

**AN ASSESSMENT OF ECONOMIC VIABILITY OF SMALL-SCALE CATFISH  
(*Clarias gariepinus*) FARMING IN YENAGOA, NIGERIA**

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**ABSTRACT**

*This study was carried out to examine the profitability, viability and constraints of small scale catfish farming in Yenagoa Local Government Area of Bayelsa State. One hundred and twenty small scale catfish farmers were randomly sampled from twelve communities purposively selected from the study area. Data were collected with the aid of well-structured questionnaire augmented with scheduled interview and discussion with the respondents. Data were analyzed using descriptive analytical tools such as tables, frequencies and percentages. The results of the analysis showed that 90% of the farmers are males; majority fell within the age bracket of 26-55 years. Most of them are fairly educated, majority are married (73.4%) with a mean household size of six persons. The net profit technique was used to estimate the profitability level of the enterprise and benefit cost ratio was used to assess the viability of the venture, while ranking was used to analyze the problems faced by the farmers. The analysis estimated an average operating cost of ₦267,029.67; an average total fixed cost (depreciation) of ₦29,689.24 and an average net farm income of ₦577,367.42. This result showed that catfish farming is a profitable enterprise. The benefit-cost ratio was 2.95 which implied that for every one naira (₦1) spent ₦2.95 was realised. High prices of fish feed and fingerlings, inadequate water supply, communal land ownership, inadequate extension services, lack of capital, diseases and pests were the top ranking constraints faced by catfish farmers. The study therefore suggests provision of conducive environment for sustainable cat fish production through provision of credit facilities, formulation and implementation of proper policies on aquaculture by the government and relevant stakeholders.*

**KEYWORDS:** Cat Fish, Small- Scale, Profitability, Benefit-Cost Ratio, Yenagoa.

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**INTRODUCTION**

Fish production depends on aquaculture to bridge the gap of fish supply, Okechi (2004). Through the centuries, fish has been an important

component of the population's diet in many parts of the world. The term aquaculture covers all forms of aquatic animals and plants in fresh, brackish and salt water. Fish farming in turn involves

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the rearing of desirable species of fish under controlled or semi-controlled environmental conditions with the aim of producing fish above the level that would be produced naturally (Slang, 1973 and Oladejo, 2010).

Small-scale fish farming has been defined as the sector which employs traditional methods of capturing, processing and preservation of fish and fish products in carrying out their operational activities (Moses, 1983). A small-scale fish farm can also be defined as a fish farm that is between 0.10-5.99 hectares of land (Shaib *et al.*, 1997). Two approaches are commonly implemented on small-scale fish farms and they are: the local pond fish farming and the open water fish farming in lakes, rivers dams and reservoirs. The bulk of the fish production in Nigeria comes from inland capture fisheries dominated by the small scale fishing sub-sector.

Eyo and Ahmed (2005) reported that out of the 511,720 tons of fish production in 2002, the small scale fisheries sub-sector accounted for 88.13% of the total production in that year. According to (Wurts, 2004), small scale fish farming are significantly more sustainable than intensive production because inputs are minimized and production costs are substantially reduced. The use of simple fishing techniques in small-scale fisheries broaden farm culture and enhance opportunities in rural areas. When compared with livestock, it requires less space, time, money and has a higher feed conversion rate.

Catfish is very important in Africa; it has great aquacultural potential in both

tropical and sub-tropical environment. The economic importance of catfish species is enhanced by their hardiness and adaptability to adverse environmental conditions, tolerance to high density, culture resistance to diseases, fast growth rate, capability to reproduce under captivity, high consumer ranking and their ability to thrive well on cheap feed (Olatunde, 1998).

Aquaculture in particular fisheries is the sector for sustainable development because hunger is the most visible manifestation of poverty in any society. Hence any activity in this sector is not only a fight against hunger but a necessary ingredient for economic development as well. Fish plays an important role in economic development, aside the fact that it is a cheap source of highly nutritive protein. A lot of families earn a living from fishing, fish processing and marketing. Fishing provides employment and income to families. The contribution of this sub-sector to the gross domestic product in 2002 was estimated at 12% (CBN, 2003). Furthermore, the sector is a high foreign exchange earner. Despite these impressive statistics, the demand for fish is yet to be met (Fishon, 2005). It is also against this background that this research is embarked upon with a view to producing answers to the research questions that could be faced by practicing and prospective catfish farmers such as; what are the socio-economic characteristics of catfish farmers? Is small-scale catfish farming a profitable enterprise? Is cat fish farming a viable

venture? What are the factors limiting small-scale catfish farming?

The objectives of the study were to identify the socio-economic characteristics of small-scale catfish farmers, determine the profitability and viability of small-scale catfish farming and identify the problems faced by small-scale catfish farmers in the study area.

## **MATERIALS AND METHOD**

### ***Area of Study***

The study was carried out in Yenagoa Local Government Area of Bayelsa State, Nigeria. Bayelsa State is one of the 36 states of the Federal Republic of Nigeria, located on the south – south geopolitical zone (Alogoa, 1999). Geographically, the State is located on latitude 4° 15' North and latitude 5°23' South of the equator. It is within longitude 6°45' East and 5°22' West of the Greenwich meridian. It has a total land area of 9,415.8 Km<sup>2</sup> and 2006 population census of 1,704,515 million (NBC, 2006). Yenagoa is located in the humid tropical rain forest region and is characterized by mangrove forest in the southern part and other parts are characterized by the ever green rain forest.

### ***Sample Size and Sampling Procedure***

The sample for the study is 120 small scale catfish farmers selected from a population of 430 registered small scale catfish farmers with the Bayelsa State Agricultural Development Program. The purposive sampling and simple random sampling technique were used. Firstly, 12 communities within Yenagoa Local Government Area were purposively selected based on the prevalence of small

scale catfish farmers. Secondly, the simple random sampling technique was used to select 10 small scale catfish farmers from the list of the Agricultural Development Programme (ADP) from each of the communities making a total of 120 small scale catfish farmers. Primary data were sourced from the administration of structured questionnaires augmented with personal interview and discussions with the respondents. Whereas the secondary sources of data used were obtained from various journals, bulletins, relevant textbooks, publications, reviewed literatures materials and other related research work.

### ***Technique of Data Analysis***

Descriptive analytical tools such as table, frequencies and percentages were used to describe socioeconomic characteristics of small scale farmers in the study area. While profitability and viability level of small scale catfish farming in the study area was analyzed using the Net Profit Technique and the Benefit-Cost Ratio.

Net Profit is given as:

$$NP = GM - TFC$$

$$GM = (TR - TVC)$$

Where

GM = Gross Margin

TR = Total Revenue from the sales of catfish in Naira (₦)

TFC = Fixed cost of catfish in Naira (₦) (such as annual rent on land, cost of pond construction, cost of farm implements etc.)

TVC = Variable cost of catfish in Naira (₦) (such as cost of feed, labour, fertilizer, fingerlings, management etc).

Benefit-Cost Ratio is given as:

$$\text{B-C Ratio} = \frac{\text{Present Value of Total Benefit}}{\text{Present Value of Total Cost}}$$

Alufohai *et al.* (2012)

Descriptive analytical tools such as table, frequency and ranking was use to analysed the identified constraints

## RESULTS AND DISCUSSION

### *Socioeconomic Characteristics*

The results of the data analysed shows that majority of the farmers interviewed were within the age bracket of 46-55years, representing 41.6 percent of the respondents. While 21.7 percent and 18.3 percent are within the age bracket of 26-35 years and 36-45years respectively. This is shown in Table 1. The implication of this is that the farmers are still in their active age and therefore, there is tendency for more productivity in fish farming and this is in line with the findings of Adediran (2002), that farmers between the ages of 26–55 years are more economically active and independent compared to those below the age of 21 years and above the age of 60 years.

The result also indicated that majority of the small scale catfish farmers were males and constituted 90% of the respondents while 12 respondents representing 10% were females. This shows that males are more involved in

catfish farming than females in the study area and this could be as a result of the hectic nature of fish farming and also due to the fact that catfish farming is both labour and capital intensive. Omoraka (1999) found out that more males than female also participated in tilapia and catfish farming in Isoko Local Government Area of Delta State.

From Table 1, 40 percent of the farmers have primary education, 28 representing 23.3% have secondary school education and those that had university degrees were 20 (7%). Farmers that had OND degree were 12 (10%), those that had HND degrees were six (5%) while those that had no formal education were six representing 5% of the sample size. Most of the farmers had only primary and secondary education. The level of education of farmers affect perception of new technologies, adoption decision and investment behavior. Since majority of the farmers are fairly educated, its implication is that respondents will not be receptive to new innovations in their methods of production. In essence, education is one of the factors limiting higher productivity in the study area and this is in line with the finding of (Stewart, 1975), who observed that the educational level of farmers influence farmers' labour and income positively.

Table 1: Socioeconomics Characteristics of small-scale cat fish farmers in Yenagoa Local Government Area

Items	Frequency	Percentage (%)
<b>Age ranges</b>		
18 – 25	4	3.3
26 – 35	26	21.7
36 – 45	22	18.3
46 – 55	50	41.6
56 – 65	10	8.3
66 and above	8	6.7
Total	120	100
<b>Sex</b>		
Male	108	90
Female	12	10
Total	120	100
<b>Level of formal Education</b>		
No formal education	6	5
Primary school	48	40
Secondary school/SSCE	28	23.3
OND	12	10
HND	6	5
University Degree	20	16.7
Total	120	100
<b>Years of farming</b>		
0-5	42	35%
6-10	18	31.7
11-15	20	16.7
16-20	14	11.7
21 and above	6	6
Total	120	100
<b>Marital Status</b>		
Single	18	15
Married	88	73.7
Divorced/Separated	4	3.3
Widowed	10	8.3
Total	120	100
<b>Size of household</b>		
0-5	56	46.7
6-10	32	26.7
11-15	28	23.3
10-20	4	3.3
Total	120	100

Table 1 also shows the experience of small scale catfish farmers in the study area. Respondents that have 0-5 years experience in catfish farming were 42 representing 35% of the sample size. Farmers with 6–10 years experience were 28 (32%). Those with 11–15 years experience were 20 (17%), those with 16–20 years experience were 14 (11.7%), while those over 20 year experience in catfish farming were six representing 5% of the sample size. This implies that the farmers are really experienced in terms of resource use and proper management practices and this is expected to enhance productivity level. This result collaborated with Ekunwe *et al.* (2009), who found that catfish farmer with less than 5 years of experience in Kaduna State, Nigeria constituted 65%, while 26.7% and 8.3 % were within the range of 5-10 years of experience and more than 10 years of experience respectively. Mafimisebi (2002) studied the demographic characteristics of fish farmers in Ondo State, Nigeria, and also found that majority of fish farmers were new in the business with less than 5 years of experience

Considering their marital status, 88 (73%) were married, while 18 representing 15% were single. The result shows that majority of the farmers are married. The implication of this figure is expected to enhance the use of more family labour in the fish farming operations thereby leading to reduction in the use of hired labour. Therefore, if serious commitment is shown from the family labour, it is expected to lead to

higher productivity in fish farming in the study area.

The results of the data analysis as presented in Table 1 also showed that 56 (46.7%) respondents had household size ranging from 0–5, 32 (26.7%) had household size ranging from 6–11, 28 (23.3%) had household size ranging from 11 to 15 while four (3%) had household size ranging from 10–20. The average household size was six persons. The result implies that family labour will be used intensely and this is expected to lead to higher productivity in fish farming. Olagunju *et al.* (2007) did observed that family size of the majority of catfish farmers in Ibadan Metropolis were between the range of five and ten.

#### ***Profitability and Viability of Catfish Production***

As presented in Table 2, the study showed an annual average operating cost of ₦267,029.67. The average annual fixed costs was estimated to be ₦29,689.42. The results of the survey showed that the farmers derived their revenue from the sale of catfish, by deducting total costs (₦296,718.91) from the Gross Farm Income of ₦874,086.33, a Net Farm Income of ₦577,367.42 was obtained and this shows that small scale catfish farming in the study area is a profitable enterprise, and this is because the net farm income obtained outweighs the total variable costs and the total fixed costs combined.

The assessment of the financial viability of the venture further showed a benefit cost ratio (BCR) of 2.95. This indicated that for every one naira invested in small scale cat fish farming in the

study area, a benefit of 2.95 naira was realized. The result clearly shows that cat fish farming is profitable in the study area.

Table 2: Annual Profitability Level and Viability of Small Scale Catfish Farming in Yenagoa Local Government Area

Items	Amount in Naira
Total Sales From Fish (Total Revenue)	874,086.33
Variable Costs	
a. Cost of fuel	7,991.67
b. Cost of fertilizer	2,658.33
c. Total cost of feed	137,836.67
d. Cost of Fingerlings	55,043.00
e. Labour Expenses	56,515.00
f. Miscellaneous	6,985.00
Total variable Cost (TVC)	267,029.67
Gross Margin (TR-TVC)	607,056.66
Fixed Costs	
a. Depreciation on ponds	4,200.00
b. Fishing/harvesting nets	3,200.67
c. Depreciation on borehole	3,675.38
d. Depreciation on Pumping machine	2,500.00
e. Scale	3,000.00
f. Spade	2,400.00
g. Matchet	600.00
h. Wheelbarrow	5,800.00
i. Miscellaneous expenses	4,313.19
Total fixed costs (TFC)	29,689.24
NP (GM-TFC)	577,367.42
BCR	2.95

**Constraints Faced by Farmers**

Catfish farming like any other agricultural enterprise is also faced with several constraints. Table 3 shows ranking of problems associated with cat fish farming in order of seriousness with a rank of one being the most serious. Although the problems were common, high cost of feed which is indicated with

the highest frequency was found out to be the most serious factor affecting cat fish farming and this is followed by high cost of fingerlings, inadequate water supply, communal land ownership. Others include poor transport network and inadequate storage and infrastructural facilities.

Table 3: Constraints Faced by Small Scale Catfish Farmers

Problems	Frequency	Rank
High cost of feed	120	1 <sup>st</sup>
High cost of fingerlings	106	2 <sup>nd</sup>
Inadequate water supply	92	3 <sup>rd</sup>
Communal land ownership	74	4 <sup>th</sup>
Inadequate extension services	68	5 <sup>th</sup>
Lack of capital	58	6 <sup>th</sup>
Diseases and pests	36	8 <sup>th</sup>
Unavailability of skilled labour	32	9 <sup>th</sup>

**CONCLUSION**

The study therefore concluded that, despite problems and challenges militating against the farmers, small-scale catfish farming is economically profitable and a viable venture in Yenagoa Local Government Area of Bayelsa State. It was discovered that due to high costs of feed and fingerlings, some farmers are forced out of business, while those that still remain in the business have been able to do so by scaling back their operations either by stocking less fingerlings (under-utilization of pond) and insufficient feeding in an attempt to minimize their

operating expenses to a sustainable level. It is therefore necessary for government to evolve policies that will encourage multinationals and individuals to build modern hatcheries and also invest in local production of good quality feed of different sizes at affordable rate.

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