

ECONOMIC STUDY OF SMALL SCALE FISH FARMING IN SELECTED LOCAL GOVERNMENT AREAS OF NIGER STATE, NIGERIA

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ABSTRACT

This study examined profitability of fish farming in Niger state. The study among other things revealed relatively high preference for fresh fish, particularly for the *Tilapia* and *Clarias* species. It is shown further that family size and education have significant positive effect on fish farming. 22 fish farms were selected using random technique drawn from two (2) local government areas (Bosso and Chanchaga) from the study area. Structured questionnaire were used to collect data from respondents. Statistical analysis was accomplished by means of frequency distribution, percentages. The result of the cost and return analysis showed that the gross income generated from the output amounted to; #252,793,400.00 and the net farm income (NFI) is #252,752,353.90 indicating that fish farming is profitable.

INTRODUCTION

Fish is highly nutritive, containing large amount of protein, lipid and essential amino acids. Fish provides about 20% of the world's total supply of animal proteins, Edward, (1980). Despite the daily increase in the cost of construction, operation and maintenance of equipments, fish farming are still within the reach of average Nigerian. The exploitative tendencies of the existing numerous middlemen in the fish distributive trade has however made the market system very complex and extensive.

Fish farming activity in Nigeria started about 50years ago, with the establishment of small experimental farm about 20ha at Panyam in Plateau state by Federal government. This generated a lot of interest in fish farming with the involvement of other levels of government and some establishment. Longhurst (1961) reported that fish farming generates employment directly and indirectly in terms of people employed in production of fishing output and other allied businesses, it also generates income for all categories of people involve in fish farming and this contribute to the national income. When compared with livestock, it requires less space, time, money and a higher feed conserving rate. Out of 35grams of animal protein per day per person recommended by F A O, less than 7grams is consumed on the average (F A O, 1990). As a result of this, many Nigerians suffer from protein deficiency due to low protein intake.

In Africa, the most common culture species include cat fish, tilapia and carp. The major constraints to the fish farming were identified to be those of environmental impacts of aquaculture operations that is water pollution, inadequate supply of fingerling, inadequate information and feeds supply, (Splauding and Blasco 1997).

Niger state has a fair share of the vast fish farming resources which include dam, river and pond where fish farming activities take place. Despite those considerably high potentials, local fish

farming has failed to meet the country domestic demand (F.A.O, 1990). A sure means of substantially solving the demand-supply gap is by embarking on widespread homestead /small scale fish farming.

It was assumed that the two local governments selected produce fish in large quantity. According to Dike (1976), who stated that John Locke emphasized the role of the conducive environment and declare that no race or class is born with innate superiority but the difference is caused by the environment. If John is correct in his statement, it means that the local government is equipped with better qualities and materials resources that can perform better in fish farming. In line with this therefore, the researcher decided to conduct an economic study of small scale fish farming in Chanchaga and Bosso local government area.

Looking at the composition of fish, it is very necessary to preserve fish to avoid its wastage. Fish flesh contains most of the mineral necessary for balanced diet. Fish offers a valuable source of calcium and phosphorus. All the vitamin recognized for human nutrition is found in the fish. Fish oil is the richest known source of vitamin A and D, which help to prevent heart disease. These are the reason why, the researcher decided to conduct economic study of small scale fish farming in some selected local government area of Niger state.

Fish farm management according to Energ *et al.*, (1981) is concerned with the decision that affects the profitability of the business. These include setting goals, recognizing the problems and obtaining information. Bolade, (1990) emphasized the location preference of any given producer may be affected by transfer or transportation cost, unless his customers can absorb these cost as much as possible. Market structure measures the number and size distribution of existing competitors; it affects the conduct and ultimate performance of the market agent. The key element of market structure is the number of sellers and total share of a few large firms in the market. As the number of rivals decrease, industry profit increases (due to high price being charged) and draw nearer those found in monopolistic industries.

The fish marketing system operates through a set of intermediaries performing useful commercial functions in a chain formation all the way from the producer to the consumers Aida *et al.* (1995). The market structure may be analyzed in terms of the degree of concentration of sellers and buyers.

Commercial unit comprising of fish marketing system can be grouped into three categories namely: fish assemblers, fish whole-sellers and fish retailers. The fish assemblers obtain their supplies of fish directly from the fish farmers as they harvest. The whole-sellers who operates in small number in principal market usually obtain their supplies either from a market or when convenient directly from the producer at farm site. Fish retailers are those that directly sale to consumer. Retailing is the last level of transaction between producer and the consumer.

The objective of this research work is the economic study of small scale fish farming in Bosso and Chanchaga local government area of Niger state.

METHODOLOGY

Sampling procedures

A systematic random sampling was used to select two local governments in Niger state. The fish farmers in the study areas were identified purposively with the assistance of some extension

agents. Twenty-two (22) questionnaires were administered to pond owners in the two local government areas.

Method of data collection.

The data used for this study were mainly primary and secondary data. The primary data were collected from pond owners through interviews scheduled using questionnaires. Secondary data were information obtained from books, journals, collections and materials related to the study.

Method of data analysis

The tool employed in analyzing the data is farm budgeting techniques. A farm budget as defined by Olukosi and Erhabo (1988) is a detailed physical and financial plan for the operation of a farm for a certain period of time. Net farm income (NFI), profitability indices like and return to naira invested was also employed to explain the extent to which a naira invested in fishery contributes to NFI.

The farm budgeting model for estimating NFI is represented by the equation below.

$$NFI = GM - TFC$$

$$GM = GFI - TVC$$

Where NFI = net farm income

GM = Gross margin

TFC = Total fixed cost

GFI = Gross farm income

TVC = Total variable cost

RESULTS AND DISCUSSION

Age distribution of the Respondents

The age of the respondents play an important role in the distribution of famers operations. The table below shows the age distribution of respondents in the study area.

Table 1: Age Distribution of Farmers

Age group (yrs)	Frequency	Percentage	cumulative percent
15-30	2	9.1	9.1
31-46	13	59.1	68.2
Above 46	7	31.8	100.0
Total	22	100.0	

Source: Field survey, 2009.

The age distribution of the respondent shows that 9.1% of them fall within 15-30 years, a greater majority fall within the middle aged group of 31-46, making up 59.1%, and 31.8% fall between the ages of 46 and above.

Sex distribution of Respondents

Table 2: Sex Distribution of Respondents

Sex	frequency	percentage	Cumulative percent
Male	17	77.3	77.3
Female	5	22.7	100.0
Total	22	100.0	

Source: Field survey, 2009

Sex distribution is meant to find out the fraction of both the male and female respondent that was engaged in the production of fish in the study area. The result in table 2 shows that 77.3% of the respondent were male and 22.7% were female, indicating the fish rearing in the study area is majorly done by male, while female have not been left out either.

Marital status of Respondents

Table 3: Marital Status of Respondents.

Marital Status	Frequency	Percentage	Cumulative percent
Single	4	18.2	81.2
Married	18	81.8	100.0
Total	22	100.0	

Source: Field survey, 2009.

Marital status may determine availability of labour in traditional agricultural economy. The result shows that 18.2% of the respondents were single. A greater majority fell within married making up to 81.8%

Table 4: Family Size of Respondents.

Family Size	Frequency	Percentage	Cumulative percent
0	2	9.1	9.1
1-9	17	77.3	86.4
10-19	3	13.6	100.0
Total	22	100.0	

Source: Field Survey, 2009.

About 77.3%, 13.6% of the respondents had a household size of between 1-9 and 10-19 respectively, 9.1% of the respondents had no family. From the study, it was observed that the size of the families determined the labour supply on the farm as well as size of their plot.

Table 5: Educational level of Respondents

Level of Education	Frequency	Percentage	Cumulative percent
Quranic	2	9.1	9.1
Secondary	3	13.6	22
Tertiary	17	77.3	100.0
Total	22	100.0	

Source: Field Survey, 2009.

The distribution of respondents on the basis of their educational attainment shows that they all had one form of education or the other, 9.1% had quranic education, and 13.6% of them had secondary school education, while 77.3% had tertiary education.

It was observed that the educational level of the respondent determines to a great extent the quality of skills possessed their cognitive abilities as well as technical competence in adopting innovations as well as latest technologies.

Table 6: Major Occupation of Respondents	Occupation	Frequency	Percentage
Cumulative percent			
Fish farming	11	50.0	50.0
Civil servant	8	36.4	86.4
Trader	2	9.1	95.5
Student	1	4.5	100.5
Total	22	100.0	

Source field survey, 2009

Table 6 shows that, the majority of the respondent had fish farming as there major occupation which is 50%, 36.4% are civil servant while 9.1%, 4.5% are traders and student respectively.

Table 7: Rearing Pattern of Respondents

Rearing pattern	frequency	percentage	cumulative percent
Mono culture	18	81.8	81.8
Mixed culture	4	18.2	100.0
Total	22	100.0	

Source: field survey, 2009

There are different types of rearing system in the study area with farmer practicing both mono and mixed culture. Mono culture was however identified to be the dominant rearing pattern in the study area.

Table 7 shows that 81.8% of the respondent rear one species of fish, while 18.2% practiced mixed culture.

Table 8: Distribution According to Fish Species Reared

Species	frequency	percentage	cumulative percent
Catfish	18	81.8	81.8
Catfish/Tilapia	4	18.2	100.0
Total	22	100.0	

Source: Field survey, 2009

Various species of fish were found to be reared in the study area. About 81.8% of the respondents' rear catfish, 18.2% rear both catfish and tilapia. The table indicates that most respondents rear catfish and this was as a result of higher profitability in sales and consumers prefer catfish to tilapia.

Table 9: Distribution According to Source of Fingerlings

Source	frequency	percentage	cumulative percent
Buy	20	90.9	90.9
Hatch	2	9.1	100.0
Table	22	100.0	

Source: Field survey; 2009.

Table 9: shows that 90.9% of the respondent buy their fingerlings, while only 9.1% obtained their fingerling through hatching.

Table 10: Mode of Selling Cropped Fish

Mode of selling	frequency	percentage	cumulative percent
Weighing	21	95.5	90.0
Random pricing	1	4.5	100.0
Total	22	100.0	

Source field survey, 2009

The highest percentage of the respondents sell their fish product using weighing method which is about 95.5% while random pricing method is the least method accounted for 4.5

Table 11: Distribution According to Form of Selling Fish

Form of selling	frequency	percentage	cumulative percent
Fresh	20	90.9	90.0
Smoked	2	9.1	100.0
Total	22	100.0	

Source: field survey, 2009

The result shows that 90.9% of respondents sell their fish product in fresh form, while 9.1% of respondents sell in smoked form. The table indicates that most of the respondent sell their fish in fresh form and this was as a result of higher profitability in sales (Oniye and Adegboye 1980)

Table 12: Distribution According to Fish Buyers

Fish buyer	frequency	percentage	cumulative percent
Consumer	12	54.5	54.5
Middle man	3	13.6	68.2
All traders	7	31.8	100.0
Total	22	100.0	

Source: field survey, 2009

Table 12 explained that 54.5% of the respondent sell their fish product directly to consumers, 13.6%, 31.8% sell to middle man and traders respectively

Table 13: Stocking Capacity of the Respondents

Quantity	frequency	percentage	cumulative percent
1-1000	7	31.8	31.8
1001-2000	8	36.4	68.2
2001-3000	3	13.6	81.8
Above 3000	4	18.2	100.0
Total	22	100.0	

Source: field survey, 2009

The result in table 13 shows the quantity of fingerling stocked in a pond in the study area. Above 31.8% of the respondent stocked 1-1000 fingerlings, 36.4% and 13.6 stocked about 1001-2000 and 2001-3000 respectively, while 18.2% of them stocked 3000 and above.

Table 14: Distribution According to Table Size Output

Quantity produced	frequency	percentage	cumulative percent
Not producing	1	4.5	4.5
1-1000	8	36.4	40.9
1001-2000	5	22.7	63.6
2001-3000	5	22.7	86.4
Above 3000	3	13.6	100.0
Total	23	100.0 00	

Source: field survey, 2009

Table size is the adult fish produced after certain period of stocking which is due for selling.

Table 14 shows that 36.4% of the respondent produced 1-1000 fish per stocking period (6months), 22.7, 22.7% produced 1001-2000 and 2001-3000 respectively and 13.6% produce 300 and above while 4.5% are yet to produce table size fish due to the newly establishment of their farm.

Table 15: Distribution According to Source of Income

Source	frequency	percentage	cumulative percent
Fish farming	13	5	59.1
Poultry	1	4.5	63.6
Salary	8	36.4	100.0
Total	22	100.0	

Source: field survey, 2009

Table 15 shows that, the majority of respondents which accounted for 59.1% obtained their income from fish farming, 4.5, 36.4, obtained their income from poultry farming and salary respectively.

Source of capital

Table 16: Distribution According to Source of Capital

Source of capital	frequency	percentage	cumulative percent
Loan	3	13.6	13.6
Borrowing	1	4.5	18.2
Personal	18	81.8	100.0
Total	22	100.0	

Source: field source, 2009

Out of 22 pond owners and aqua culturist sampled; 18.8% save money personally as their source of capita, 13.6% obtained their capital through loan, while 4.5 borrowed money as their source of capital.

Problems of Fish Production Encountered by Respondents

Problems are challenges or difficulties that need attention and consideration (long man dictionary). They reflect the factors affecting the level of production. The problems of fish production are given bellow.

Table 17: Factor Affecting Fish Production

Factors	frequency	percentage	cumulative percent
Loss of fingerlings during transportation	9	40.9	40.9
Dead of stocked fish	5	22.7	63.6
Stunted growth of fish	7	31.8	95.5
Inadequate water and high cost of feed	1	4.5	100.0
Total	22	100.0	

Source: field survey, 2009

Table 17 shows that 40.9% of the sampled fish farmers in the study area encountered problem of loss of fingerlings, 22.7%, 31.8% encountered the problem of dead of stocked fish and stunted growth of fish respectively in the process of production and, 4.5% had water problem.

COST AND RETURN ANALYSIS

This measures the rate of return of setting up of fish farm. The cost and return analysis is given in the table below.

Table 18: Cost and Return per Stocking Period (6months)

Variable cost	per 6 months	% of the total cost
Feed	250240.48	60.97
Fingerlings	61693.18	15.03
Fertilizer	722.50	0.18
Lime	3333.33	0.81
Labour	14250.00	3.47
Transportation	44733.33	10.87
Total variable cost (TVC)	374972.82	91.35
Fixed cost (Depreciation)		
Pond	27982.04	6.82
Pumping machine	4492.04	1.09
Water tank	2872.65	0.69
Aerator	140.82	0.03

Total fixed cost (TFC)	35487.55	8.63
Total cost (TVC+TFC)	410460.37	100.00
Returns		
Income from sales of adult fish (GI)	252793400.0	
Gross margin (GI-TVC)	252755902.7	
Net farm income (GM-TFC)	252752353.9	

Source: field survey, 2009

It was observed in the course of study that the age distribution of the respondents shows that the greater majority of them fall within the middle aged group of 31-46years given 59.1%. This implies that majority are within the active productive age, it is at this age those individuals are more active and energetic in performing the tasks from observation and oral interview, the fish farming in the study area majorly done by male, while the female have not been left out either, though the percentage of the male is greater than that of female.

Table 3 shows that 18.2% of the respondents were single while a greater majority is married with 81.2%. This is similar to the finding of Okpenefe (1982) that the marital status may determine availability of labour in traditional agricultural economics. Also in table 4, it was also observed that the size of some families determine labour supply on the farm as well as the size of their plot.

The result obtain in table 5 reveal that, all the respondents had one form of education or the other, but the majority had tertiary education which accounted for 77.3%. This is in line with Adeniyi (1983) that the educational level of respondents determine to a great extend the quality of skills possessed by their cognitive ability, technical competence in adopting innovation as well as latest technology and to the opinion of Eyo and Ita (1990) which viewed formal education as an important factor in the performance and management of fish marketing and fisheries sector in general. Most of the respondents reared cat fish in the study area and this as a result of higher profitability in sales and consumer prefer cat fish to other fish such as tilapia. It was also observed that most of the respondents practice mono culture. The reason for this is the attractiveness to consumer adaptability (Oniye and Adegboye 1980).

There are inadequate hatcheries in the state to observe her growing population couple with the unreliable source of the wild and the activity of the local fisher men (harvesting method) as shown in the table 9. This has equally accounted for the low level of protein by people in view of ever increasing cost of protein from animal origin. About 40% of animal protein consumed in the country is derived from fish (Nigeria 1980). The highest percentage of respondents sell their fish product using weighing method and in fresh from directly to the consumer. This may be as a result of higher profitability in sales, less labour cost and the risk of reducing their profit by going in to processing method before selling.

The total variable cost, total fixed cost and the overall (total) cost were; N374,972.82, N35,487.55 and N410,460.37 respectively. The gross income generated from the output amounted to N252,793,400.00

Fish production is therefore profitable in the study area only that the level of profitability is minimized by some problems encountered in the study area e.g. low status of fish preservation, erratic power supply, inadequate feed supply, inadequate hatchery etc. Therefore there is a need to find a way of providing necessary facilities needed for fish farming.

CONCLUSION

The result of the study shows that the fish production is profitable in the study area, and this can contribute to the growth of Nigeria economy, however, the various problem confronting fish farming (i.e. water problem, high cost of feed, lack of capital etc) need to be tackled to ensure greater production of fish.

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