# FISH FARMING IN AN EMERGING ECONOMY: A CASE STUDY OF NORTH CENTRAL, NIGERIA

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## ABSTRACT

*Fish farming is not merely an aspect of agriculture but that which provides the most widespread and the fastest growing animal food with no cultural and religious belief that place a taboo on its consumption, thereby constitute a great contributory factor to reduction in global food insecurity and unemployment. Hence, this study investigated the profitability of fish farming in the study area. A total of 120 fish farmers were randomly selected and interviewed using structured questionnaire. Data collected was subjected to descriptive statistics and Cost/Returns Analysis. Capture fisheries is the most popular form of fish farming in the area with men (70.00%) dominating the fishery activities. The annual income of farmers in the area fell within the range of ₦51000 ₦100000/year. The findings also revealed that a Total Cost of N1, 581,784 was incurred in the enterprise while Total Revenue of ₦2, 582,616.00/year was realized. Return per Naira invested was found to be ₦1.63 with a Net Return of 1,000,832/year and a Gross Margin was ₦3, 855,400 and the Gross Ratio was 0.61 (less than one). All these are indicators of a profitable enterprise, therefore there is need to exploit the entrepreneurial development potentials that fish farming avails taking into cognizance the reduction of the constraints to fish farming in the study area.*

**Key Words:** Fish farming, production, marketing, economy.

## INTRODUCTION

One of the activities involved in agriculture is fish farming. Fish farming is becoming increasingly popular in Nigeria and it plays a significant role in augmenting protein supply, providing employment for large number of people both in urban and rural areas. One of the numerous sectors that can contribute to reduce food insecurity is aquaculture. It is the world's fastest growing source of animal food, outpacing terrestrial meat production and the capture fisheries (FAO, 1991). Fish processing and marketing in Nigeria enjoy wide spread acceptability, since no religious or cultural belief place any taboo against it (Ala, 2002)

With the exception of clothing and shelter as the basic necessities of life, food remains the most vital because of its importance to human existence (Mohammed, 2009). Increase in population worldwide has necessitated the increase in food production. Nigeria as country is not only experiencing increase in population like other parts of the world but rapid increase which is similar to what is obtainable in many developing countries. As a result of the conflicting geometric growth in population with the arithmetic growth in food production, the prices of basic food items have gone up by at least 50%, and in some scenarios, above 100% because the human and material resources available were not fully utilized (Annon, 2008). It is obvious that there is need to diversify the economy for employment generation and wealth creation; since overdependence on oil, heavy importation of foods (both raw and processed forms) and white collar jobs that are farfetched, can no longer sustain the economy (Akoroda,

2009). The various macroeconomic reforms put in place have not produced the expected results. Hence, there is the need to develop the small scale industries that could have a meaningful contribution to the growth and sustainability of the nation's economy.

The price of fish may rise beyond the reach of the rural poor and even some segments of the population. Likewise, the prices of alternative meat protein source are soaring, coupled with dwindling nature of harvest from capture fisheries (Kanga, 2009). One major area of concern is the increase in demand in both restaurants and markets. Subsistence fish farming involves digging seasonal ponds in the well developed fresh water flood plains and swamps to retain fish at the recession of the flood. Fish farming should be confined to coastline and cities near the major rivers and lake (Ozo, 2008).

Repeated decline in captured fisheries and aquaculture production reflects inadequate controlled exploitation of target species including illegal unreported and unregulated fishing. Also, damage to non-targeted organisms, impact on fish habitats by inappropriate fishing gears and techniques with other varieties of externalities such as coastal development, regulation of rivers, urban and agricultural run-off and global warming are the many problems of capture fisheries (Bolorunduro, 2000).

Post harvest problems especially that of marketing of agricultural commodities are one of the major problems farmers face in the enterprise of agriculture. This involves the collection, processing and transportation of fish products from farms in remote areas to the major centres. At the retail end, fishes are left to decompose due to lack of proper storage facilities and this loss is estimated to be between 20% and 60% of the total fish produced annually; depending on the season and location (Ruben, 2000). Nigeria has potential to expand its fisheries if properly managed. The nation's annual yield is estimated to be 1, 830,994 m-tons in the 90s (Adeokun, 2005). The most important task ahead of the country is to increase and improve the fishery industry in order to complement the protein requirement in the Nigerians diet and also begin to think inwardly on how to export fishes and other aquatic foods instead of living on importation of fishes and other sea foods.

The broad objective of this study is to assess the profitability of fish farming in Idah Local Government Area of Kogi State. However, the specific objectives are to examine the socio-economic characteristics of fish farmers in the study area, determine the level of income of the farmers, investigate other supportive occupation apart from fish farming, and to identify the major constraints to fish farming in the area and make workable recommendations.

## METHODOLOGY

The study area is Idah Local Government Area of Kogi State. It lies within the latitude $7^{0}5^{1}$ North and longitude $5^{0}45^{1}$ East. It has two seasons (that is the wet and dry seasons). The average rainfall is about fifty inches per annum. It occupies about 150 square kilometers and has a total population of about 79,815 according to 2006 Population Census. It has a gradually undulating low land. The Local Government Area is divided into three main districts, namely, Idah main town, Ega and Edeke. The soil is mostly clayey but sandy in some areas. Three prominent rivers are found in the area; they are the Niger, Ocheche and Ofiae respectively.

The fish farmers are mainly situated around the rivers Niger, Ocheche and Ofiae. Apart from fish farming, most residents are subsistence farmers growing crops such as yam Coco yam, maize, millet, sorghum, rice, cassava, water leaf, and spinach. A lesser percentage of the residents are into white-collar-job.

Structured questionnaire was administered while oral interview complemented the questionnaire. Information on the socio-economic characteristics of the Fish farmers were investigated, method of farming,

harvesting, processing, transportation system, storage, sales and profitability potentials were solicited from the respondents. A total of 120 marketers were selected from a population of 340 through stratified random sampling. First stage, 80 persons each were selected from 3 districts of the study area; after which 40 respondents were randomly selected from each of the 3 districts which brings it to a total of 120 respondents.

In this study, descriptive statistics such as means, frequency, range and percentage (%) were used. Cost/return analysis was used to determine profitability of fish farming. The various steps and formulae involved in cost/return analysis are given in equations (1) (6) below:

$$TC = TVC + TFC \quad (1)$$

$$TR = Q \times P \quad (2)$$

$$NR = TR - TC \quad (3)$$

$$GM = TR - TVC \quad (4)$$

$$\text{Return/Capital Invested} = TR/TC \quad (5)$$

$$GR = TC/TR \quad (6)$$

Where, TC = Total Cost, TVC = Total Variable Cost, TFC = Total Fixed Cost, Q = Quantity of fish sold, TR = Total Revenue, P = Prevailing Market Price, AR = Average Revenue, GR = Gross Ratio, NR = Net Return, GM = Gross Margin

Depreciation = cost of item salvage value / Lifespan (Straight line Method)

## RESULTS AND DISCUSSIONS

Table 1 shows the socio-economic characteristics of the farmers. Age distribution revealed that most of the farmers (69.00%) fell within their working and enterprising age (30 39 years). Fish farming in the area is a male dominated business of which 70.00% were male while only 30.00% of them were female. This is because of the stress and laborious nature of the fishery activities. Apart from fish farming as their major occupation, some of them also engaged themselves in some supportive businesses which include civil service (12.50%), crop production (46.67%), Trading (37.50%) and artisanship (3.33%). Their income level was also investigated and the analysis showed that most of the farmers (55.83%) fell within the range of (N51000 - N100000)/annum.

**Table 1: Socio-economic Characteristics of the Respondents**

| Variables | Frequency | Percentage |
|---|---|---|
| **Age** | | |
| 20 – 29 | 20 | 16.67 |
| 30 – 39 | 70 | 58.33 |
| 40 – 49 | 26 | 21.67 |
| 50 and above | 4 | 3.33 |
| **Total** | 120 | 100 |
| | | |
| **Gender** | | |
| Male | 84 | 70.00 |
| Female | 36 | 30.00 |
| **Total** | **120** | **100** |
| | | |
| **Educational Background** | | |
| Non-Formal | 38 | 31.67 |
| Primary | 54 | 45.00 |
| Secondary | 19 | 15.83 |
| Tertiary | 9 | 7.50 |
| **Total** | **120** | **100** |

**Table 1 Contd.**

| Variables | Frequency | Percentage |
|---|---|---|
| **Supportive Occupation** | | |
| Civil Service | 15 | 12.50 |
| Crop Production | 56 | 46.67 |
| Trading | 45 | 37.50 |
| Artisan | 4 | 3.33 |
| **Total** | **120** | **100** |
| | | |
| **Farming Experience** | | |
| 1 – 5 | 50 | 41.67 |
| 6 – 10 | 45 | 37.50 |
| 11 – 15 | 10 | 8.33 |
| 16 – 20 | 9 | 7.50 |
| 21 and above | 6 | 5.00 |
| **Total** | **120** | **100** |
| | | |
| **Income Level** | | |
| 10000 – 50000 | 30 | 25.00 |
| 51000 – 100000 | 67 | 55.83 |
| 101000 – 200000 | 23 | 19.17 |
| **Total** | **120** | **100** |

**Source: Field Survey, 2010**

Table 2 shows the cost component of fish farming in the area. The fixed costs considered in this study include: cost of canoe (₦1,136,600.00), Fishing Gears (₦3,788,66.67) and earth moving machine (₦757,733.33). The Total Fixed Cost was N2,273,200.00k with annual Depreciation of ₦272,784.00 and the total Variables Cost was N1309000.00k/year and the Total Cost incurred was ₦1581784.00/year.

**Table 2: Costs Component of Fish Farming in the Area.**

| Cost Component | Value (₦)/year |
|---|---|
| **Variable Costs (VC)** | |
| Fingerlings | 654,500 |
| Feeds | 327,250 |
| Labour | 150,000 |
| Transportation | 177,250 |
| **Total Variable Cost (TVC)** | **1,309,000** |
| **Depreciation on Fixed Costs** | **272,784** |
| **Total cost (TC)** | **1,581,784** |

**Source:** Field Survey, 2010

Table 3 shows the return component of fish farming where the Total Revenue realized was ₦2582616.00/annum and the Gross margin was N1,273,616.00 with Net Return of ₦1,000,832.00/annum. Return per Naira Invested was found to be N1.63 and a Gross Ratio of 0.69 (less than one) which all signified that fish farming in the area was highly profitable. This result agrees with Adejoh et al (2009) who in their research on indigenous fish processing, ascertained that fish farming is a profitable venture to be given priority attention.

**Table3: Returns Component of Fish Farming**

| Return Component | Value (₦)/year |
|---|---|
| Total Revenue (TR) | 2582616 |
| Net Return (NR) | 1,000,832 |
| Gross Margin (GM) | 1,273,616 |
| Gross Ratio (GR) | 0.61 |
| Return Per Naira Invested | 1.63 |

**Source: Field Survey, 201**

However, the enterprise was not devoid of problems. Table 4 shows the major constraints to fish farming in the area and they include: inadequate storage facilities (98.3%), low income from sales (93.3%), inefficient extension service (75.8%), lack of social amenities (88.3%) and lack of managerial skills (82.5%) respectively as responded by the farmers. Bolorunduro (1993) also highlighted on some of these challenges especially that of inefficient extension services and lack of managerial skills as factors influencing the adoption of fish processing and preservation technologies.

**Table 4: Constraints to Fish Farming in the Study Area**

| Constraints | Frequency | Percentage |
|---|---|---|
| Inadequate storage facilities | 118 | 98.33 |
| Low income from sales | 112 | 93.33 |
| Inefficient extension services | 91 | 75.83 |
| Lack of social amenities | 106 | 88.33 |
| Lack of effective management skills | 99 | 82.50 |

**Source: Field Survey, 2010**
Note: Multiple responses

## CONCLUSION AND RECOMMENDATIONS

The findings from this study have confirmed that Fish farming to be economically successful if well managed. It is obvious that fishery is a profitable enterprise. Though, fish farming has some peculiar problems that hinder its productive efficiency as mentioned in this study. The following recommendations could go a long way to improving the efficient production and marketing of fishes:

1. Reduction to the barest minimum of post harvest losses of fish through the application of effective and efficient processing methods, development of effective fish marketing and distribution system especially in the rural areas.
2. Government should subsidize the prices of fishing equipment and fishery inputs to make fish production more affordable for small scale farmers. Examples are storage facilities, transportation through good road network and electricity.
3. Workshops and seminars should be organized by both private and public stake holders of fish farming in order to train fish farmers on how to manage their farms.
4. Extension service delivery on fish farming should be intensified where it exists and service should be made available where there is none, so as to boost the level of awareness in improving fish farming in the area.
5. A strict measure or laws should be put in place in order to dissuade farmers from using harmful chemicals in harvesting their fishes because such chemicals pollute the water bodies and cause harm to both human and aquatic organisms

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