Influence of agricultural extension services and socioeconomic characteristics on the production of small-scale catfish farmers in Ikpoba Okha Local Government Area, Edo State, Nigeria

[1]DICKSON A. A. and [2]OKUNDAYE, S. E.

Department of Agricultural Extension and Rural Development, Faculty of Agriculture, University of Benin, Benin City

e-mail:aniekan.dickson@uniben.edu

Abstract

This study investigated the influence of agricultural extension services on the productivity of small-scale Catfish farmers in Ikpoba-Okha Local Government Area, Edo State, Nigeria. It assessed farmers' access to extension services and the resulting effects on their output. A two-stage sampling method was used: purposive sampling to select three communities with high numbers of small-scale catfish farmers, followed by snowball sampling to identify individual catfish farmers, resulting in 120 catfish farmers. Data were gathered using structured questionnaires and analyzed with both descriptive and inferential statistics.

The results revealed that 65.8% of catfish farmers were male, with an average age of 41 years, and most (78.3%) were married, with 14 years of farming experience. The average annual income was ₦410,009.44. Catfish stocking density increased from 250,719.49 before extension agent contact to 365,199.45 afterward. Major constraints identified included inadequate awareness of catfish production technologies ($\bar{x}$ = 3.09), poor extension services ($\bar{x}$ = 4.37), high cost of services ($\bar{x}$ = 3.59), poor market structure ($\bar{x}$ = 3.73), and unavailability of services ($\bar{x}$ = 3.59). Statistical analysis showed that age (t = -5.58) and duration of contact with extension agents (t = -3.22) had a negative, significant relationship with fish output, while farming experience (t = 4.36, $p<0.01$), number of fingerlings stocked (t = 3.61, $p<0.01$), and annual income (t = 5.24, $p<0.01$) had a positive, significant relationship. Extension services overall had a significant positive impact (t = 2.15, $p<0.05$) on fish production output.

The study found that extension services have a strong positive impact on catfish production, highlighting the important role of extension agents in supporting catfish farmers. It recommended reducing the high costs of accessing these services by subsidizing training programs, offering grants for inputs, and promoting community-based extension initiatives to share resources and lower catfish farmers' individual expenses.

Keywords: catfish, purposive, stocking, constraints, unavailability

Introduction

Agricultural extension services help farmers and their organizations access new knowledge, information, and technologies. They also promote collaboration with research, education, agribusiness, and other relevant institutions, supporting farmers in building their technical, organizational, and management skills. Extension service promulgates development because it provides opportunities for agricultural professionals to make expert contribution in identifying, adopting and sharing technology in a way suited to diverse ecological and socioeconomic conditions (Sehu, 2018).

Agricultural extension has long been seen as a key element for enabling farmers to obtain information and technologies that can improve their livelihoods and is recognized as an important factor in promoting agricultural development (Onyibe,2019). It involves the dissemination of services and products of educational advantage of an institution to persons unable to access them in a normal manner (Hamisu *et al.,* 2017).

Asfaw et al. (2012) argued that while increasing agricultural output is important, sustainable growth in productivity—measured as output relative to inputs—can only be achieved through the development and dissemination of improved agricultural technologies to smallholder farmers in rural areas. Similarly, Faborode and Ajayi (2015) stressed that access to adequate, accurate, timely, and relevant information is critical for improving agricultural productivity.

Aquaculture is the beneficial and sustainable use of water as a medium to farm organisms, such as finfish, shellfish and aquatic plants and serve as a means of efficiently increasing food production in food-deficit countries and improving livelihood and poverty status among farming households (Nandi *et al.,* 2014). It also serves as a weapon to fight malnutrition and is widely heralded as the world's fastest growing food production sector (Lim, 2015; Himanshu and Dileep, 2014).

In Nigeria, fish remains a major source of animal protein, with a current consumption rate exceeding 1.5 million tons per year (CBN, 2016). However, a significant gap persists between fish demand and supply, which must be addressed to achieve national food security. Extension service delivery plays a crucial role in bridging this gap by facilitating farmers' access to essential knowledge, information, and technologies. According to Ijatuyi (2016), catfish farmers face numerous challenges—including poor farming methods, limited technical skills, high feed costs, low access to financing, inadequate storage and processing facilities, low-quality broodstock, and poor genetic management—that collectively hinder catfish output and profitability. Many of these challenges stem from a lack of timely and accurate information.

Agricultural extension services have long been recognized as a vital tool for promoting agricultural development and improving farmers' livelihoods (Ajayi, 2013; Machila et al., 2015). With the right information and technologies, catfish farmers can enhance their production levels and incomes, taking advantage of the growing opportunities in the aquaculture sector. Studies such as Agbebi (2012) have shown that catfish farmers with access to extension services achieve higher profits compared to those without such access, highlighting the critical role of extension services in improving fish output and profitability. Agbebi further recommended that extension agents should intensify their outreach efforts to farmers yet unreached, to boost their productivity and income levels.

Given the essential role of catfish in human nutrition and the rising demand driven by population growth, improving fish farming practices and technologies is necessary for enhancing production levels. Against this backdrop, this study was conducted to assess the influence of agricultural extension services on the output of small-scale fish farmers in Ikpoba-Okha Local Government Area of Edo State, Nigeria.

Objectives of the study

Given the challenges identified, this study aims to achieve the following objectives:

i. describe the socio-economic characteristics of small-scale Catfish Farmers in the study area.
ii. identify the various services provided by extension agents in fish production.
iii. examine the extension services used by small-scale Catfish farmers.
iv. ascertain the influence of Agricultural Extension Services on small-scale Catfish Farmers' production
v. identify the constraints faced by small-scale Catfish farmers accessing to extension services.

Hypothesis of the study

H_{01}: There is no significant relationship between socioeconomic characteristics of small-scale Catfish farmers and their production

H_{02}: There is no significant relationship between Agricultural extension services used and small-scale Catfish farmers' production

Materials and Method

The study was conducted in Ikpoba-Okha Local Government Area of Edo State. The area has a population of approximately 301,447 people, primarily from the Bini ethnic with a total land area of 862 square kilometers and has a tropical climate with high temperatures and humidity levels. It is located at 6.1645°north Latitude and 5.6228° East Longitude, and its elevation is 121 feet above sea level.

The population of this study involved small-scale Catfish farmers of Ikpoba Okha Local Government Area. In this study, Catfish farmers refer to individuals engaged in fish production activities as well as those involved in post-harvest activities, such as fish processing. A two-stage sampling procedure was used in selecting the farmers for the study. In the first stage, three major communities with high population of Catfish farmers were purposively selected for the study. The second stage employed a snowballing technique sampling 40 farmers from each of the selected communities, thus giving a total sample size of 120 Catfish farmers .

Primary data were collected using structured questionnaire. Descriptive statistics such as frequency counts, percentages, mean scores, standard deviation were used to summarise the data. The constraints faced by fish farmers were measured using a 5-point Likert Scale with score less than 3.5 representing serious constraints.

Also, inferential statistics such as ordinary least Square (OLS) regression model was used to test relationship between variables. The ordinary least square model is given thus:

$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + e$. Where: Y= Farmer's outputX_1 = Gender (male1, female 0) X_2 = Age, X_3 =Experience (years)X_4 = Income (Naira) X_5 = Membership of (yes 1, No 0) X_6 = Contact with Extension agents, X_7 = Number of Kg of fish harvested/production Cycle, E = Error term

Results and Discussion

Socio-Economic Characteristics of small-scale Catfish Farmers

Results from Table 1 showed that 65.8% of the Catfish farmers were male and 34.2% female, indicating that Catfish farming in the study area was male-dominated. This reflects existing gender disparities in agricultural participation, where men are traditionally more engaged in Catfish farming activities (Ayisi et al., 2016). It underscores the need for targeted initiatives to promote gender inclusivity and empower women through improved access to resources, training, and support (Kumaran et al., 2012).

Age distribution revealed that 45.8% of respondents were between 31 and 40 years, an active age group beneficial for managing the labor-intensive demands of Catfish farming. This aligns with previous findings by Ezedinma and Otti (2001) and Lawal (2002) that Nigerian farmers typically fall within the 40–49-year range, and supports Abankwah et al. (2010), who noted Catfish farming is dominated by the active labor force aged 18–40 years.

A majority (78.3%) of the respondents were married, suggesting strong family support systems, which can enhance farm resilience, labor availability, and intergenerational knowledge transfer within fish farming households.

Regarding farming experience, 34.2% had between 5–10 years, while 24.2% had over 16 years of experience, with an average of 14 years across all Catfish farmers. This extensive experience implies a deep knowledge base, contributing to greater efficiency and productivity in catfish farming operations.

However, 69.2% of Catfish farmers reported no contact with extension agents, highlighting a significant gap in access to training and technical support. Only 10.0% had contact with extension services once every 12 weeks.

Most farmers (59.2%) sourced extension support from the Federal Ministry of Agriculture, while 24.2% relied on the State Ministry, pointing to a stronger federal-level presence in agricultural outreach (Faborode and Ajayi, 2015).

In terms of sourcing catfish stock, 39.2% obtained fingerlings from fellow farmers and 30.0% from the Ministry of Agriculture, indicating strong peer networks and informal sourcing channels within the community.

Stocking levels showed that 34.2% of Catfish farmers respondents stocked between 5,001–10,000 fingerlings per cycle, 31.7% stocked 5,000 or fewer, and 20.8% stocked between 10,001–15,000. This suggests careful management of stocking densities to optimize resource use and maximize productivity.

Income data revealed that 25.8% earned between ₦200,001–₦300,000 annually, while 22.5% earned between ₦100,000–₦200,000. The mean annual income for Catfish farmers was ₦410,009.44, indicating moderate profitability levels among small-scale catfish farmers in the area.

Production characteristics

Table 2 shows that 46.7% of the catfish farmers sold their fish at ₦2,000 per kilogram, while 44.2% sold at ₦2,500 per kilogram, indicating that most farmers sold their fish within the ₦2,000–₦2,500 price range. In terms of sales volume, 52.5% sold between 3,000–4,000 kilograms of catfish per production cycle, while 30.0% sold between 2,000–3,000 kilograms.

Regarding production cycles, 55.0% of respondents stocked three cycles per year, 34.2% stocked two cycles, and 10.8% stocked one cycle annually. In each production cycle, 42.5% stocked between 3,000–3,500 kilograms of catfish, 24.2% stocked between 1,000–1,500 kilograms, and 14.2% stocked between 2,500–3,000 kilograms.

These results highlight that the majority of catfish farmers maintained moderate stocking and sales volumes, aligning their production practices to optimize profitability across multiple cycles annually.

Extension practices provided by extension agents

Table 3 presents the agricultural extension practices introduced to catfish farmers in the study area. The results show that the use of tarpaulin tanks ranked first among introduced practices, followed by record keeping (2nd), on-farm feed formulation (3rd), sorting (4th), refrigeration of fish (5th), and canning (6th). Other practices ranked lower, including the use of reinforced tanks, pond liming and fertilization, aerated transportation containers, modern smoking kilns, fish biotechnology, water testing kits, vacuum packaging, flow-through systems, use of pesticides as preservatives, earthen ponds, solar dryers, sex reversal methods, hormone injections, and re-circulatory systems.

The prioritization of tarpaulin tanks suggests their popularity due to versatility, affordability, and adaptability to different environmental conditions (Lucas et al., 2019). Emphasis on record-keeping reflects the importance of monitoring farm performance for informed decision-making and long-term planning. The introduction of sorting practices shows a focus on improving fish health, growth rates, and overall farm profitability. Altogether, the extension practices introduced reflect a comprehensive strategy aimed at boosting productivity, efficiency, and sustainability in aquaculture (Oliva-Teles, 2021).

Extension practices used by small scale fish farmers

Table 4 reveals that the use of tarpaulin tanks ranked as the most widely adopted extension practice among fish farmers, followed by sorting (2nd), record keeping (3rd), concrete tanks (4th), canning (5th), refrigeration of fish (6th), on-farm feed formulation (7th), use of reinforced tanks (8th), and both pond liming and modern smoking kilns (9th).

The preference for tarpaulin tanks highlights their flexibility, affordability, and ease of installation compared to traditional concrete tanks (Wuyep & Rampedi, 2018). The emphasis on sorting practices reflects catfish farmers' efforts to enhance catfish health and optimize growth rates through size-based management. The strong focus on record-keeping demonstrates the importance placed on tracking farm performance and supporting informed decision-making (Rath, 2018). Although concrete tanks ranked lower, their use indicates ongoing investments in durable infrastructure to ensure long-term sustainability. Overall, the adoption of these extension practices reflects a proactive shift by catfish farmers towards innovative strategies aimed at improving productivity, efficiency, and profitability in aquaculture (Lucas et al., 2019).

Influence of Agricultural Extension Services on small-scale Cat fish Farmers' production

Table 5 shows that the catfish farmers' stocking density was 250,719.49 before extension agent contact, while the production status increased to 365, 199.45 stocking capacity after extension agent visitation as shown in Table 4.5. Analysis shows that there was an increase of about 45.66% in the stocking capacity of catfish farmers as a result of the effort of agricultural extension services in catfish production in the study area.

The increase in stocking capacity from 250,719.49 to 365,199.45 after extension agent visitation indicates a significant positive impact on catfish farmer's production output in the study area. This change suggests that the guidance and support provided by extension agents likely led to improved stocking management practices, resulting in higher stocking densities and ultimately increased production potential (Zagonel *et al.*, 2019).

Constraints faced by small-scale Catfish farmers

The result shows that out of the numerous constraints identified, inadequate awareness of technologies in catfish production ($\bar{x}$ = 3.09), poor extension services ($\bar{x}$ = 4.37), high cost of accessing extension services ($\bar{x}$ =

3.59), poor market structure ($\bar{x}$ = 3.73) and unavailability of extension services ($\bar{x}$ = 3.59) were rated as those constraints that are serious. However, Communication problem (Mean = 1.54), Illiteracy ($\bar{x}$ = 2.19), Complexity ($\bar{x}$ =1.28) and Poor organization ($\bar{x}$ =1.45) were not serious constraint affecting fish production in the study area.

The identification of several constraints such as inadequate awareness of technologies, poor extension services, and high cost of accessing extension services, poor market structure, and unavailability of extension services were highlighted as significant challenges faced by catfish farmers in the study area. Firstly, inadequate awareness of technologies hampers farmers' ability to adopt modern and efficient production methods, limiting their productivity potential (Bonye *et al.*, 2012). Secondly, poor extension services signify a lack of timely and relevant support and guidance, hindering catfish farmers' capacity building and problem-solving capabilities. Thirdly, the high cost associated with accessing extension services exacerbates financial burdens on catfish farmers, potentially restricting their ability to invest in necessary inputs and services (Oredipe, 2015). Additionally, the poor market structure and unavailability of extension services further impede catfish farmers' access to markets and vital information, constraining their ability to sell their produce efficiently and profitably.

Ho1: There is no significant relationship between socio economic characteristics and catfish farmer's production output

Results in Table 7 showed the relationship between socio-economic characteristics and catfish production outputs. The result showed that age (t = - 5.58), duration of contact with extension agent (t = -3.22) had a negative and significant relationship with catfish outputs. The result also showed that catfish farming experience (t =4.36), number of fingerlings stocked per cycle (t = 3.61), estimated annual income (t = 5.24) had positive and significance ($p<0.01$) relationship with fish output. The R-square value of 0.591 is an indication that about 59.1% variation in the output of fish farmers can be explained by the combination of the above significant variables.

The significant positive relationships found between catfish farming experience, number of fingerlings stocked per cycle, estimated annual income, and catfish output in the study area indicates several key implications. Firstly, experience in catfish farming likely correlates with improved skills, knowledge, and management practices, leading to higher production levels (Nandi *et al.*, 2014). Secondly, the number of fingerlings stocked per cycle directly impacts production output, indicating the importance of stocking density management for optimal growth and yield. Thirdly, the positive relationship between estimated annual income and catfish output suggests that greater financial investment in the catfish farming enterprise translates into increased productivity and profitability (Lim, 2015). These findings emphasize the significance of both technical expertise and financial resources in driving successful fish farming ventures. Moreover, they highlight the need for targeted support and training programs to enhance farmers' capabilities and access to inputs, ultimately fostering sustainable growth and income generation in the aquaculture sector (Rashid *et al.*, 2019).

Ho2: There is no significant relationship between Agricultural extension services used and catfish farmers production output

Table 8 showed the influence of extension services on catfish production outputs. The result indicated that significant influence was found in the services (t = 2.15) delivered by extension agents on the output of catfish production at 5% level of probability. This shows that extension services have a positive and significance influence on the production capacity of farmers at 5% significant level. The R-square value explains that extension services is able to predict about 33.7% variation in the output of fish farmers in the study area.

The significant influence of agricultural extension services on catfish farmer's production output in the study area suggests that effective dissemination of information and support from extension agents positively impacts fish farming activities (Sehu 2018). This implies that access to relevant knowledge, training, and resources enhances productivity within the sector. Ultimately, this relationship highlights the pivotal role of extension programs in driving agricultural transformation and improving livelihoods in rural communities. Asfaw *et al.* (2012) opined that achieving productivity growth in the agricultural sector can only be successful through the development and dissemination of improved agricultural technologies to these smallholder farmers in the rural areas. Access to adequate, accuracy, timeliness and relevant information is very essential to increase agricultural productivity (Faborode and Ajayi, 2015).

Conclusion

The study examined the socio-economic characteristics, production practices, extension services, and constraints faced by small-scale catfish farmers in the study area. Findings revealed that fish farming is predominantly male-driven, with the majority of farmers falling within the economically active age group of 31–40 years. Most Catfish farmers were married and had substantial farming experience, which positively influenced their fish production output.

Despite their experience, limited access to extension services was a major setback, with a significant portion of Catfish farmers having no regular contact with extension agents. Nonetheless, the introduction of innovative extension practices — such as the use of tarpaulin tanks, record keeping, and on-farm feed formulation — significantly boosted production, leading to a 45.66% increase in stocking density after extension contact.

Constraints such as poor extension services, inadequate awareness of new technologies, high cost of extension access, and poor market structures critically hindered farmers' productivity. Socio-economic factors, notably farming experience, stocking density, and income levels, were found to positively and significantly influence production outputs. These results underscore the crucial role of effective extension support, access to resources, and proper market systems in enhancing catfish farming productivity

Recommendations

1. Government and corporate organizations should invest in strengthening extension services by recruiting and training more agents, subsidizing service costs, improving accessibility, and ensuring timely, relevant, and frequent farmer-agent interactions to promote the adoption of modern farming technologies.
2. Policymakers should organize targeted training programs to boost catfish farmers' adoption of modern catfish production technologies, while improving access to affordable inputs, essential infrastructure, and structured markets to enhance productivity and profitability.
3. Implement measures such as subsidized training, grants, and community-based extension initiatives to reduce catfish farmers' costs, while regularly organizing workshops and awareness programs to build technical skills, promote innovation, and address technology and market access challenges.

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Table 1: Socioeconomic characteristics of CatFish Farmers

Variable	Freq., n = 120	%	Mean	Std. Dev.
Sex	79	65.8		
Male	41	34.2		
Female				
Age				
10-20 yrs	17	14.2		
21- 30 yrs	29	24.2		
31-40 yrs	55	45.8	41.19	8.19
41-50 yrs	10	8.3		
51 and above	9	7.5		
Marital Status				
Single	19	15.8		
Married	94	78.3		
Divorced	2	1.7		
Widowed	5	4.2		
Separated				
Educational Status				
No formal education	7	5.8		
Primary School	16	13.3		
Secondary School	49	40.8		
OND	26	21.7		
HND	11	9.2		
B.sc	11	9.2		
Years of experience in fish farming				
<5	26	21.7		
5 - 10 yrs	41	34.2	14.15	3.28
11 -15 yrs	24	20.0		
16 yrs and above	29	24.2		
Have you been visited by extension agent?	37	30.8		
Once in 2 weeks	3	2.5		
Once in 4 weeks	11	9.2		

Once in 6 weeks	5	4.2		
Once in 8 weeks	1	0.8		
Once in 10 weeks	5	4.2		
Once in 12 weeks	12	10.0		
Source of Extension Services?				
ADP	20	16.6		
State Ministry of Agriculture	29	24.2		
Federal Ministry of Agriculture	71	59.2		
State your source of fish stock				
ADP	32	26.7		
Ministry of Agriculture	36	30.0		
Fish Farmer	47	39.2		
Personal Fish Hatchery	5	4.2		
Number of Fingerlings Stocked per cycle				
5000 and below	38	31.7		
5001 – 10000	41	34.2		
10001 – 15000	25	20.8	6002.37	1020.55
Above 150000	16	13.3		
Estimated annual income earning (N)				
<100000	15	12.5		
1000,000 - 200,000	27	22.5		
200,001 - 300,000	31	25.8	410,009.44	120,619.12
300,001 - 400,000	22	18.3		
400,001 - 500,000	9	7.5		
500,001 and Above	16	13.3		

Source: Field Survey, 2024.

Table 2: Production characteristics

Selling price per kg	**Freq.**	**%**
1500/kg	11	9.2
2000/kg	56	46.7
2500/kg	53	44.2
Quantity sold in kg in each production cycle		
1000- 2000kg	21	17.5
2000-3000kg	36	30.0
3000- 4000kg	63	52.5
Production cycle stocked / year		
1	13	10.8
2	41	34.2
3	66	55.0
Quantity stocked in each production cycle		
500- 1000kg	1	0.8
1000-1500kg	29	24.2
1500- 2000kg	6	5.0
2000-2500	16	13.3
2500-3000	17	14.2
3000 -3500.	51	42.5

Source: Field Survey, 2024.

Table 3: Extension practices provided by extension agents

Practices	Introduced Freq.	%	Not Introduced Freq.	%	Rank of practices introduced
Flow through system	30	25.0	90	75.0	16th
Water testing kit	44	36.7	76	63.3	13th
Liming of pond	61	50.8	59	49.2	9th
Fertilization of pond	61	50.8	59	49.2	9th
Aerated transporting of containers	59	49.2	61	50.8	10th
On farm feed formulation	81	67.5	39	32.5	4th
Record keeping	90	75.0	30	25.0	2nd
Sex reversed method	12	10.0	108	90.0	19th
Re-circulatory system	7	5.8	113	94.2	20th
Sorting	71	59.2	49	40.8	5th
Hormone injection	25	20.8	95	79.2	19th
Modern Smoking kilns	55	45.8	65	54.2	11th
Solar dryers	26	21.7	94	78.3	18th
Refrigeration of fishes	68	56.7	52	43.3	6th
Vacuum packaging	31	25.8	89	74.2	15th
Use of pesticides as preservative	27	22.5	93	77.5	17th
Canning	66	55.0	54	45.0	7th
Fermentation	35	29.2	85	70.8	14th
The use of tarpaulin tank	101	84.2	19	15.8	1st
Use of reinforced tanks	62	51.7	58	48.3	8th
Concrete tanks	85	70.8	35	29.2	3rd
Earthen ponds	26	21.7	94	78.3	18th
Fish biotech	49	40.8	71	59.2	12th

Source: Field Survey, 2024.

Table 4: Extension practices used by small scale fish farmers

Practices used	Freq.	%	Rank
Flow through system	15	12.5	18th
Water testing kit	35	29.2	13th
Liming of pond	54	45.0	9th
Fertilization of pond	38	31.7	12th
Aerated transporting of containers	51	42.5	10th
On farm feed formulation	57	47.5	7th
Record keeping	87	72.5	3rd
Sex reversed method	6	5.0	19th
Circulatory system	1	0.8	20th
Sorting	95	79.2	2nd
Hormone injection	21	17.5	17th
Modern Smoking kilns	54	45.0	9th
Solar dryers	23	19.2	16th
Refrigeration of fishes	63	52.5	6th
Vacuum packaging	30	25.0	14th
Use of pesticides as preservative	25	20.8	15th
Canning	69	57.5	5th
Fermentation	30	25.0	14th
The use of tarpaulin tank	99	82.5	1st

Use of reinforced tanks	56	46.7	8th
Concrete tanks	78	65.0	4th
Earthen ponds	25	20.8	15th
Fish biotech	40	33.3	11th

Source: Field Survey, 2024.

Table 5: Influence of Agricultural Extension Services on small-scale Catfish Farmers' production

	Stocking density Before	Stocking density After	% difference
No of fish (Average)	250,719.49	365,199.45	45.66%

Source: Field Survey, 2024

Table 6: Constraints to small-scale catfish production

Constraints	Mean	Std. Dev.
Communication problem	1.54	0.16
Illiteracy	2.19	0.55
Inadequate awareness of technologies	3.09*	0.37
Poor extension services	4.37*	0.24
Complexity	1.28	0.31
High cost of accessing extension agents	3.59*	0.13
Poor market structure	3.73*	
Unavailability of extension agents	3.59*	0.13
Poor organization	1.45	0.26
Inconsistency in visitation	2.44	0.22

Source: Field Survey, 2024.
Mean >/= 3.0 = Serious constraints

Table 7: Relationship between socio-economic characteristics and fish outputs

	B	Std. Err.	t-stat	P-value
Age	-0.519	0.093	-5.58	0.000*
Years of experience in fish farming	3.483	0.799	4.36	0.002*
Have you been visited by extension agent?	-0.103	0.062	-1.66	0.164*
How long have you been having contact with extension agents?	-0.058	0.018	-3.22	0.004*
Number of Fingerlings Stocked per cycle	0.148	0.041	3.61	0.003*
Are you a member of any Association?	0.371	0.217	1.71	0.621*
Estimated annual income earning (N)	5.193	0.991	5.24	0.000*
Constant	0.137	0.015	9.13	0.000*

Source: Field Survey, 2024.
R-square = 0.591 NB * - significantly different at 5% probability

Table 8: Influence of extension services on catfish production outputs

	B	Std. Err.	t-stat	P-value
Extension Services	0.0215	0.010	2.15	0.005

Source: Field Survey, 2024.
R-square = 0.337