Research Journal of Agriculture and Biological Sciences, 6(3): 215-219, 2010

Profitability and Viability of Catfish Farming in Kogi State, Nigeria.

[1]Emokaro C.O., [1]Ekunwe P.A. and [2]Achille A.

[1]Department of Agriculture, Faculty of Basic and Applied Sciences, Benson Idahosa University, P.M.B. 1100, Benin City, Edo State, Nigeria.
[2]Department of Agricultural Economics, University of lbadan, Oyo State, Nigeria.

ABSTRACT: This study was designed to analyze the economics of catfish farming in Lokoja and Adavi Local Government Areas of Kogi State, as a way of determining the profitability and viability of commercial catfish production in the study area. The simple random sampling technique was used in selecting 40 catfish farmers that provided the primary data used in this study. The primary data were collected with the aid of well-structured sets of questionnaire, administered through personal interviews and observations so as to elicit the required information from the targeted catfish farmers. The data were analyzed using Benefit-Cost Ratio (BCR) and Cost and Return Analysis (CRA). The result of the study also showed that an estimated average initial capital of $2,283 was used in setting up each of the 0.5 hectare catfish farm business studied, at a prevailing interest rate of 17.5% /annum. The result also showed an estimated average annual gross revenue of $5,723 and an average net profit of $2,576, a mean gross margin of $2945.16 and a net profit margin of 51.46%, which shows that catfish farming is a profitable business in the study area. Also the benefit cost ratio was estimated as 1.82, indicating that the catfish farms in the study area are viable enterprises. Thus, in order to boost catfish farming in the study area, the farmers should be assisted in circumventing whatever constraints they may be facing in their production process.

Key words: Aquaculture, Benefit-Cost Ratio, Catfish, Gross margin, Gross Profit, Net Profit Margin, Viability.

INTRODUCTION

Statistics indicate that Nigeria is the largest African aquaculture producer, with production output of over 15,489 tonnes per annum[4], which constitutes about 4% of the nation's agricultural G.D.P[5]. However, F.A.O[4] estimated that Nigeria imports about 560,000 tonnes of fish estimated at about $400 million annually while annual domestic fish supply in Nigeria stands at about 400,000 tonnes. This makes Nigeria one of the largest importers of fish in the developing world. To solve the country's high demand for fish, Nigerians must turn to their under-utilized in-land water for improved fish production and aquaculture. However, aquaculture expansion has been a slow process as private sector fish farmers have faced major constraints including lack of seed and quality feed[1] (Akolisa and Okonji, 2005) and Kogi State is not an in anyway insulated from these constraints.

As in most parts of Africa, the most commonly cultured species of fish in Nigeria include catfish (*clarias gariepinus*), the imported tilapia and carp (*Clarias lazera* and *Heterobrachus spp*). Many fish farmers focus on catfish, as they can have a market value of two to three times that of tilapia. However, the current level of fish production is considerably too low to meet the protein requirement of the nation's population. The low level of fish production is due to constraints, retarding the pace of development in the fishery sub-sector. The development of the fishery sub-sector is constrained by a number of interrelated factors. Past records indicate that, encouraging fish production can curb the deficiency of protein in the country. It is therefore necessary to determine the profitability and viability of catfish farming in Kogi State with the aim of evolving strategies for increased catfish production in the region.

Research Methodology:

Study Area: The study was carried out in Lokoja and Adavi Local Government Areas of Kogi State. The State is one of the 36 States of Nigeria. It is located in the North-Central zone of Nigeria. Kogi State occupies a land area of about 29, 833 km^2. It is bounded by the following States, Edo and Ekiti (to the West), Kwara, Niger and Abuja (to the North), Nassarawa and

Corresponding Author: Dr. Emokaro Christopher, Department of Agriculture, Faculty of Basic and Applied Sciences, Benson Idahosa University, P.M.B. 1100, Benin City, Edo State, Nigeria.
E-mail <emokaro@yahoo.com>

Benue (to the East) Enugu, Anambra and Delta (to the South).

Focus of the Study: This study focused on catfish farmers in Lokoja and Adavi Local government area of Kogi State, where over 70% of the catfish farmers in Kogi State can be found.

Sampling Method: The sampling technique used for this research was the simple random sampling technique in which 40 catfish farmers were randomly chosen in the study area. The method was chosen to ensure that every catfish farmer in the study area was given an equal chance of selection.

Data Collection: The sampling frame for this study was obtained from the Ministry of Agriculture and Natural Resources and Kogi State Agricultural Development Programme (KSADP). This frame contained the list and addresses of registered catfish farmers in the State. The primary data were collected with the aid of well-structured sets of questionnaire, administered through personal interviews and observation so as to elicit the required information from the targeted catfish farmers.

Data Analysis (Analytical Technique): The viability and profitability of catfish farmers in the study area were analyzed using:

a).Cost and Return Analysis i.e. GR = Q x P; NP=GR-TPC; TPC=TFC + TVC; GM=GR-TVC; NPM=GM/TR x 100
Where; GR= Gross Revenue, Q=Quantity of output, P=Price per unit of output, NP= Net Profit, GR=Gross Revenue, TPC=Total Production Cost, TFC=Total Fixed Cost, TVC=Total Variable Cost, GM=Gross Margin, NPM=Net Profit Margin.

b). Benefit-Cost Ratio (BCR):

$$\sum_{i=1}^{n} \frac{Bn}{(1+r)^n}$$

$$\sum_{i=1}^{n} \frac{cn}{(1+r)^n}$$

Where; Bn = benefit in each year
Cn = cost in each project year
n = number of years
r = Interest (discount) rate

RESULTS AND DISCUSSION

Estimated Average Annual Investment cost per 0.5 Hectare Catfish Farm: The study showed an estimated annual mean investment outlay of $2,283 (Table 1). This covered the cost of land $1,389 (60.84%), pond construction $556 (24.35%), water pump $222 (9.72%), expenses on fishing net of $33 (1.45%) and other inputs such as spades, head pans, machetes, baths, drums etc $83 (3.64%).

Estimated Average Annual Operating cost/0.5 Hectare of Catfish Farm: As presented in Table 2, the study showed an average annual operating cost estimate of $2,778. This cost covered feed expense of $1,667 (60%), fingerlings input expense of $833 (30%), labour cost of $83 (3%), lime expense of $28 (1%), fertilizer input of $56 (2%) and miscellaneous (e.g. fuel expense, transport etc.) of $111 (4%).

These findings compare favourably with the result obtained by Louise[6], where cost of feed was estimated as the largest variable cost item in catfish production.

The depreciation schedule for fixed inputs used in each of the catfish farm unit is presented in Table 3 (below).

Estimated Annual Cost and Returns: The result of the survey showed that the farmers derived their revenue from the sale of catfish. Estimated average gross revenue from the sale of catfish/0.5 hectare was observed to be $5,723. By deducting costs from the gross revenue, a mean net profit of $2,576 was obtained from 0.5 hectare (Table 4).

Profitability Analysis: Profitability analysis involves the determination of the total variable cost and gross revenue and determining the difference between the two. An enterprise could be adjudged profitable in the short run, if the gross revenue is greater than the total variable cost. Alternatively, the gross margin, which is the difference between the gross revenue and total variable cost, must be positive. This measurement enables investors to decide whether to invest in catfish farming business or not. Hence, such an estimate would serve as a general guide in the choice of investment opportunity in the study area.

Viability Analysis: Viability analysis involves the determination of how viable an enterprise is, i.e how effective, the revenue covers the cost of an enterprise. It is important or necessary to determine how viable an enterprise is, since an enterprise can be profitable without being viable. The technique used in this study for the determination of enterprise viability is the Benefit-Cost Ration (BCR).

Table 1: Estimated Annual Average Investment Cost per 0.5 hectares Catfish Farm.

Items	Cost ($)	% of Total Investment Cost
Land	1,389	60.84
Pond Construction	556	24.35
Water pump	222	9.72
Fishing nets	33	1.45
Other Accessories	83	3.64
TOTAL (Average)	2,283	100

Source: Computed from Field Survey Data, 2007.

Table 2: Estimated Average Annual Operating Cost for Catfish Production in Kogi State.

Items	Cost ($)	Percentage of Total Operating Cost
Feed expense	1,667	60
Fingerling input	833	30
Labour cost	83	3.0
Lime expense	28	1.0
Fertilizer input	56	2.0
Miscellaneous	111	4.0
Total	2,778	100

Source: Computed from Field Survey Data, 2007.

Table 3: Depreciation Schedule for Fixed Inputs used in Catfish Production in Kogi State.

Items	Expected Lifespan (Yrs)	Quantity	Unit Cost ($)	Total Cost ($)	Annual Depreciation ($)
Water pump	5	1	222	222	44
Wheel Barrow	2	2	39	78	39
Nets	3	2	17	34	11
Head pan	2	3	4	12	6
Spade	2	2	6	12	6
Matchet	2	2	4	8	4
Total					110

Source: Computed from Field Survey Data, 2007.

Benefit-Cost Ratio: this measure how effective, the revenue covers the cost of an enterprise.

Using 17.5%, which is the interest rate on bank loans, we will have:

$$BCR = \frac{\sum_{i=1}^{n} Bn/(1+r)n}{\sum_{i=0}^{n} Cn/(1+r)n}$$

$$= \frac{5{,}723.16}{(1+17.5)^1} \Big/ \frac{3{,}147}{(1+17.5)^1}$$

$$= \frac{5{,}723.16}{18.5} \Big/ \frac{3{,}147}{18.5}$$

$$= \frac{309.36}{170.11}$$

$$= 1.82$$

The estimate of 1.82 indicates that at 17.5% discount rate, the gross revenue covered the total cost 1. 82 times. This result shows that the catfish farming business in the study area is viable since BCR is greater unity. The findings in this study compare favourably with those of Emokaro and Ekunwe[3] who examined the efficiency of resource-use among catfish farmers in Kaduna, Nigeria and that of Ehirim and Onyeka[2], who applied the stochastic frontier approach in the estimation of technical efficiency in Aquaculture

Table 4: Estimated Average Annual Cost and Returns/0.5 hectare of Fish Farm.

Cost and Returns	Quantity (Kg)	Unit Price ($)	Cost ($)
1. Overhead (fixed costs)			
Water pump			222
Wheel Barrow			39
Nets			11
Head pans			4
Spade			6
Machete			4
Management (salaries)			83
Total Fixed Cost			369
2. Operating variables			
Feed expenses			1.667
Fingerlings			833
Labour cost			83
Lime			28
Fertilizer			56
Miscellaneous			111
Total Variable Cost			2778
3. Total Production Cost (1+2)			3,147
4. Gross Revenue			
Quantity of fish sold	2578		
Price of fish per Kg		2.22	
5. Gross sales of fish			5,723.16
6. Net Profit (5-3)			2,576.16

Source: Computed from Field Survey Data, 2007.

Table 5: Gross Margin Analysis of an Average 0.5 Hectare Sized Catfish Farm in the Kogi State.

Year	Variable or Operating Cost ($)	Total Revenue ($)	Gross Margin ($)	Net Profit Margin (%)
2006	2,778	5,723.16	2945.16	51.46

Source: Computed from Field Survey Data, 2007.

in Oyo State and concluded that opportunities exist for increased efficiency (and by implication, profitability) in Aquaculture. Ogundari *et al*.[7], reported a return to scale of 0.841 in a study of aquaculture in Oyo State, Nigeria indicating that aquaculture posses enough potentials for economic returns. The result is however in contrast with the findings of Louise[6], who found that many fish farms in the UK now operate on marginal profit and those farms which are successful are generally those farms with reduced cost of production due to rigorous standards of husbandry and management, and good market development.

Conclusion: This study has shown clearly that catfish farming is not only profitable but equally viable in Adavi and Lokoja Local Government Areas of Kogi State, Nigeria. All stakeholders must therefore endeavor to play their part in ensuring the survival and sustainability of the emerging catfish industry in the State. The high initial capital outlay could serve as a disincentive for would-be catfish farmers who may be resource-poor, thus resulting to fewer people engaging in catfish production, this will lead to low fish supply. In view of meeting the increasing demand for protein intake by filling the yawning gap between the demand and supply of catfish in the region, commercial banks should be compelled by legislation to reserve a reasonable portion of their portfolios for fish farming at low interest rates. In other words, a type of selective credit policy should be adopted. This will make funds to be available to some targeted sectors of the economy, most especially aquaculture. These policies will promote borrowing and expansion of investment in commercial catfish production. Effort should be made to bring down the cost of feeding which accounted for about 60% of the total variable cost of catfish production in the study area. Since profit is the difference between total revenue and total cost. This

would directly translate to higher profit for the catfish farmers, a development that is healthy for the catfish industry. This can be done, by exploring alternative sources of feed for catfish, through well funded researches.

REFERENCE

1. Akolisa, O. and V.A. Okonji, 2005. Increasing Fish Supply through Genetically Modified Fish Stocks: need for caution in Nigeria. Proceedings of the 39th Annual Conference of the Agricultural Society of Nigeria, University of Benin. October 9th-13th, pp: 64-66.
2. Ehirim, N.C. and U.P. Onyeka, 2002. A Stochastic Frontier Approach to the Technical Efficiency in Aquaculture in Oyo State, Nigeria. Proceedings of the 16th Annual Conference of Agricultural Society of Nigeria, Owerri, Nigeria. 20th-24th October 2002, pp: 170-173.
3. Emokaro, C.O. and P.A. Ekunwe, 2009. "Efficiency of Resource-Use and Elasticity of Production Among Catfish Farmers in Kaduna, Nigeria". Journal of Applied Sciences Research, 5(7): 776-779.
4. FAO, 2007. State of World Fisheries & Aquaculture http://www.fao.org/fi/statist/fisoft/fishplu.asp.
5. Federal Ministry of Agriculture and Water Resources, 2008. The National Programme for Food Security, Federal Ministry of Agriculture and Water Resources, Federal Republic of Nigeria, pp: 4.
6. Louise, V.R., 1977. Fish farming International unit of Aquatic pathobiology" University of Stirling, Scotland, 4: 17-19.
7. Ogundari, K., S.O., Ojo, B. Brummer, 2006. Productivity Potential and Technical Efficiency of Aquaculture Procuction in Alleviating Poverty: Empirical Evidence from Nigeria. J. Fish. Int., 1(1-2): 21-26.