Profitability of Fish Farming in Awka, Anambra State, Nigeria

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KEYWORDS

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Cost,
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ABSTRACT

The study examined the profitability of fish farming in Awka, Anambra State, Nigeria. A simple random sampling technique was used to select six Fish farms namely Housetully fish farm, Ujundu fish farm, Ausco fish farm, Chizzy fish farm, and Chuksagro farm in the Awka metropolis. Structured questionnaires were used to collect data from the respondents. Descriptive statistics and net farm income analysis were used to analyze the data obtained. The result of the socio-economic analysis showed that all the respondents (100%) were males and all had formal tertiary education. Also, 50% of the respondents were mostly between the ages of 31- 40 years and had an average of 7 years of experience in the fish farming business. The majority of the respondents derived their capital largely from personal savings and spent an average total expenditure of N610,242.2 and earned an average gross income of N1,100,000. Gross margin analysis revealed a gross margin of N579,096 with a net farm income of N599,758 implying that for every 1N invested in the fish farm business, there was a return of N1.11. This study concluded that fish production in the study area is highly profitable. The study also revealed that despite the high profitability of the fish farm business in Awka, the fish farmers still face some serious problems such as high feed costs, fish diseases, high cost of fish seeds, high labor costs, and inadequate power supply. It is suggested that government involvement in fish farming will support these practicing fish farmers and also encourage unemployed youths to engage in fish farming.

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INTRODUCTION

Fish farming is known to have significantly boosted Nigeria's economic development over the past 20 years (Olanrewaju, *et al*., 2022). Fish farming currently contributes 3.5% to Nigeria's gross national product (GNP) and accounts for 0.2% of the total world fish supply (Umaru *et al*., 2021). Nigeria's annual demand for fish presently is about 1.4 million tonnes, while domestic production is about 780,000 tonnes. This shows that there is a large gap between supply and demand and this has led Nigeria to import fish annually (Nwiro, 2012). To cover this deficit, Nigeria needs at least one million tons of fish to feed its population annually (Sambo *et al*., 2021). Nyong, (2021) asserted that there is a need to increase production and reduce fish imports into the country to enable economic growth in Nigeria. Therefore, more efforts in fish farming are needed to bridge the gap between fish supply and demand in Nigeria.

Fish farming is a branch of aquaculture that involves the domestication and rearing of various species of fish. This practice allows for the feeding, breeding, growing, and harvesting of fish in a well-planned and controlled environment (Sambo *et al*., 2021). According to Agyakwah *et al*., (2020), there is a wide range of fish farming options including raising fish in earthen ponds, concrete ponds, plastic tanks, and other water holding facilities. However, the popular and simple techniques are fish production in an earthen and concrete pond, which are the basic units of fish farming practices worldwide (Ekine *et al*., 2019). The major species cultured in Nigeria include tilapia, catfish, and carp. However, the African catfish species (*Clarias gariepinus*) is the most widely accepted and highly valued fish with a higher survival rate (Nyong, 2021). Fish farming has great potential to increase the nutritional needs of the Nigerian populace. FAO, (2012) reported that fish contribute more than 60% of the world's protein supply, especially in developing countries. Fish farming also has the prospect of creating employment, generating income for the urban population, improving the socio-economic status of the farmer as well as generating foreign exchange (Oluwasola and Ige, 2015).

The farming of catfish accounts for more than half of the total national aquaculture production. However, a decline in production has been observed since 2015 and it has been reported that some catfish farmers are abandoning the fish farming business (Olanrewaju, *et al*., 2022). Despite the potential of fish farming to improve livelihoods in rural communities of Nigeria, it has not been fully explored as a poverty reduction strategy. Ikeogu *et al* (2020) reported that inadequate quality fish seed for stocking, poor extension services, lack of fish farmers' cooperative societies, poor infrastructural facilities, poor funding by the government, and high cost of fish feed are some of the major constraints facing aquaculture industry in Nigeria. These problems reduce the income potential of farmers, which in turn affects their livelihoods.

With this in mind, the Nigerian government has devised several developmental projects with a greater focus on fish farming to address the problem of low fish production and also to create a conducive environment for fish farming in Nigeria (Nyong, 2021). Government support for fish production is essential, but the most important aspect is the management of fish farms by farmers to maintain production capacity. To fully understand the economics of fish farms in Nigeria, it is necessary to obtain information on the cost and return generated by the fish farms which will guide financial planners on net farm income analysis to increase fish production and fish farm performance towards profitability (Asuquo *et al*., 20018). Therefore, this study aims to evaluate the profitability of fish farming and fish production constraints in Awka, Anambra State.

MATERIALS AND METHODOLOGY

Sampling Procedure

A simple random sampling technique was used to select six fish farms in the Awka metropolitan area namely Housetully fish farm, Ujundu fish farm, Ausco fish farm,Chizzy fish farm, and farm. A structured questionnaire was used to collect data from the respondents. The survey collected information on socioeconomic characteristics, costs and incomes of fish farming, and production constraints faced by farmers.

Net Farm Income Analysis

Net farm income (NFI) analysis was used to determine the profitability of the fish farming business in the Awka metropolis, Anambra State. It is the difference between the gross farm income and the total costs of production. A positive NFI indicates a profitable business while a negative NFI indicates an unprofitable one.

(1) Net farm income was determined as follows: NFI = GM-TFC
TFC = total fixed cost
(2) Gross margin analysis was calculated as GM =TR-TVC
Where GM = gross margin (N)
TR= total revenue (N) = Price (P) x Quantity of fish (Q)
TVC = total variable cost (N)
(3) RCI = GM/TVC
Where RCI = return on capital invested

The 3 Points Likert Rating Scale Technique

The 3 points Likert scale rating was used to assess the constraints of fish production in the study area which has three response categories as follows: very severe (VS) =3; Severe (S)=2; and not severe (NS) =1. The mean score of the three response categories was computed as 3+2+1=6/3=2.0. Any item with a mean score of 2.0 and above was considered a serious constraint while an item that scored less than 2.0 was considered as not a serious constraint to catfish farming in the study area.

Data Analysis

Descriptive statistics such as frequency distribution and percentages were used to determine the socio-economic characteristics of the respondents. Net farm income analysis and gross margin techniques were used to determine the profitability of fish farming in the Awka metropolis, Anambra State.

RESULT

Table 1 showed the socio-economic status of the fish farmers in Awka. All the respondents (100%) were males and all had formal tertiary education. Also, 50% of the respondents were married, mostly between the ages of 31- 40 years, and had an average of 7 years of experience in the fish farming business. 83.3% of the respondents had fish farming as their primary occupation and derived their source of capital from personal savings.

Table 1: Socio-economic characteristics of respondents

Parameters	Frequency	Percentages
Sex		
Male	6	100
Female	0	0
Total	6	100
Age		
21-30	2	33.33
31-40	3	50.0
41-50	1	16.67
51-60	0	0.0
Total	6	100
Marital status		
Single	3	50
Married	3	50
Separated	0	0
Total	6	100
Level of Education		
No formal education	0	0
Primary education	0	0
Secondary education	0	0
Tertiary education	6	100
Total	6	100
Primary occupation		
Farming	5	83.3
Trading	0	0
Civil servants	0	0
Artisans	0	0
Others	1	16.67
Total	6	100
Farming experience(years)		
<4	1	16.67
5-8	3	50
9-12	2	33.3
More than 12	0	0
Total	6	100
Source of capital		
Personal savings	5	83.3
Relatives and friends	0	0
Cooperative societies	0	0
Bank loan	1	16.67
Total	6	100

Table 2 showed the variable cost involved in fish production in the Awka metropolis which includes fish seed, fish feed, labour, drugs, fuel, transportation, and others. The average value of all the variable costs in the six fish farms was N520,904.

Table 2: Average value of the variable cost of fish production (per batch) in Awka Metropolis

Variable cost	Value (Naira)	
Fish seed (fingerlings)		30,000
Fish feed	340,266	
Labour	81,000	
Drugs	20,133	
Utilities	8,866	
Fuel	3,973	
Transportation	10,000	
		10,000
Miscellaneous	16,666	
Total variable cost		520,904

Table 3 showed the depreciated value of all the fixed costs incurred in the six fish farms in the Awka metropolis which include pond construction, pumping machines, tanks, weighing scale, and land. The average value of all the fixed costs in the six fish farms in Awka was N89.338.2.

Table 3: Average value of fixed assets and their depreciation values

Fixed cost items	Total value (N)	Lifespan (years)	Depreciation (Naira)
Pond construction (10x10ft)	231,333	10	23,133.3
Pumping machines	50,000	15	3,333
Plastic tank (10x10ft)	39,275	10	3,927.5
Weighing scale	20,000	10	2,000
Land (plot)	854,166	30	28,472.2
Total Fixed cost	1,194,772		89,338.2

Table 4 showed the average cost and returns of fish production in the Awka metropolis. The fish farmers spent an average total expenditure of N610,242.2 and earned an average gross income of N1,100,000. Gross margin analysis revealed a gross margin of N579,096 with a net farm income of N599,758 and a return of N1.11 implying that fish farming is profitable in Awka.

Table 4: Average cost and returns of fish production in Awka Metropolis

Items	Average value (N)	
Revenue		
The average quantity of fish sold in kg		1000
Average price per kg		1,100
Total Revenue		1,100,000
Total variable cost.	520,904	
Total depreciated fixed cost		89,338
Total Cost (N).		610,242.2
Gross Margin GM (TR-TVC)		579,096
Net Farm Income NFI (GM-TFC)		599,758
Return on capital invested (RCI) (GM/TVC)		1.11

Table 5 showed the constraints of fish production in the study area using the 3-point Likert scale rating. The major problems identified were high feed costs, fish diseases, high cost of fish seeds, high labor costs, inadequate power supply, and others.

Table 5: Constraints to fish Farming in Awka Metropolis

Constraints	mean	standard deviation
Access to capital	1.33	0.516
Disease problem	2.33*	0.816
High cost of equipment/materials	2*	0.63
Poor infrastructure	2*	0.63
Low harvest of fish	2.33*	0.816
High cost of labor	2*	0.63
Climatic conditions	1.67	1.03
High cost and poor quality of feed and lime	2*	0.63
Inadequate power supply	2*	0.89
Theft/pilfering of fish	1.33	0.816
High cost and poor quality of fish seeds	2.17*	0.983
Pests and diseases infestation	1.5	0.84
Flooding in earthen pond	1.33	0.82
.Lack of adequate land	1.67	0.816
Poor brood stock breed	1.83	0.98
Lack of adequate water	1.33	0.816
Lack of technical know-how	1.67	0.816

Source: Field Survey, 2022.

DISCUSSION

The Socioeconomic characteristics of fish farmers considered in this study included gender, age, level of education, farming experience, primary occupation, and source of capital. Results of the socio-economic analysis of this study presented in Table 1 showed that all the respondents (100%) were males and all had formal tertiary education. Also, 50% of the respondents were mostly between the ages of 31- 40 years and had an average of 7 years of experience in the fish farming business. This study showed that men were the dominant fish farm owners in the Awka metropolis. This could be so because women engage more in fish processing, preservation, and marketing in the study area (Ikeogu, *et al*., 2020). Male predominance in fish production was also reported in Niger state by *Yisa et al*., (2015). The analysis also showed that 50% of the respondents were in the middle and economically active age group (31-40 years) suggesting that training the farmers in fish farming may be effective. This result compares favorably with the finding of Tunde *et al*. (2015). All the respondents (100%) had attained a tertiary level of education as indicated in Table 1. This study agrees with the work of (Umaru *et al*., 2021) who reported that a higher level of education is necessary for improved farm management and the use of new production technologies. The analysis of the years of experience revealed that 50% of the fish farmers in the study area had an average of 7 years of experience in the fish farming business. This finding is in agreement with the work of Olanrewaju, *et al.* (2022) who stated that the profitability of fish farms is also influenced by farmers' years of experience. Age, level of education, as well as years of experience in the fish farming business, are among the factors that determine the managerial ability of the fish farmers. In fish farming, proper management determines the profitability of aquaculture production (Olanrewaju, *et al.*, 2022).

Table 1 also revealed that the majority of fish farmers have fishing as their primary source of income. This may be a result of the huge capital investments it takes to start up the business which also requires commitment. Results showed that most of the farmers (83.3%) obtained their capital from personal savings. This could be a result of the large interest rate on loans offered by banks, which therefore makes it not feasible for starting the business. The finding is consistent with that of Yisa *et al.* (2015) who found out that the majority of fish farmers in Niger state derived their source of capital from personal savings.

Data on the cost and return generated by the six fish farms were obtained and expressed on average to determine the profitability of the fish farm business in the Awka metropolis. Variable costs (VC) included in the analysis were expenditures on fish seed, fish feed, labour, drugs, utilities, fuel, transportation, and other miscellaneous costs. On the other hand, fixed costs that can be used for more than a production cycle include depreciated value on pond construction, pumping machines, tanks, weighing scale, and land. This study recorded an average variable cost of 520,904, an average fixed cost of 89,338.2, an average total cost of N610,242.2, and an average gross income of N1,100,000 which are all presented in Tables 2, and 3. Gross margin analysis revealed a gross margin of N579,096 with a net farm income of N599,758 implying that for every 1N invested in the fish farm business, there was a return of N1.11. The study revealed positive net return and a high rate of income indicating that fish farming is profitable in the Awka metropolis. This result agrees with that of Umaru *et al*., (2021) who reported a return on capital investment of 1.25 and a positive Net Farm Income indicating that fish farming is profitable in Enugu State. Several studies have shown that fish farming is a profitable business (Sambo *et al*., 2021; Ebukiba and Anthony, 2019; Ekine *et al*., 2019).

Despite the profitability of the fish farming business in the Awka metropolis, the production level is very low. This study identified all the constraints of fish production faced by the fish farmers in Awka, Anambra State, and the result is presented in Table 5. Fish

diseases and low fish harvest are the major problems of fish farming in the study area. An outbreak of diseases in a fish farm reduces overall output leading to low fish production. Other serious constraints affecting the fish farm business in Awka are poor quality of fish seed, high cost of fish feed, high cost of equipment/materials, high cost of labor, poor infrastructure, and inadequate power supply. This may be attributed to the cost of importation of most commercial feeds and fish farm inputs into the country, nonfunctional hatcheries to improve the quality of fish fingerling, and erratic power supply in the Awka metropolis. The findings reported here are similar to that of Yisa, *et al*., (2015).

CONCLUSION

This study concluded that fish production in the study area is highly profitable as a result of positive net returns and a high rate of income. It is also observed that Awka has great potential for fish farming in creating employment, improving the socio-economic characteristics of the fish farmers, and generating income. The study also revealed that despite the high profitability of the fish farm business in Awka, the fish farmers still face some serious problems. It is suggested that government should support these existing fish farmers with subsidized fish farm inputs and also encourage unemployed youths to engage in fish farming.

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