

## INTRODUCTION

### Background of the Study

Fishing like other hunting activities has been a major source of feed for human race and has put an end to the unsavory outbreak of anemia, kwashiorkor and so on. Fish allows for protein improved nutrition in that, it has high biological value in terms of high protein retention in the body, higher protein sources, low cholesterol content and one of the safest source of animal protein (Antonio and Akinwunmi, 1991). Fish farming generates employment directly and indirectly in terms of people employed in the production of fishing output and other allied business, it also generates income for all categories of people involved in fish farming and thus contributes to the national income. When compared with livestock, it requires less space, time, money and has higher feed conserving rate (FAO, 1991). Fishery food products are a potential answer to the growing problems of world dietary animal-protein shortages. Fish are able to convert their feed into flesh about two times more efficiently than chickens and five to ten times more efficiency than beef cattle. Feed conversion rates of fish are higher than other common commercial animal protein sourcing because:

(a) Fish can utilize foods that are not used by most land animals.

(b) Aquaculture products can compete favourably in terms of price with chicken and hamburger, the size of the fish-consuming public will remain relatively low (Helfrich and Garling, 1997).

Aquaculture expansion moreover has been a slow process, as private sector fish farmers have faced major constraints, including lack of seed and quality feed. As in much of Africa, the most commonly cultured species included catfish (*Clarias gariepinus*, the imported *C.lazera* and *Heterobranchus spp*), tilapia and carp. Many fish farms focus on catfish, as they can have a market value of two to three times that of tilapia FAO, (2000).

### Statement of the Problem

Out of the 35grams of animal protein per day per person recommended by the FAO, less than 7grams is consumed by the Nigerians (FAO, 1991). As a result of this, many Nigerians suffer from protein deficiency and its attendant problems most especially women and their children. Although aquaculture has high potential but, there are number of constraints that are militating against its development and viability, these include lack of adequate information about the operation of aqua cultural practices, finance, trained personal or expertise data on inputs and output of already

existing farms, lack of adequate fish seeds of fingerlings and capital to produce them, poor handling, preservation and processing techniques and unorganized market distribution channel. The question to ask now is why are people not venturing into aquaculture? Is aquaculture not profitable? Therefore, there is the need to explore aquaculture as a means of solving protein malnutrition as well as exploring its potential to enhance economic empowerment of the populace.

This study therefore provides answers to these research questions:

- (1) What is the cost-returns relationship in catfish production hence, its profitability?
- (2) What are the factors affecting catfish production?
- (3) What are the effects of each of these factors on output and hence, profit?

### Objective of the Study

The general objective of the study is to analyze the economics of catfish production to unfold its potential in poverty alleviation in Oyo State, Nigeria.

The specific objectives are to:

- (i) identify the socio-economic characteristics of catfish farmer in the study area,
- (ii) determine the factors that affect the output of catfish production,
- (iii) examine the cost-return relationship of catfish farming,
- (iv) examine the management practices adopted by the catfish farmers,
- (v) examine the output of cat fish farmers and

### Hypothesis of the Study

There is no significant relationship between factors of production and total output of catfish.

### METHODOLOGY

The study was carried out in Oyo State. The population of the study was made up of the catfish farmers in the State. Purposive sampling technique was adopted to arrive at selecting randomly One hundred and sixty (160) catfish farmers from all Agricultural zones of Oyo state. Data were collected using a well-structured questionnaire and analysis was carried out using frequency counts, percentages, mean, Gross margin and multiple regressions.

## RESULTS AND DISCUSSION

### Socio-economic characteristics of the respondents

The data in Table 1 shows the distribution of respondents by socio-economic characteristics. This result shows that majority (72.5%) of the respondents were male while 27.5 percent of the catfish farmers are female.

About 35.2 percent of the respondents had their ages between 41-50 years of age, 34 percent are between 31-40 years, 18.9 percent are between 51-60 years, 7.6 percent of the catfish farmers were above 61 years while 5.1 percent of the respondents are 30 years and below. The mean age of the respondents was found to be 44.5 years. This implies that majority of the catfish farmers are in their productive age. Majority (78.8%) of the respondents were married, 15 percent are single, 3.8 percent were widowed while 1.3 percent each of the respondents were separated and divorced respectively. About 40.0 percent of the respondents had 13 years and above of schooling, 27.5 percent had between 10-12 years of education, 17.5 percent have 7-9 years of education while 15 percent of the respondents had 1-6 years of education. The mean year of education was 13 years. This implies that most of the respondents have tertiary education which would hasten their understanding of technologies in fish production.

About 51.1 percent of the catfish farmers in the study area are Christian, 38.8 percent are Muslim while 10.0 percent of the respondents are traditional worshippers. All the catfish farmers in the study area are private operators, while none of the pond was owned by the government.

About 43.8 percent of the respondents had been in catfish production for between 6-10 years, 41.4 percent for between 1-5 years, 13.8 percent of the respondents are between 11-16 years while 1.3 percent for more than 17 years. The mean year of experience of the respondents is 6.94 years. This result shows that catfish production is just gradually been known in the State. This result also reveals that 30 percent of catfish farmers have fish farming as their major occupation while majority (70%) has other occupation apart from catfish production. About 31.3 percent of respondents are catfish farmers, 20 percent are livestock farmers (poultry), and 15 percent of the respondent couple catfish farming with other vocation i.e. self-employment, 13.8 percent couple catfish farming with administrative job, 12.5 percent are into trading while 7.5 percent of the respondent are engaged in crop farming in addition to catfish farming.

Above average (56.4%) of the respondents have pond with size that range between 600-1000m<sup>2</sup>, 31.3 percent have ponds with size 1100-1500m<sup>2</sup>, and 6.3 percent of the respondents have pond size with 1600-2000m<sup>2</sup>, while 6.3 percent of the catfish farmers have pond size of 1-500m<sup>2</sup>

Table 1: Distribution of Respondents by Socio-economic characteristics

Socio-Economic Characteristics	Frequency	Percentage (%)
<b>Sex</b>		
Female	44	27.5
Male	116	72.5
<b>Age of respondents (Years)</b>		
=30	8	5.1
31-40	54	34.0
41-50	56	35.2
51-60	30	18.9
=60	12	7.6
<b>Marital status</b>		
Married	126	78.8
Separated	2	7.3
Widowed	6	3.8
Divorced	2	1.3
Single	24	15.0
<b>Years of School</b>		
1-6	24	15.0
7-9	28	17.5
10-12	44	27.5
=13	64	40.0
<b>Religion</b>		
Christianity	82	51.3
Muslim	62	38.8
Traditional	16	10.0
<b>Types of Ownership</b>		
Government	-	-
Private	160	100.0
<b>Years of Experience</b>		
=5	66	41.4
6-10	70	43.8
11-15	22	13.8
=15	2	1.3
<b>Occupation</b>		
Catfish farmers	50	31.3
Administrative Job	22	13.8
Crop Farming	12	7.5
Livestock Farming	32	20.0
Self Employment	24	15.0
Trading	20	12.5
<b>Size of pond (m<sup>2</sup>)</b>		
1-500m <sup>2</sup>	10	6.3
600-1000m <sup>2</sup>	90	56.4
1100-1500m <sup>2</sup>	50	31.3
1600-2000m <sup>2</sup>	10	6.3

Source: Field Survey, 2009

### Management Practices of Respondents in Catfish Production

The data in Table 2 shows the management practices of the respondents. The data shows that fertilization ranked highest among the management practices with a weighted mean score (WMS) of 3.20. This is followed by weed control with (WMS) of 2.60. Next in the rank is test cropping with (WMS) of 2.54 while liming followed with (WMS) of 2.43. Other agricultural management are ranked in the following order: medication (2.36), cropping (2.08), stocking of pond (1.55), while feeding ranked least with a weighted mean score of 1.01. The result indicates that the respondents are actively involved in the activities that are essentials and prerequisite to having the maximum efficiency in fish production.

**Table 2: Distribution of Respondents by Management Practices in Catfish Production**

Management Practices	Rearly	Often	V. often	Not at all	Weighted Mean Score (EX/N)
Stocking of pond	1	2	3	4	1.55
Feeding	36	88	0	0	1.01
Limming	79	2	0	0	1.01
Fertilization	4	98	48	44	2.43
Test cropping	2	34	72	148	3.20
Cropping	2	88	69	44	2.54
Medication	1	144	21	0	2.08
Weed Control	16	62	63	48	2.86
	7	66	75	60	2.60

Source: Field Survey, 2009

### Cost and Return Analysis of Catfish Production

#### Analysis of Fixed Cost

The fixed cost incurred by the catfish farmers include land, fence, pond construction and cost of equipments like fishing net, scale, pumping machine, tank and shovel. The cost of the fixed assets was arrived at by the use of straight-line method of depreciation, it was found necessary to have depreciated the initial value of fixed assets in order to properly evaluate the amount of fixed assets used in the production year.

From Table 3 below the average fixed cost was N102,761.92k. Where land accounted for N25,081.52k, fence accounted for N23,833.33k, pond construction accounted for N34,285.71k, fishing net accounted for N7,445.10k, scale accounted for N2,976.56k while other miscellaneous like water pump, tank and shovel etc accounted for N9,139.70k. This means that pond construction accrued the highest cost.

**Table 3: Analysis of Fixed Cost**

Items	Cost (N)	Life Span	Depreciation (N)
Land	200,652.17	8	25,081.52
Fence	95,333.33	4	23,833.33
Pond	240,000	7	34,285.71
Fishing net	22,335.29	3	7,445.10
Scale	5,953.13	2	2,976.56
Others	36,558.82	4	9,139.70
Total			102,761.92

Source: Field Survey, 2009.

#### Analysis of Variable Cost

Variable cost are cost, which vary with output, as output increase the cost of variable factor rises. Variable cost item in catfish production include Fingerlings, Feed, Drugs, Labour, Lime, Fertilizer, Fuel and Cost of Supplements.

From Table 4, the average variable cost of catfish production was N1,538,963.97k. Where feeds accounted for N1,306,556.23k, fingerlings accounted for N64,248.10k, supplements (miscellaneous), accounted for N13,000, followed by fuel which accounted for N5,388.33k, drugs accounted for N4,614.09k, lime accounted for N2,950 while fertilizer is the least which accounted for N1,375. This means that feed, fingerlings and labour are necessary in the production of catfish.

**Table 4: Analysis of Variable Cost**

Items	Cost (N)	Percentage (%)
Fingerlings	140,847.22	9.15
Feed	1,306,556.23	84.90
Drugs	4,614.09	0.30
Labour	64,238.10	4.17
Lime	2,950	0.20
Fertilizer	1,375	0.08
Fuel	5,388.33	0.35
Supplements	13,000	0.84
Total	1,538,963.97	100.0

Source: Field Survey, 2009

#### Analysis of Total Cost

Total cost is the sum of fixed cost and variable cost. Variable cost is the highest, which accounted for N1,538,933.97k of the total cost of

producing catfish production in the study areas while fixed cost account for N102, 761.92k. The high accounted money for variable cost can be attributed to the high and unstable cost of feed materials and other inputs.

**Table 5: Analysis of Total Cost**

Items	Cost (N)	Percentage (%)
Fixed Cost	102,761.92	6.26
Variable Cost	1,538,963.97	93.74
Total	1,641,725.89	100.0

Source: Filed Survey, 2009.

**Analysis of Gross Margin and Net Farm Income**

Table 6, shows the Analysis of Gross Margin and Net Farm Income (profit) of catfish production. The average total revenue from catfish production was N2, 430,500.31k; the average variable cost was N1, 538,963.97k given a gross margin of N891, 536, 34k. The average fixed cost was N102, 761.92k, while the net farm income was N788, 774.42k.

This implies that catfish production was a profitable venture in the areas of study.

**Table 6: Analysis of Gross Margin and Net Farm Income**

Items	Cost (N)
Total Fixed Cost	102,761.92
Total Variable Cost	1,538,963.97
Total Revenue	2,430,500.31
Gross Margin	891,536.34
Net Farm Income (δ)	788.774.42

Source: Field Survey, 2009.

**Results of Gross Margin and Net Farm Income Analysis.**

The gross margin analysis was used to determine the cost-return relationship of catfish production in the area of study and hence its profitability. Mean values are used for calculation.

$$TR = \text{Selling Price} \times \text{Quality Produce}$$

Where Selling Price = N386 and Quality Produced = 6,293.75kg

$$\begin{aligned} \text{Thus, } TR &= N386 \times 6,293.75\text{kg} \\ &= N2,430,500.31\text{k}/6\text{months.} \end{aligned}$$

$$GM = TR - TVC$$

Where TR = Total Revenue = N2, 430,500.31k/6months  
 TVC = Total Variable Cost = N1, 538,963.97k/6months  
 Thus, GM = N2, 430,500.31k - N1, 538,963.97k  
 = N891, 536.34k/6months

**Net Farm Income (δ) = GM - TFC**

Where GM = Gross Margin = N891, 536.34k/6months  
 TFC = Total Fixed Cost = N 102,761.92k/6months  
 Thus, (δ) = N891.536.34k - N102, 761.92k  
 = N788, 774.42k/6months.

The profit level was calculated over a period of six months, since one production season in catfish production covers six months. The result of the Gross Margin Analysis reveals that catfish production is a highly profitable venture, since a farmer could make up to N788, 774.42k under a period of six months.

**Benefit Cost Ratio of Catfish Production**

The Benefit Cost Ratio (BCR) is the ratio of return to cost. It is used to analyze the profitability of an enterprise. From the calculation below, the Benefit Cost Ratio (BCR) of the catfish production is 1.48. This implies that catfish production is highly profitable in the study areas. The calculation is shown below;

$$BCR = TR/TC$$

Where TR = Total Revenue = N2, 430, 500.31k  
 TC = Total Cost = N1, 641, 725.89k  
 Thus, BCR =  $\frac{N2,430,500.31k}{N1,641,725.89k}$

$$BCR = 1.48$$

Since the BCR is greater than 1, the enterprise is profitable

**Test of Hypothesis**

Ho: There is no significant relationship between factors of production and total output of catfish.

The data in Table 7 shows the relationship between factors of production and the output of catfish. The result showed that there is a positive and significant relationship between drugs (B= 135.216), feeds ( B = 3.980), fingerlings ( B=0.671) and output. There is also a negative but significant relationship between labour ( B = -125.288), lime ( B = -106.802) and output. The result implied that quality fingerlings fed with adequate quality feed with well administered routine drugs would increase output of catfish while high cost of labour and lime application would decrease the profit margin of catfish production.

**Table 7: Relationship between factors of production and total output of Catfish.**  
Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
(Constant)	313.434	168.105	1.865	.067	
Fingerlings	.671	.068	.794	9.910	.000
Feeds	3.908	.962	.298	4.064	.000
Drugs	135.216	47.304	.083	2.858	.006
Labour	-125.288	44.568	.087	-2.811	.006
Lime	-106.802	46.351	-.075	-2.304	.024
Fuel	-2.820	2.206	-.046	-1.278	.205
Land	1.310E-03	.001	.026	.972	.334
Fertilizer	66.422	59.121	.025	1.124	.265
Pond Construction	-3.383E-04	.001	-.018	-.642	.523

Dependent Variable: Total Kg of Fish Produced  
Source: Field Survey, 2009

## CONCLUSION AND RECOMMENDATION

It is very evident from the result of gross margin analysis that Catfish production is a profitable venture, however caution must be taken on the management of factors of production especially labour and other variables that have negative relationship to avoid dwindling profit. It is also clear that production of catfish would reduce unemployment level because if people get involved in profitable venture which would empower them economically, it may lead to gradual movement out of poverty region which people would be very interested in. It is therefore necessary to carry out awareness campaign to educate the masses on the high potential that Catfish has to alleviate poverty through economic empowerment to enhance development.

## REFERENCES

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