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Determinants of Profit in Fresh Catfish production in Ogbaru Local Government Area of Anambra State, Nigeria.

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Abstract

The study "determinants of Profit in fresh catfish production in Ogbaru Local Government Area of Anambra State, Nigeria" focused on the factors influencing profit in catfish production in the study area. Data was collected with a well-structured questionnaire from 50 respondents that were selected. The objectives were achieved using statistical tools and econometric techniques such as descriptive statistics, gross margin analysis and multiple regression analysis. The study revealed that greater proportion (48%) of the farmers are within the age of 40 – 49years, with average age of 42 years to conclude they are in their active years. It also revealed that male (64%) who were married (74%) dominated catfish production in the area. Majority (58%) attended secondary school with a mean of 10.6 and has an average farming experience of 5.2years. The study further revealed that majority (56%) of the farmers has household size between 4 to 6 persons and many (66%) belonged to cooperatives. Majority (54%) made use of between 1 and 3 ponds and average pond size of 3.5 indicating they are operating on subsistent level. About 48% had extension contact between 1 to 5 times. Details from the analysis revealed that the total revenue realized from catfish production is ₦1,025,228. The variable cost (operational cost) was ₦396, 336, and the depreciated fixed cost value was ₦176,054; which summed the total cost expended to ₦572,390. Furthermore, farmers made a gross margin of ₦ 628,892 from the sales, the net return which is the profit after deduction total cost is ₦452,838. Net return on investment realized during a cycle production for 1000 catfish is about ₦1.79, suggesting that for every 100kobo spent there was a return of about 179 kobo which makes catfish a very profitable on in the area. The study further revealed that pond size (7.22)***, feed cost (3.06)**, extension contact (2.33)* and stocking size (-1.92)* are the socioeconomic characteristics that influenced the profit realized by the catfish farmers. The study finally presents the most important constraints to catfish production as: high feed cost, high fuel cost, inadequate finance, lack of power supply, high mortality, Government policies, lack of adequate water supply, inadequate extension services and recommended that in order to reduce commensalism, fish should be sorted out according to size at appropriate time and feeding done when necessary as well to avoid cannibalism. Government should provide facilities such as incentives, subsidies and facilitate access to credit by catfish farmers in the study area by the review of the stringent lending policies of the formal lending institutions and effort should be made to bring down the cost of feeds by exploring alternative sources of feed for catfish through well-funded researches.

Keywords: Profit, Fresh catfish, production, determinants.

Introduction

In Nigeria, Fish remains one of the most common form of animal protein. Outside provision of required nutrients, it is also known to provide employment as various stages, which may range from fish farming, processing and marketing. As noted by Offiah, etal (2024), the practice of farming which includes broiler production, still remain the pillar of the Nigerian economy for growth and development especially in rural communities. Onyeneke etal (2022), observed that Fish significantly contributes to household food and nutrition security in Nigeria. The fish

subsector involves fish production (harvesting fish in their natural habitat, as well as raising fish through aquaculture), fish processing, and fish distribution. These activities create employment and trade that generate income for the rapidly growing population Onyeneke etal (2022).

The fishery sector according to Okelola etal (2026), remains a vital pillar of Nigeria's agricultural economy, contributing substantially to food security, employment, and rural livelihoods. Fish provides over 50% of the animal protein intake in Nigeria and serves as a critical source of micronutrients, particularly for low-income households (FAO, 2024). Aquaculture value chain involves the inter-linkages of economic activities inherent in fisheries business venture such as; business conception, breeding, rearing/harvesting processing, marketing, transportation, financing and culminating to product delivery to the final consumer (Awolumate and Inyang, 2020)

Increasing profit within the fresh catfish industry require a good knowledge of the industry as well as being at home with factors capable of raising every naira invested in the industry which will serve as a yardstick for continuity in the business, which will enhance sustainability. As noted by Nzeocha etal (2024), the development of the food and agricultural sector relies heavily on efficient marketing which brings about improved pricing thus resulting in a better distribution of income among producers of agricultural produce. Thus the growth of a country's population is usually accompanied by increases in the demands for the basic necessities of life including water, food and shelter. This is the case with the unrestricted increases in the demand for protein rich food items of animal origin especially. Acheneje and Ogiji (2025), noted that in recent times, Nigeria has observed an exceptional concern by entrepreneurs in fish production. This is largely due to scarcity of fish in the local markets, in addition to the high export potential of our local shellfish species in international markets.

Catfish farming as an industry is faced with a lot of constraints which include inadequate supply of fishing inputs (fingerlings and feed), rising cost of trawling operation, insufficient production of fingerlings of cultivable catfish species, lack of sufficient least cost-effective feed for catfish culture among others (Oluwatayo, et.al. 2019; Olagunju, 2020). Annual fish demand and supply in Nigeria was projected as 3.48 million metric tonnes and 1.95 million metric tonnes respectively, this leaves a demand supply deficit of 43.9 per cent (Giwa, et. al, 2018). This empirical result suggested that employment opportunities abound in the fishery subsector of the Nigerian economy. Globally, catfish farming is considered an important agricultural activity that is capable of ending nutritional deficiencies of the world and contributing to poverty reduction. It meets the food security needs of millions of people in developing countries who will benefit from it as it is a source of relatively inexpensive protein (Kaleem & Abudou-Fadel, 2020). This has prompted the government to package the presidential initiative on fisheries and aquaculture development in 2003 to provide financial and technical assistance to government programmes and projects encourage fish production. It has been asserted by Adederan (2016) that the only way of boosting catfish production and profitability; thereby move the country towards self-sufficiency in catfish production is by embarking on efficient fish farming.

The profitability of aquaculture as a business has not been demonstrated adequately as compared to other industries like crop production in the Ogbaru LGA in Anambra State. Commercial production of this species has been hampered by small harvest resulting from excessive production and stunting. Regardless these efforts of government, catfish production has remained low in the country as well as in Ogbaru local government area of Anambra State. This has been attributed to inadequate supplies from local catfish farmers due to the use of poor quality catfish seeds, inadequate information, poor infrastructural facilities and low capital investment (Ugwumba & Ninabuife, 2018). Greater improvement in catfish production can be achieved with a proper analysis that will lead to knowledge of the level of profitability of catfish farming and constraints to production in Ogbaro LGA in Anambra State.

To ascertain the determinants of profit in fresh catfish farming in Ogbaru local government area in Anambra State, the study specifically:

i. described the socio-economic characteristics of catfish farmers in the study area

ii. determine the cost and returns in catfish farming

iii. determine the socio-economic factors affecting profit in catfish production

iv. identify the constraints in catfish farming in the study area

Methodology

Study Area

The study area is Ogbaru Local Government Area, located in Anambra State, Nigeria. Anambra State, situated in the southeastern region of Nigeria, boasts a rich cultural heritage and a population of over 5 million inhabitants (City population, 2022).

Geographically, Anambra State is bounded by Delta State to the west, Imo State to the south, Enugu State to the east, and Kogi State to the north, with coordinates 6.2047° N and 6.9370° E. The state's economy is diversified, with agriculture, commerce, and industry being the main drivers. Ogbaru Local Government Area, is one of the 21 local government areas in Anambra State, and has its headquarters in Atani. As of 2006, the area had a population of approximately 164,794 people, according to the National Population Commission. Covering an area of 328 square kilometers, Ogbaru LGA shares boundaries with Idemili North, Idemili South, and Onitsha North LGAs. The area experiences a tropical savanna climate, characterized by two distinct seasons: rainy and dry. The rainy season, which lasts from April to October, is marked by heavy rainfall and high humidity, while the dry season, which lasts from November to March, is characterized by dry and dusty conditions. The tropical savanna climate of Ogbaru LGA supports the growth of a wide range of crops, including yams, cassava, maize, and vegetables. The area's fertile soil and favorable climate make it an ideal location for agricultural activities.

The main occupations in Ogbaru LGA are farming, trading, and craftsmanship. The area is predominantly inhabited by the Igbo people, Ogbaru LGA comprises several communities, including Atani, Odekpe, Akili-Ozizor, Akili-

Umunze, Ogbakuba, Umunankwo, and Ossomala. Each of these communities has its unique cultural and historical significance, making Ogbaru LGA a rich and diverse cultural landscape.

Population and Sampling Procedure

The population of the study comprised of all the catfish farmers operating in Ogbaru LGA of Anambra State. Multi-stage involving purposive and random sampling techniques was used to select fifty (50) respondents that were used for the study. In stage I, five communities, Atani, Odekpe, Akili-Ozizor, Akili-Umunze, and Ossomala were selected randomly. Stage II involved a purposive selection of 2 major fish villages in each of the selected communities predominantly know for rearing catfish to make a total of ten villages. Stage III involved random selection of five (5) catfish farmers from each of the selected villages to arrive at a total of fifty (50) respondents that were used for the study.

Method of Data Collection

The data for the study were collected through primary source using a well-structured questionnaire. Based on the objectives of the study, the questionnaire was divided into four sections. The information elicited from the catfish farmers laid emphasis on the farmers' socio-economic characteristics, profitability, resource, variables influencing profit and constraints faced by catfish farmers in their daily activities.

Method of Data Analysis and Model Specification

The Statistical Product and Service Solution (SPSS) software version 21 was used to analyze the data collected. Descriptive statistics such as frequency counts, percentage and mean score were used to achieve Objective i (socio-economic characteristics of the respondents), objective ii (cost and returns of catfish farming) was achieved using gross margin analysis/budgeting technique, objectives iii (socio-economic factors affecting profit in catfish production) was analyzed using multiple regression and objective iv (constraints faced by catfish farmers) was achieved using Likert type scale.

The budgetary technique model deployed for profitability assessment for the marketers is given as:-
GM = TR – TVC
NMI =TR –TC
Where,
GM = Gross margin,
TR =Total Revenue, (Price per kg X quantity) (₦),
TC = Total Cost,
NMI = Net marketing income,
TVC = Total Variable Costs
The regression model specified for fish production was implicitly represented as
Q = F(Fd, Fs, Ps, Lr, Wr + U)…….(1.1)
Where,
Q = Output of fish harvested in kg
Fd = Quantity of feed utilize (kg)
Fs = Numbers of fingerlings

Ps = Size of pond (m
Lr = Labour (man days)
Wr = Water quality (turgid water = 1, non-turgid water = 0)
U = Error term

Result and discussion

The presentation and discussion of result of data analyses were done under the following sub-headings: socioeconomic characteristics of the catfish farmers, cost and return analysis in fresh catfish production, factors influencing fresh catfish production and constraints to profit from fresh catfish production

Socio-Economic Characteristics of fresh catfish producers in the Study Area.

The study revealed that greater proportion (48%) of the farmers are within the age of 40 – 49years, with average age of 42years. The implication for the study is that farmers are still in their active farm age and can adopt new innovation to better their production. This is in line with Onubogu *et.al.*(2025) who found a mean age of 46 among catfish farmers in Anambra. The sex of the catfish producers in Ogbaru LGA, shows that the majority (64%) of farmers are male while the remaining 36% are female. The indication is that catfish farming is dominated by male in the area, this could be linked to the fact that male have more access to productive resources than the women in terms of capital and land. This agrees with Nwankwo etal (2021), who noted that majority of farmers (61%) involved in Agripreneurs the area was female. Majority (74%) of the farmers are married, while the remaining 26% are otherwise single or divorced. This indicates that most of the farmers will get the work done easily by family members and thereby reducing amount paid for labor. This finding equally was in agreement with Enwelu *et.al.*(2023) who found that about 79.2% of catfish farmers were married in Anambra state. The level of education of the fish producers in the study shows that the greater proportion (58%) of the respondents attended secondary school, while the average years of schooling was found to be 10.6, this as an indication that catfish farmers are literate enough to understand, practice and adopt innovation which will translate to increased profit. This is in agreement with the findings of Ezeaputa *et.al.*(2020) who recorded that majority (52%) had secondary education as the highest qualification with mean years of formal education of 11 years.

The farming experience of the catfish farmers in the study area. The finding shows that greater proportion (64%) of the respondents had 1 –5 years of farming experience, and average experience was 5.2years, this implies that the farmers are still new in catfish production showing new entrance of farmers to commercial catfish production as a source of livelihood opportunity. This is in line with the findings of Adeniyi (2021) who found that majority (65%) of catfish farmers had between 1-5 years farming experience. On household size, majority (56%) of the farmers have a household size of 4–6 people, this could be as a result of the fact that majority of the farmers were still young as seen in the years as most young people do not believe in having many children. This also agrees with Adeniyi (2021) who found average household size of 5 persons in her study. The study revealed that majority (66%) belonged to cooperative society and about 24% were non-members. This interestingly means that purchasing inputs like feed

can be done together thereby reducing the production cost, and also new information can easily be disseminated collectively. This conforms to Ume *et.al.* (2016) who recorded 75% of the respondents to be cooperative members.

Finally, the study revealed that majority (54%) reared about 1-3 ponds, this entails that many of the catfish farmers are still operating on subsistence level belonged to cooperative society and about 22% were non-members. This aligns with Adeniyi (2021) who found that about 71% used ponds numbering 1-3.

Socioeconomic characteristics of fresh catfish producers in Ogbaru LGA

Socioeconomic variables	Frequency	Percentage	Mean
Age (years)			
Less than 20	2	4	
20 – 29	2	4	
30 – 39	14	28	
40 – 49	24	48	42
Gender			
Male	32	64	
Female	18	36	
Marital status			
Single	8	16	
Married	37	74	
Divorced	5	10	
Household size:			
1 - 3	13	26	
4 – 6	28	56	
7 – 9	9	18	
Level of education:			
Primary (1 – 6years)	6	12	
Secondary education (7 – 12 years)	29	58	
Tertiary education (13 years and above)	15	30	10.6
Farming experience			
1 – 5 years	4	8	
6 -10 years	13	26	11.5
11 – 15 years	27	54	
16 - 20 years	6	12	
Cooperative Membership			
Non members	17	24	
Members	33	66	
Number of ponds			
1-3 ponds	27	54	
4-6 ponds	21	42	
7-9 ponds	2	4	3.5

Source: Field survey 2025

4.2 Cost and Return Analysis in catfish production

The profit realized from catfish production enterprise is presented in Table 2 below. Details from the analysis revealed that the total revenue realized from catfish production is ₦1,025,228. The variable cost (operational cost) was ₦396, 336, and the depreciated fixed cost value was ₦176,054; which summed the total cost expended to ₦572,390. Furthermore, farmers made a gross margin of ₦ 628,892 from the sales, the net return which is the profit after deduction total cost is ₦452,838. Net return on investment realized during a cycle production for 1000 catfish is about ₦1.79, suggesting that for every 100kobo spent there was a return of about 179 kobo which makes egg production a very profitable on in the area. This supports the assertion by Ikechukwu (2023) who recorded that catfish production was profitable in Anambra State with return on investment of ₦1.11 for every capital invested. This also agrees with Offiah etal (2023), who reported a NOI of ₦1.57 in broiler production in Anambra state

Table 3: Average cost and return in catfish per production cycle

Item description	Quantity / unit	Average amount in ₦
A. Variable Cost		
Cost of fingerings	1000@20	20,000
Feed cost	27@10200	275,400
Cost of drugs		7,783
Labour cost	2@18,000	36,000
Cost of water		33,976
Transportation		23,177
Total variable cost (TVC)		396,336
B. Fixed Cost		
Dep. Pond construction		73,970
Dep. Weighing scale		8,366
Cost of electricity		73,276
Dep. Pumping machine		17,967
Dep. Harvesting net		725
Dep. Basins		1750
Total fixed cost(TFC)		**176,054**
Total Cost		**572,390**
C. Revenue		
Sales from matured fish	914@1,102	1,007,228
Sales from hatchery (fingering)	900@20	18,000
Total Revenue		**1,025,228**
D. Income Analysis		
Gross Margin (TR-TVC)		628,892
Net farm income (NFI) = TR-TC		452,838
Net Return on investment (NROI)		1.79

Source: Field survey 2025

Influence of Socioeconomic characteristics on catfish production

The relationship between socioeconomic / enterprise characteristics of catfish farmers and profit is presented in Table 3. The result of the multiple regression showed the coefficient of multiple determinant (R^2) of 0.77, which implies that 77% variation in profit in catfish production was explained by the joint action of farmers' socioeconomic and enterprise variables, while the remaining 23% unexplained was as a result of the error beyond the farmer's control. The significant F-stat. value of 20.583*** significant at 1% level of probability is an indication that the model was a good fit model and that all the variables used in the analysis improved the result. This agrees with Onuwa *et.al.*(2020) who recorded 84% of the coefficient of multiple determination to explain profit realized by catfish farmers.

The coefficient of pond size was positive and significant at 99% level of significance, this implies that increase in pond size of the catfish producers will increase the profit from the enterprise by ₦58,580. This means that catfish production require enough space for the fish to increase its production and reduce cannibalism which translates to increased profit. This agrees with Adeosun (2019) who found pond size to be 99% positively significant to increased profit.

The coefficient of level of quantity of feed was positive and significant at 95% level of probability, this implies that increase in quantity of feed will increase profit by 94 kobo. This is so because feed is a prerequisite in catfish production as cannibalism mostly occurs as a result of hunger. When the fishes have enough feed they will grow to gain the required weight needed for market. This agrees with the findings of Adeosun (2019) who found quantity of feed to be positive at 99% probability level.

The coefficient of extension contact was positive and significant at 90% level of probability, this implies that a unit increase in the number of extension contacts will lead to about ₦13, 865 profit in catfish production in the area. This is because extension contact happens to be the means of passing new ideas and educating farmers of the likely outcome of any action. This agrees with Onuwa *et.al.*(2020) who found extension contact to be positively significant at 95% significance level.

Furthermore, the coefficient of stocking size was negative and significant at 90% level of probability; this implies that an increase in stocking density will reduce farmers profit by about ₦106.61k. This is could be because higher stocking capacities lead to reduced output as there would be massive competition which lead to increased mortality and reduce profit. This results is also in alliance with Onuwa *et.al.*(2020) who found a negatively significant probability relationship of stocking size with profit at 99% level.

The coefficient of family size, educational qualification and years of experience were positive but not significantly affecting profit in catfish production in Ogbaru LGA.

Thus, the variables that influenced the profit of the catfish farmers in the study area include pond size, quantity of feed, stocking size and number of extension contacts.

Influence of socioeconomic and enterprise characteristics on profit of catfish production

Socioeconomic variables	Linear Estimate	t-test
Intercept	137782.059	1.52
Family size	7270.872	1.38
Pond size	58580.555	7.22***
Educational qualification	1775.877	1.10
Feed cost	0.940	3.06**
Years of experience	2704.536	0.70
Stocking size	-106.636	-1.92*
Extension contact	13865.001	2.334*
R^2	0.77	
F-stat	20.583***	
Number of Obs.	50	

*Source: Field Survey, 2025. ***,**,* means significant 99%,95% and 90% respectively*

Constraints associated with catfish Production in the study area

The constraints to catfish production in the study area are presented in table 4, the data was analyzed from the mean threshold of five point Likert scale, decision rule was set at 3.0. Thus variables with a mean score of 3.0 and above were regarded as a problem while those below were not seen as a threat to catfish production in Ogbaru LGA. Based on the twelve (12) constraining variables identified, those with a mean score of 3.0 and above includes; high feed

cost (4.36) , high fuel cost (4.43), inadequate finance (4.02), lack of power supply (3.86), high mortality (3.76), Government policies (3.54), lack of adequate water supply (3.00), inadequate extension services (3.00). However, variables such as disease incidence (2.40), security issues (2.54), inadequate market (2.60) and scarcity/cost of fingerings (2.70) were not considered as threat to catfish production. The constraints also found a cluster mean of 3.35 implying that the problems identified were actually the major problems they encounter in catfish production.

Table 4: Constraints limiting catfish production in the area.

Constraints	SD	D	SWA	A	SA	Total score	Mean	Decision
High feed cost	0(1)	2(2)	9(3)	8(4)	31(5)	218	4.36	Agree
Inadequate finance	0(1)	4(2)	6(3)	25(4)	15(5)	201	4.02	Agree
Disease incidence	13(1)	19(2)	5(3)	11(4)	2(5)	120	2.40	Disagree
Lack of adequate water	3(1)	9(2)	5(3)	9(4)	24(5)	150	3.00	Agree
Inadequate market	13(1)	16(2)	9(3)	2(4)	10(5)	130	2.60	Disagree
Inadequate extension services	9(1)	5(2)	17(3)	15(4)	4(5)	150	3.00	Agree
High fuel cost	2(1)	2(2)	3(3)	11(4)	32(5)	217	4.43	Agree
Scarcity/cost of fingerings	3(1)	29(2)	5(3)	6(4)	7(5)	135	2.70	Disagree
Lack of Power supply	4(1)	8(2)	4(3)	9(4)	25(5)	193	3.86	Agree
High mortality	2(1)	6(2)	7(3)	18(4)	17(5)	188	3.76	Agree
Security issues	4(1)	31(2)	6(3)	2(4)	7(5)	127	2.54	Disagree
Govt. policies	4(1)	9(2)	11(3)	8(4)	18(5)	177	3.54	Agree
Cluster mean							**3.35**	**Agree**

Source: Field survey data 2025. Key: SD (strongly disagree), D (disagree), SWA (somewhat agree), A (agree), SA (strongly agree).

Conclusion

Based on the findings of this study, it can be concluded that catfish production in Ogbaru local Government Area is a very profitable and lucrative business since every naira investment yield about ₦1.79kobo. The study further shows that improving factors such as pond size, feed cost and extension contact will increase the profit made by the catfish farmers in the area; also reducing the stocking size will reduce commensalism. Addressing constraints such as high feed cost, high fuel cost, inadequate finance, lack of power supply, high mortality, Government policies, lack of adequate water supply and inadequate extension will further improve the profit realized in catfish production.

Recommendations

i. Based on the study findings, the study recommends that in order to reduce commensalism, fish should be sorted out according to size at appropriate time and feeding done when necessary as well to avoid cannibalism.

ii. Scarcity of fingerlings can be solved through organizing workshops and seminars to educate the farmers on fish culture and breeding and where to source it.

iii. Government should provide facilities such as incentives, subsidies and facilitate access to credit by catfish farmers in the study area by the review of the stringent lending policies of the formal lending institutions and effort should be made to bring down the cost of feeds by exploring alternative sources of feed for catfish through well-funded researches.

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