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# COST AND RETURNS ANALYSIS OF SMALL-SCALE CAT FISH FARMING IN ISOKO NORTH LOCAL GOVERNMENT AREA, DELTA STATE, NIGERIA

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**ABSTRACT:** *The main objectives of the study was to estimate the cost and returns of small – scale cat fish farming in the study area. Data obtained with the aid of structural questionnaires were analyzed using descriptive statistics to describe the socio-economics characteristics of respondents and gross margins analysis model was used in estimation of cost and returns of small scale cat fish farming. Multi-stage sampling techniques were used in the random selection of small-scale cat fish farmers in the area of study. Small-scale cat fish farming is done on part-time basis and most respondents were in their productive mean age of 41 years with secondary level of education. Most households were headed by male and married households with average household size of 10 persons. Respondents have a gross margin and business net returns of ₦174,000 and ₦119,400 respectively, signifying that small-scale fish farming is profitable. The benefit cost ratio was 1.34 signifies that for every one naira invested, a profit of 34k (₦0.34) was realized from its sales. The study recommends that Government should enact policies that will subsidized cat fish farmers' inputs at affordable rate. It also recommends that fish farmers' awareness campaign should be carried out.*

**KEYWORDS**: Cat fish, small-scale, cost and returns, farming

## INTRODUCTION

The practice of rearing, raising, producing or growing fish in a water managed system (pond) is called fish farming or aquaculture. The world's fastest growing food production sub-sector, increasing at a yearly rate of about 8.9% since 1970 is fish farming (World Fish Center, 2009). Fish is a vital source of income for many developing countries in which Nigeria is one (Williams *et al.,* 2010). Apart from animal source of protein other usefulness of fish includes employment generation, poverty reduction and saving foreign exchange by stimulating local production at various rural areas (Yunusa and Maidala, 2008).

The cheapest source of animal protein in Nigeria consumes is fish (FDF, 2009). Alexanderatos (2000), reported that "fish is a high quality protein rich in micronutrients that are not present in staple foods". Fish is superior to other sources of animal protein as it contains most of the essential amino acid particularly leucine, lysine, tryptophan and methionine, hence fish protein is regarded as first class protein (Ekelemu *et al.,* 2000).

Fish farming is a profitable enterprise and it is rapidly expanding and it will continue to be viable if its management and planning are well implemented (Runfu *et al.,* 2009).

Adewunmi (2006) reported that Nigeria is a protein deficient nation. Central bank of Nigeria (CBN, 2006) put the current fish demand in Nigeria at about 1.5 million metric tons per annual and the current domestic output at about 600,000 metric tons per annual thereby creating a gap of 899,400 metric tons. There existed a gap between demand and supply of fish in Nigeria that needed urgent attention.

**Objectives of the Study**

Objectives of the study is to:

i. Examine the socio-economic characteristics of respondents
ii. Determine small-scale cat fish revenue
iii. Ascertain the cost of production of small – scale cat fish
iv. Estimate the cost and returns of small-scale cat fish farming in the study area.

## METHODOLOGY

**Area of Study**

The Area of study was Isoko North Local Government Area, Delta State, Nigeria. According to NPC, 2006, the area has an average population of 143,559 persons with nine clans and 50 communities. The area experience two climatic seasons' namely dry and wet seasons with a land mass of about 479 square kilometers (National Bureau of Statistics, 2007). The main occupation of the area is agriculture ranging from crops, livestock and fish production. The area has a lot of tributaries that derives their sources from the Niger River and located in tropical rainforest of Niger-Delta Region of Nigeria that is rich in mineral resources (crude oil) but the incidence of poverty is high.

***Material and Methods***

Multi-stage sampling procedure was used in random selection of 45 small –scale cat fish farmers. Firstly, five clans were randomly selected from the nine clans present in the study area. Secondly, three communities each were randomly selected from the five clans giving a total of 15 communities. Thirdly three small-scale fish farmers each were purposely selected from the 15 communities giving a total of 45 small-scale cat fish farmers.

Data analysis were achieved using Descriptive Statistics such as Mean, Mode and Percentages to describe the small-scale cat fish socio-economics characteristics. Gross Margin Analysis model were used in the estimation of costs and returns of small-scale cat fish farming.

***Specification of Model***

$GM_f = TR_f - TVC_f$ …… i

$TC_f = TVC_f + TFC_f$ ……ii

$NR_f = GM_f - TFC_f$ ……iii

$BCR_f = {}^{TR_f}\big/_{TC_f}$

Where:

$GM_f$ = Gross margin of small – scale cat fish farming

$TVC_f$ = Total variables cost of small – scale cat fish farming

$TC_f$ = Total cost of small – scale cat fish farming

$TFC_f$ = Total fixed cost of small – scale cat fish farming
$NR_f$ = Net Returns of small – scale cat fish production
$BCR_f$ = Benefit cost ratio of small – scale cat fish farming

## DISCUSSION OF RESULTS

**Table 1: Socio-Economics Characteristics of Cat Fish Farmers**

| Variable | Frequency | Percentage (%) |
|---|---|---|
| **Age (Years)** | | |
| 18 – 27 | 7 | 15.6 |
| 28 – 37 | 1 | 24.4 |
| 38 – 47 | 14 | 31.1 |
| 48 – 57 | 8 | 17.8 |
| 58 – 67 | 5 | 11.1 |
| Mean | 41 Person | |
| **Gender** | | |
| Male | 29 | 64.4 |
| Female | 16 | 35.6 |
| Mode | Male | |
| **Marital Status** | | |
| Single | 12 | 26.7 |
| Married | 22 | 48.9 |
| Divorced | 6 | 13.3 |
| Widow | 5 | 11.1 |
| Mode | Married | |
| **Education Status** | | |
| No Formal Education | 8 | 17.8 |
| Primary Education | 10 | 22.2 |
| Secondary Education | 18 | 40.0 |
| Tertiary Education | 9 | 20.0 |
| Mode | Secondary Education | |
| **Household size** | | |
| 2 – 5 | 9 | 20.0 |
| 6 – 9 | 14 | 31.1 |
| 10 – 13 | 12 | 26.7 |
| 14 – 17 | 10 | 22.2 |
| Mean | 10 persons | |
| **Part time farming** | | |
| Yes | 41 | 91.1 |
| No | 4 | 8.91 |
| **Farming Experience (Years)** | | |
| 1 – 4 | 13 | 28.9 |
| 5 – 8 | 15 | 33.3 |
| 9 – 12 | 10 | 22.2 |
| 13 – 16 | 7 | 15.6 |
| Mean | 7 years | |

**Source: Field Data**

***Socio – Economic characteristics of cat fish farmers***

Most respondents were part-time cat fish farmers (91.1%). The cat fish farmers were mostly in their mean age of 41 years and male headed households. Most respondents were married with secondary level of education as revealed by the study. The mean household size of 10 persons and average farming experience of 7 years were dominant as shown in Table 1. This collaborates with the findings of Ogunlada, (2007) that "Osun State fish farmers has less than 10 years' fish farming experience".

**Table 2: Distribution of Small Scale Cat Fish Farming Revenue**

| **Quantity (kg)** | **Ozoro** | **Iyede** | **Ellu** | **Emevor** | **Owhe** | **Entire** |
|---|---|---|---|---|---|---|
| Harvested (kg) | 900 | 914 | 823 | 970 | 810 | 4,417 |
| Rate per kg (₦) | 600 | 500 | 500 | 500 | 550 | 2,650 |
| Total Revenue (₦) | 540,000 | 457,000 | 411,500 | 485,000 | 445,500 | 2,339,000 |
| Mean revenue | ₦467,800 | | | | | |

**Source: field data**

***Distribution of Small-Scale Cat fish farmers' revenue***

The revenue of ₦467,800 got from small-scale cat fish farming was quite substantial. The rate per kilogram of cat fish ranging between ₦500 and ₦600 in the study area as shown in Table 2.

**Table 3: Distribution of Small – scale cat fish production cost**

| **Variable Cost** | **Ozoro** | **Iyede** | **Ellu** | **Emevor** | **Owhe** | **Entire** |
|---|---|---|---|---|---|---|
| Fish feed | 144,000 | 147,000 | 145,000 | 145,000 | 146,000 | 727,500 |
| Fingerlings | 15,000 | 16,500 | 13,000 | 17,000 | 16,000 | 77,500 |
| Medication/Pond preparation | 12,200 | 13,700 | 14,100 | 11,300 | 12,000 | 63,400 |
| Labour/Security | 60,000 | 65,000 | 60,000 | 65,000 | 60,000 | 310,000 |
| Logistics/Netting | 57,300 | 59,200 | 62,000 | 51,700 | 56,400 | 286,600 |
| Total | | | | | | 1,465,000 |
| Mean of TVC | 293,000 | | | | | |
| | | | | | | |
| **Fixed Cost (FC)** | **Ozoro** | **Iyede** | **Ellu** | **Emevor** | **Owhe** | **Entire** |
| Land rentage (₦) | 20,000 | 19,000 | 19,500 | 18,000 | 20,000 | 96,500 |
| Depreciation cost on tools (₦) | 6,000 | 7,000 | 5,000 | 6,100 | 4,900 | 31,000 |
| Depreciation cost on accommodation | 18,000 | 10,000 | 12,000 | 8,000 | 13,000 | 61,000 |
| Water bills | 18,000 | 16,000 | 17,000 | 18,000 | 16,000 | 85,000 |
| Total | 273,000 | | | | | |
| Mean | ₦54,600 | | | | | |
| Total Cost (TC) | | | | | | |
| TC = TVC + TFC | | | | | | |
| TC = 293,000 + 54,600 | | | | | | |
| TC = ₦347,600 | | | | | | |

Source: Field Data

**Distribution of Small-Scale cat fish Production cost**

The study revealed that variable cost ranging from cost of feeds, fingerlings, medication, pond preparation, labour, security, logistics and netting. The mean total variable cost was ₦293,000 per cycle of cat fish production. The fixed cost (FC) are land rentage depreciation cost on tools, accommodation and water bill cost. The mean total fixed cost of cat fish production from this study was ₦54,600 as shown in Table 3. Hence the total cost (TC) of production which is equal to Total Variable Cost (TVC) and Total Fixed Cost (TFC) giving a total of N347,600.

**Cost and Return of Small-Scale Cat Fish Farming**

The study revealed that the gross margin (GM) and Net Return (NR) of cat fish farming was ₦174,000 and ₦199,400 respectively. This show that small –scale cat fish farming is profitable. The benefit cost ratio of 1.34 signifies that for every one naira invested in small – scale cat fish production in the area of study a profit of 34k was realized from its sales.

**Table 4: Cost and Returns of Small-Scale Fish farming**

| | |
|---|---|
| Total Revenue (TR) | ₦467,000 |
| Total Variable Cost (TVC) | ₦293,000 |
| Total Fixed Cost (TFC) | ₦54,600 |

Gross Margin (GM) = TR – TVC
GM = 467,000 – 293,000
GM = ₦174,000
Business Net Return (NR) = GM - TFC
BNR = 174,000 – 54,600
BNR = N119,400

Benefit Cost Ratio (BCR) = $\frac{Total\ Revenue\ from\ small-scale\ cat\ fish\ production}{total\ cost\ of\ small-scale\ cat\ fish\ production}$

BCR = $\frac{467,000}{347,600}$ = 1.34

## CONCLUSION AND RECOMMENDATIONS

Most small – scale cat fish farmers engaged in the business as part time status with productive mean age of 41 years. Its households are headed by male with secondary level of education as revealed by the study. Respondents were mostly married with mean household size of 10 persons indicating a large household size. The average small – scale cat fish farmers' experience was seven years. The mean revenue derived from small – scale cat fish business was ₦467,800 per cycle that usually ranges between six to eight months. The study also revealed that the total variable cost of the business was ₦293,000 and a fixed cost of ₦54,600 giving a total cost of production to be ₦347,600. Small – scale cat fish farmer Gross Margin and Net Return was ₦174,000 and ₦119,400 respectively. This indicates that small-scale fish farming is profitable in the study area. The business benefit cost Ratio was 1.34 signifies that for every one naira invested in small scale cat fish production a profit of 34k (₦0.34) was realized from its sales. This indicates that the business is economically rewarding and viable considering the poverty level present in the rural

areas. The study recommends Government should enact policies that will subsidize cat fish farmer's inputs at affordable rate. The study also recommends that fish farming awareness campaign programme mostly by extension workers should be carried out in the rural poor areas.

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