average rainfall which ranges from 1500mm in the extreme northern part to 2500mm in the south. On the other hand, the dry season lasts from November to April with cold harmatan spell between December and January. It has an average temperature of 25^oC.

Sampling Procedure

The sampling technique used was the multi-stage sampling procedure. The first stage was the selection of six Local Government Areas which includes Egor, Esan Central and Etsako East. Others were Ikpoba-Okha, Oredo as well as Umunwode. These local government areas were spread across the three Agricultural zones of Edo State viz; Edo Central, Edo North and Edo South. The selection was based on their high level of involvement in catfish farming activities, relying on the data provided by the State Ministry of Agriculture and Natural resources and the Federal Department of Fisheries. Next stage involves the selection of three communities randomly from each of the LGAs that is Aduwawa, Aduhanhan, Agenebode and Ekosodin. Others include Eyean, Idogbo, Ikhimwinri, Igieduma, Irrua, Oguola, Okhoro, Oko, Ugbor, Ugbowo, Ugonoba, Urora, Uselu as well as Uteh. Thus a total of 18 communities were selected. In the third and final stage, 10 catfish farmers were randomly selected from each of the communities, making a total size of 180 respondents.

Primary data for the study were collected through the administration of questionnaire. This was aided with an interview schedule for those respondents who could not neither read nor write.

Data Analysis

The data collected from all the respondents were analysed using descriptive statistics, budgetary analysis as well as profitability analysis.

Descriptive Analysis

This made use of mean, standard deviation, frequency count, percentages and inferential statistics in achieving the objectives of the study.

Budgetary Analysis

This was used to determine the cost components and the profitability of the fish farming enterprise. It revolves around the determination of Gross Margin, Net Income and Net Returns on Investment. Gross Margin (GM) is the difference between the total revenue from the catfish production and the total variable cost involved in the production process. It is expressed as:- GM = TR-TVC.

The Net Income (NI) is the difference between the total revenue and the total cost. It is expressed as:- NI = TR – TC (TFC + TVC).

The Net Returns on Investment was also evaluated and expressed as:-

$$NRI = \frac{(TR-TC)}{TC} \times \frac{100}{1}$$

NRI greater than 20% which is the lending rate operating in the country will be taken as a profitable venture.

Profitability Criteria

The profitability of catfish production in the study area was evaluated using the t-ratio test, given by:

$$t = \frac{\pi - 0}{\emptyset} \times \sqrt{N-1}$$

Where:

π = Net Profit per output

\emptyset = Standard deviation

N – 1 = Degree of freedom

It was hypothesized that catfish production business was not a profitable venture in the study area that is Ho: $\pi=0$. This was tested against the alternative hypothesis that the business was profitable, that is Ha: $\pi \neq 0$.

Decision: Reject Ho if t-cal. > t-tab and accept Ho if the result is otherwise.

RESULTS AND DISCUSSION

Table 1 showed that majority of the catfish farmers in the study area were males (88.3%) and females (11.7%). Majority (75%) of the catfish farmers in the study area, fall within the age bracket of 40 – 59 years with a mean age of 49 years. This showed that catfish farming is embraced by the ageing proportion of the population. This result conforms to the studies of Esobhawan (2007) and Erie (2008) and they concluded that the ageing proportion of the population is involved in agricultural production. Also, majority of the respondents were married (96.1%) while only few were singles (3.9%). 63.3% of the respondents had a family size of 4 and below. The literacy level of the respondents was high with all the catfish farmers (100%) having attained a minimum of primary education. The relevance of education in agricultural production has been documented by Onuabugu and Nnadozie (2005). Majority (52%) of the respondents had a catfish

farming experience of 4 years and below. This means that the business is relatively new in the study area and is attracting the investment attention of the educated members of the society. A small proportion of the farmers (34%) operated a pond size of 401-500 squares meters (0.41-0.5ha), while a large proportion of them (66%) operated a pond size even below 400 square meters (0.4ha). The implication of this is that small size catfish farms dominate catfish farming operations in the study area; hence the farmers

cannot enjoy the benefits of economies of scale which is connected with large scale farming. Table 1 further showed that majority of the respondents (81%), had no access to extension service in the study area. Majority of the farmers (87%), had no access to credit facilities and depended on their personal savings and financial assistance from relatives and friends. The reason may be attributable to the unfavorable terms for obtaining loans which they find cumbersome and uncomfortable.

TABLE 1: Socio-economic Distribution of Catfish Farmers

Characteristic	Frequency	Percentage
Gender of the Respondents.		
Female	21	11.7
Male	159	88.3
Total	180	100
Age Category		
30 -39	22	12.2
40-49	75	41.7
50-59	60	33.3
60 and above	23	12.8
Total	180	100
Marital Status of Fish Farmers		
Single	7	3.9
Married	173	96.1
Total	180	100
Family Size of the Respondents		
4 and below	114	63.3
5 – 8	63	35
9 and above	3	1.7
Total	180	100
Educational Level of Respondents.		
Primary	55	30.6
Secondary	69	38.3
Tertiary	56	31.1
Total	180	100
Farming Experience of Respondents.		
4 and below	93	51.7
5 – 8	71	39.4
9 and above	16	8.9
Total	180	100
Categories of Pond Size of Respondents.		
200 and below	49	27
201 – 300	52	29
301 – 400	18	10
401 – 500	61	34
Total	180	100
Access to Extension Service.		
Lack access	147	81.7
Have access	33	18.3
Total	180	100
Credit Source of Respondents		
No response	157	87.2
Bank	18	10
Co-operate Societies	3	1.7
Money lenders	2	1.1
Total	180	100

Data on Table 2 indicated that the cost of feed had the highest proportion of Total Cost (TC) of production and was 67.70%. This was followed by hired labour which constituted 22.84% of the TC and cost of fingerlings accounted for 5.51% of the TC. Miscellaneous operating cost and marketing cost which are the remaining variable cost items were 1.41% and 0.02% of the TC respectively. The depreciation of fixed item materials constituted 2.50%, while the interest paid on credit was 0.19% of the TC of production. The study revealed that variable cost accounted for 97.31% of the TC while

the fixed cost accounted for 2.69% of catfish farming in the area of study. The implication of the above findings was that the high cost calls for the adoption of cost reducing strategy such as formulation of feeds. The low proportion taken by marketing is an indication that this variables did not posed any financial problem implying that the demand for the product is quite high. This result agreed with the work of Esobhawan (2008), where the variable cost was found to constitute about 86.69% of the TC of Aquaculture production in Lagos State.

Table 2: Cost Analysis of Catfish Farming

Cost Item (Variables)	Amount	Percentage of TC
Cost of Fingerlings	609, 100.45	5. 5
Cost of Feed	7, 489,935.14	67.7
Labour Cost	2, 523, 211.29	22. 84
Miscellaneous operating expense	126, 434.34	1. 14
Marketing Cost	2475. 34	0 .02
Total Variable Cost	10, 751, 156.56	97. 31
Depreciated Fixed Materials	276, 363.17	2. 50
Interest Paid on Credit	20, 827.43	0. 19
Total Fixed Cost	297, 190.60	2. 69
Total Cost	11, 048, 347.16	100

The profitability analysis of catfish farming investment in the study area (Table 3), showed that the gross margin per unit of output is ₦102.34. This indicates that for every 1kg of catfish produced by the farmers, the return on the variable cost was ₦102.34 of the total cost of fish production in the study area. Taking cognizance of the fact that the variable cost items constitute 97.31% of the TC of fish production in the study area, a return of M102.34 per kg of fish output was encouraging. The result shows that the net profit per kg of catfish produced

was ₦92.72. This gave a return on investment of 25.94%. This value is higher than the prevailing interest rate of 20% charged by the lending agents in the study area and hence the business was profitable and should be encouraged. This result conforms to the 224% obtained by Esobhawan (2007) for Artisanal fishing in Edo State, and 163% obtained by Esobhawan *et al*, (2008) for Aquaculture production in lagos State.

Table 3: Profitability Analysis of Fish Farming.

Cost / Return Items	Amount	Std.Deviation
Fish Output Produced (Kg)	30, 909.17	12, 715.2
Gross Revenue (₦)	13, 914, 261.11	5, 590,193.8
Total Variable cost (₦)	10, 751, 156.56	
Total Fixed cost (₦)	297, 190.60	
Total cost (₦)	11, 048, 347.16	
Gross Margin (₦)	3, 163, 104.55	
Gross Margin per Output (₦)	102.34	
Net Profit (₦)	2, 865, 913.15	
Price per Kg (₦)	450.17	
Cost Per Kg Output (₦)	357.45	
Profit per kg Output (₦)	92.72	
Profit Returns on Investment (ROI) $\frac{TR - TC}{TC} = 25.94\%$		

In order to test the validity of the profitability analysis, the null hypothesis that catfish production was not quite viable in the study area that is Ho:

X=O was tested against the alternative hypothesis that it was a profitable or viable business that is Ha: x ≠O. The result of the hypothesis testing showed that

the computed t-ratio of 4.53 was greater than the tabulated t-ratio of 1.96 at 5% significant level and 179 degrees of freedom as shown in Table 4. Thus the null hypothesis was rejected while the alternative

hypothesis was accepted. Hence, the business was observed to be highly viable in the study area.

Table 4: Profitability Test of Fish Production Business in Edo State

Parameter	Estimate
Profit	N92.72
Standard Deviation	N274.19
Number of Respondents (N)	180
Degree of Freedom (N-I)	179
t-computed	4.53
t-tabulated ($t_{0.05, 179}$)	1.96
Decision	Reject H_0

The result presented in table 5 showed that inadequate capital (27%), high cost of feed (24%), high cost of pond construction (19%) were the major

constraints to catfish production in the study area. Others were disposal of effluents (17%) and inadequate water supply (13%).

Table 5: Rating of Production Constraints by the Respondents

Constraints	Frequency	Percentage
Inadequate capital	48	27
High Cost of Feed	44	24
High cost of pond construction	35	19
Disposal of Effluents	30	17
Inadequate Water Supply	23	13
Total	180	100

CONCLUSION AND RECOMMENDATIONS

The study concluded that catfish farming business was profitable in the area as the result shows that the net profit per kg of fish produced was ₦92.72. This actually gave a return on investment of 25.94% which is higher than the interest rate of 20% charged by the lending agents in the study area. Though it was found to be profitable, major constraints such as inadequate capital, high Cost of feed, high cost of pond construction, disposal of effluents and inadequate water supply were revealed to have affected optimum production. Based on this, it is recommended that the government should encourage catfish production in the study area by subsidizing factors inputs as well as providing credit facilities to catfish farmers in order to increase their production, thereby increasing profit. More so, further study should be encouraged to develop fries and fingerlings with shorter maturity period.

REFERENCES

- Anyanwu, A. C., Anyanwu, B. O. and Anyanwu, V. A. (2001): *A textbook of Agricultural Science for Schools and Colleges*. African Feb Publishers Ltd. Onitsha. P. 381-389.
- Dada, R., (2004): Profitability of artisanal fish farming in Badagry local government of

- Lagos State. Unpublished B. tech. Thesis, Ladoke Akintola University of Technology Ogbomosho, Oyo State, Nigeria, 7 –10.
- Edo State Economic Empowerment and Development Strategy (2007).
- Erie G.O (2008): Gender Differentials in Productive Efficiency if food Crop Farmers in Edo State, Nigeria. Unpublished Ph.D Thesis. Department of Agricultural Economics and Extension, Ambrose Alli University, Ekpoma.
- Esobhawan, A. O. (2007): Efficiency Analysis of Artisanal Fishery Production in Edo State, Nigeria. Ph. D Dissertation of the Department of Agriculture Economics and Extension, Ambrose Alli University, Ekpoma.
- Esobhawan, A. O. (2008): Profitability, Input Elasticity and Returns to Scale in Aquaculture Production in Lagos State, Proceedings of the 14th Annual conference. Federal University of Technology, Akure, Nigeria. May 21.P219-222
- Idodo-Umeh, G. (2004): *College Biology*. Idodo-Umeh Publishers Ltd, Benin City P.95-100.
- Food and Agriculture Organization (FAO) (2014): The state of the world fisheries and

- aquaculture opportunities and challenges, FAO, Rome, 3-18.
- Idodo-Umeh, G. (2004): *College Biology*. Idodo-Umeh Publishers Ltd, Benin City P.95-100.
- Mohammed, S. T., Ghide, A. A., Shettima, B. G., & Umoru, M. Y., (2014): Resource-use efficiency of male and female fish farmers in Maiduguri: A comparative analysis. *Nigerian Journal of Fisheries and Aquaculture* 2(1),6-14
- Oladejo, A. J. (2010): Economics analysis of small catfish farming in Ido Local Government Area of Oyo State, Nigeria. *Agricultural Journal*, 5 (6), 318 – 321.
- Onuabugu, G.C. and Nnadozie (2005) “Socio-Economic Factors Affecting Brioler Brooding in Obowo Local Govt. Area of Imo State” Proceedings of the 39th Annual Conference of the Agricultural Society of Nigeria. Benin City. P,132 – 135.
- Ologbon, O.A.C., Idowu, S.D. and Oshisanya, K.P. (2013): Profitability and Technical efficiency of concrete- based catfish farming in Sagamu area of Ogun State, Nigeria “Proceedings of the 27th Annual Conference of the Farm Management Association of Nigeria” Ilorin. 216–220.