FISH FARMING: A SOURCE OF INCOME IN SELECTED LOCAL GOVERNMENT AREAS IN NIGER STATE, NIGERIA.

Ibrahim F.D., Oseghale A.I., Jirgi A.J. and Ogaji A.

Department of Agricultural Economics and Extension Technology, Federal University of Technology Minna

Corresponding author's e-mail/Phone Number: **itodine@yahoo.com/** **08033641643**

Abstract

The study examined the fish farming enterprise as a source of income in selected local government area in Niger State, Nigeria. Data for the study was collected through the use of questionnaire from 226 randomly selected fish farmers. Data collected was analysed using descriptive statistics, budgetary techniques and multiple regression analysis. The results revealed that fish farming was carried out predominantly by males who are 42 years of age on the average. The NFI was N12255, while the BCR and RORI were 1.83 and 0.83 respectively an indication that fish farming was a profitable venture. In addition, the study revealed that cost of feed, cost of fingerlings, household size, and years spent schooling and farming experience were the factors that influenced revenue as they were significant at 5%. Based on the findings, the study concludes that fish farming is a profitable enterprise and it has a potential because it contributes to the household income. The study therefore recommends that young unemployed persons in the study area should be encouraged to start up fish farming enterprise and the government should help to subsidize the cost of feed so as to help fish farmers maximize their revenue.

Keywords: Fish, NFI, BCR, RORI, Income, Farming

Introduction

Fish farming is one of the oldest income generating activity Christopher *et al.,* (2003) and the potential of fish farming to contribute to domestic fish production has continued to increase in the country since there is a need to meet the much needed fish for domestic production and export (Adewuyi *et al.,* 2010). There is a great demand for fish in Nigeria as fish constitutes about 41% of the total animal protein intake. About 2.6million metric tonnes of fish is needed in order to meet the dietary requirement of Nigeria's ever growing population. In terms of its contribution to the Gross Domestic Product (GDP), the fishery sub-sector contributed about 76.8million in 2001 and 162.61billion in 2005(Central Bank of Nigeria (CBN, 2005). Furthermore, fish farming provides 6 and 9million full and part time jobs for the Nigeria populace because it is the primary and sometimes only source of livelihood for its populace.

Nigeria has a coastline of about 3122km with about 1.75million hectares suitable for fish farming and she is one of the countries in sub-Saharan Africa with great potential to attain sustainable fish production via fish farming considering the mangrove ecosystem available in the country (Food and Agricultural Organization (FAO, 2005). However, Nigeria is one of the largest importers of fish among the developing countries (FMARD, 2011). Nigerians are large consumers of fish with demand estimate of

1.4 million metric tonnes and domestic supply of 400000 tonnes. Hence, a demand supply gap of about 0.7 million metric tons exists nationally with import making up the short fall (Kudi *et al.,* 2008). FAO (2011) reported that about 580000 tonnes of fish valued at about 400million US dollars is imported annually while Nigeria produces 400000tonnes domestically.

The interest for fish farming has increased rapidly over the years as a result of the awareness of the importance of this practice to individuals and the economy at large, as well as the advantage attached to it. More so, government and the private sectors have shown interest in the fish farming sector yet, the gap between the demand of fish in Nigeria and the supply of fish from domestic production have been increasing and even the importation (FAO, 2010). Therefore there is a need to create an awareness on the potential of fish farming as a source of income so as to attract more producers to the industry in order to bridge the gap between demand and supply. On this note, the objectives of this study were to identify the type of fish cultured, determine the cost and returns of fish farming and to determine the factors affecting revenue obtained from fish farming.

Methodology
Study Area.
The study was conducted in Niger state. It is located between latitude $8^021^'N$ and longitude $3^030E^'$ with a land area of about 86000sqkm and a population of about 3.9 million. The annual rainfall ranges from 1100mm in the northern part to 1600mm in the southern part while temperature ranges from 23^0C to 37^0C with a relative humidity of 40%.

Sampling Technique and Method of Data Collection
Multi-staged sampling technique was adopted for the study. In the first stage, agricultural zones 2 and 3 were selected out of the 3 zones in Niger state. In the second stage 2 LGAs were purposively selected from each of the zones, making a total of 4 LGAs. The third stage was a random selection of 4 communities from each LGA and in the last stage 226 fish farmers were randomly selected. Primary data was collected with the aid of a structured questionnaire in addition to an interview schedule. The data collected included information on the fish farmers' socio-economic characteristics, system of fish farming and also cost and returns associated with fish farming.

Method of Data Analysis

Descriptive statistic, budgetary techniques and multiply regression analysis were used for the study. Descriptive statistics was used to describe the socio-economic characteristics of the fish farmers as well as the type of fish farming practiced.

Budgetary Techniques

Net Farm Income (NFI)

NFI was used to estimate the cost and returns associated with fish farming and it is stated as;

$NFI = GM - TFC$.

Where;

GM= TR-TVC and GM= Gross Margin, TFC= Total Fixed Cost, TR= Total Revenue and TVC= Total Variable Cost

Profitability Ratios:

Benefit-Cost Ratio (BCR): $BCR = TR/TC$

TC= Total Cost

Rate of Returns on Investment (RORI): $RORI = NR/TC$

NR= Net Return

Decision Rule

If BCR > 0 = Profit, BCR< 0 = Loss and BCR =0 the fish industry will be said to be breaking even.

Regression Analysis

Multiple regression analysis was used to determine the factors that influenced revenue obtained by the fish farmers from fish farming and the model is as specified below;

$$\ln Y_i = \beta_0 + \beta_1 lnx_1 + \beta_2 lnx_2 + \beta_3 lnx_3 + \beta_4 lnx_4 + \beta_5 lnx_5 + \beta_6 lnx_6 + \beta_7 lnx_7 + \beta_8 lnx_8 + e_i$$

Where;

Y_i is revenue (₦), X_1 = cost of feeds (₦), X_2 = cost of fingerlings (₦), X_3 = cost of labour (₦), X_4 = age (years), X_5 = household size (number of persons), X_6 = level of education (years), X_7 = farming experience (years) X_8 = pond size (m²), X_9 = water source (1=wetland and 0 otherwise), ei= error term that is assumed to be normally distributed with a mean of 0 and a constant variance.

Results and Discussions

The socio economic characteristics of the respondents is as shown on table 1. The mean age of the respondents was 42 years although some (9.3% and 2.7%) the farmers were less than 30 and above 61 years respectively. This is an indication that fish farming is one income generating activity that can be carried out by both the young and old. Also, most (44.7%) had household size ranging from 1- 5 persons with a mean of persons. In addition, majority (60.6%) of the fish farmers have had tertiary education. This implies that fish farming has become a source of livelihood to the unemployed graduates in the study area and this could be because fish farming is not as tedious as crop farming even though it involves a lot of technicalities and it requires scientific knowledge for it to be successfully undertaken. More so, household members could be involved in the daily activities of the farm hence the advantage of having a large household. This findings collaborates the findings of Olaoye *et al.,* (2013) who reported that fish farming was done mainly by males who have had tertiary education. The table 1 also revealed that fish farming is predominantly carried out by males (78.8%) in the study area and most of the fish farmers have had 6-10 years fish farming experience. Hence, they should be able to conform to modern day fish farming techniques.

Table 2 shows the fish cultured and the type of fish culture practiced. 94.7% of the respondents in the study area cultured clarias and tilapia while the remaining 5.3% cultured clarias. This study depicts that the environment favours the rearing of this two species. In addition, table 2 revealed that majority (81.0%) of the respondents practiced polyculture which is the act of rearing more than one species of fish.

Table 1: Distribution of respondents by socio-economic characteristics

Variables	Frequency	Percentage (%)
Age		
Less than 30	21	9.3
31-40	74	32.7
41-50	98	43.4
51-60	27	11.9
61 and above	6	2.7
Mean	**42**	
Household Size		
1-5	101	44.7
6-10	82	36.3
11-15	34	15.0
16-20	7	3.1
21 and above	2	0.9
Mean	**6**	
Gender		
male	178	78.8
female	48	21.2
Educational Level		
No Formal Education	23	10.2
Primary	9	4.0
Secondary	57	25.2
Tertiary	137	60.6
Farming Experience		
1-5	87	38.5
6-10	104	46.0
11-15	29	12.8
16 and above	6	2.7
Mean	**7**	

Source: Data from Field Survey, 2015

Table 2: Distribution of respondents by fish cultured and type of culture practiced

Variables	Frequency	Percentage (%)
Fish Culture		
Clarias	12	5.3
Clarias and Tilapia	214	94.7
Type of Culture		
Polyculture	184	81.4
Integrated	42	18.4

Source: Data from Field Survey, 2015

Table 3 shows the quantity of fish cultured, mortality and survived fish in the study area. As shown 40.7% of the respondents bought fingerlings ranging from 601-700 fingerlings. However, about 21-30 (44.2%) of fingerlings died before the age of maturity while about 39.8% of fingerlings in the study area survived to maturity age.

Table 3: Distribution of respondents by quantity of fish cultured, mortality and survived fish

Variables	Frequency	Percentage
Quantity Purshased		
Less than 500	19	8.4
501-600	31	13.7
601-700	92	40.7
701-800	78	34.5
801 and above	6	2.7
Mortality		
Less than 10	15	6.6
11-20	69	30.5
21-30	100	44.2
31-40	32	14.2
41 and above	10	4.4
Survived Culture fish		
Less than 500	19	8.4
501-600	33	14.6
601-700	90	39.8
701-800	78	34.5
801 and above	6	2.7

Source: Data from Field Survey, 2015

The implication is that the mortality rate was minimal maybe due to proper management practices.

In a production system, costs are incurred in the production of output and income are also generated from the sales of the output produced. As summarized in table 4, the income obtained from the sales of fish was 268815.93NGN. However, an average of 14726.13NGN was expended for the production of the fish. Cost of building was the highest followed by cost of pumping machine and fingerlings. It is interesting to note that labour cost was just about 2.4% of the total cost. This is an indication that fish farming is not so labour intensive. Hence it is a good venture that can be carried out with the aid of household members. Furthermore, table 4 revealed that fish farming enterprise is a profitable one because the BCR was greater than 1 (1.83). Also, the results of the RORI further helped to reiterate the profitability of fish farming as it indicated that for every 1NGN invested the fish farmers gets 83K as returns. This findings is similar to Olaoye *et al.,* (2013) and Adewuyi *et al.,* (2010) who reported that fish farming was profitable with a RORI score of 0.69 and 0.55 respectively.

Table 4: summary of budgetary results

Variables	Average amount	Percentage
TR	**269815.93**	
Variable Cost		
Cost of fingerlings	13256.42	9.00
Cost of lime	359.07	0.24
Labour cost	3514.60	2.39
Transportation cost	1905.40	1.29
Cost of power	2572.12	1.75
TVC	**21607.61**	
GM	**248208.32**	
Fixed Cost		
Cost of water pump	13527.73	9.19
Cost of plumbing materials	1791.31	1.22
Cost of building	96794.91	65.73
Other cost	4592.51	3.12
Depreciation	7854.37	5.33
TFC	**125656.52**	
TC	**147264.13**	
NFI	**122551.80**	
BCR	**1.83**	
RORI	**0.83**	

Source: Data from Field Survey, 2015

The result of the regression analysis is as shown on table 4. The result showed that cost of feed, cost of fingerlings, household size, age and years spent in school, farming experience were the significant factors that influenced revenue. As shown, the higher the amount expended in the purchase of fingerlings the higher the revenue obtained at the end of the production. The reason being that the higher the number of fingerlings used in the production, the more the output which further translates into higher revenue for the farmer. This is in line with Adewuyi *et al.,* (2010) who opined that the output of a fish farmer is determined by the quantity and quality of fish used.

Similarly, household size, had positive influence on fish farming revenue. Implying that the higher the number of persons in a household the higher the revenue. The reason is not farfetched because fish farming although not tedious requires attention and proper management. Therefore, the contribution of the household members goes a long way in aiding proper management. In the same vein, years spent schooling and fish farming experience had positive relationship with revenue. This is however not surprising because fish farming requires technical knowledge and both education and experience enhances the ability to understand and utilize technology which in turn increases the level of output. Furthermore, cost of feeding and age had negative effect on revenue as they were statistically significant at 1% and 5% respectively. The implication is that higher feed cost exerts a downward pressure on expected returns. The inverse relation could be explained in relation to the high cost of fish feed which is a major problem in fish production. Therefore, farmers sought different feeds in order to minimize the cost of feeds. Consequently, farmers feed their fishes feed that are of low quality and unbalance and therefore, they harvest small fishes which attracts low prices.

Table 4: Determinants of fish farming revenue

Explanatory Variables	Coefficients	t- values
Constant	11.670***	15.83
Cost of feed	-1.496***	-20.08
Cost of fingerlings	1.968***	39.45
Labour cost	0.019	0.60
Age	-0.113**	-2.65
Household	0.053***	3.82
Years of schooling	0.044***	3.17
Farming experience	0.092***	4.27
Pond size	-0.037	-1.44
Water source	-0.034	-1.09
R^2	0.8892	
Adjusted R^2	0.8846	

Source: Data from Field Survey, 2015

Conclusion and Recommendation

The study examined the fish farming enterprise as a source of income in selected local government area in Niger State, Nigeria. Based on the findings, the study concludes that fish farming is a profitable enterprise and it has a potential because it contributes to the household income. The study therefore recommends that young unemployed persons in the study area should be encouraged to start up fish farming enterprise and the government should help to subsidize the cost of feed so as to help fish farmers maximize their revenue.

References

Adewuyi S.A., Phillip B.B., Ayinde I.A. & Akerele D. (2010): Analysis of Profitability of Fish Farming in Ogun State, Nigeria. *J Hum Ecol, 31(3): 179-184*

Central Bank of Nigeria (2005): Statistical Bulletin 264-267

Christopher, L.B., Delgado, W., Mark, W.R., Siet, M. & Mahfuzuddin A. (2003). Fish to 2020: Supply and Demand in Changing Global Markets. International Food Policy Research Institute and World Fish Center. Library of Congress Catlaoging Publication Data 1(30): 10-20

FAO (2005): Small Scale Aquaculture in Sub-Saharan Africa. Revisiting the Aquaculture Target Group Paradigm. Retrieved from www.fao.org. Date assessed 11th June, 2015.

FAO (2010). Fishery and aquaculture country profiles. Uganda. Fishery and aquaculture country profiles.

Federal Ministry of Agriculture and Rural Development (2011): Agricultural Transformation Agenda Document Pg 92.

Kudi T.M., Bako F.P &Atala T.K. (2008): Economics of Fish Production in Kaduna State, Nigeria. *Journal of Agriculture and Biological Science. 6(5&6): 17-21*

Olaoye, O. J, Ashley-Dejo, S. S, Fakoya, E. O, Ikeweinwe, N. B, Alegbeleye, W. O, Ashaolu, F.O & Adelaja, O. A. (2013): Assessment of Socio-Economic Analysis of Fish Farming in Oyo State, Nigeria .*Global Journal of Science Frontier Research Agriculture and Veterinary 13(9):44-55*