



PROFITABILITY ANALYSIS OF CATFISH PRODUCTION IN ODOGBOLU LOCAL GOVERNMENT AREA OF OGUN STATE, NIGERIA

*1Adeosun, O. M., ¹Olaoye, O. J., ²Ojebiyi, W. G., ³Agarawu, O. L. and ³Adeosun, F. I. ¹Agricultural Media Resources and Extension Centre, Federal University of Agriculture, P.M.B. 2240, Abeokuta ²Department of Agricultural Extension and Rural Development,

Federal University of Agriculture, P.M.B. 2240, Abeokuta ³Department of Aquaculture and Fisheries Management, Federal University of Agriculture, P.M.B. 2240, Abeokuta ***Corresponding Author's Email:** adeosunom@funaab.edu.ng

ABSTRACT

This study analyzed the profitability of catfish production in Odogbolu local government area of Ogun state. Multistage sampling procedure was used to select the study samples and data were collected with the aid of interview guide from 120 catfish farmers. Descriptive and inferential statistics were used for data analysis. Results revealed that catfish farming was dominated by male (75.0%) with mean age of 47.3 ± 7.7 years. Also, highest proportion (46.7%) of the farmers had post-secondary education. The mean household size was 4±1persons. Majority (83.3%) of the respondents had 1-10years of fish farming experience with mean farming experience being 6.5±4.9 years. Majority (88.3%) of the fish farmers got involved in fish farming for commercial reasons. A total of N3.051.537.50 was expended to realize a total revenue of ₹3,770,291.70 leaving a gross margin of ₹1,216,123.30 and net farm income of ₹718,754.10. It was further revealed that fish feed accounted for 77.4% of the total cost. Most (99.2%) of the respondents identified flooding, outbreak of disease (82.5%) and poor quality of fish seed (60.8%) as severe constraints to fish farmers. The regression analysis established that number of ponds was the only significant determinant (p<0.05) of fish farmers' profitability from catfish production. The study concludes that although catfish farming is faced with some constraints, it is a profitable enterprise among farmers in Odogbolu Local Government Area of Ogun State, Nigeria. It is recommended that farmers must ensure that they keep their cost of production as low as possible. Also, they should ensure efficient use of input resources especially feeds.

Keywords: Catfish, Resources, Profitability

INTRODUCTION

Fish constitutes about 41% of the total animal protein intake by the average Nigerian hence there is great demand for fish in the country (Federal Ministry of Agriculture and Rural Development, 2011). Nigeria requires about 2.66 million metric tons of fish annually to satisfy the dietary requirement of its citizens (Worldfish 2017). Regrettably, the total aggregate domestic fish supply from all sources (capture and culture fisheries) is less than 0.7 million metric tons per annum. Nigeria has to import about 0.7 million metric tons of fish valued at about \$500 million annually to augment the shortfall (FMARD, 2011). According to Ajagbe (2019), Nigeria spent over N125 billion per annum on importation of 1.9 million metric tonnes of fish in 2015. The Federal Ministry of Agriculture and Rural Development - FMARD (2011) also stated that Nigeria spent N97 billion on fish in 2010 alone in spite of all the endowed marine resources, rivers, lakes and creeks of the nation. This massive importation of frozen





fish in the country has ranked Nigeria the largest importer of frozen fish in Africa (FMARD, 2011). The WorldFish future research projects that, total fish production will increase from 1.3 to 2.8 million tonnes during the 2020-2050, 4.5 times increase in aquaculture to 1.8 million tonnes in 2050. Aquaculture production will exceed the capture fisheries production by mid 2030, heavy dependence on imports to sustain fish supply and consumption, fish consumption will remain low under Business as Usual (BAU), 50% of global average As its population increases from 196 million in 2018 to 263 million in 2030, WorldFish (2021) indicates that Nigeria would need 752 thousand tons more fish to maintain 11.2 kg of current per capita fish consumption and would need 3.14 million tons more fish to reach 20.3 kg current global per capita fish consumption, by 2030. This market situation provides significant new opportunities for aquaculture growth, creating opportunities for smallholders, jobs along the value chain, women's empowerment and nutritional improvement (Subasinghe et al., 2021, WorldFish 2017). To solve the country's high demand for fish, Nigerians must turn to their underutilized inland water for improved fish production and aquaculture. One of the adopted strategy is the rearing of fast growing fish species which are resistant to diseases, one of such species in Nigeria is Catfish. Efforts to boost animal production and to bridge the gap between supply and demand are particularly directed at fish production which is traditionally regarded as a cheap source of protein. Some of the programmes aimed at increasing fish production include (i) in-shore fisheries development project (ii) National Accelerated fish production project (NAFPP) and Canoe mechanization scheme (CMS); (iii) Special fisheries development project and (iv) processing and marketing project among others (FAO, 2020). The implementation of these projects brought about increase fish production initially but owing to policy shifts and unsustainable implement, fish production has declined steadily over the years.

Recently, there have been renewed efforts towards revitalizing the fishery sub-sector. As in most parts of Africa, the most commonly cultured species of fish in Nigeria include catfish (*Clarias gariepinus*), the imported tilapia and carp (*Oreochromis niloticus and Cyprinus spp.*). Many fish farmers focus on catfish, as they can have a high market value of two to three times that of tilapia (Emokaro *et al.*, 2010). Fish farming in Nigeria is constrained by many problems, principally: inadequate supply of quality fish seed, extension support, and intensive management strategies, lack of cost effective feed and poor infrastructure, limited opportunities for credit and the presence of technical inefficiency (Ogunremi *et al.*, 2022). Short supply of resources needed to meet up with the needs of the increased population has raised the cost of animal protein especially beyond the reach of the low-income groups. This has led to considerate increase in demand for fish to supplement animal protein because of its availability and accessibility to the common man (Ogunremi *et al.*, 2022).

MATERIALS AND METHODS

The Study Area

The study area is Odogbolu Local Government Area, Ogun State which is strategically located on a large expense of land of about 640sq.km, on the grid line of 6°48'21"N 3°49'25"E (Google Earth, 2021) and was created on the 21st September 1991 and it shares boundaries on its northern fringes with Ijebu-North Local Government, in the east with Ijebu-Ode Local Government, in the west with Ikenne Local Government and in the south with Epe Local Government in Lagos State (*Figure* 1). This Local Government Area has about 150 towns and villages under its jurisdiction. It has 15 wards and its headquarters is in Odogbolu.



Figure 1: Map of the study area

Sampling Techniques and Sample Size

The study employed a multi-stage sampling procedure. The first stage, involved the purposive sampling of catfish farmers in the study area while the second stage, consists of the cluster sampling of two cluster fish farms. The third stage, entailed random selection of 60 catfish farmers from each of the clusters giving a total of 120 catfish farmers.

Method of Data Collection

The study employed the use of interview guide to draw information from the respondents in the study area. The interview guide was divided into four sections. Section A was on the personal characteristics of the respondents; Section B was concerned with the production characteristics; Section C was on the cost - return structure of catfish farming while the final section focused on the constraints to catfish farming in the study area.

Method of Data Analysis

Descriptive analysis such as frequency distribution, percentages and mean was used to analyze the socio-economic characteristics of catfish farmers and input used in its production. Multiple linear regression was used to test the association between the socio-economic characteristics

RESULTS AND DISCUSSION

Socio-economic Characteristics of Catfish Farmers

Results of the socio-economic characteristics of the fish farmers are presented in Table 1. It shows majority (75.0%) of the catfish farmers were male while 25.0% were female. Alawode *et al.* (2016), Asa and Obinaju (2014), Adebayo and Daramola (2013), Brummett *et al.* (2010) and Ideba *et al.* (2013) also confirmed that more men than women were involved in catfish farming. This suggests that fish farming in Nigeria was generally dominated by the male gender. This could be attributed to the tedious and strenuous nature of fish farming. Also, fish farming, especially pond management, is labour intensive and required some special skills which can be best offered by men. This submission, however, did not underscore the tremendous roles played by women in the fisheries sector especially in the processing and marketing of fish. It further reveals that about half (49.2%) sampled catfish farmers were in the age bracket 41-50 years with mean age of 47.3 \pm 7.7 years. This indicates that though they are ageing, most of the catfish farmers are within the productive economically active age. This finding is in agreement with previous findings (Alawode and Jinaid, 2014; Asa and Obinaju, 2014; Akegbejo-Samsons and Adeoye, 2012; Awoyemi and Ajiboye, 2011), who reported in their studies that fish farming was practiced by the economically active population.

The education attainment of the respondents shows that 46.7% had tertiary education while 53.3% either have primary or secondary school certificates with 76% of the respondents having spent at least 12 years in school. This indicated that catfish farming was practiced as a business





by people with varied levels of education with substantial proportion having post-secondary education. This implies that with higher levels of education, there is the possibility of getting higher profits from the enterprise as educated persons are likely to adopt improved means of production which have the potential of improving their productivity. Fregene *et al.* (2011) also reported high levels of education among fish farmers in Oyo and Osun States of the country. Results also show that 25.8% of fish farmers in the study areas were single while 63.3% were married, implying that the bulk of the catfish farmers was married. The mean household size was 4.0 ± 1.0 person with majority (86.7%) of the sampled catfish farmers having a household size of 4 to 7 person. This is an indication that fish farming enterprise is a viable business that can sustain family livelihood but however implies that they will incur higher household expenditure that will reduce the quantum of income realizable from the enterprise. This is in line with the findings of Oluwasola and Ige (2015) who stated that household size is one of the factors of determining profitability of catfish production.

Also, from the findings in Table 1, the mean number of extension agent visitation was 4.2 ± 1.5 with 94% of the sampled respondents claiming that they were visited 4 to 6 times in the last one year. The profitability of catfish farming depends on how frequently extension services are provided. Extension agents visit farmers on a regular basis to assist in the adoption of improved farming techniques, which boosts output and profitability. Saliu *et al.* (2018) highlighted the contribution of extension services to the spread of agricultural technologies and the enhancement of farm income in Nigeria. In addition to preventing losses and increasing productivity, extension professionals offer quick fixes for agricultural issues. Oladele and Kareem (2019) assert that the availability of extension services has a major effect on Nigerian fish farmers' productivity.

Likewise, all the sampled catfish farmers are members of an association with majority (70.0%) of them belonging to fish farmers' association while 17.5% and 12.5% were members of cooperative societies and fish farmer's association respectively. Access to essential resources, information, and collective bargaining power is possible for farmers through association membership. According to Ibrahim and Omotesho (2020), farmers who belong to associations have easier access to agricultural supplies and extension services. Organisations that support their members' interests frequently give them a forum to voice grievances and shape public policy. Adenegan *et al.* (2021) emphasised how farmer groups might help agricultural development by cooperating and sharing resources.





Table 1: Socio-economic Characteristics of Catfish Farmers (n=120)						
Variable	Frequency	Percentage	Mean ±SD			
Sex						
Male	90	75.0				
Female	30	25.0				
Age (years)						
<u>≤</u> 30	4	3.3				
31-40	26	21.7				
41-50	59	49.2	47.3±7.7years			
51-60	28	23.3	·			
>60	3	2.5				
Education status						
Primary	42	35.0				
Secondary	22	18.3				
OND/NCE	3	2.5				
HND/BSC	44	36.6				
MSC	7	5.8				
PhD	2	1.7				
Number of years spent in school						
6-11	44	36.7				
12-17	68	56.7	12.0±4.9			
>17	8	6.6				
Marital status						
Single	31	25.8				
Married	76	63.3				
Divorced	11	9.2				
Widowed	2	1.7				
Household size (persons)						
1-3	16	13.3	4.0±1.0persons			
4-7	104	86.7	1			
Number of extension agent visitation						
0-3	26	21.7	4.2±1.5			
4-6	94	78.3				
Membership of association						
Fish farmers association	84	70.0				
Cooperative society	15	12.5				
Both	21	17.5				

..... f C. (f. 1) E. 1.00

Source: Field survey (2021)

Farming Practices Engaged by Fish Farmers

The result of analysis presented in Table 2 reveal that 83.3% of the respondents had a farming experience of 1-10 years with a mean fish farming experience of 6.5±4.9 years. This suggests that the majority of the fish farmers in the sample were recent additions to the industry, which has many ramifications for the Odogbolu Local Government Area's catfish farming's sustainability and profitability. For example, compared to farmers with decades of expertise, those with 1 to 10 years of experience are probably more willing to embrace new technologies and creative farming techniques. Profitability and productivity may increase as a result.





Younger farmers with less experience are more likely to adopt modern farming techniques, according to Olowogbaji *et al.* (2019).

Majority (88.3%) of the respondents ventured into catfish farming for commercial purpose. Farmers are compelled by this commercial mindset to adopt measures that increase efficiency and output. Effiong and Edet (2020) have observed that commercial fish farming yields greater production and financial gains in contrast to subsistence farming. Commercial farmers are better able to adjust to changes in prices and market demands when they have a market-driven mindset. They will probably produce at volumes that satisfy consumer demand and capitalise on economies of scale. The significance of market-oriented output in attaining economic sustainability in aquaculture was underscored by Adeoye *et al.* (2018).

It was also shown that almost all (97.5%) rented the fish farm. Farms that are rented rather than owned indicate that farmers may be unable to buy property due to financial difficulties. Long-term investments in upgrades and infrastructure may be limited by renting. Olowosegun et al. (2018) observed that land tenure arrangements influence fish farmers' propensity to invest in long-term productivity gains, which lends credence to this. Results further show that 64.2% and 71.7% fish farmers sourced production information from extension agents and fellow fish farmers respectively. The significant roles that extension agents play in spreading knowledge and innovations is highlighted by the heavy reliance on them for production information. Good extension services can improve farming methods and close the knowledge gap. Aina et al. (2019) claim that the knowledge and practices of fish farmers are greatly enhanced by extension services, which raises productivity and profitability. The results also indicate that, even while extension agents provided the catfish farmers with information about their industry, they relied more on their fellow fish farmers, highlighting the value of peer learning and community networks in the transfer of real-world expertise. Peer relationships among farmers are a major factor in the adoption of improved farming methods (Ahmed et al., 2020).

Results in Table 2 show that 37.5% and 43.3% of the catfish farmers sourced loans from bank and cooperative societies respectively. This suggests that Odogbolu's catfish farmers had access to a variety of financing sources, including moneylenders, cooperative societies, commercial banks, and friends and family. Farmers that have access to a variety of loan sources are better able to invest in high-quality inputs, technologies, and infrastructure, which raises their profitability and productivity. According to Olomola (2019), having access to loans can greatly improve the performance of small-scale farmers and is a key factor in determining agricultural production. Agboola *et al.* (2018) claim that diversifying one's sources of loans reduces financial risk and enables farmers to continue operating.

All (100%) of the catfish farmers were making use of earthen ponds and hired labour was employed with needed workforce. The advantage of giving catfish a more natural habitat may be the reason behind the usage of earthen ponds; this can result in improved growth rates and general health of the fish. According to Olusola and Ayo-Olalusi (2020), because earthen ponds provide more natural conditions, fish frequently grow more successfully there. Hiring workers enables catfish farmers to fulfil their workforce demands, which is essential for overseeing the day-to-day administration of the farm's activities, including as feeding, maintaining the pond, harvesting, and marketing. Productivity and operational efficiency may increase as a result. According to Yusuf *et al.* (2018), employed labour considerably improves the operational effectiveness of Nigerian fish farms. Results in Table 2 showed that nearly all (99.2%) of the fingerlings sourced from commercial hatcheries, with the majority (92.5%) stocked fingerlings. Purchasing fingerlings from commercial hatcheries guarantees farmers





fast-growing, disease-free, high-quality stock — a critical component in attaining maximum growth and high survival rates. The findings of Nwanna *et al.* (2018), who discovered that fingerlings from reliable hatcheries typically show better growth performance and health status, are consistent with this.

While 28.3% of farms used a borehole, 64.2% of farmers obtained their water from deep wells. Water with a generally good quality can be reliably obtained by drilling deep wells and boreholes, which is crucial for catfish growth and health. Having constant access to clean water is essential to keeping pond conditions at their ideal. According to Ezenwa *et al.* (2018), deep well and borehole water quality is typically less polluted and better regulated than surface water sources. Majority (96.7%) of respondents obtained their fish feed from commercial feed mills. Commercial feeds are designed to satisfy the dietary needs of catfish at various phases of development, which can improve growth rates and feed conversion efficiency. Utilising premium commercial feeds can greatly improve the production and health of fish. According to Adewale *et al.* (2018), commercial feeds outperform locally prepared feeds in terms of growth performance and general fish health.





Table 2: Farming Practices of Fish F	farmers (n=120)	Table 2: Farming Practices of Fish Farmers (n=120)							
Variable	Frequency	Percentage	Mean±SD						
Year of farming experience									
1-10	100	83.4							
11-20	19	15.8	6.5±4.9 years						
>20	1	0.8							
Purpose of catfish farming									
Commercial	106	88.3							
Home consumption	2	1.7							
Both	12	10.0							
Farm ownership									
Rent	117	97.5							
Own	1	0.8							
Both	2	1.7							
*Source of production									
information	77	64.2							
Extension agent	86	71.7							
Fellow fish farmers									
*Source of credit									
Commercial bank	45	37.5							
Money lender	4	3.3							
Cooperative societies	52	43.3							
Friends and family	3	2.5							
Culture medium									
Earthen pond	120	100							
Others (e.g concrete, tank)	0	0.0							
Source of labour									
Family labour	0	0.0							
Hired labour	120	100.0							
Self	0	0.0							
Sources of fish seed									
Personal farm	1	0.8							
Commercial hatchery	119	99.2							
Sources of water									
River/stream	9	7.5							
Borehole	34	28.3							
Deep well	77	64.2							
Type of culture system									
Monoculture	112	93.3							
Polyculture	7	5.8							
Integrated	1	0.8							

Source: Field survey (2021)

***Indicates multiple entry**

Production Characteristics of Fish Farmers

Results in Table 3 revealed that the average number of ponds was 3 with majority (80.0%) of the respondents having 1 to 5 ponds with average size of $1706\pm546m^2$. It may be inferred from





this that the predominant cultural medium in the studied area was an earthen pond, with a minimum production cycle of four months and a maximum cycle of three. Yisa *et al.* (2015) reported that most catfish farmers utilise earthen ponds; however, Issa *et al.* (2014) found that most sampled catfish farmers in Kaduna state used concrete ponds. Findings also reveal that almost half (48.3%) of the respondents stocked 4001-6000 fingerlings while 40.0% stocked 2000-4000 with average stocking density of 4821 ± 1466 .

Variable	Frequency	Percentage	Mean±SD
Source of fish feed			
Self compounded	3	2.5	
Commercial feedmill	116	96.7	
Both	1	0.8	
Type of fish feed			
Sinking feed	117	97.5	
Floating feed	0	0.0	
Both	3	2.5	
Kind of fish seed stocked			
Fingerlings	111	92.5	
Fry	4	3.3	
Juvenile	5	4.2	
Number of ponds			
1-5	96	80.0	
6-10	14	11.7	3.4±2
>10	6	8.3	
Pond size(m ²)			
≤1000	3	2.5	
1001-3000	116	96.7	1706.3±546.2
3001-5000	0	0.0	
>5000	1	0.8	
Number of production cycle/year			
1			
3	118	98.3	
	2	1.7	1.0±0.3
Length of production cycle			
4-9	39	32.5	10.2 ± 1.5
10-12	81	67.5	
Quantity of fish stocked			
2000-42000	105	87.5	
42001-82000	10	8.3	4820.8 ± 1466.4
82001-126000	5	4.2	
Price per Kg			
≤1000	48	40.0	
>1000	72	60.0	1049.6±104.0
Quantity harvested(Kg)			
1000-3500	58	48.3	
3501-5000	54	45.0	3633.8±1158.8
5001-7500	8	6.7	
0 E ' 11 (2021)			

Table 3: Production Characteristics of Fish Farmers (n=120)

Source: Field survey (2021)





Also, Table 3 shows that the mean price of table sized catfish was N1,049.6±104/Kilogramme with almost half (44.2%) of the respondents selling at N1,100 while 40% sold at N1,000 and below. Average quantity of catfish harvested by the respondents was $3,633.8\pm1,158.8$ kg with 48.3% cropping 1000 - 3500 kg while 45.0% of the sampled catfish farmers harvested 3,501 - 5,000Kg. Average stocking density of 4821 fingerlings per $1706m^2$ and average quantity harvested per production cycle per year was 3634kg. This is at variant with Issa *et al.* (2014) who found an average of 200 m² pond size in their study and also Yisa *et al.* (2015) who recorded in their study that most catfish stocked 1850 fingerlings per $20-40m^2$.

Profitability Analysis of Catfish Production

Results in Table 4 showed that the average variable cost (TVC) that include cost of fish seed (fingerlings and juvenile catfish) stocked in the ponds, cost of feed, wages of temporary labour, cost of medications, transportation, pond maintenance and fuel was $\aleph 2,554,168.4$. Average total fixed cost (TFC) which includes cost of pond rented for the production, water source, scales, pipes and pumping machine was $\aleph 497,369.2$. Therefore, average total cost, was $\aleph 3,051,537.5$. The average revenue generated from the sales of table size catfish in the study area was $\aleph 3,770,291.7$. The results further showed that the total variable cost ($\aleph 2,554,168.4$) accounted for 83.7% of the total cost out of which 77.4% was expended on fish feeds. The gross margin (GM) was $\aleph 1,216,123.3$ with net farm returns of $\aleph 718,754.1$. The significant proportion of variable costs attributable to fish diets highlights the financial strain that feed costs have on catfish farmers. This result is consistent with other research, including studies by Omitoyin *et al.* (2018), which demonstrated that feed expenditures represent the largest outlay in aquaculture, frequently making up over 50% of the total operating costs.

The analysis of profitability ratios in Table 4 shows that expense structure ratio (ESR) was 0.163 while the benefit cost ratio (BCR) value was 1.33. This indicates that fixed costs made up 16.3% of the overall cost of production, or that for every \$100 invested in fish farms, \$16.30 was spent on fixed inputs and \$83.70 on variable inputs. Adewumi and Olaleye (2018) claim that farmers can increase or decrease their businesses' scale without appreciably compromising profitability when their ESR is lower. The total revenue being higher than the total cost was an indication that catfish farming was a profitable enterprise. Also, the positive values of gross margin and net farm income as well as the BCR value greater than 1.00 were additional pointers to the profitability of catfish farming.

The study area's small-scale catfish business is very profitable, as indicated by the benefit-cost ratio of 1.33, which indicates that every $\aleph 100$ invested in the business will generate an additional $\aleph 33.00$ in revenue. This confirms other research that found BCR values of more than 1.00 (Akegbejo-Samsons and Adeoye, 2012; Adebayo and Daramola, 2013; Tunde *et al.*, 2015; Alawode *et al.*, 2016). This demonstrated the viability and profitability of catfish farming. This could explain why more people are venturing into the enterprise because it has proven to be sustainably profitable. This result corroborates with the findings of Adebayo and Daramola (2013) and Ajagbe (2019) but opposed the findings of Oluwasola and Ige (2015) who documented a low net farm income of $\aleph 182,573.04$.





Income/Cost items	Value (ℕ)	Percentage of Total Cost (%)
Revenue	3770291.7	
Variable costs		
Feed	2362626.3	77.4
Fingerlings	76158.3	2.5
Labour(temporary)	9620.8	0.3
Medication	5591.7	0.2
Fuel	77543.4	2.5
Transportation	2908.3	0.1
Maintenance	19719.6	0.6
Total variable cost	2554168.4	83.7
Fixed cost		
Land acquisition/rent	52416.7	1.7
Building/shed	3500.0	0.1
Pond construction/rent	54541.7	1.8
Plumbing/drainage	14125.0	0.5
Generator	20500.0	0.8
Net	2942.5	0.1
Weighing scale	1697.5	0.1
Permanent labour	342366.7	11.2
Security	5279.2	0.2
Total fixed cost	497,369.2	16.3
Total cost	3,051,537.5	
Gross margin	1,216,123.3	
Net farm income	718,754.1	
BCR	1.33	
ESR	0.163	

Table 4:	Profitability	Analysis	of Catfish	Production
Lable 4.	1 Ionuonney	1 mary 515	or Cutifish	rouuction

Source: Field survey (2021)

Factors Influencing the Profitability of Catfish Farming

Results in Table 5 reveal that number of ponds was a significant determinant of profitability of catfish farming (β =185906.937, p<0.05) while other variables were not significant determinants of profitability (p>0.05.). All the independent variables with the exception of the farm size and quantity of fish harvested were positive. According to Akinyemi and Ogbonna (2018), the number of ponds indicates the scale of operations, which has a substantial impact on profitability. This is why the number of ponds is a crucial variable. This suggests that because of economies of scale or greater manufacturing capacity, adding more ponds could result in higher profitability. The result also reveal that the overall model is statistically significant (F=2.231, p=0.037). Furthermore, all of the predictor variables are not statistically significant except number of ponds. From the results presented, the coefficient of determination (R square) was 0.122.





Tuble C. Fuctors infractions the Frontaismery of Caution Furning						
Variables	Regression	Standard	T-value	Sig. p-value		
	coefficient	error				
Constant		402562.105	0.595	0.553		
Years of farming experience	0.008	6271.623	1.006	0.317		
Farmsize	0.008	22416.015	-0.673	0.503		
Number of ponds	-0.020	7343.563	2.520	0.013*		
Number of production cycle per year	0.006	115452.912	0.901	0.370		
Quantity of fish stocked	-0.072	20.282	0.744	0.459		
Quantity of fish harvested	1.059	28.852	-0.733	0.465		
Price per Kg of table size fish	0.059	323.255	0.925	0.357		
(2001)						

 Table 5: Factors Influencing the Profitability of Catfish Farming

Source: Field survey (2021)

*Indicates significant determinant at p<0.05

F=2.231, p=0.037

Constraints in Catfish Farming

Results in Table 6 revealed that respondents opined that flooding (3.93±0.34) was a very severe constraint to catfish farming likewise outbreak of diseases (2.75±0.59), poor quality of fish seed (2.38 ± 0.83) and high cost of feed (2.32 ± 0.72) . The highest proportion of the catfish farmers identified flooding (99.2%), disease outbreak (82.5%), poor quality of fish seed (60.8%) and high cost of feed (40.8%) as severe constraints to fish farming.

Findings also reveal that predators (2.96±0.81), poor marketing channel (2.95±0.98), poor quality of feed (2.94±0.85) and mortality (2.31±0.70) were not severe constraints in the study area. Predator (91.7%), poor quality of feed (70.0%) and poor marketing channel (61.7%) were considered as not severe constraint among highest proportion of the catfish farmers. The highest proportion of the catfish farmers identified flooding, disease outbreak, poor quality fish seeds and high cost of transportation as severe constraints to catfish farming. Also, predators, poor marketing channel, poor quality of feeds and mortality were considered as not severe among highest proportions of the catfish farmers. The findings are supported by Onuche et al. (2020) who reported scarcity of viable fingerlings and high cost of feed as serious constraints to catfish production in Kogi state.

 $R^2 = 0.122$





S/N	Constraints	Very	Severe	Slightly	Not	Not a	Mean±	Rank
		Severe		Severe	Severe	Constraint	SD	
		F(%)	F(%)	F(%)	F(%)	F(%)		
1	Flooding	114(95.0)	5(4.2)	0(0.0)	1(0.8)	0(0.0)	3.93±0.34	1st
2	Disease out break	1(0.8)	98(81.7)	12(10.0)	8(6.7)	1(0.8)	2.75±0.59	2nd
3	Poor quality of fish seed	0(0.0)	73(60.8)	20(16.7)	27(22.5)	0(0.0)	2.38±0.83	3rd
4	High cost of feed	4(3.3)	45(37.5)	57(47.5)	11(9.2)	3(2.5)	2.32±0.72	4th
5	Inadequate capital	9(7.5)	35(29.2)	48(90.0)	28(23.3)	0(0.0)	2.21±0.89	5th
6	High cost of transportation	5(4.2)	45(37.5)	39(32.5)	30(25.0)	1(0.8)	2.20±0.88	6th
7	Scarcity of fish feed	9(7.5)	42(35.0)	32(26.7)	37(30.8)	0(0.0)	2.19±0.96	7th
8	Unfavorable climatic conditions	9(7.5)	31(25.8)	51(42.5)	29(24.2)	0(0.0)	2.18±0.88	8th
9	Water pollution	9(7.5)	37(30.8)	41(34.2)	30(25.0)	3(2.5)	2.17±0.93	9th
10	Poaching and theft	5(4.2)	10(8.3)	103(85.8)	2(1.7)	0(0.0)	2.15±0.50	10th
11	Scarcity of fish seed	8(6.7)	41(34.2)	28(23.3)	43(35.8)	0(0.0)	2.12±0.98	11th
12	Non- availability of perennial source of water	8(6.7)	32(26.7)	44(36.7)	30(25.0)	6(5.0)	2.10±0.91	12th
13	Predators	3(2.5)	25(20.8)	59(49.2)	30(25.0)	3(2.5)	1.98 ± 0.77	13th
14	Poor marketing channel	4(3.3)	38(31.7)	30(25.0)	44(36.7)	4(3.3)	1.98±0.93	13th
15	Poor quality of feed	2(1.7)	34(28.3)	39(32.5)	45(37.5)	0(0.0)	1.94±0.85	15th
16	Mortality	3(2.5)	7(5.8)	14(11.7)	96(80.0)	0(0.0)	1.31±0.70	16th

Table 6: Constraints to Catfish Farming (n=120)

*Figures in parenthesis are expressed as percentage, SD = Standard deviation. Source: Field survey (2021). Cut off point=2.00

CONCLUSSION AND RECOMMENDATIONS

The study has shown that catfish enterprises are recent means of livelihood among middle age and educated male who are engaged in catfish farming for commercial purpose. While supply of fish could enhance the nutrition of households engaged in catfish farming, it could also be targeted by policy to engage unemployed educated youths. The study concludes that although catfish farming is faced with some constraints, it is a profitable enterprise among farmers in Odogbolu Local Government Area of Ogun State, Nigeria. To increase profitability of fish farming business, it is recommended that farmers should ensure that they keep their cost of production as low as possible. Also, they should ensure efficient use of input resources





especially feeds. It is also suggested that policy measures should attract medium to large scale farmers into the catfish enterprise not only to increase output to bridge the supply gap but also to provide employment for the unemployed youths since catfish farming was on small scale though oriented mainly for commercial for cash exchange with the surplus domestically consumed. Additionally, the study recommended that adequate drainage should be facilitated within the locality to reduce the effect of flooding and proven and quality species of catfish with high disease resistance should be made available to farmers at a subsidized rate.

REFERENCES

- Adebayo, O. O. and Daramola, O. A. (2013). Economic analysis of catfish (*Clarias gariepinus*) production in Ibadan metropolis. *Discourse Journal of Agriculture and Food Sciences*, 1(7), 128-134
- Adenegan, K. O., Omonona, B. T. and Omotayo, A. O. (2021). Impact of membership in farmers' associations on the adoption of agricultural technologies in Nigeria. *Journal* of Agricultural and Food Information, 22(1), 70-88
- Adeoye, A. O., Ayanda, I. F. and Oyewole, S. O. (2018). Market-oriented aquaculture: An analysis of factors affecting catfish production and profitability in Ibadan, Nigeria. *International Journal of Aquaculture*, 8(1), 19-26.
- Adewale, O. J., Olanike, A. A. and Abiodun, O. O. (2018). Comparative analysis of commercial and locally formulated feeds on the growth performance of *Clarias* gariepinus. Nigerian Journal of Animal Production, 45(2), 78-86.
- Adewumi, M. O. and Olaleye, O. (2018). Financial risk management in aquaculture: The role of expense structure ratio. *Journal of Aquaculture Economics & Management*, 22(1), 25-40.
- Agboola, J. O., Oyekale, A. S. and Akinrinde, O. S. (2018). Credit access and its impact on the productivity of small-scale farmers in Southwestern Nigeria. *International Journal of Agricultural Policy and Research*, 6(3), 42-53.
- Ahmed, A. M., Ogunmola, O. and Adeoye, P. (2020). Influence of peer learning on the adoption of improved aquaculture practices among fish farmers in Nigeria. *Journal of Agricultural Extension and Rural Development*, 12(1), 12-21.
- Aina, O. S., Ojebiyi, W. G. and Obadina, A. T. (2019). Effectiveness of extension services among fish farmers in Nigeria: An empirical review. *Nigerian Journal of Agricultural Extension*, 20(2), 54-61.
- Ajagbe, S. O and Ojo-Fakuade, F. F. (2019). Analysis of profitability of catfish production in Ibadan metropolis, Oyo State, Nigeria. *Journal of Forestry Research and Management*, 16(3), 50-57.
- Akegbejo-Samsons, Y. and Adeoye, D. (2012). *Measuring profitability in small scale* aquaculture enterprises in Southwest Nigeria. IIFET 2012 Tanzania Proceedings.
- Alawode, O. O. and Jinad, A. O. (2014). Evaluation of technical efficiency of catfish production in Oyo State: A case study of Ibadan Metropolis. *Journal of Emerging Trends in Educational Research and Policy Studies (JETERAPS)*, 5(2), 223-231.
- Alawode, O. O., Oluwatayo, I. B. and Adebowale, O. A. (2016). Effect of catfish production on welfare of smallholder farmers In Osun State, Nigeria. *Journal of Agribusiness and Rural Development*, 4(42), 471–481
- Asa, U. A. and Obinaju, L. C. (2014). Economics of catfish production in Akwa Ibom State, Nigeria. Global Journal of Management and Business Research: Economics and Commerce, 14(3), 22-28.





- Awoyemi, T. T., and Ajiboye, A. J. (2011). Analysis of profitability of fish farming among women in Osun state, Nigeria. *Journal of Economics and Sustainable Development*, 2(4), 1-8.
- Brummett, R. E., Youaleu, J. L. N. Tiani, A. M. and Kenmegne, P. (2010). Women's traditional fishery and alternative aquatic resource livelihood strategies in the Southern Cameroonian rainforest. *Fisheries Management and Ecology*, *17*, 221-230.
- Effiong, B. N. and Edet, J. I. (2020). Economic analysis of fish farming in Calabar, Cross River State, Nigeria. *Journal of Fisheries and Aquatic Science*, 15(1), 1-8.
- Emokaro C. O., Ekunwe P. A. and Achille, A. (2010). Profitability and viability of catfish farming in Kogi State, Nigeria. *Research Journal of Agriculture Biological. Science*, 6(3), 215-219.201
- Ezenwa, B., Udo, I. O. and Amadi, A. (2018). Evaluation of water quality from different sources for aquaculture use in Nigeria. *Journal of Environmental Science and Water Resources*, 7(1), 54-62
- Federal Ministry of Agriculture and Rural Development FMARD (2011). Agricultural transformation agenda document. 92p.
- Food and Agriculture Organization -FAO (2020). *The state of world fisheries and aquaculture 2020. Sustainability in action*. Rome 2020.
- Fregene, B. T., Inyang, I. and Awolumate, S. (2011). Operational attributes of urban aquaculture systems in Ibadan Municipal, Oyo State, Nigeria. In: R. Adeyemo (Ed.), Urban agriculture, cities and climate change (pp. 173-178). Cuvillar Verlag Gottingen.
- Ibrahim, H. and Omotesho, O. A. (2020). Farmers' perception of effectiveness of farmers' associations in agricultural production in Kwara State, Nigeria. Nigerian Journal of Agriculture, Food and Environment, 16(2), 78-85
- Ideba, E. E., Otu, W. I., Essien, A. A., Iniobong, E. O., and Ekaette, S. U. (2013). Economic analysis of fish farming in Calabar, Cross River State, Nigeria. *Greener Journal of Agricultural Sciences*, 3(7), 542-549.
- Issa, F. O., Abdulazeez, M. O., Kezi, D. M., Dare, J. S. and Umar, R. (2014). Profitability analysis of small scale catfish farming in Kaduna State, Nigeria. *Journal of Agricultural Extension and Rural Development*, 6(8), 347-353.
- Nwanna, L. C., Omotayo, O. A. and Ajayi, O. O. (2018). Quality assessment of fingerlings from selected hatcheries in Southwest Nigeria. *Journal of Fisheries and Aquatic Science*, 13(2), 67-74.
- Ogunremi, J. B., Igbani, F., Onimisi, M.M. and Shetur, C. Y. (2022). Assessment of fish farming practices, development and constraints among fish farmers in Ibi Local Government Area, Taraba State, Nigeria. *Nigerian Agricultural Journal*, 53(1), 260-266.
- Oladele, O. I. and Kareem, M. A. (2019). Effectiveness of extension services among fish farmers in Oyo State, Nigeria. African Journal of Agricultural Research, 14(32), 1483-1490
- Olomola, A. S. (2019). Agricultural finance and the impact of agricultural credit on the performance of small-scale farmers in Nigeria. *Journal of Agricultural Economics and Development*, 8(2), 34-45.
- Olowogbaji, M. G., Ipinmoroti, R. R. and Fapojuwo, O. E. (2019). Adoption of improved aquaculture technologies among fish farmers in Lagos State, Nigeria. *Journal of Agricultural Extension*, 23(1), 104-115





- Olowosegun, T., Falayi, R. A. and Oyero, J. O. (2018). Influence of land tenure systems on fish farming in the North Central States of Nigeria. *Journal of Agricultural Research and Development*, *17*(2), 56-67.
- Olusola, A. O. and Ayo-Olalusi, C. I. (2020). Comparative study of growth performance of *Clarias gariepinus* in earthen and concrete ponds. *Nigerian Journal of Fisheries and Aquatic Sciences*, 8(2), 56-65.
- Oluwasola, O. and A. O. Ige 2015. Factors determining the profitability of catfish production in Ibadan, Oyo State, Nigeria. *Sustainable Agriculture Research*, 4(4), 57-65.
- Omitoyin, B. O., Dada, B. F. and Fregene, T. O. (2018). Economic analysis of fish farming in Ibadan metropolis. *Journal of Aquatic Sciences*, *33*(2), 145-156.
- Onuche, U., Ahmed, T. A. and Ebenehi, O. K. (2020). Assessment of the constraints to catfish farming in Kogi State, Nigeria. *Asian Research Journal of Agriculture*, *12*(3):39-46
- Saliu, O. J., Ogunbiyi, T. F. and Oyetunde, J. T. (2018). Role of agricultural extension in fish farming development in Osun State, Nigeria. *Journal of Agricultural Extension*, 22(2), 90-101
- Subasinghe, R., Siriwardena, S.N., Byrd, K., Chan, C.Y., Dizyee, K., Shikuku, K., Tran, N., Adegoke, A., Adeleke, M., Anastasiou, K., Beveridge, M., Bogard, J., Chu, L., Fregene, B.T., Ene-Obong, H., Cheong, K.C., Nukpezah, J., Olagunju, O., Powell, A., ... Phillips, M. (2021). Aquaculture in Nigeria: Increasing income, diversifying diets and empowering women. Report of the scoping study. Penang, Malaysia: WorldFish. Program Report: 2021-16.
- Tunde, A. B., Kuton, M. P., Oladipo, A. A. and Olasunkanmi, L. H. (2015). Economic analyze of costs and return of fish farming in Saki-East Local Government Area of Oyo State, Nigeria. *Journal of Aquaculture Research Development*, 6(2): 306-311.
- WorldFish. (2017). Rapid appraisal of fisheries management systems in the Philippines: Fisheries governance of Sarangani Bay-Celebes Seascape Annex 3. Los Baňos, Laguna. 41 p.
- Yisa, E. S., Adebayo, C. O., Mohammed, U. S. and Anaweta, P. U. 2015. Profitability analysis of catfish farming in Suleja Local Government Area of Niger State, Nigeria. *Journal of Agriculture and Food Sciences*, 13(1): 1-6.
- Yusuf, S. A., Olalekan, I. O. and Ejiogu, N. C. (2018). The role of hired labour in aquaculture production in Ogun State, Nigeria. *International Journal of Agricultural Economics*, 3(2), 65-74.