

# Cost, Returns and Constraints to Catfish Production in Lokoja Metropolis of Kogi State and Yenagoa Metropolis of Bayelsa State, Nigeria

Ologidi, P.O\*, Amaegberi H., and Onuche, U.

*Faculty of Agriculture, University of Africa, Toru Orua, Sagbama, Bayelsa State, Nigeria.*

*\*Corresponding Author*

**Abstract:** This study examined the cost, returns and constraints to catfish production in Lokoja and Yenagoa metropolis in Kogi and Bayelsa state respectively, with the aim to ascertain the similarities and differences in the cost, returns and constraints of the two metropolises. Lokoja Metropolis has a population of 300 farmers and Yenagoa 370 farmers. A total of 90 catfish farmers from Lokoja and 110 from Yenagoa metropolis were surveyed using random sampling. Profitability analysis was done using gross margin analysis (GM), benefit cost ratio (BCR) and a mean position analysis utilising a 3-point Likert scale in ordering the biasness of the constraints. The study revealed Gross margin and benefit cost ratio to be ₦596.6 with a standard deviation of 68.9 and 2.2 for Lokoja metropolis and ₦692.95 with a standard deviation of 69.0 and 2.23 respectively for Yenagoa metropolis. The major constraints for both metropolises are inadequate finance, high cost and poor quality of fish seed, lack of adequate land, high cost of fish feed, inaccessibility to credit, high cost of hired labour and poor extension services. Recommendations from the study include Catfish farmers should form cooperatives/farmers/association to be a bloc to pool resources, ideas and gains. The government should inject the needed subsidies to boost the growth and development of cat fish production in Nigeria.

**Key words:** Cost, Returns, Constraints, Kogi and Yenagoa Metropolis

## I. INTRODUCTION

Catfish production makes an important contribution to the Nigerian economy. The enterprise serves as a source of income, employment and generates the Gross Domestic Product – GDP (Dizyee, Williams, Anastasiou, Powell, Shikuku, Tran and Siriwardena, 2022). In most countries catfish fetch a higher market price than tilapia previously having reported a market value of two to three times that of tilapia (Bentley, 2021; Emokaro, 2010). The importance of catfish production cannot be overemphasized, according to Bentley (2021), catfish provide high quality animal protein with low cholesterol content that ensures improved nutrition security among the population. It requires less space, time, money and has a higher feed conversion. Catfish farming is a crucial aqua cultural enterprise which requires fish production facilities such as ponds, feed production and storage facilities, adequate water supply, and other necessary equipment depending on the scale of production and production systems employed (Engle, Hanson and Kumar, 2022).

In their various studies on the profitability of catfish farming in different areas of the country and using different analytical methods - Olagunju, Kristófersson, Tómasson and Kristjánsson (2022); Deinye, Olapade and Obi (2021); Emaziye (2020); Oyibo, Okechukwu and Onwudiwe (2020) Idris-Adeniyi, Busari, Badmus and Adeniyi (2018); Njoku and Offor (2016); Okpukpara and Morgan (2015) and Iheke and Nwagbara (2014) all reported the profitability of the enterprise...

Catfish farming progress the world over and in Nigeria is hindered by a preponderance of constraints. Yusuf (2021) enumerated diminishing hereditary resources for catfish, inadequate regulations from the industry, dearth of breeding programmes/plans and arbitrary mixing of heritable materials. Nwali, Samuel, Adepoju, Oladiran and Yilson (2017 and Okpukpara and Morgan (2015) revealed that Subpar marketing also detracted from the efforts of farmers. High input cost and (credit) to farmers are constraints militating against production (Onuche, Ahmed and Ebenehi (2020). The importance of training raining and Extension (Olagunju et al., 2022; Ogunnaike, Kehinde, Olabode and Kehinde, 2021; Oyibo et al., 2020; Okpukpara and Morgan, 2015; Tsue et al., 2012) and Adedeji and Okocha (2010) detailed unstable government policy as constraints of catfish farming

A Surfeit of studies has been carried out on the cost and return of catfish production and have all chronicled the profitability of catfish farming using a variety of analysis. Olagunju, Kristófersson, Tómasson and Kristjánsson (2022), modeled their study using profitability (BCR, NFI, OPM and GR) analysis. Deinye, Olapade and Obi (2021), used descriptive statistics and regression analysis, Emaziye et al., (2020) deployed the use of descriptive statistics and gross margin. Oyibo, Okechukwu and Onwudiwe (2020) deployed the use of descriptive statistics, gross margin and analysis of variance (ANOVA), Idris-Adeniyi, Busari, Badmus and Adeniyi (2018), employed the use of regression, Njoku and Offor (2016) used net returns and regression. Okpukpara and Morgan (2015), employed the use of descriptive statistics and budgetary techniques and Iheke and Nwagbara (2014) using the analytic tools of Cost benefit ratio (BCR) and net profit.

On the constraints divide, an overabundance of limitations from various studies carried out in different locations in the

country ranging from the quality of breeding materials, poor regulations. High input costs, finance, marketing, fish health care, Training and extension, transportation, logistics to safety concerns. These were undertaken by Olagunju et al., 2022; Yusuf, 2021; et al., 2021; Deinye et al., 2021; Onuche et al., 2020; Rabo et al., 2020 and others.

All the studies above had worked on either costs and returns or constraints on catfish farming and the studies have concentrated on a single location of study. This study seeks to analyse cost, returns and constraints to catfish production in Lokoja metropolis of Kogi and Yenagoa metropolis of Bayelsa State. That is combining costs, returns and constraints and in addition looking at two different locations as against the single location for the other studies.

II. METHODOLOGY

This study was carried out in both Lokoja local government area (Kogi state) and Yenagoa local government area (Bayelsa state). Lokoja, the state capital is situated on an area spanning 3,180 km<sup>2</sup> with a population of 195, 261 according to the 20006 census. It bounded by Niger and Kwara in the North East. It is located at latitude 7°49'N 6°45'E and longitude 7.817°N 6.750°E. Figure 1 shows the map of kogi state showing Lokoja (Wikipedia, 2022).

Yenagoa is a Local Government Area and capital city of Bayelsa State, Southern Nigeria. It is located at the southern part of the country at coordinates 4°55'29"N, 6°15'51"E. The Local Government Area has an area mass of 706km<sup>2</sup> and a population of 352, 285 according to the 2006 census. Bayelsa shares a boundary with Rivers state to the East and Delta state to the West, with the waters of the Atlantic Ocean dominating its Southern borders (Wikipedia). Figure 2 captures Yenagoa in the map of Bayelsa state (Wikipedia, 2022).

Lokoja and Yenagoa LGA were purposively selected. Multistage random sampling technique was used for the study. The first stage involved the selection of five (5) catfish farming wards in the study areas. In stage 2 twelve (18) catfish farmers from each of the wards were randomly selected for Lokoja and (22) for Yenagoa. A total of Ninety (90 and 110) out of 300 and 370 catfish farmers for both metropolis were used for the study for each location. Data for this study were collected by the use of a well-structured questionnaire administered to the 90 and 110 selected catfish farmers in the study areas. Benefit cost Ratio (BCR) cost and returns analysis and mean score from a 3-point Likert type of rating scale were used to analyze the data.

Benefit Cost ratio

This is the value of total benefits divided by the value of total cost (Shively and Galopin, 2013), values greater than 1 are adjudged to be positively viable.

Benefit Cost Ratio =  $\frac{\text{Benefit}}{\text{Cost}}$

Cost and Return Analysis

Gross Margin (GM) Gross margin is the difference between the gross farm income and the total variable cost (Tashikalma, Sani and Giroh, 2014).

GM = TR – TVC  
 Where GM = Gross margin  
 TR = Total Revenue  
 TVC = Total Variable Cost

Mean Score

Likert scale was used to measure the mean scores of variables (Croasmun and Ostrom, 2011). The three point Likert type of scale will be used as specified below:

Opinion	Point
Very Serious (VS)	3
Serious (S)	2
Not Serious (NS)	1

The mean response to each item will be calculated using the following formula: Where:  $\bar{x}$  = means response,  $\sum$  = summation, F = number of respondents choosing a particular scale point, X = numerical value of the scale point and N = total number of respondents to the item.

Decision: the mean is 3. Any mean score of 2 and above will be considered as a serious constraint any mean score below 2 will be considered as not a serious constraint.

The mean response to each item will be interpreted using the concept of real limits of numbers. The numerical value of the scale points (Response modes) and their respective real limits are as follows:

- Not Serious (NS) = 1 point with real limits of 0.5 - 1.49
- Serious (S) = 2 points with real limits of 1.50 - 2.49
- Very Serious (VS) = 3 points with real limits of 2.50 -3.49

III. RESULTS AND DISCUSSION

Table 1: Average Costs and Return in Catfish Production per Kg in the study areas; Kogi and Bayelsa state

	Kogi State New		Bayelsa State	
	Value (₦)	Percentage	Value (₦)	Percentage
<b>A. Variable costs</b>				
Fingerling	52.09	11.5	32.05	6.32
Feed	309.56	68.3	390.67	77.05
Water	46.29	10.2	30.53	6.02
Labour	36.10	8.0	41.58	8.20
Chemical	2.54	0.6	3.49	0.69
Miscellaneous	6.81	1.5	8.73	1.72
<b>Total Variable Costs (TVC)</b>	<b>453.40</b>	<b>100.0</b>	<b>507.05</b>	<b>100</b>

<b>B. Fixed Costs</b>	-			
Depreciation on pond	10.70		11.36	
Depreciation on land	2.32		3.67	
Total Fixed Costs (TFC)	13.02		<b>15.03</b>	
<b>C. Total Costs</b>	<b>479.44</b>		<b>537.11</b>	
<b>D. Return</b>				
Total Revenue/kg (TR)	<b>1050</b>		<b>1200</b>	
<b>E. Gross Margin (GM) = TR – TVC</b>	<b>596.6</b>		<b>692.95</b>	
<b>F. Benefit Cost Ratio (BCR) = TR/TC</b>	<b>2.2</b>		<b>2.23</b>	

Table 3 Means, Standard deviation and T-test for Kogi and Bayelsa State Gross Margin.

	<b>Lokoja</b>		<b>Yenagoa</b>
<b>Mean</b>	595.6		692.95
<b>Stddev</b>	68.79		69.04
<b>T-test</b>		4.75E-22	

Table 2: Distribution of Respondents According to problems of catfish production

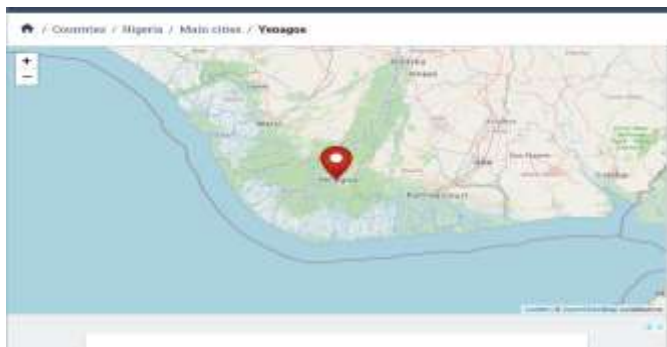
Problems	Kogi State						Bayelsa State						
	Very serious(VS)	Serious (s)	Not serious (NS)	TSS	Mean score	Rank	Problems	Very serious(VS)	Serious (s)	Not serious (NS)	TSS	Mean score	Rank
Inadequate finance	90	0	0	270	3	1	Inadequate finance	108	2	0	328	2.98	1
High cost and poor quality of fish seeds	53	23	15	218	2.42	2	High cost and poor quality of fish seeds	80	18	12	288	2.62	2
Lack of adequate land	38	30	23	195	2.17	3	High cost and poor quality of fish feed	71	22	17	264	2.4	3
Limited market sales	36	32	23	194	2.15	4	Inaccessibility to credit	56	40	14	262	2.38	4
Inaccessibility to credit	27	24	39	168	1.87	5	Scarcity/high cost of hired labour	48	50	12	254	2.33	5
High cost of equipment	12	30	48	144	1.6	6	Extension service (education)	36	61	13	243	2.21	6
Inadequate power supply	15	23	53	128	1.42	7	Lack of adequate water	10	43	57	173	1.57	7
Flood	11	15	65	126	1.4	8	Poor infrastructure	7	48	55	172	1.55	8
Poor infrastructure	5	26	60	125	1.38	9	Flood	5	22	83	142	1.29	9
Disease	9	14	68	122	1.35	10	Disease	3	25	82	141	1.28	10
Lack of adequate water	3	23	65	118	1.32	11	Inadequate power supply	3	24	83	140	1.27	11
Predators	3	14	74	110	1.22	12	High cost of equipment	3	21	86	137	1.25	12
High cost and poor quality of fish feed	3	11	77	107	1.18	13	Limited market sales	2	15	93	129	1.17	13
Scarcity/high cost of hired labour	2	12	77	105	1.17	14	Lack of adequate land	1	12	97	122	1.11	14
Extension (Training)	3	9	78	105	1.17	15	Predators	1	9	100	121	1.1	15

Figure 1. Map of Kogi State highlighting Lokoja Local Government Areas (LGA)



Source: Wikipedia

Figure 2. Map of Bayelsa State showing the eight Local Government Areas (LGAs) and the Capital Yenagoa



Source: Wikipedia

### 3.1 Costs and Return Analysis of Catfish Production in Lokoja and Yenagoa Metropolises

The findings on the cost and returns as indicated in Table 1 shows (TC), total revenue (TR), Gross margin (GM) and benefit cost ratio (BCR) to be ₦479.44, ₦1050, ₦596.6 and 2.2 for Lokoja metropolis and ₦531.11, ₦1,200, ₦692.95 and 2.23 respectively for Yenagoa metropolis. The differences in indicators are as a result of the varying cost of inputs in the different metropolis. Averagely the farmers in Yenagoa makes more profit (₦97.33) than their counterparts in Lokoja, this is also supported (Table 3) statistically by the highly significant ( $t=4.749$ ). Bayelsa State is a transit route to the other South South States, this confers pressure on the demand for catfish leading to consumers paying higher than the consumers in Kogi State. According to Varella (2019) the poverty rate for Kogi State is higher than that of Bayelsa, this also gives credence to why the profitability is higher for Bayelsa State.

In a study - Socio-Economic and Cost Benefits of Catfish (*Clarias gariepinus*) Marketing in Obio-Akpor Local Government Area, Rivers State, Nigeria, Deinye, Olapade and Obi (2021), reported TVC (₦ 68,119.17), TFC (₦ 2,131.71) and TCP (₦ 70,250.92) Total revenue TR came up to ₦181,000.00, mean net income (MNI) ₦137,572.08 and Gross margin (GM) ₦139,635.83. Idris-Adeniyi, Busari, Badmus and Adeniyi (2018), employing the use of regression in the study in the Economic Analysis of Catfish Production among Fish Farmers revealed profitability indicated a BCR of

1.5 and gross margin (GM) of ₦ 240,423.42. Olagunju, Kristófersson, Tómasson and Kristjánsson (2022) modeling their study with the use of profitability analysis (Profitability assessment of catfish farming in the Federal Capital Territory of Nigeria). surmised with the general overview that catfish farming is beneficial, farms were classified into large and small scale and were appraised on the basis of BCR (Benefit Cost Ratio) 1.25 and 0.97, NFI (Net farm Income) ₦2,611,811 and ₦17,247, OPM (Operating Profit Margin) 18.5 and -11.06 and GR (Gross Ratio) 19.5 and -6.93. In another study on profitability and viability of catfish farming in Abia state of Nigeria, Iheke and Nwagbara (2014) using the analytic tools of Cost benefit ratio (BCR) and net profit. They Reported ₦ 770,200 as the average capital invested to start a catfish venture, gross revenue (GR) annually averaged ₦ 1,325,000 and annual average profit of ₦ 545,000 and a benefit cost ratio of 1.33.

The above studies and their findings on the profitability of catfish farming is consistent with that of Lokoja and Yenagoa metropolis having constraints such as inadequate finance, high cost and poor quality of fish seed, lack of adequate land, low credit accessibility, high cost of fish feed, inaccessibility to credit, poor extension

Feed accounted for 68.3%, fingerlings 11.5% and water 10.2% of Cost for Lokoja metropolis, while for Yenagoa metropolis, feed is responsible for 77.05%, labour 8.2% and fingerlings 6.32% of the cost of production. The high cost of inputs evidenced in this study is corroborated in the study - Profitability assessment of catfish farming in the Federal Capital Territory of Nigeria, the small farms (₦703/kg) outspent the large farms (₦598.5/kg) averagely on every kilogramme of fish produced (Olagunju, Kristófersson, Tómasson and Kristjánsson, 2022).

### 3.2 Problems Militating Against Catfish Farmers in Lokoja and Yenagoa Metropolises

The major constraints (Table 2) for both metropolises are inadequate finance and inaccessibility to credit. Olagunju et al., (2022); Ahmadu et al., (2021); Onuche et al., (2020); Idris-Adeniyi et al., (2018); Njoku and Offor, (2016); Okpukpara and Morgan, (2015); Tsue et al., (2012) and Adedeji and Okocha, (2011) all listed finance and input cost as key setback to catfish farmers. Ajah, Igiri and Ekpeyong (2017) in their study in Biase Local Government Area, Cross River State with farmers revealed high interest rate, security (collateral) and guarantor ship as barriers to accessing credit.

At a recently concluded FAO-FISH4ACP conference, stakeholders enumerated diminishing hereditary resources for catfish, high cost of fish feed, inadequate regulations for the industry, dearth of breeding programmes/plans and arbitrary mixing of heritable materials as constraints catfish farmers are facing in the country (Yusuf, 2021)

Despite various studies attesting to the fact that catfish farming is a lucrative venture, farmers still suffer from market failures as they struggle to trade (market) their produce for

amounts commensurate to their efforts (Nwali, Samuel, Adepoju, Oladiran and Yilson, 2017 and Okpukpara and Morgan 2015). This is the case in Lokoja metropolis where catfish in Lokoja metropolis identified limited sales as the fourth major constraints

Poor extension services and training is another issue as corroborated by Olagunju et al., (2022), Tsue et al., (2012). Even though it ranked very low in Lokoja, it ranked higher in the Yenagoa indicating a need for it there.

Emaziye (2020) and Adedeji and Okocha (2010), reported that the lack of comprehensiveness on the part of the government to follow through on policies and programmes also affects the growth of this sub sector.

The entirety of the above are further exacerbated as the catfish farmers' struggle to forge ahead on their own.

#### IV. CONCLUSION

This Paper probed the Cost, Returns and Constraints to Catfish Production in Lokoja Metropolis of Kogi State and Yenagoa Metropolis of Bayelsa State, Nigeria. The study findings revealed the cost of operations, gains and the challenges encountered in the endeavours of catfish activities in Lokoja and Yenagoa metropolises.

##### 4.1 Recommendations

Cascading from the study the following recommendations are made; Catfish farmers should form cooperatives/farmers association to be a bloc in order to pool resources, ideas and gains.

Government should play the stabilising role of ensuring things are done in line with best practices in the areas of policies, providing healthy fish stock, feed, other inputs, regulate/supervise cooperatives and farmers association, organising training/extension programmes and also aiding the credit availability, conditions and process of accessing.

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