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Profitability Analysis of Catfish (*Clarias gariepinus*) Production in Edo State, Nigeria

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ABSTRACT

The continuous importation of fish portends a colossal loss of foreign exchange reserved to Nigeria which requires urgent attention to boost fish production. It is against this backdrop that this study analyzed the profitability analysis of catfish production in Edo State, Nigeria. It specifically describe the production characteristics of the catfish farmers, estimate the input and output quantities of catfish, determine the profitability and identify the constraints associated with catfish production in the study area. Multi-stage sampling procedure was employed to select a total of 468 catfish farmers from the study area. Data collection was achieved through the administration of structured questionnaire. Data analysis was done using descriptive statistics, budgetary techniques and 4-Point Likert-type scale. The results revealed that the farmers in the study area used more of personal savings (58.12%), family land (59.40%) and local feed (82.48%). Stocked more at juvenile stage (70.30%) and produced average output of 4859.51kg per production cycle. The results also showed the average total cost incurred and revenue realized were ₦ 543.67 and ₦ 752.56 per kg fish respectively. The catfish production was profitable with average gross margin, net profit and return per naira invested of ₦224.35, ₦208.90 and ₦1.38 per production cycle respectively. The major constraints faced by catfish farmers were high cost of food (3.96), lack of capital (3.65) and lack of inadequate power supply (3.51) are very serious constraints among others. Since the catfish production was profitable, the farmers should be encouraged to combat these constraints and expand their holdings to boost production.

1. Introduction

There has been growing concerns in the recent years at the low level of animal protein intake which is essentially higher in quality than that of plant as it contains all essential amino acids for growth (Ahmadu, Boheje Odum and Osariemen, 2021). Fish happens to be the cheapest source of protein available to man (Imade and Ogieva 2022) and fish production is often viewed as one of the means of increasing food production in food deficient countries like Nigeria. According to Odioko & Becer, (2022), "the Nigerian Minister of Agriculture and Rural Development, stated that Nigeria's total fish production is estimated at 1.123 million metric tonnes (Vanguard, 2021), to which marine catches contributed 36 per cent, inland waters catch contributed 33 per cent and aquaculture 31 per cent (FAO, 2021). Akinsorotan et al., (2019) reported that the yearly fish demand of Nigeria is about 2.1 million metric tons with Nigeria only able to meet up just about 38.1% of its fish needs and depends on imports to cover the shortfall of about 61.9% of its population need yearly. In 2021, the Nigerian Ministry of Agriculture and Rural Development put the fish demand of the country at 3.6 million metric tonnes of which the country only meet up about 31.19% and depends on importation to meet up the huge gap of about 68.80% (Vanguard, 2021). Fish remains an important dietary element for Nigeria, especially in the southern part of the country where fish is highly valued and one of the cheapest sources of animal protein available to many Nigerians (FAO, 2021). The fishery sector is 1.09% of the national GDP in 2020 and 0.97% in the Q3 of 2021 (NBS, 2021)".

Many species of fish are cultivated all over the world, but catfish is taking the lead due to its uniqueness (Ahmadu and Egbodion 2017). The favoured catfish cultured in Nigeria is *Clarias gariepinus*. *Clarias gariepinus* is regarded as an excellent aquaculture species because it grows fast and feeds on a variety of agricultural by-products; it is hardy and can tolerate extreme temperature, easy to produce in captivity with high annual production, good feed conversion rate and

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healthy for human consumption. Most consumers prefer catfish to other fish species because of its low calorie value, low carbohydrate content, high protein, low fat, low bone content and fine flavor (Ahmadu and Egbodion 2017). In addition, it is quick and easy to prepare and above all, it has great taste. These qualities coupled with its high growth rate, its ability to feed on virtually anything and the fact that its market value is higher than those of other fish species such as tilapia makes the catfish the pride of most fish farmers in Nigeria (Imade and Ogieva 2022).

Catfish has the potential to contribute to sustainable development and poverty reduction in Nigeria by generating income and employment. The production of Catfish as an economic resource is undertaken by a large number of people especially the small-scale farmers in Nigeria (Alawode and Ajagbe 2020). The Nigerian vast aquatic medium comprising numerous water bodies like rivers, streams, lake reservoirs, flood plains, irrigation canals, and coastal swamps offer great potentials for catfish production in Nigeria. The United Nation (UN) noted in its 2016 State of World Fisheries and Aquaculture report that nearly a third of wild stocks are overfished (FAO 2016). Thus, there is need to annexed the potentials of catfish production to fill this gap. This can only be possible if adequate information on the profitability of the production is known. It is in this view that this study seeks to analyze the profitability of catfish production in Edo State of Nigeria.

The specific objectives of the study are to: describe the production characteristics of the catfish farmers; estimate the input and output quantities of catfish production; determine the profitability of catfish production; and identify the constraints associated with catfish production in Edo States, Nigeria.

2. Methodology

Study Area

The study was carried out in Edo State of Nigeria. Edo State is located in the south-south region of Nigeria with Benin City as capital. The State is found in the forest zone of the country. Edo State was created on August 27, 1991 from former Bendel State. The popular language groups include Edo (Binis), Esan, Afemai (Owan/Etsako), Ora, Akoko Edo and Ibibio. The state lies between latitudes 05^{o} 44'N and 07^{o} 34'N of the Equator and longitudes 06^{o} 04'E and 06^{o} 43'E of the Greenwich Meridian. It covers land area of 17,802km^{2} with a projected population in 2018 of 4,592,935 people (Imade and Ahmadu. 2022). The tropical region is characterized by two distinct seasons: the wet season with a mean temperature of 25^{o}C, which starts by April and ends by October and the dry season with a mean temperature of 28^{o}C, which is from November to March. Relative humidity and rainfall are high giving rise to thick vegetation cover with an average rainfall in the range of 1500 - 2500mm (Ebomwonyi, Omorogie, Noutcha, Abajue and Okiwelu, 2019).

The major occupation of the inhabitants of the State is agriculture. Agricultural practices carried out in the area include arable and tree crops production, fishing, snailry, aquaculture, poultry and livestock rearing. Edo State is divided into three Agricultural zones according to Agricultural Development Programme (ADP) delineation as follows: Edo Central, Edo North and Edo South zones. Edo Central is divided into five Local Government Areas (LGAs) as follows: Esan Central, Esan West, Esan North-East, Esan South-East and Igueben LGAs. Edo North comprises six LGAs, namely, Owan West, Akoko Edo, Etsako West, Etsako East, Owan East and Etsako central LGAs. Edo South consists of seven LGAs, namely, Oredo, Ovia South West, Ovia North East, Ikpoba-Okha, Egor, Uhunmwode and Orhionmwon LGAs. In all, there are a total of Eighteen Local Government Areas (LGAs) in Edo State. The State is blessed with freshwater swamp and others coastine areas that is sultable for fish farmers (Ahmadu, Boheje Odum and Osariemen, 2021)

Experimental Design and method of data analysis

The data for the study were drawn from a population of 570 catfish farmers using structured questionnaire in Edo State. Multistage sampling procedure was adopted in selecting farmers for the study. The first stage involved a purposive random sampling of two Local Government Areas (LGAs) each from the various Agricultural Zones where catfish production is dominant in the state. Oredo and Ikpoba-Okha LGAs were from Edo South, Esan North-East and Esan South-East LGAs from Edo Central, and Owan West and Owan East LGAs from Edo North Agricultural Zone. A total of Six LGAs were sampled from State.

Snowballing sampling technique was adopted in the second stage where catfish farmers in the various LGAs were identified in addition to the list obtained from Agricultural Development Programme (ADP) zone in state for this study.

The formula for determining the sample size according to Ryan (2013), was used to select the respondents in the third stage,. This formula is expressed as

$$n = N/(1 + Ne\hat{}2) \quad (1)$$

Where n = Corrected Sample Size, N = Population Size, e = Margin of Error (MoE), e = 0.05 or 5%.

The Catfish Farmers drawn from the LGAs using the sample size formula gave a total sample size of 487 Catfish Farmers used for this study. However, a total of 468 respondents provided useful information for data analysis. The data covered the quantities of inputs and outputs of catfish production and their respective prices. The constraints faced by the farmers were also sourced. Data collected were analyzed using descriptive statistics, budgetary analysis and Likert scale.

Descriptive statistics used include means, frequency count, percentages and standard deviation in tables was used to describe the production characteristics of the catfish farmers and examine the input and output

quantities of catfish production. Budgetary analysis was employed to determine the profitability analysis of catfish production per production cycle.

Model specification

The budgetary tools used are gross margin, net profit and return on investment as adapted from Ahmadu and Egbodion (2017), it is specified as follows:

$$GM = TR - TVC \quad (2)$$

$$TC = TVC + TFC \quad (3)$$

$$Gross\ Ratio = TC/TR \quad (4)$$

$$TR = P*Q \quad (5)$$

$$NFI = \Sigma P_{Yi}Y_i - \Sigma P_{Xj}X_j - \Sigma Fk \quad (6)$$

Where,

GM = Gross Margin (NGN)

TR = Total Revenue (NGN)

TVC = Total Variable Cost (NGN)

TFC = Total Fixed Cost (NGN)

TC = Total Cost (NGN)

P = Market Price (NGN)

Q = Total Quantity (KG)

NFI = Net farm Income (NGN)/production cycle;

P_{Yi} = Unit price of the output of catfish (NGN)

Y_i = Total output of catfish (KG);

P_{Xj} = Unit price of variable inputs (NGN)

X_j = Quantity of variable inputs (where j = 1,2,3……n)

Fk = Cost of fixed inputs (NGN) (where k = 1,2,3….n)

Σ = Summation sign.

Estimates of the operating ratio reveal the level of liquidity in the catfish production business. It is estimated as the percentage of the ratio of total variable costs to the total revenue derived from the business. The Benefit-Cost (B/C) ratio measures the relationship between the costs borne to the benefits obtained from a business venture.

$$ROS = \pi/TR \quad (7)$$

$$OR = TVC/TR \quad (8)$$

$$B/C = TR/TC \quad (9)$$

$$ROI = \pi/TC \quad (10)$$

$$\%ROI = 100*ROI \quad (11)$$

Where,

ROS = Return on Sales (NGN)

OR = Operation Ratio

B/C = Benefit-Cost Ratio

ROI = Return on investment (NGN)

%ROI = Percentage Basic of ROI

The analyses of constraints associated with catfish production in the study area were identified using 4-point Likert-type scale (Likert 1932). The response to the various constraints were served in such a way that the response indicating the most serious constraints were given the highest scale (that is 4) as a 4-point scale, the responses were grouped into 4, that is:

Very Serious (VS) = 4

Serious (S) = 3

Not Serious (NS) = and

Not a Problem (NP) = 1

for a given constraint. A mean score (greater than) > 2.5 were regarded as serious constraints.

3. Results and Discussion

3.1. Socio-economic Characteristics of Catfish Farmers

The results of the study presented in Table 1 indicate that males dominated the catfish production in the study area and this is in agreement with the finding of Ajiboye, Adekunmi, Osundare, Oluwatusin, Toluwase and Amao (2020). This may be connected to the rigorous nature of catfish production activities which requires physical strength and men are known to be more physically endowed. Numa, Obayelu, Sanusi and Bada (2017) also support the males dominating the business in Delta South agricultural zone.

The age distribution of the respondents showed that most of the catfish farmers were relatively young; hence can contribute to improvement in their catfish business. According to Ahmadu, Boheje Odum and Osariemen (2021), catfish farmers in this age category have the propensity for improved agricultural production. Majority (76.71%) of the respondents were married with high household sizes. This emphasizes the advantage of higher family labour to single-member household catfish farmers as corroborates by Olajide and Omonona (2019). Table 1 also showed that most of the farmers were literate with 96.58% of them having at least secondary education. This result confirms the findings of Ahmadu, Boheje Odum and Osariemen (2021) who reported that most catfish farmers in their study area were literate. The result compares favorably with Olajide and Omonona (2019) who reported that the years of education enhance the farmers' capacity to interprets and apply information on improved farm practices. Majority of catfish farmers (66.03%) operate on part time basis. This implies, the farmers had other supporting occupation and catfish production were secondary occupation for them as means of increasing their household income. This is contrary to the findings of Yaqoob and Fasakin (2021) that farming is a major occupation for self-reliance and income generation. As regards production experience, about 52% of the respondents had over 8 years of experience. According to the submission of Olajide and Omonona (2019), the ability to manage catfish ponds efficiently depends on the years of experience, which they found was directly related to the total productivity of the farm.

Table 1
Socio-Economic Characteristics of Catfish Farmers in Edo State.

Variables	Edo State							
	Edo South		Edo Central		Edo North		Total	
	Freq (186)	% (100)	Freq (138)	% (100)	Freq (144)	% (100)	Freq (468)	% (100)
Sex								
Male	138	74.19	100	72.46	72	50.00	310	66.24
Female	48	25.81	38	27.54	72	50.00	158	33.76
Age (years)								
24 – 35	45	24.19	34	24.64	60	41.67	139	29.70
36 – 47	95	51.08	84	60.87	54	37.50	233	49.79
48 – 59	40	21.51	18	13.04	30	20.83	88	18.80
60 – 71	6	3.23	2	1.45	-	-	8	1.71
Mean	41.13		39.29		39.14		39.98	
Std. Dev.	8.48		7.40		7.63		7.95	
Marital status								
Single	27	14.52	22	15.94	22	15.28	71	15.17
Married	153	82.26	114	82.61	92	63.89	359	76.71
Separated	3	1.61	2	1.45	10	6.94	15	3.21
Widow	-	-	-	-	4	2.78	4	0.85
Divorce	3	1.61	-	-	16	11.11	19	4.06
Labour Type								
Family	45	24.19	24	17.39	14	9.72	83	17.73
Hired	33	17.74	24	17.39	46	31.95	103	22.01
Both	108	58.07	90	65.22	84	58.33	282	60.26
Household Size								
1 – 4	100	53.76	116	84.06	72	50.00	288	61.54
5 – 8	80	43.01	20	14.49	50	34.72	150	32.05
9 – 12	6	3.23	2	1.45	22	15.28	30	6.41
Mean	4		3		5		4	
Level of Education								
non-formal	-	-	-	-	2	1.39	2	0.43
Primary	4	2.15	-	-	10	6.94	14	2.99
Secondary	37	19.89	16	11.59	48	33.33	101	21.58
Tertiary	145	77.96	122	88.41	84	58.33	351	75.00
Nature of Catfish Production								
part-time	117	62.90	90	65.22	102	70.83	309	66.03
full-time	69	37.10	48	34.78	42	29.17	159	33.97
Production Experience								
1 – 7	112	60.22	97	68.12	20	13.89	226	48.29
8 – 14	67	36.02	42	30.43	102	70.83	211	45.09
15 –21	7	3.76	2	1.45	22	15.28	31	6.62
Mean	6.31		6.28		9.42		7.25	
Std. Dev.	3.32		2.46		2.60		3.21	

Source: Computed from Field Survey, 2021

3.2. Production Characteristics of Catfish Farmers

Table 2 showed the production characteristic of catfish farmers who participated in catfish production. The results revealed that the percentage of the farmers who used personal savings was 59.14%, 63.77%, 51.39% and 58.12% in Edo-South, Edo-Central, Edo-North and Edo State respectively. This implies that majority of the catfish farmers in the study area fund their production with their personal savings. This agrees with Michael and Duru (2020) where they reported that 80.80% of the respondents financed their fish farm by themselves. In fact, the need to increase farmers' access to credit is necessary in order to ensure agricultural development (Imade and Ogieva 2022). The results also revealed that the majority of the catfish farmers used family land (59.40%) in Edo State then, followed by the leased/rented land (26.28%). This majority of family lands indicate more access to cheap and low cost farming land used for catfish business.

Various types of pond culture systems were used for catfish production in the study area. 40.60% of the catfish farmers used concrete pond, followed by plastic/tarpaulin pond (36.75%) and earthen pond (22.65%). Thus, the concrete pond types were the most common used in the study area. This finding agrees with Imade and Ahmadu. (2022) who stated that majority of fish farmers in Edo State used concrete ponds for fish production. The use of concrete pond might be due to the convenience offered, in being easy to clean and manage, and the ease of harvesting and draining. 70.30% of the farmers stocked at juvenile stage. The majority that stocked at juvenile stage might be so because the farmers could well identify good culture stock even from the juvenile stage so as to reduce mortality of the catfish and as well aid the growth and maturity rate. Catfish farmers used more of local feed (79.57%, 88.41%, 80.56% and 82.48% in Edo South, Edo Central, Edo North and Edo State respectively). This agrees with Ekanem et al. (2012) who compared the growth performance and food utilization of catfish feed on local, midst and import feed and concluded that locally formulated feeds are good alternative in catfish production. More of family and hired labour (60.26%) was also used in the area. This agrees with the finding of Ahmadu and Egbodion (2017) also confirm that both

family and hired labour are used more in catfish production in Lagos Metropolis, Nigeria. The results (Table 2) further revealed that borehole was the major water source (75.00%) in the area. This implies that the respondents depended heavily on borehole water that directly increases the cost of production.

Table 2
Production Characteristics of Catfish Farmers

Variables	Edo State							
	Edo South		Edo Central		Edo North		Total	
	Freq (N=186)	% (100)	Freq (N=138)	% (100)	Freq (N=144)	% (100)	Freq (N=468)	% (100)
Source of finance								
Personal savings	110	59.14	88	63.77	74	51.39	272	58.12
Credit/loan	46	24.73	44	31.88	56	38.89	146	31.20
Government agency	30	16.13	6	4.35	14	9.72	50	10.68
Farm Land Acquisition								
Gift	3	1.61	-	-	4	2.78	7	1.50
Communal	12	6.45	14	10.14	6	4.17	32	6.84
Family	92	49.46	90	65.22	96	66.67	278	59.40
Lease/Rent	55	29.57	30	21.74	38	26.38	123	26.28
Purchase	24	12.90	4	2.90	-	-	28	5.98
Pond Type								
Earthen	48	25.81	24	17.39	34	23.61	106	22.65
Concrete	66	35.48	60	43.48	64	44.45	190	40.60
Plastic/Tarpaulin	72	38.71	54	39.13	46	31.94	172	36.75
Stocking Stage								
Fingerlings	13	6.99	-	-	80	55.56	93	19.87
Juvenile	131	70.43	138	100.00	60	41.67	329	70.30
Post Juvenile	42	22.58	-	-	4	2.77	46	9.83
Feed Type								
Imported	6	3.23	-	-	4	2.78	10	2.14
Local	148	79.57	122	88.41	116	80.56	386	82.48
Midst	32	17.20	16	11.59	24	16.66	72	15.38
Labour Type								
Family	45	24.19	24	17.39	14	9.72	83	17.73
Hired	33	17.74	24	17.39	46	31.95	103	22.01
Both	108	58.07	90	65.22	84	58.33	282	60.26
Water Source								
River	51	27.42	24	17.39	42	29.17	117	25.00
Borehole	135	72.58	114	82.61	102	70.83	351	75.00

Source: Computed from Field Survey, 2021

3.3. Average quantites of Inputs and Output of catfish production

The average quantities of inputs and output of catfish production is presented in Table 3.

The average feed quantity of catfish production in the study area was 0.78kg per cycle for a kg of catfish produced. Edo-South fertilizer quantity (0.28kg per cycle per kg fish) was the highest while Edo-North had the least fertilizer quantity (0.18kg per cycle per kg fish). The results in Table 3, also recorded that the average number of catfish produced was 4153.43, the weight of a catfish was 1.17kg and the output quantity produced was 4859.51kg per cycle per average of 584.17m^2 pond sizes of the catfish farmers in the study area. The prices per kg of mature catfish in Edo-South, Edo-Central and Edo-North were respectively NGN 760.22, NGN 760.87 and NGN 734.72, and the study area price per kg was NGN 752.56. This was supported by Ebukiba and Anthony (2019), who reported that higher output is due to efficiency utilization of resources used in catfish production.

Table 3
Distribution of Catfish Farmers by Input-Output Quantities per cycle

Variable	Edo State			
	Edo South (186) Mean	Edo Central (138) Mean	Edo North (144) Mean	Total (468) Mean
Inputs				
Feed Quantity /kg of catfish	0.71	0.75	0.90	0.78
Labour Used /kg of catfish	0.002	0.002	0.002	0.002
Fertilizer Quantity/kg of catfish	0.28	0.20	0.18	0.22
Outputs				
Average number of catfish /farmer	3412.36	4261.81	5168.46	4153.43
Average Weight/ Catfish (kg)	1.24	1.20	1.05	1.17
Pond Size(M^2)/ farmer	576.61	566.96	610.42	584.17
Output (kg)	4231.33	5114.17	5426.88	4859.51
Price/kg of Mature Catfish	760.22	760.87	734.72	752.56

Source: Computed from Field Survey, 2021

3.4. Profitability (costs and returns) analysis of catfish production

The results in Table 4, revealed that the average total cost incurred in catfish production across the state were NGN 500.04, NGN 547.54, NGN 596.32 and NGN 543.67, and revenue of NGN 760.22, NGN 760.87, NGN 734.72 and NGN 752.56 per kg fish was realized respectively in Edo-South, Edo-Central, Edo-North and Edo State as a pool. On average in the study area as a whole, a kg of catfish produced gave an average gross margin of NGN 224.35 and net profit of NGN 208.90 per production cycle. The return on sales was 0.28 indicating that for every one Naira of catfish sold, 28k profit was made. The gross ratio 0.72 implies that from every N1.00 return to the farm enterprise, 72k expenses were incurred in the production. The operating ratio of 0.70 means 70% of the revenue was used to offset the variable costs. The B/C ratio (1.38) and the rate of return on investment of 0.38 imply that for every one Naira invested in catfish production by each catfish farmer, returns (NGN 1.38) and profit of NGN 0.38 was obtained. The Profitability analyses show that, the catfish production was profitable in the Study area. This result is consistent with the findings of Alawode and Ajagbe.(2020) on the profitability of small-scale catfish production in Southwest Nigeria. Also, it is similar to the findings by Ebukiba and Anthony (2019) which concluded that catfish production is a profitable business in Nassarawa State as well as Onyekuru., Ihemezie and Chima (2019) which also concluded that catfish production in Enugu State is profitable.

Table 4
Profitability analysis of Catfish production per cycle per kg catfish

Variables	Edo State			
	Edo South (186) Mean	Edo Central (138) Mean	Edo North (144) Mean	Total (468) Mean
Returns (NGN)				
Total Revenue per kg fish	760.22	760.87	734.72	752.56
Variable Costs (NGN)				
Unit cost of stocking	28.28	35.90	25.62	29.69
Cost of fertilizer	44.35	31.87	28.42	35.77
Cost of lime	0.01	0.01	0.01	0.01
Cost of feeding	404.56	453.03	525.15	455.96
Cost of medication	2.25	2.53	2.17	2.31
Cost of transportation	1.20	0.96	1.18	1.12
Cost of energy	3.01	2.92	1.88	2.64
Cost of labour	0.92	0.67	0.55	0.73
Total Variable Cost (NGN)	484.51	527.89	584.99	528.21
Fixed Costs (NGN)				
Rent on Land	3.85	3.37	2.81	3.39
Cost of Pond construction	2.39	2.25	1.73	2.155
Harvesting nets Cost	0.39	0.36	0.31	0.36
Cost of scale	0.00	0.00	0.00	0.00
Cost of Sorting Filter	0.15	0.06	0.09	0.10
Plastic container Cost	1.19	0.92	0.96	1.04
Cost of generator	3.56	3.30	2.20	3.06
Cost of Shovel	0.09	0.10	0.10	0.10
Cost of Borehole	3.91	9.28	3.15	5.26
Total Fixed Cost (NGN)	15.53	19.65	11.34	15.46
Total Cost per kg fish (NGN)	500.04	547.54	596.32	543.67
Profitability Index				
Gross margin (NGN)	275.71	232.99	149.74	224.35
Net Profit (NGN)	260.18	213.33	138.40	208.90
Return on Sales	0.34	0.28	0.19	0.28
Gross Ratio	0.66	0.72	0.81	0.72
Operation Ratio	0.64	0.69	0.80	0.70
Benefit-Cost Ratio	1.52	1.39	1.23	1.38
Return on Investment	0.52	0.39	0.23	0.38
Percentage Basic of ROI	52.00	39.00	23.20	38.40

Source: Computed from Field Survey, 2021

3.5. Constraint faced by Cafish Farmers

The production constraints faced by catfish farmers in the study area are presented in Table 5. Out of the 16 constraints under consideration, 15 of them are rated serious with their mean scores greater than the bench mark of 2.5. They influence catfish productivity negatively. Top among the constraints are high cost of food, lack of capital and credit at affordable rates, and inadequate power supply respectively. Except for high spread of pest and disease that shows not serious, other constraints presented are greater than the bench mark of 2.5, meaning serious constraints. These results agreed with the findings of Saagulo *et al.* (2017) and Ahmadu, Boheje Odum and Osariemen (2021) that also reported these constraints are serious constraints in their respective study areas.

Table 5
Constraints faced by Catfish Farmers

Variable	Edo State			
	Edo South (186) Mean	Edo Central (138) Mean	Edo North (144) Mean	Total (468) Mean
Feed high cost	3.95	4	3.92	3.96
Lack of capital	3.63	3.71	3.61	3.65
Lack of credit at affordable rates	3.68	3.77	3.56	3.36
Lack of skilled manpower	3.24	3.28	3.25	3.25
Scarcity of fingerlings/ juveniles	3.37	3.39	3.28	3.35
Lack of modern technologies	3.26	3.30	3.22	3.26
High cost of transportation	3.36	3.29	3.19	3.29
High cost of labour	3.40	3.49	3.39	3.43
Inadequate access to farm land	3.31	3.35	3.28	3.31
Inadequate water supply	3.48	3.48	3.42	3.46
Inadequate power supply	3.45	3.55	3.56	3.51
Poor storage facilities	3.24	3.32	3.33	3.29
Ineffective extension services	3.21	3.30	3.31	3.27
Lack of organized market	2.79	2.97	2.83	2.86
Inadequate data collection	2.74	2.91	2.83	2.82
High spread of pest and disease	2.07	2.32	2.19	2.18

Source: Computed from Field Survey, 2021
Mean score $\geq$ 2.5 is a serious constraint.

4. Conclusıon and Recommendatıons

The study analyzed the profitability of catfish production in Edo State. It revealed that the cost of feeds was the major cost component in catfish production but it was found to profitable with more profit in Edo South and least profit in Edo North agricultural zone. The major constraints identified to confront catfish production were high cost of food, lack of capital and credit at affordable rates respectively. In boosting catfish production effort should be geared towards reduction in the cost of feeds and making credit facilities accessible to the farmers to finance their production. Government, private and non-governmental organizations as well as financial institutions should be encouraged to provide accessible financial support to the catfish farmers at affordable rate so as to increase their productivity. Catfish farmers should come together to form co-operative societies and/or join Catfish Farmers Association to ease their accessibility to farm inputs, through cooperate effort reduce cost of feed and organized marketing channels to enable sales of marketable catfish.

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