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Profitability Analysis of Cat Fish Production in KUJE Area Council Federal Capital TERITORY, Nigeria

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Abstract: *This study determined the profitability of catfish production in Kuje Area Council federal Capital Territory Abuja, Nigeria. Data were obtained through the aid of a pre-tested structured questionnaire. The questionnaires were administered to 50 sampled respondents using simple random sampling technique. Descriptive analysis was used to analyze the socio-economic characteristics of the respondent Farm Budgetary technique was used to analyzed the profitability of cat fish production in the study area, while descriptive statistics was also used to analyze the constraint faced by catfish farmers. The result shows that 26 percent of the sampled respondents were between 31-35 years of age, while 68 percent of the respondents attained secondary education. The result of the budgetary technique show that cat fish production is profitable in the study area with average revenue of ₦5,9310,000:00 and gross margin of ₦4,806,200:00. The profit realized by the sampled respondents on average was ₦4,729,820:00, this revealed that cat fish production is a very lucrative enterprise to venture into in the study area. Though catfish production was profitable, farmers encountered: lack of capital, poor stock of fingerlings, poor marketing outlet and transportation, high cost of input and labour, theft as major constraints. Therefore, the study concluded that catfish production is a profitable enterprise, when properly financed and all its associated problems well managed for efficient productivity. The study also recommends that adequate provision of capital and inputs should be made available to farmers, there is also need for government to established modern hatcheries in the study area to supply quality fingerlings, extension services should be scalp up, and adequate marketing outlet and storage facilities should be made available to farmers at a subsidized rate as this will assist the small scale farmers increase their output and hence profit level in the study area.*

Keywords: *Cat Fish, Profitability, Cost, Revenue, Kuje, Nigeria*

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I. Introduction

Nigeria in 1960's depends mainly on agrarian economy until the discovery of oil sector where agriculture witness a lot of negligence from various successive government. However, the agricultural sector is still the main source of employment and livelihood. It accounts for about one third 35% of the GDP and about two-thirds of the country's 65% labour force. (Ekpo and Umoh, 2012 and Noko; 2017). Fish is very important to human diet. It contributes significantly to the survival and wellbeing of a larger number of the people, it is an essential nutrient which includes; protein, lipids, vitamins and minerals (Tsado et al, 2012). Animal protein is essential to the human body and it constitute about 41%. Aquaculture is a known practice in Nigeria, predominantly an extensive land based system, practiced mainly at subsistence levels in fresh waters (Anyawu-Akeredolu, 2005). However, only a few species such as catfish and tilapia are cultured commercially (Komolafe and Arawomo, 2007) as commercial farming is yet to become widespread (Fagbenro, 2005). At present, most fish farmers operate small-scale farms ranging from homestead concrete ponds (25 – 40 meters) to small earthen ponds (0.02 - 0.2 hectares). The industry produced over 85,000 tonnes of fish in 2007 (FDF, 2008). FAO (2005b, 2006b) pointed out that Nigeria with extensive mangrove ecosystem and over 14 million hectares of inland water surface out of which 1.7 million are available and suitable for fish farming, should not have any major challenge in achieving sufficient and sustainable fish output to meet domestic demand. Yet, in spite of the nation's enormous fish potentials and increasing interests in the subsector (Tobor, 1990; Shimang, 2005; Welcome, 1979; Kapetsky, 1981), the gap between the demand for fish in Nigeria (1.3 million metric tonnes annually) and its supply from domestic production (about 0.45 metric tonnes annually) has continued to widen (Oluwasola & Ajayi, 2013).

Nigeria total Annual fish demand is estimated at 2.7 million metric tonnes (mmt). Just 30% of this demand is met domestically, resulting in an annual spend of 125bn (US$ 625m) on fish imports Nigerian's per capita fish consumption is 11kg; this is significantly lower than the global average of 21kg (NBS 2016). while

the present importation rate is over 750,000 metric tonnes. With importation of more than 750,000 MT of fish, more than USD 600 million are spent in hard currency and thousands of jobs are exported (USAID, 2010).

Fish supply is from four major sources viz., artisanal fisheries, industrial trawlers, aquaculture and imported frozen fish. The Nigerian fishing industry comprises of three major sub sectors namely the artisanal, industrial and aquaculture of which awareness on the potential of aquaculture to contribute to domestic fish production has continued to increase in the country. A right step towards arresting the demand-supply deficit for fish is aquaculture, which involves raising fish under controlled environment where their feeding, growth, reproduction and health can be closely monitored. The demand for fish, on the other hand, has been rising rapidly as a result of increases in population, in income per capita, in exports and in the prices of alternative sources of animal protein.

Despite the myriads of information on the integral role of the fishery sub-sector to the nation's economy, there exists a dearth of empirical information on the linkage between fishery production and economic growth in Nigeria and its perspective for sustainable economic development which ought to form the basis for policy formulation towards enhancing the fishery sub-sector.

The need to increase fish production in Nigeria and has become most desirable because of continuous decline in capture fisheries production over decades. Intensive aquaculture has been identified as the panacea to fish farming. According (Tsado et al, 2012) fish is a rich source of amino acid, vitamins, minerals and poly-unsaturated fatty acids not found in other sources of protein. It accounts for about one fifth of world total supply of animal protein and this has risen five folds over the last forty years from 20 million metric tons to 98 million metric tonnes in 1993 and projected to exceed 150 million metric tons by the year 2010. However out of 35grams of animal protein per day per person recommended by F.A.O, less than 7 grams is consumed on the average. As a result of this, many Nigerians suffer from protein deficiency due to low protein intake.

A sector's direct contribution is the contribution of its own production to economic performance. It can be measured by the value added and employment generated by all production activities within the sector. While the contributions of employment and labour income are straightforward, the concept of value added deserves some explanation. In short, the value added of a production unit (firm) reflects the amount of economic value of primary inputs used in every production process: primary and intermediate. While the former (primary) includes mainly labour and capital (land) attached to a firm, the latter includes imports and products purchased from other sectors but which are used as production inputs by the firm. The output value of the firm reflects the values of both kinds of inputs. Yet, while the value of primary inputs is "created" during the production process, that of intermediate inputs, which is created by other sectors that produce them, is merely a "pass –on" value. Thus, in any firm, value added is measured by the difference between the value of the firm's output and the value added equals the firm's output value minus the value of the intermediate inputs used in the production process.

The problem of protein deficiency has continued unabated. The need therefore arose, to explore aquaculture as a means of curbing this menace.

Despite the increase of fish production in Nigeria, production level is still very low and this has been attributed to the inefficiency i.e. inadequate use of resources.

The major problem hindering the promotion and development of the aquaculture industry in Nigeria has been the lack of know-how, awareness and real training is lacking in fishing industries. It was also reported that inadequate supply of fingerlings is also a constraint to fishery subsector amongst other factors such as inadequate information and feed supply.

It is against this background that this research is embarked upon with a view to provide answers to research questions that could be faced by practicing and prospective catfish farmers, which bring about the following researched questions.

I. What are the socio-economic characteristics of catfish farmers?
II. What is the profitability level of catfish farmers?
III. What are the constraint affecting catfish production?

The specific objective of this study are;

a. To identify the socio-economic characteristics of catfish farmers.
b. To determine the profitability level of catfish farmers
c. To determine the constraints associated with catfish production.

II. Materials And Method

Study Area:

The study was carried out in Kuje Area Council, Federal Capital Territory Abuja. It is located in North Central geopolitical zone of Nigeria with coordinate 8^0 53' 47 North, 7^0 14' 35' East. It has a population of 97,367 (NPC 2006) and projected Population of 246,400 (NBS 2016) with an area of about 1644.589km^2. Kuje Area Council is one among the six Area Councils of the Federal Capital Territory of Nigeria, which include;

Abuja Municipal, Abaji, Gwagwalada, Bwari, and Kwali. It is 40 km southwest of Abuja bounded by Gwagwalada to the west, Abaji, Abuja Municipal to the east and Suleja in Niger State to the south.

Sampling Techniques:
The sampling technique used in this study are: random sampling, simple random sampling was applied to select fifty (50) catfish farmers from the selected communities within Kuje Area Council, to give the total sample size of fifty (50) catfish farmers in the study area.

Method of Data Collection:
The sampling frame for this study was obtained from primary data. The primary data were collected with the aid of well-structured sets of questionnaire, administered through personal interviews and observation based on the social-economic characteristics of cat-fish farmers in the study area such as; level of education, sex, age, farming experience and house hold size. Other data collected include; cost and revenue of catfish farmers, factors that affect catfish farming in the study area, so as to elicit the required information from the targeted catfish farmers.

Method of Data Analysis (Analytical Technique)
Data was analyzed using descriptive statistics to categorized the socioeconomic characteristics of the sampled respondents and farm budgetary techniques was carried out to investigate the profitability level of catfish farmers.

Descriptive Statistics:
This involved the use of tables, percentage, frequency range and mean. This was used to achieve specific objective one and three**.**

Farm Budget Model:
This involved costs and return analysis to investigate the profitability level of the business. This was used to achieve specific objective two.
Profit = GM – AFC
GM = AR – AVC
AR = Output x Unit price/n
ATC = AVC + AFC
Where:
GM = Gross margin
AR = Average Variable Cost
AFC = Total fixed cost
ATC = Average Total cost
n = number of respondents
Ranking and percentages: This tool involves the use of numbers to determine the degree to which the constraint is classified; this is used for specific objective 3.

III. Result And Discussion

Socio-economic Characteristics of the Sampled Respondents in the Study Area
Table 1 shows the socio-economic characteristics of the sampled respondents. The result shows that most of the respondent were within the age of 31 – 35 years which is represented by 26% while 24% were between the range of 36-40 years of age in the study area. Most youth shy away from agriculture because they see it as been crude, this in turn discourages most youth from venturing in to the business, more so the youth that have interest in the production are gendered due to lack of start-up capital or availability of land, table1also show that majority 66% of the sampled fish farmers were male, while 33% were female. Also majority 84% were married, this agreed with the findings of (Adewuyi et al., 2010) which reported that they, could easily make use of family labour to perform critical farm tasks. It is however also means that they will incur higher household expenditure that will reduce the quantum of income realizable from the enterprise. About 12% were single and 2% were divorced. Table1 further revealed that the house hold size of the respondents in the study area is between the ranges of 2 – 3 persons per household showing a percentage level of 44%, which implies that most of the labour were household members. Invariably, it encourages diversification into other agricultural ventures. Majority of the samples respondents interviewed in the study area had secondary education than any other form of education with a percentage level of 68%, while 2.0% and 30.0% of the respondents had primary and tertiary education respectively. Education plays an important role in any agricultural venture, in the case of catfish farming, the farmers needs technical know-how of the venture, this is to enable them embrace innovation

that is beneficial to improve their production and also boost their financial income. More so 58% of the sampled respondents used concrete pond for rearing their fish while 38% utilizes earthen pond. 72% of the sampled farmer's stocked less than 5000 cat fish while 22% stocked up to 5000 fish per individual farm.

Table4.1. Distribution of the Respondents According to Socioeconomic Characteristics in the Study Area

Variable	frequency f	percentage %
AGE		
21 – 25	1	2.0
26 – 30	8	16.0
31 - 35	13	26.0
36 – 40	12	24.0
41 – 45	6	12.0
46 – 50	10	20.0
Gender		
Male	33	66.0
Female	17	34.0
Marital Status		
Single	6	12.0
Married	42	84.0
Divorced	2	4.0
Number of household		
1	6	12.0
1 – 2	7	14.0
2 – 3	22	44.0
3 and above	15	30.0
Farming Experience		
Less than 1	2	4.0
1 – 2 years	23	46.0
3 – 4 years	18	36.0
4 – years and above 7	14.0	
Total	**50**	**100**

Table1 continued

Variable	frequency *f*	percentage%
Education Status		
Primary	1	2.0
Secondary	34	68.0
Tertiary	15	30.0
Farming System		
Intensive	50	38
Extensive	0	0
Types of Pond		
Earthen	19	38
Concrete	29	58
Other	2	2
Stocking Density		
<5000	36	73
5000	11	22
>5000	3	6
Source of feed		
Local feed	24	48
Factory feed	26	52
Total	**50**	**100**

Profitability Analysis for Catfish production in the study Area.

Table2 show the analysis of costs and returns of cat fish production in the study area, the results revealed that the average cost of feed was₦ 868,000:00 while the average cost of fingerlings was₦4,660:00,

cost of feeds carries the highest proportion of the total average cost of production this is in line with Oluwasola, et al (2015) who reported in his study that the cost of feed for the fish production constitute 79.2% of the total operating cost. Any policy and/or technical measure that substantially reduces the cost of feeding the fish will substantially increase farm income and hence profit. Also the average revenue was ₦5,931,000:00 and the average total cost realized was ₦1,201,180:0 with the gross margin of ₦ 4,806,200:00 and the net profit realized was ₦4,728,520:00 on average in the study area. This result surely indicate that cat fish production is highly lucrative enterprise to venture into in the study area.

Table: 2 Farm budgetary and Profitability Analysis for Catfish production in the study Area.

(A)

Variable Cost	**TVC (₦)**	**AVC (₦)**
Feeds	43,400, 000:00	868, 000:00
Fingerlings	233,000:00	4, 660:00
Labour	885,000:00	17,700:00
Medication	417, 000:00	8,340:00
Management	11,305,000:00	226,100:00
Total	**56,240,000:00**	**1,124,800:00**

(B)

Fixed Cost	**TFC (₦)**	**AFC (₦)**
Pond construction	1,074,000:00	21,480:00
Land acquisition	2,810,000:00	56,200:00
Total	**3,704,000:00**	**77,680:00**

(C)

Total cost	**Summation (₦)**
TC = TFC + TVC	**3,704,000:00 + 56, 240, 000:00 = 59,944,000:00**
AC = AFC + AVC	**77,680:00 + 1,124,800:00 = 1,202,480:00**

(D) Total Revenue (TR)

TR for catfish = ₦296, 550,000:00

Average Revenue (AR) = TR/ Number of Respondents

$$\text{Average Revenue (AR)} = \frac{₦296,\ 550,000:00}{50}$$

AR = **₦5, 931,000:00**

(E) Gross margin (GM) = AR – AVC

GM = ₦5, 931,000:00 – ₦1,124,800:00

GM = ₦ 4, 806200:00

(F) Profit (n) = GM – AFC

π = ₦ 4, 806,200:00 – ₦ 77,680:00

π = ₦ 4,728,520:00

Table 3 Farm Budget Analysis for Catfish Production.

Variable	**Average Cost in Naira**
Feeds	4,660:00
Fingerlings	868,000:00
Labour	17,700:00
Medication	8,340:00
Management	226,100:00
Average variable cost (AVC)	**1,124,800:00**
Pond construction	20,180:00
Land acquisition	56,200;00
Average fixed cost (AFC)	**7,680:00**
Average total cost (ATC)	**1,201,180:00**
Gross margin (GM)	**4,806,200:00**
Profit	4,729,820:00

Catfish Production Constraints in the study area

The study revealed that a greater portion of the respondents (31.30%) identified cost of inputs as the major constraints of catfish production in the study area; this implies that the fish farmer will be working on economic profit; the surplus profit which he/she hoped for will not be realizable because of the cost incurred on inputs. Others include poor marketing and transportation (15.60%), nearly all agribusinesses face a highly seasonal demand that creates the possibility of a bottlenecks in serving customers. About 14.6% of the respondents attributed their problem to poor stock of fingerlings, this implies that majority of the farmers were affected by this, most especially if their source of income was loan from banks and they encounter such a major setback, it tends to make them weary and discouraged to continue with fish production. 10.40% attributed theirs to lack of capital, when banks refuse to give loans for Agricultural businesses, it makes it difficult for farmers in the study area to go into large scale production thus leading to low output, which implies that his/her production will be for immediate environment, leading to little or no profit and labour theft, this affects output drastically which in turn affects profit. About 9.38% of respondents identified diseases and high mortality rate of the fish as their constraints, which means either the ponds were overstocked leading to cannibalism amongst the fish. 5.20% opined that lack of information from extension services, as we know information is power, with little or no information from extension agents or other agricultural sources on the new trends and innovation, farmers will still be using old methods, which will affect productivity and output level which in turn affects income and profit. 3.10% owe theirs to climate variation in the study area, unpredictable weather patterns further complicate market planning, and volatile agricultural commodity prices often cause the demand for catfish supplies to fluctuate.

Table 4: Distribution of Respondents According to Production Constraints

Constraints	Frequency *f*	Percentage%	Rank
Lack of capital	10	10.40	4
Cost of inputs	30	31.30	1
Extension services	5	5.20	6
Climate variation	3	3.10	7
Poor quality of Fingerlings	14	14.60	3
Theft by labour	10	10.40	4
Market and transport	15	15.60	2
Disease and mortality	9	9.38	5
Total	**96**	**100**	

IV. Conclusion And Recommendation

This study concluded that catfish production is a profitable enterprise if adequately financed and the challenges limiting its production are properly taken care of, and measures should be put in place to promote efficient production. The following recommendations were made

1. Government should provide adequate and standard input such as modern fishery hatcheries, Refrigerated warehouse/Van in the study area to boast and improve quality supply of fingerlings and table fish. As most farmers had small farm sized in terms of fished stock because of high cost of fingerlings and poor storing facilities. This would reduce cost of production, reduce susceptibility to early mortality, improve the production of fast maturing fish and thereby increase general output level.
2. Government should establish feed mill in the study area. Because most feed used by farmers are produced and supply from other states (Oyo/Plateau). This will assist the fish farmers in the Area, to reduce cost of production and increase output of catfish.
3. Agricultural extension agency and other agencies should be involved in catfish production, enlighten, promotion and marketing of catfish so as to encourage production and prevent wastage through spoilage.
4. Government should create a forum where new ideas and innovation can be made available to train and retrain the farmers in the study area.

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