ANALYSIS OF THE PROFITABILITY OF CATFISH PRODUCTION IN ENUGU EAST L.G.A. OF ENUGU STATE, NGERIA

Abstract

i) Objectives of the study: The study examined the profitability of catfish production in Enugu – East L.G.A of Enugu state.

ii) Sample size and sampling procedure: A purposive sampling technique was employed in the selection of 50 respondents used for the study.

iii) Method of data collection: Data for the study were collected using structured questionnaires and interview schedules.

iv)Method of Data analysis: Descriptive statistics, gross-margin analysis and profitability ratios were used in analyzing the data.

v)Results and Discussion: The result of the analysis showed that majority of the fish farmers (70%) were males and within the age range of 31 - 50 years. The result equally revealed that majority of the farmers (86%) had at least a National Diploma with about 5 -14 years fish farming experience. The result further indicated that cost of feed and fingerlings were the major cost component involved in catfish production. The gross margin analysis and profitability ratios revealed that catfish production is very profitable in the study area with a net income of about ₦576, 667 and a BCR of 1.6. The study however revealed that the high cost of farm inputs and poor credit facilities were the major constraints to catfish production in the area.

vi) Recommendations: It was recommended that more fish feed producers be encouraged into the business to reduce the high cost of feed.

Key words: Profitability, Catfish, Production, Gross- margin, Costs.

Introduction

The elimination of food insecurity and rural poverty is a major objective of the Food and Agriculture Organization (FAO) and this topic features conspicuously as the first element of the organization's corporate strategy for the period 2000-2015. FAO has equally initiated several programmes like the Special Programme for Food Security (SPFS), the Telefood Programme and special assistance to countries in the context of the technical cooperation programme, all aimed at boosting food production and increasing the income of the farmer.

With the specific focus on poverty alleviation, the challenge is to convert these development principles into practical and reliable strategies for action. Fish farming is cited as one of the means of efficiently increasing food production in food deficient countries [15]. Although the outlook of fish production is worrisome given the growing demand for fish and the declining yield of natural fish stocks due to over-exploitation, fish farming still holds the greatest potential to rapidly boost domestic animal production.

Therefore the study aims to determine the effect of the farmers' socio- economic characteristics on their profit level

Review of Literature

Fish farming is the principal form of aquaculture. Fish farming involves raising fish commercially in tanks or enclosures usually for food. Economic studies have demonstrated that fish farming in Nigeria can be a good source of income. Several works [1] show that fish farming provides cash to a family in addition to supplementing the diet of the farmer. Fish can be an important cash crop even for farmers with limited resources. According to Jamu and Ayinla (2003),[2] the high domestic demand for fish, the stagnation of inland capture fisheries and changing macro-economic environment in most Sub-Saharan Africa implies that investment in aquaculture can be profitable in Nigeria.

Fish is highly nutritious, rich in micronutrients, minerals, essential fatty acids and proteins, and represents a valuable supplement to diets otherwise lacking essential vitamins and minerals [13]. In Nigeria, the average per capita fish consumption may be low, but even in small quantities; fish can have a significant positive impact on improving the quality of dietary protein by complementing the essential amino acids that are often present only in low quantities in vegetable based diets [14].

Employment in fisheries has grown substantially in the last three decades, with an average rate of increase of 3.6 percent per year since 1980 (FAO 2010).[3] Many persons are employed in the fish industry as producers, processors or marketers. It is estimated that in 2009, 44.9 million people were directly engage, full time or more frequently, part-time in capture fisheries or in fish farming, at least 12 percent of these were women (ibid)

Studies by Augustesson et al (2003),[4] report possible anti-cancer effect of n -3 fatty acids found in fish oil (particularly breast, colon and prostate cancer). According to Nair and Connolly (2008),[5] taking fish oil in any form can help regulate cholesterol in the body. The

American Heart Association recommends the consumption of 1g of fish oil daily, preferably by eating fish, for patients with coronary heart disease.

Materials and Methods

The study was conducted in Enugu-East L.G.A of Enugu State which has its headquarters in Nkwo Nike. The study area has an area of about 383 km^2 and a population of 279, 089 (NPC 2006).[6] It has a population density of 728.69 inhabitants per km^2. The area is made up of several communities.

Ten communities where fish farming activities are prevalent were purposively selected for the study. These communities include Alulu, Edem, Emene, Ibeagwa, Amoji, Obinagu, Iji, Akpoga, Nokpa and Ngwuomu. Five catfish farmers were randomly selected from each community. Thus a total of fifty catfish farmers were selected for the study. Data for the study were collected from both primary and secondary sources. Data collected were analyzed using both descriptive and inferential statistics.

Budgetary technique of analysis was used to determine gross margin which was them used to analyze the profitability level. Profitability ratios of catfish farmers were then calculated in order to determine economic performance of catfish production.

The gross margin analysis is stated as:

$$GM = TR - TVC \quad \ldots\ldots 1$$

$$TR = P \times Q \quad \ldots\ldots 2$$

$$TC = TVC + TFC \quad \ldots\ldots 3$$

$$NI\ (profit) = GM - TFC \quad \ldots\ldots 4$$

Where

GM = Gross margin
TR = Total Revenue
TVC = Total Variable Cost
TFC = Total Fixed Cost
TC = Total Cost
NI = Net Income
P = Price per kg of catfish
Q = Quantity of catfish sold

Profitability ratios:

Rate of Return on Investment (RRI) = $\frac{NI}{TC}$ x 100 ……..5

Profitability Index (PI) = $\frac{NI}{TR}$ ……6

Operating Ratio (OR) = $\frac{TVC}{TR}$ ……7

Results and Discussion

Socio –economic characteristics

Table 1 shows that most of the fish farmers (54%) in Enugu-East L.G.A. fall within the age range of 41 -50 years. This means that most catfish farmers in the area are still in their active age group. Majority of the farmers (70%) were males, thus justifying Bamigboye et. al [7] and Ogunleye et. al [8] who stated that more men than women are involved in fish farming. Also, majority of the respondents (74%) were married. The table also shows that 96% of the respondents can read and write. About 54% had HND or B.Sc. while only 4% had no formal education. This finding confirms the works of Olagunju et. al (2007)[9] and Nwibo (2012)[10] who ascertained that majority of fish farmers were educated. This high level of literacy will have positive effect on the utilization of inputs and incentives for fish farming and processing. Also, education is a facilitating factor for the utilization of technologies. Most of the respondents (44%) had 5 - 9 years of fish farming experience while 16% had about 1 – 4 years experience. This indicates that most of the fish farmers were experienced. Majority of the respondents had a household size of 6-10 while 4% had over 15 persons in their household. Most of the farmers (40%) had a total pond size of between $26m^2$ – $50m^2$. Only 10% of the respondents have a total pond size of over $100m^2$. Majority of the fish farmers (42%) are teachers or lecturers. This is followed by civil servants who represent 36% of the respondents. Only 10% of the respondents are full-time fish farmers.

Costs and returns to fish farmers.

The result of the analysis of the costs and returns accrued to an average fish farmer in the study area in 2017 are displayed on table 2. According to the result, an average fish farmer invested about ₦923, 333 in catfish production. These include the operating cost, labour cost and fixed cost. The cost of land constituted the greatest share of the fixed cost representing about 95.81% of the fixed cost and 54.15% of the total cost. This means that cost of land

acquisition is the major important single cost item associated with catfish production. The cost of feed (₦200, 000) was next in amount accounting for 21.70% of the total cost. This is followed by cost of labour (₦90, 000) accounting for 9.75% of the total cost. The cost of fingerling (₦60, 000) is next and accounted for 6.5% of the total cost. The variable cost items constituted 42.49% of the total cost while the fixed cost accounted for 56.51% of the total cost. From the table, total revenue of ₦1, 5000.000 was realized by the catfish famer at the end of sales during a production cycle. A production cycle is normally 6 months.

The gross margin (GM) was ₦1, 098,500 while a net income (NI) of ₦576, 667 was realized. The benefit cost ratio was 1.62. This indicates that for every ₦1.00 invested in catfish production, a profit of ₦0.62 was realized. This means that catfish production is profitable in the study area. The result obtained compared favourably with the findings of Awoyemi (2011)[11] and Olawunmi et.al (2010)[12] that catfish farming is a very profitable business.

Profitability ratios

The profitability ratios of catfish production are presented in Table 3. According to the table, the profitability index (PI) was 0.38 thus indicating that for every naira earned, about ₦0.38 returned to the farmer as net income. The rate of return on investment (RRI) was 62.45% which indicates that the farmer earned ₦0.62 on every naira spent on catfish production. The operating ratio (OR) is 0.27. Operating ratio that is less than one indicates a good and profitable business.

Table 1: Socio-economic characteristics of respondents

Characteristics	**Frequency(n = 50)**	**Percentage.**
Age (years)		
18 - 30	3	6
31 - 40	10	20
41 – 50	27	54
> 50	10	20
Gender:		
Male	35	70
Female	15	30
Marital Status:		
Married	37	74

Single	8	16
Widowed	5	10
Education level:		
No formal education	2	4
F.S.L.C	2	4
SSCE	3	6
OND/NCE	16	32
HND/B.Sc	27	54
Fish farming experience (years):		
1 – 4	8	16
5 – 9	22	44
10 – 14	12	24
>15	8	16
Household size:		
1 - 5	10	20
6 -10	33	66
11 -15	5	10
>15	2	4
Pond size (M^2):		
< 25	9	18
26 -50	20	40
51 -100	16	32
>100	5	10
Main occupation:		
Full-time fish farmer	5	10
Civil servant	18	36
Teacher/lecturer	21	42
Trader	3	6
Artisan	3	6

Source: Field Survey, 2017

Table 2: Average costs and returns of raising 2000 catfish per $50m^2$

			Cost (₦)		Percentage of total cost
Operating cost:					
Fingerling	2000@₦30/fingerling		60,000		6.50
Feed	50 bags @₦4000/bag		200,000		21.70
Utilities			10,000		1.08
Medication			6,500		0.70
Transportation			10,000		1.08
Miscellaneous			20,000		2.17
Fertilizer, lime, manure			5,000		0.50
Total			**311,500**		**33.74**
Labour cost:					
Pond construction			30,000		3.25
Salaries/wages			60,000		6.50
Total			**90,000**		**9.75**
Fixed cost:					
Land			500,000		54.15
Pond			250,000	Depreciation 12,500	
Nets, buckets, baskets, knives			10,000	3,333	2.36
Water pump		1	50,000	5,000	
Weighing machine		2	10,000	1,000	
Total				**521,833**	**56.51**

Source: Field Survey, 2017

Cost	**Amount**	**Percentage**
Variable cost:		
Operating cost	311,500	33.74
Labour cost	90,000	9.75
TVC	401,500	43.49
Fixed cost:		
Land	500,000	54.15
Depreciation	21,833	2.36
TFC	521,833	56.51

TC = TVC + TFC

= 401,500 + 521, 833

= 923,333

Total number of fish harvested and sold = 2,000

I kg of catfish sold for ₦750.00

:. TR = P.Q

= 750 x 2000 = ₦1, 500,000.00

GM = TR – TVC = 1500000 – 401,500 = 1,098,500

NI (profit) = GM - TFC

= 1,098, 500 – 521, 833 = 576,667.00

$$BC\ R = \frac{\text{Total Revenue (TR)}}{\text{Total Cost (TC)}}$$

$$= \frac{1,500,000}{923,333} = 1.62$$

Table 3: Profitability Ratio Analysis of Catfish production

Ratio		Value
$RRI = \frac{576,667}{923,333} \times 100$	=	62.45%
$PI = \frac{576,667}{1,500,000}$	=	0.38
$OR = \frac{401,500}{1,500,000}$	=	0.27

Conclusions and Recommendation

Fish farming has the potential to contribute to sustainable development and poverty reduction by generating income and employment. Though there are several identified problems faced by fish farmers such as poor credit facilities, high cost of farm inputs lack of extension services and high cost of land. In view of the above constraints, it was recommended that easy access to credit facilities, subsidization of farm inputs and regular visit by extension agents should be given strong consideration. Finally, government should address the high cost of land and fish feed to encourage more fish farmers and fish feed producers into the business. Therefore, Fish farmers should be encouraged to access their credits from

microfinance and commercial banks at reduced interest rate by the appropriate government agency.

Competing Interest

Authors have declared that no competing interests exist.

References

1. Omotoso, F.O and Fagbenro, O.A. 2005a "The Role of Aquaculture in Poverty Alleviation in Nigeria" *World Aquaculture* 3 6 (3) 19 -23.

2. Jamu, D.M and Ayinla, O.A 2003 "Potential for the Development of Aquaculture in Africa." *NAGA world fish centre.* Vol. 26 No 3 PP9 – 13

3. FAO 2010. Fishery Statistics
http:www: FAO. Org/figis/ser. 01 -09 -2017

4. Augustsson, K; Michaud D.S and Rimm E.B. 2003 "A prospective study of intake of fish and Marine fatty acids and prostate cancer" *cancer Epidemiol* Biomarkers Prev. 12 (1): 64 - 7

5. Nair, G.M. and Connolly, S.J. 2008 "should patients with cardio –vascular disease *take fish oil" http://www.cmaj.ca/cgi/content/full/178/2/181 15/03/2017*

6. National Population Commission of Nigeria (NPC) 2006. National Population figures, Abuja.

7. Bamigboye, E.O; Kuponiyi, F.A. and Yusuf, O.J. 2010 "Analysis of Farmers' utilization of fish farming Technologies in Ekiti State, Nigeria. *Proceedings of the 44th Annual conference of Agricultural Society of Nigeria. LAUTECH 2010. 18th -22nd Oct. 2010*

8. Ogunleye, K.Y, Ojo, T.Y and Oyewo, T. 2010 "Training Needs of Fish Farmers in Ibadan North L.G.A of Oyo state. *Proceedings of the 44th Annual Conference of Agricultural Society of Nigeria, 'LAUTECH 2010.* 18TH -22ND Oct. 2010

9. Olagunju, F. I., Adesiyan, I. O, and Ezekiel, AA 2007. "Economic viability of catfish production in Oyo state, Nigeria. *Journal of Human Ecology*, 21 (2): 121 -124

10. Nwibo, S.U. 2012 "Economics of Catfish production in Ebonyi North Agricultural zone of Ebonyi state, Nigeria. *Proceedings of International Agricultural Conference ANSUIAC 2012. 6 -9th* May, 2012.

11. Awoyemi, T. T. 2011 "Analysis of Profitability of fish farming among Women in Osun state" *Journal of Economics and Sustainable Development* Vol. 2, No 4.

12. Olawunmi, A.T., Dipeolu, A.O. and Bamiro, O.M. 2010 "Economic Analysis of Homestead Fish production in Ogun state. *Journal of Human Ecology*, 31 (1): 13 – 17.

13. Shao, A., Drewnowski, A., Willcox, D. C., Krämer, L., Lausted, C., Eggersdorfer, M., Mathers, J., Bell, J. D., Randolph, R. K., Witkamp, R., … Griffiths, J. C. (2017). Optimal nutrition and the ever-changing dietary landscape: a conference report. *European journal of nutrition*, *56*(Suppl 1), 1-21.

14. Henchion, M., Hayes, M., Mullen, A. M., Fenelon, M., & Tiwari, B. (2017). Future Protein Supply and Demand: Strategies and Factors Influencing a Sustainable Equilibrium. *Foods (Basel, Switzerland)*, *6*(7), 53.

15. Tidwell, J. H., & Allan, G. L. (2001). Fish as food: aquaculture's contribution. Ecological and economic impacts and contributions of fish farming and capture fisheries. *EMBO reports*, *2*(11), 958-63.