

Socio-Economic Analysis of Fish Farming in Andoni Local Government Area of Rivers State, Nigeria

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Abstract

The socio-economic analysis of fish farming in Andoni Local Government Area of Rivers State was studied. Structured questionnaire was administered to 150 respondents in randomly selected 10 communities. The data obtained were analyzed using descriptive statistics, budgetary and profitability analysis. The results revealed that the average mean age, household size and farming experience were 65.5 years, 15.5 persons and 12.4 years respectively. About 66.67% of the fish farmers joined the business for profit and 67.33% used borehole as their source of water. The result also showed that total cost (TC) of ₦6,73,500 was incurred by respondent per season while total revenue (TR) of ₦6,840,000 was reached with a return gross margin (GM) of ₦2,920,000 and a net farm income (NFI) of 109,500, benefit cost ratio of 1.016 and rate of return of 0.016. This result clearly showed that fish farming/aquaculture is a profitable venture in the study area. The study also showed that insufficient labour, inadequate processing/ storage/ preservation facilities, high cost of fish feed among others were the problems militating against fish farming in the area. Considering the profit derived from fish farming in this study, it could be deduced that fish farming is a lucrative business in the study area and that Government should motivate the respondents in the area.

Keywords: Socio-Economic, Fish Farming, Cost and Revenue Analysis

I. INTRODUCTION

Fish farming as an economic activity was first introduced into Nigeria about 66 years ago with the establishment of a small experimental station at Onikan in Lagos State, Agodi in Ibadan, Oyo State and an industrial farm (20 hectares) at Panyam in Plateau State by the Federal Government of Nigeria (Ayodele and Ajani, 1998). Since the establishment of fish farms was spear-headed by the Federal Government of Nigeria, fish farming had received some attentions from the government through her programmes on agriculture such as the establishment of Aquaculture and Inland Fisheries Project and the Presidential Initiative on Aquaculture in 2005. Among the different food

production systems around the world, fish farming is widely seen as an important weapon in the global fight against poverty, malnutrition and food insecurity, particularly within developing countries like Nigeria and Rivers State in particular. Among the different food production systems around the world, fish farming is widely seen as an important weapon in the global fight against poverty, malnutrition and food insecurity, particularly within developing countries like Nigeria and Rivers State in particular.

Rivers state belongs to one of the coastal states in Niger Delta region of the country with vast potential for fish farming (Anyanwu *et al.*, 2007). The state is characterized by various types of water bodies such as rivers, fresh and brackish water, creeks and estuaries as well as marine water bodies. These water bodies provide great opportunities for aquaculture. Fish farming in the state is rather means of capture fisheries which is the pre-occupation of most Riverine Communities in the state. The need to increase food supply especially animals' protein in Nigeria like in most third world countries gave rise to culture fishery activities in the state (Akinrotimi *et al.*, 2007). In recent times, aquaculture has gained wide popularity. It has been identified as a rational way of making up the dwindling fish supply from capture fisheries (Ezenwa, 2006). This increase in acceptance could also be attributed to the growing demand for some fresh and brackish water fish species for the supply of valuable fish protein (Akinrotimi *et al.*, 2010).

The objective of this study is to determine the socio-economic features of fish farming in Andoni Local Government Area of Rivers State with the aim of ascertaining the socio-economic analysis of the fish farmers, the production level of fish farmers, fish farming management practices as well as to determine the constraints to fish farming in the study area.

II. MATERIALS AND METHODS

StudyArea

Andoni is a Local Government Area in Rivers State, Nigeria with its headquarters at Ngo Town. It has an area of over 233 km² and a population of over 311,500 at the last year census. The Andoni area is located on coordinates 4°32'57"N 7°26'47"E (fig 1). About 10 out of the entire communities in Andoni are mostly riverine and are involved in fish farming.

Sampling technique, sample size

A three random sampling technique was used. Based on the existing communities, 10 were selected and from each 15 fish farmers were selected from a list obtained from Rivers State Agricultural Development Project (ADP), Fisheries Division Records. This gives a study population size of one hundred and fifty fish farmers.

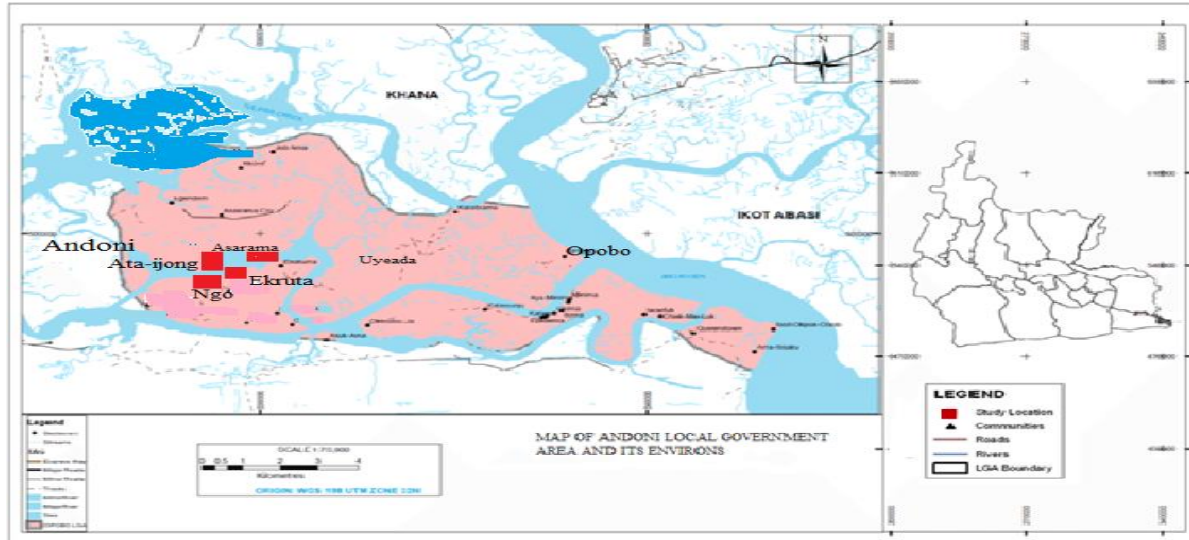


Fig.1 Map of the study area

Instrument of Study

The study used a well structured interview questionnaire divided into four sections: Section A contains socio-economic characteristics of fish farmers in the study area, B contains the types of fish farming practices and characteristics, C contains the costs and returns involved in fish farming in the study area and D contains the constraints/problems of fish farming in the study area.

Data Analysis

The data collection and analysis made use of descriptive statistics and Likert scale techniques. Descriptive statistics were used to describe sections A, B and C while a 4 point Likert-type scale of Strongly Agree (4), Agree (3), Disagree (2) and Strongly Disagree (1) was used to determine the respondents perception of the challenges for fish farmers with the mean benchmark of 2.5.

Strongly Agree	(SA)	4
Agree	(A)	3
Disagree	(D)	2
Strongly Disagree	(SD)	1

Other indices used were

- i. **Gross Margin (GM) calculated with the formular:**
 $GM = GFI - TVC$ (Olukosi and Erhabor, 1989).
Where GM = Gross margin, GFI = Gross farm income and TVC = Total variable cost
- ii. **Net Farm Income (NFI) calculated using the formular:**
 $NFI = TR - TC$ (Olukosi and Erhabor,1989)
Where TR = Total Revenue and TC = Total cost
- iii. **Profitability Ratios consisting:**
(Okwn and Acheneje, 2011). Some examples of profitability ratios are listed and explained below:
 - a. **Benefit Cost Ratio (BCR) estimated using the formular:**
 $BCR = TR/TC$ (Okwu and Acheneje,2011)
Where TR = Total Revenue and TC = Total cost
 - b. Expense structure ratio (ESR) = FC/VC
Where, FC = Fixed cost and VC = Variable cost,
 - c. Rate of return (ROR)= NR/TC ,
Where, NR = Net Return and Gross Revenue Ratio (GRR)= TFE/GI
Where, TFE = Total farm expenses and GI = Gross income.

RESULTS AND DISCUSSION

Table 1 shows the socio-economic characteristics of fish farmers in Andoni Local Government areas of Rivers State. The results showed that 60% (90) of the respondents were within the age brackets of 36-45 years while 20% (30) were within the age bracket of 46-55 years. This collaborates with the results of Okayi *et al* (2013) who opined that “the age classes of respondents actively involved in fish farming were majorly within the age bracket of 21 – 40 years” which is in tandem with the result of this study. The result is also in line with the findings of Oladimeji *et al* (2013) who reported ages brackets of 31 – 40 and 41 – 50 years with the highest percentages of 45% and 42.5%” respectively. The high percentage of young people participating in fish farming showed that this age bracket is considered a productive and economic viable age for fish farming as asserted by Olaoye *et al.*, (2013) and Olowosegun *et al.*, (2004).

With respect to sex, 60% (90) and 40% (60) of the respondent were males and females respectively. Thi is in line with the finding of Olaoye *et al.*,(2013) who noted that 84.2% of the fish farmers studied in Andoni Area were male while 15.8 percent were female. Also,Brummett *et al.*, (2010) states that fisheries activities are mostly dominated by men.

Eighty percent of the respondents were married and 20% were single. This study is in line with the findings of Shettima *et al.*,(2014) who reported that 80.5% of the fishermen studied were married while 19.5% were single. This implies that married men dominated the fishing activities in the study area. Fakoya (2000) and Oladoja *et al.*,(2008) opined that marriage confers some level of responsibility and commitment on individual in career. The higher percentage of married respondents in this study may be attributed to the fact that people get married earlier and as such had to find for means of livelihood to sustain the family.

Ninety percent of the respondents had various levels of formal education while only 10% had no formal education. This result showed that fish farming is dominated by the educated class with primary, secondary and tertiary education which have exposed their scientific and are eager to adopt innovations easily as noted by Agbamu (2006) will make fish farming considered to be highly scientific. This result is in agreement with Ikenweiwe *et al* (2011) observation that only 18% of the respondents had no formal education while 38.4% of the respondents had formal education (secondary and tertiary institutions). According to Okunlola (2009) educational level is one of the factor that influences adoption of new technology by farmers and that it is a strong instrument to consider in the adoption of innovation.

The result also showed that 46.67% of the respondents had 5-10 years of experience in fish farming. Respondents with the highest number of years of experience that have good skill and better approaches to fish farming business. Respondents with longer years of experience were often able to forecast market situation in which they sell their products at higher prices. The results also showed that most of the fish farmers in the study area had a family size of between 4-7, indicating youthful workforce. This result is in agreement with the finding of Oladimeji *et al* (2013) who opined that 46.3% and 30.6% of the study population had household size of 6 – 10 and 1 – 5 respectively. They attributed this population explosion occur mostly in the rural areas especially in the supply of farm labour.

The study findings showed that 60% of the respondents got their land through inheritance where as 40% through renting/leasing. This observation is in line with Shettima *et al.*,(2014) who reported that 67.6% of the respondents purchased the land they are using for fish farming, 23.0% rented the land, while 7.7% and 1.8% got the land through inheritance and gift respectively.

Table.4.1 Socio-Economic features of Fish Farmers in Andoni Local Government Area of Rivers State.

S/N	Age Range (Yrs)	Frequency	Percentage	Mean
	18-25	9	6.00	
	26-35	11	7.33	
	36-45	90	60.00	
	46-55	30	20.00	65.5
	56 and above	10	6.67	
	Total	150	100.00	

Sex (Gender)			
Male	90	60.00	
Female	60	20.00	
Total	150	100.00	
Marital statue			
Married	120	80.00	
Single	30	20.00	
Total	150	100	
Educational Quantification			
No formal Education	10	6.67	
Primary	20	13.33	
Secondary	80	53.33	
Tertiary	40	26.67	
Total	150	100.00	
Household			
1-3	40	26.67	
4-7	70	46.67	
8-11	30	28.00	15.5
12-15	10	6.67	
Total	150	100.00	
Fish Farming Experience(Yrs)			
<5	50	33.37	
5-10	70	46.67	12.5
16-20	30	20	
Total	150	100.00	
Mode of Land Acquisition			
Purchase	30	20	
Inheritance	60	40	
Gift	20	13.33	
Lease /Rent	40	26.67	
Total	150	100.00	

Table 2 showed the fish farming practices and features of the fish farmers in the study area. From the table, 66.67% and 13.33% of the respondents went into fish farming for profit and for household consumption respectively. These results are consistent with the findings of Olaoye *et al.*,(2013) who revealed that 89.2% of the fish farmers studied in Andoni Area went into fish farming for profit while others went into fish farming to make up income and household consumption.

The various sources of water varied and included borehole (67.33%), stream/river (26.00%) and deep well 6.67%. According to Olaoye *et al.*,(2013) quantity and source of water needed for commercial aquaculture varies with the production method employed, type of aquaculture chosen, scale of operation, and species cultured. The results also showed that the respondents in the area preferred monoculture to polyculture in agreement with the findings of Olaoye *et al.*,(2013) who attributed it to poor market price for tilapia.

Many respondents (53.33%) in this study purchased their fingerlings from fish hatchery outside their farms unlike the finding of Olagunju *et al.*,(2007) who opined that respondents get their fingerlings from their own farm indicating that they are well trained and they have acquired the needed information to operate a personal fish hatchery. This study showed that majority of the respondents harvest twice per season which is in line with the assertion of Okoye and Omorinkoba (1994) who opined that harvest is done with the influence of festivity and feed availability.

This study showed that majority (72.67%) of the respondents in the study areas were members of cooperative societies while others do not belong to any registered or unregistered society due to lack of awareness and interest. This finding is in consonance with that of Akinbile, (1998) who opined that groups ensure that members derive benefits from the associations in which they cannot derive individually if they were acting alone.

The result showed that 90 (60%) of the respondents use their personal money to start or do this business which is in agreement with the finding of Olasunkanmi (2013) who opined that about 75% of the farmers were able to raise their capital from personal savings and only 5.6% had access to bank loans.

Okoye and Omorinkoba (1994) opined that majority of fish farmers have culture periods of six months which is in line with the result of this study. Table 2 also showed that more respondents used Zeigler than any other feeds probably due to price difference. This result is in agreement with the findings of Kudi *et al.*(2006) who asserted that feed accounted for the highest cost of fish production in Kaduna State, Nigeria. According to White,(2013) for fish to grow and reach market size in a short time, there is a need to use good quality feeds.

Table 2. Fish Farming Practices and Characteristics of Fish Farmers

Item	Frequency	Percentage
Reason for going into fish Farming		
To make profit	100	66.67
To amusement	30	20.00
Income		
For invoice hold	20	13.33
consumption		
Total	150	100.00
Sources of Water		
	Frequency	Percentage

Stream/River	39	26.00
Borehole	101	67.33
Deep well	10	6.67
Earthen pond & concrete tank	60	40.00
Concrete pond only	30	20.00
Earthen pond only	40	26.67
Fish trough	10	6.67
Tarpaulin	10	6.67
Total	150	100.00

Type of Culture	Frequency	Percentage
Monoculture	110	73.33
Polyculture	30	20.00
Integrated	10	6.67
Total	150	100

Types of Culture Species	Frequency	Percentage
<i>Clarias gariepinus</i>	70	46.67
<i>Clarias and tilapia</i>	30	20.00
<i>Heterobranchus spp</i>	50	33.33
Total	150	100.00

Sources of Fingerling	Frequency	Percentage
Own Fish Farm	40	26.67
Fish hatchery	80	53.33
Government fish farm	30	20.00
Total	150	100.00

Number of Ponds	Frequency	Percentage
<6	20	13.33
6-12	80	53.33
12-18	40	26.67
>18	10	100.00
	<u>150</u>	

Number of Fish Stocked **2,000**

Culture period	Frequency	Percentage
Four month	30	20
Five months	35	23.33
Six months	60	40.00
Six months	25	16.67
Total	150	100.00

Types of Feed

Blue crown	40	26.67
Zeigler	50	33.33
Agua max	30	20.00
Coppens	10	6.67
Total	150	100.00
Harvesting Penal (Year)	Frequency	Percentage
Once	1..0	6.67
Twice	120	80.00
Thrice	20	13.33
Total	150	100.00
Cooperative Society		
Yes	109	72.67
No	41	27.33
Total	150	100.00
Source of Finance		
Personal Savings	90	60.00
Friends/Relation	20	13.33
Co-operatic Society	30	20.00
Bank Loan	10	6.67
Total	150	100.00

Cost and Return of Fish Farming in the Area.

The result on Table 3 showed that fish farmers in the study area has operating cost such as for purchase of fish feed (3,000,000), fuel (300,000) and fish seed/fingerling (240,000). This observation is in agreement with the findings of Olaoye *et al.*,(2013) that variable cost, fish feed and cost of fingerlings formed the greatest cost of catfish production. The results also showed that total cost (TC) of ₦6,73,500 was incurred by respondent per season while total revenue (TR) of ₦6,840,000 was reached with a return gross margin (GM) of ₦2,920,000 and a net farm income (NFI) of ₦109,500, benefit cost ratio of 1.016 and rate of return of 0.016. This is in agreement with the finding of Iheke and Nwagbara, (2014) who reported that annual gross revenue of N1, 325,000 with a net profit of N545,800 was accrued to the farmers and therefore concluded that catfish farming is a profitable enterprise in the study area. Raufu *et al.* (2009) used budgetary analysis to study determinants of yield performance in Lagos state, Nigeria and estimated a farmer's net farm income as N8, 985,904 per annum with a benefit cost ratio of 3.43 and a gross margin ratio of 1.41. The results also showed that total cost of production (TC) incurred was ₦6,730,000 consisting of TVC, ₦3,920,000 and total fixed cost, ₦2,810,000.

Table 4.3: Economic Analysis of Fish Farming in the Study Area

Items	Amount (₦)
Variable Cost	
Fish Feed	3,000,000

Fish Seed	200,000
Lime/Fertilizers	10,000
Labour	200,000
Fuel	300,000
Transportation	100,00
Others	70,000
Totals	N3,920,000
Fixed Cost	
Land Purchase/Rent	1,800,000
Water Pump	25,000
Concrete Tank	450,000
Digging of Well	30,000
Earthen Pond	180,000
Plumbing Materials	40,000
Building/Shed	100,000
Generator	65,000
Drag Net/Weighing Scale/Cutlass	20,000
Wheelbarow/Shovel/Bowl	20,500
Total	2,810,500
	N6,840,000

Revenue Generation

Sales/Income Per Season

$$\text{Mortality} = 5\% = \frac{5}{100} \times 12000 = 600 \quad 12000 - 600$$

= 11,400 sales at N600 per kg.

Summary

TVC	=	3,920,000
TFC	=	2,810,500
TC	=	6,730,500
Total Revenue	=	6,840,000

$$\text{GM} = \text{GFI} - \text{TVC} = \underline{\underline{2,920,000}}$$

Table 4.4: Profitability Ratio of Fish Farming in the Study Area

	ITEMS	Value (₦)
1.	Benefit Cost Ratio (BCR)	1.016
2.	Rate of Return (ROR)	0.016
3.	Expense Structure Ratio (ESR)	0.717
4.	Net Profit Margin (NPM)	0.016
5.	Net Farm Income (NFI)	109,500

The profitability ratio calculated are shown in Table 4.4

The analysis of ratios in this study revealed that the Benefit cost ratio (BCR) was greater than one (>1) a concepts of project evaluation. As a rule, any business with benefit cost ratio greater than 1 (>1), equal to one (=1) or less than 1 (<1) indicate profit, break-even or loss respectively (Olagunju *et al.*, 2007). The ratio BCR = 1.016 it implies that fish farming in Andoni Local Government Area is profitable.

Table 5 showed the problems faced by fish farmers in the study area. They include high cost of fish feed (3.10) insufficient labour in the rural area (2.60), inadequate processing/storage/preservation facilities (3.00), lack of finance (3.07), absence of strong cooperative society (2.97). The results therefore showed that insufficient labour, inadequate processing/storage/ preservation facilities high cost of fish feed among others were problems militating against fish farming in Andoni Local Government area of Rivers State which are in line with the findings of Iheke and Nwagbara, (2014) who opined that the major problems confronting the fish farmers were high cost of feed, unavailability of improved seeds and poor feed quality. According to Iheke and Nwagbara, (2014) the major problems confronting the fish farmers were high cost of feed (100%), unavailability of improved seeds (100%), poor feed quality (60%) and lack of retail outlet for purchase of feed (50%).

Table 4.5: Constraints/Problems Faced by Fish Farmers in the Study Area

		4	3	2	1			
		SA	A	D	SD	Totals	Mean	Remark
1	Poaching/Predation	260	165	50	20	495	3.30	Accept
2	High cost of fish feed	320	120	20	20	480	3.20	Accept
3	High cost of fish seed	240	150	50	25	465	3.10	Accept
4	Inadequate finance	280	120	40	20	460	3.07	Accept
5	High cost of construction	280	105	40	25	450	3.03	Accept
6.	equipmen Fluctuation in power Inadequate Processin /Storage facilities	280	105	40	25	450	3.00	Accept
7.	Inadequate Preservatio n/Storage Facilities	240	150	40	20	450	3.00	Accept

8	Absence of strong cooperative	240	150	30	25	445	2.97	Accept
9	Disease & pest Infestation	220	135	40	30	425	2.80	Accept
10	Insufficient labour	120	90	120	60	390	2.60	Accept
11	Water shortage in dry season	120	90	100	40	350	2.33	Reject
12	Inadequate motivation from ext. office	100	75	120	40	335	2.23	Reject
13	Farm distance is really discouraging	40	90	160	30	320	2.13	Reject
14	Land acquisition is expensive	80	60	140	40	320	2.13	Reject
Grand Mean								

Mean ≥ 2.50 Accepted, while mean < 2.50 Rejected

CONCLUSION AND RECOMMENDATION

Based on the results of this study, fish farming in the study area has great potential to take the unemployed youth off the street. However, the business is bedeviled with factors such as insufficient labour, inadequate processing/ storage/ preservation facilities, high cost of fish feed and among others. It is therefore recommended that government should motivate the fish farmers by addressing some major challenges in addition to making available loan package and creation of conducive environment for farming.

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