

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

Abstract

The study examined the profitability of catfish production in Enugu –East L.G.A of Enugu state. A purposive sampling technique was employed in the selection of 50 respondents used for the study. Data for the study were collected using structured questionnaires and interview schedules. Descriptive statistics, gross-margin analysis and profitability ratios were used in analyzing the data. 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. 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. Although the outlook of fish production is worrisome given the growing demand for fish and the declining

31 yield of natural fish stocks due to over-exploitation, fish farming still holds the greatest
32 potential to rapidly boost domestic animal production.

33 **Literature Review** (Review of Literature)

34 Fish farming is the principal form of aquaculture. Fish farming involves raising fish
35 commercially in tanks or enclosures usually for food. Economic studies have demonstrated
36 that fish farming in Nigeria can be a good source of income. Findings of Omotoso and
37 Fabgbenro (2005a) [1] show that fish farming provides cash to a family in addition to
38 supplementing the diet of the farmer. Fish can be an important cash crop even for farmers
39 with limited resources. According to Jamu and Ayinla (2003),[2] the high domestic demand
40 for fish, the stagnation of inland capture fisheries and changing macro-economic environment
41 in most Sub-Saharan Africa implies that investment in aquaculture can be profitable in
42 Nigeria.

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

49 Employment in fisheries has grown substantially in the last three decades, with an
50 average rate of increase of 3.6 percent per year since 1980 (FAO 2010).[3] Many persons are
51 employed in the fish industry as producers, processors or marketers. It is estimated that in
52 2009, 44.9 million people were directly engaged, full time or more frequently, part-time in
53 capture fisheries or in fish farming, at least 12 percent of these were women (ibid)

54 Studies by Augustesson et al (2003),[4] report possible anti-cancer effect of n -3 fatty
55 acids found in fish oil (particularly breast, colon and prostate cancer). According to Nair and
56 Connolly (2008),[5] taking fish oil in any form can help regulate cholesterol in the body. The
57 American Heart Association recommends the consumption of 1g of fish oil daily, preferably
58 by eating fish, for patients with coronary heart disease.

59 **Materials and methods**

60 The study was conducted in Enugu-East L.G.A of Enugu State which has its
 61 headquarters in Nkwo Nike. The study area has an area of about 383 km² and a population of
 62 279, 089 (NPC 2006).[6] It has a population density of 728.69 inhabitants per km². The area
 63 is made up of several communities.

64 Ten communities where fish farming activities are prevalent were purposively
 65 selected for the study. These communities include Alulu, Edem, Emene, Ibeagwa, Amoji,
 66 Obinagu, Iji, Akpoga, Nokpa and Ngwuomu. Five catfish farmers were randomly selected
 67 from each community. Thus a total of 50 catfish farmers were selected for the study. Data for
 68 the study were collected from both primary and secondary sources. Data collected were
 69 analyzed using both descriptive and inferential statistics.

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

73 The gross margin analysis is stated as:

$$\begin{aligned} 74 \quad GM &= TR - TVC \dots\dots\dots 1 \\ 75 \quad TR &= P \times Q \dots\dots\dots 2 \\ 76 \quad TC &= TVC + TFC \dots\dots\dots 3 \\ 77 \quad NI \text{ (profit)} &= GM - TFC \dots\dots\dots 4 \end{aligned}$$

78 Where

$$\begin{aligned} 79 \quad GM &= \text{Gross margin} \\ 80 \quad TR &= \text{Total Revenue} \\ 81 \quad TVC &= \text{Total Variable Cost} \\ 82 \quad TFC &= \text{Total Fixed Cost} \\ 83 \quad TC &= \text{Total Cost} \\ 84 \quad NI &= \text{Net Income} \\ 85 \quad P &= \text{Price per kg of catfish} \\ 86 \quad Q &= \text{Quantity of catfish sold} \end{aligned}$$

87 Profitability ratios:

$$88 \quad \text{Rate of Return on Investment (RRI)} = \frac{NI}{TC} \times 100 \dots\dots\dots 5$$

$$90 \quad \text{Profitability Index (PI)} = \frac{NI}{TR} \dots\dots\dots 6$$

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

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 (2010)[7] and Ogunleye et. al (2010),[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 26m² – 50m². Only 10% of the respondents have a total pond size of over 100m². 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
Characteristics	Frequency (n = 50)	Percentage.
Marital Status:		
Married	37	74
Single	8	16

162	Widowed	5	10
163	Education level:		
164	No formal education	2	4
165	F.S.L.C	2	4
166	SSCE	3	6
167	OND/NCE	16	32
168	HND/B.Sc	27	54
169	Fish farming experience (years):		
170	1 – 4	8	16
171	5 – 9	22	44
172	10 – 14	12	24
173	>15	8	16
174	Household size:		
175	1 - 5	10	20
176	6 -10	33	66
177	11 -15	5	10
178	>15	2	4
179			
180	Pond size (M²):		
181	< 25	9	18
182	26 -50	20	40
183	51 -100	16	32
184	>100	5	10

185

186

187

188

189

190	Characteristics	Frequency(n=50)	Percentage.
191	Main occupation:		
192	Full-time fish farmer	5	10
193	Civil servant	18	36
194	Teacher/lecturer	21	42
195	Trader	3	6

196 Artisan 3 6

197

198 Source: Field Survey, 2017

199

200 **Table 2: Average costs and returns of raising 2000 catfish per 50m²**

201

202

203

204

205

206

207

208

209

210

211

212

213

214

215

216

217

218

219

220

221

222

223

224

225

226

227

228

229

230

231

			Cost (₦)	Percentage of total cost
Operating cost:				
Fingerling	2000@N30/fingerling		60,000	6.50
Feed	50 bags @N4000/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	Depreciation 54.15
Pond			250,000	12,500
Nets, buckets, baskets, knives			10,000	3,333
Water pump	1		50,000	5,000
Weighing machine	2		10,000	1,000
Total			521,833	56.51

225 Source: Field Survey, 2017

226

227

228

229

230

231

Cost	Amount	Percentage
Variable cost:		
Operating cost	311,500	33.74
Labour cost	90,000	9.75
TVC	401,500	43.49
Fixed cost:		

232	Land	500,000	54.15
233	Depreciation	21,833	2.36
234	TFC	521,833	56.51
235	TC =	TVC + TFC	
236	=	401,500 + 521, 833	
237	=	923,333	

238

239 Total number of fish harvested and sold = 2,000

240 I kg of catfish sold for ₦750.00

241 ∴ TR = P.Q

242 = 750 x 2000 = ₦1, 500,000.00

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

244 NI (profit) = GM - TFC

245 = 1,098, 500 – 521, 833 = 576,667.00

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

247

248

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

250 = 1.62

251

252 Table 3: Profitability Ratio Analysis of Catfish production

253	<u>Ratio</u>	<u>Value</u>
254	RRI = $\frac{576,667}{923,333} \times 100$	= 62.45%
255		
256		
257	PI = $\frac{576,667}{1,500,000}$	= 0.38
258		
259		
260		
261	OR = $\frac{401,500}{1,500,000}$	= 0.27
262		
263		
264		

265 Conclusion (Conclusions) and Recommendation

266 Fish farming has the potential to contribute to sustainable development and poverty reduction
 267 by generating income and employment. Though there are several identified problems faced
 268 by fish farmers such as poor credit facilities, high cost of farm inputs lack of extension
 269 services and high cost of land. In view of the above constraints, it was recommended that
 270 easy access to credit facilities, subsidization of farm inputs and regular visit by extension

271 agents should be given strong consideration. Finally, government should address the high
272 cost of land and fish feed to encourage more fish farmers and fish feed producers into the
273 business.

274

275

276 **Competing Interest**

277 Authors have declared that no competing interests exist.

UNDER PEER REVIEW

References

(Add some recent references)

1. Omotoso, F.O and Fagbenro, O.A. 2005a “The Role of Aquaculture in Poverty Alleviation in Nigeria” *World Aquaculture* 36 (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.](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., Adesiyani, 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.