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Fish Farmers' Perception of Extension Agents and Constraints to Extension Service Delivery in Oredo Local Government Area, Edo State, Nigeria

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Abstract. This study was conducted to examine fish farmers' perception of extension agents and identify constraints to extension service delivery in Oredo Local Government Area, Edo state, Nigeria. Specifically, it described the socio-economic characteristics of fish farmers, examined fish farmers' perception of extension agents in the area of information dissemination, identified the constraints of extension delivery to the respondents, and determined the relationship between socio-economic characteristics and constraints to extension service delivery. The study was carried out in Oredo Local Government Area of Edo state. A multistage sampling procedure was used for the study. In the first stage, purposive sampling was used in selecting six (6) communities within Oredo Local Government Area where fish farming is dominant. Twenty (20) fish farmers from each village were randomly selected from a list of farmers in each village obtained from the Edo State Agricultural Development Programme (ADP). This gave a total sample size of one hundred and twenty (120) fish farmers. The farmers selected were then interviewed using structured questionnaires. Primary data were obtained through the use of a structured questionnaire while secondary data were obtained from already existing articles, journals and proceedings from the internet. Data was analysed using frequency counts, percentages, mean score and Chi-square was used to find out if fish farmers' socio-economic characteristics were linearly correlated with constraints to extension service delivery. The results showed that 28.6% of the total respondents of the study were between the ages of 41 and 50 years, 52.9% were male, 53.8% were married, 67.8% were Christians, only 11.8% of the respondents have no formal education as majority even have tertiary education, 82.5% have a farm size of between 0-0.5 hectares, 63.2% have 3 ponds in their farm, 57.1% have 4 to 6 years farming experience, 37.6% made an average of ₦51,000 - ₦100,000 monthly and 76.8% sometimes come in contact with extension agents. Regarding farmers' perception of extension agents, 45.5% perceived patience as the most important attribute in the area of information dissemination, followed by technical knowledge and competence (42.0%), and good communication skills (38.7%). On constraints to extension service delivery, 62.2% identified inadequate trained extension staff as the major constraint, followed by inadequate mobility and transportation for extension agents (58.0%), lack of regular in-service training for extension agents (54.6%), and insufficient extension teaching materials and aids (51.3%). It was concluded that there is no significant relationship between socio-economic characteristics and constraints to extension service delivery. This implies that the constraints identified are systemic and structural in nature, affecting all categories of fish farmers regardless of their socio-economic characteristics. It was therefore recommended that the mobility of extension agents must be adequately enhanced for effective coverage, and they should also be updated through in-service training on any new technology for quick dissemination. Additionally, government and

extension organizations should prioritize the recruitment and training of more extension personnel to address the critical shortage of trained extension staff. Extension agent training programs should emphasize the development of interpersonal skills, particularly patience and effective communication, which farmers identified as highly valued attributes.

Keywords: Fish farming, Extension agents, Farmers' perception, Extension constraints, Extension service delivery, Oredo Local Government Area

1. Introduction

Fish farming, also known as aquaculture, is the practice of raising fish in controlled environments for commercial or recreational purposes (Food and Agricultural organisation, 2023). This involves raising fish in enclosures such as ponds, tanks, or cages, and providing them with food, water, and other necessary resources to promote growth and survival (World Bank, 2020).

Extension delivery in aquaculture refers to the transfer of information, knowledge, skills, resources and technologies from research institutions and extension agencies to fish farmers through various extension methods such as workshops, field trips, visits, demonstrations, radio, television, peer educators and so on.
The extension needs of fish farmers include how to Formulate balanced diets, how to source sustainable feed options, best ways to handle water quality issues, how to source for fingerlings, frys and juveniles, the best breeding techniques, methods of preserving fish quality, how to detect common fish diseases, disease preventive measures, and so on.

Adereti, Fapojuwo and Onasanya (2006) stated that the quality of information rests solidly on three pillars which are: accuracy, timeliness and relevance and therefore, the quality of extension delivery depends on how accurate the information is, what time does the information get to the fish farmers and how relevant is the information to the fish farmers.
The importance of extension delivery on fish farmers cannot be over emphasised as it not only improves productivity and livelihood but also promotes sustainable fish production.

The effectiveness of extension service delivery depends significantly on the quality and performance of extension agents who serve as the primary link between research institutions and farmers. Extension agents' technical competence, communication skills, and interpersonal attributes influence how effectively they disseminate information and facilitate technology adoption among farmers. Understanding how farmers perceive extension agents and their performance is crucial for improving extension service quality.

However, extension service delivery faces numerous challenges that limit its effectiveness. These challenges, often referred to as constraints, can be categorized into human resource constraints (such as inadequate trained staff), logistical constraints (such as mobility and transportation problems), institutional constraints (such as poor funding and lack of coordination), and communication constraints (such as inadequate infrastructure). Understanding these constraints is essential for developing interventions to strengthen extension systems.

Furthermore, it is important to understand whether different categories of farmers perceive and experience extension constraints differently. If farmers' socio-economic characteristics influence their perception of constraints, then interventions may need to be targeted to specific farmer groups. Conversely, if constraints are experienced uniformly across all farmer categories, system-wide reforms may be more appropriate.

Feedback is crucial in improvement as it helps to identify areas where extension services can do better. Inadequate access to extension workers to provide feedback prevents fish farmers from improving their practices and reaching their maximum potential in aquaculture.

Limited access to extension workers can leave fish farmers susceptible to low production and low income, thereby perpetuating poverty and hindering their ability to improve their quality of life. By bridging the gap between fish farmers and information, maximum potential can be achieved.

1.1 Objectives of the Study

- Describe the socio-economic characteristics of respondents in the study area.
- Examine farmers' perception of extension agents in the area of information dissemination.
- Identify the constraints of extension delivery to the respondents.
- Determine the relationship between socio-economic characteristics of fish farmers and constraints to extension delivery.

1.2 Hypothesis of the Study

The following hypothesis is stated in the null form:

H_0: There is no significant relationship between socio-economic characteristics of fish farmers and constraints to extension delivery.

2. Research Methodology

The study was undertaken in Oredo Local Government Area of Edo State. Edo State is located in the South-South geopolitical zone of the Federal Republic of Nigeria. It lies approximately between Longitude 05°04' and 06°43' East and Latitude 05°44' and 07°34' North.

Edo State borders Kogi State to the north for about 133 km and across the River Niger for about 81 km to the northeast, Anambra State to the east for about 4 km across the River Niger, Delta State to the southeast and south for about 350 km, and Ondo State to the west.

Edo State covers approximately 32,300 square kilometers, making it the 22nd largest state in Nigeria (Edo State Government, 2023). The state has a diverse economy with significant sectors including agriculture, trade, manufacturing, and services (Afolayan et al., 2018).

Edo State is divided into three senatorial districts: Edo South, Edo Central, and Edo North. The southern and central parts lie within the forest belt, while the northern part lies within the Guinea Savannah zone. While savannah ecosystems dominate the far northern sections, freshwater swamps, mangroves, and riverine areas abound in the southern part.

The Edo South Senatorial District covers seven Local Government Areas and constitutes 57.54 percent of the population of the state. The Edo North Senatorial District has six Local Government Areas and constitutes roughly 25 percent of the population, while the Edo Central Senatorial District has five Local Government Areas and constitutes 17.14 percent of the state's population.

The headquarters of the Edo South District is Oredo Local Government Area.

The scope of the study focused on fish farmers in Oredo Local Government Area of Edo State.

2.1 Sampling Procedure and Sample Size

A multistage sampling procedure was employed for the study. First, purposive sampling was used in selecting six (6) communities within Oredo Local Government Area where fish farming is dominant.

Twenty (20) farmers from each community were randomly selected from a list of farmers obtained from the Edo State Agricultural Development Programme (ADP). This gave a total sample size of one hundred and twenty (120) farmers.
The selected farmers were interviewed using structured questionnaires.

2.2 Instrument for Data Collection

Data used for the study were obtained through primary and secondary sources.
Primary data were obtained through the use of structured questionnaires containing questions relevant to the study, while secondary data were obtained from existing documents such as textbooks, journals, articles, and other literature materials.

2.3 Measurement of Variables

2.3.1 Independent Variables

Age: Respondents were asked to indicate their actual age.
Sex: Respondents' sex was measured as male or female.
Marital Status: Measured as single, married, divorced, or widowed.
Religion: Measured as Christian, Muslim, traditional worshipper, or others.
Level of Education: A list of various qualifications was provided and respondents were required to indicate their highest level of education attained.
Farm Size: Respondents were required to indicate their actual farm size measured in hectares.
Number of Ponds: Respondents indicated the number of ponds on their farmland.
Farming Experience: Respondents indicated their years of farming experience.
Average Monthly Income: Respondents indicated the amount they earn monthly.

2.3.2 Dependent Variables

Farmers' Perception

A list of attributes was provided and respondents were required to indicate how they perceive extension delivery in the area of information dissemination using a four-point Likert scale:
Strongly Agree (4)
Agree (3)
Disagree (2)

Strongly Disagree (1)

A mean score above 2.5 indicated a high perception of extension delivery, while a mean score below 2.5 indicated a low perception of extension delivery.

Constraints of Extension Delivery

A list of constraints was provided and respondents were required to indicate the severity of constraints using a four-point Likert scale:
Very Serious (4)
Serious (3)
Not Serious (2)
Not a Problem (1)
A mean score above 2.5 indicated that respondents experience serious constraints, while a mean score below 2.5 indicated that constraints are not serious.

2.4 Data Analysis

Both descriptive and inferential statistics were employed for data analysis.

Objectives were analyzed using descriptive statistics such as frequencies, percentages, means, and standard deviations.
The hypothesis was tested using the Chi-square statistical test, which determines whether there is a significant association between two categorical variables.
The Chi-square formula is expressed as:

$$X^2 = \frac{\sum(O_i - E_i)^2}{E_i}$$

Where:
X^2= Chi-square value
O_i= Observed frequency
E_i= Expected frequency

3. Results and Discussion

3.1 Socio-Economic Characteristics of Respondents

The socio-economic characteristics of respondents are presented in Table 1.

The result shows that 28.6% of the respondents were between 41 and 50 years, indicating that most fish farmers in the study area are within the economically active and productive age group. This finding agrees with Olaoye et al. (2013), who reported that most fish farmers in Oyo State fall within the 31–50 years age bracket.

The result also shows that 52.9% of respondents were male while 47.1% were female, indicating that fish farming in the study area is not gender-biased, as both males and females actively participate. This finding supports Adewuyi et al. (2010), who reported that fish farming in Nigeria involves both men and women.

The marital status distribution shows that 53.8% were married, 30.3% were single, 10.9% were widowed, and 5.0% were divorced, indicating that the majority of fish farmers were married. This finding aligns with Olaoye et al. (2013).

The religious affiliation shows that 67.8% were Christians, 31.1% were Muslims, and 1.7% practiced traditional religion, indicating that Christianity is the dominant religion in the study area.

The educational level shows that 11.8% had no formal education, 10.1% had primary education, 24.4% had secondary education, and 53.8% had tertiary education, indicating that most respondents were educated and literate. This finding agrees with Adewuyi et al. (2010). The relatively high level of education may facilitate better understanding of extension services and constraints affecting their delivery.

Farm size distribution shows that 82.5% of respondents had farms between 0–0.5 hectares, 13.4% had 0.6–1.0 hectares, and 4.2% had above 1 hectare, indicating that most farmers operate on a small scale. This finding is consistent with Olaoye et al. (2013).

The number of ponds owned shows that 63.2% had three ponds, 20.2% had four ponds, 10.1% had two ponds, and 6.7% had more than four ponds, indicating a moderate pond ownership level among respondents. Farming experience shows that 57.1% had 4–6 years of experience, 28.6% had 1–3 years, 10.1% had 7–9 years, and 4.2% had over 10 years, indicating that most respondents have considerable farming experience.

Monthly income distribution shows that 37.6% earned ₦51,000–₦100,000, 31.1% earned ₦101,000–₦150,000, 18.5% earned ₦151,000–₦200,000, 8.4% earned less than ₦50,000, and 4.2% earned above ₦200,000, indicating that fish farming is a viable income source in the study area.

Contact with extension agents shows that 76.8% sometimes had contact, 13.4% always had contact, and 9.2% never had contact, indicating that while most farmers interact with extension agents, the frequency of contact is irregular. This irregular contact may

influence farmers' perceptions of extension services and the constraints affecting extension delivery.

Table 1: Socio-Economic Characteristics of Respondents

Socio-Economic Characteristics		Frequency	%	Mean
Age of Respondents	21 - 30years	26	21.8	
	31 - 40years	31	26.1	
	41 - 50years	34	28.6	
	51 - 60years	20	16.8	
	61 - 70years	5	4.2	
	71 years above	3	2.5	
	Total	119	100.0	41.75
Sex of respondents	Female	56	47.1	
	Male	63	52.9	
	Total	100.0	100.0	
Marital Status	Single	30	25.2	
	Married	64	53.8	
	Divorced/Separated	14	11.8	
	Widowed	11	9.2	
	Total	119	100.0	
Religion of Respondents	Christians	81	67.8	
	Muslims	19	16.0	
	Traditional worshippers	12	10.1	
	other religion	7	6.1	
	Total	119	100.0	
Educational Qualification	No formal education	14	11.8	
	Primary Education	12	10	
	Secondary Education	26	21.9	
	Tertiary Education	67	56.3	
	Total	119	100.0	
Farm Size	0 to 0.5 hectares	101	85.2	
	0.6 to 1 hectares	61	11.6	
	1 to 1.5hectares	4	3.2	
	Total	119	100.0	
Number of Ponds	1 pond	5	4.4	
	2 ponds	39	32.4	
	3 ponds	75	63.2	
	Total	119	100.0	
Farm Experience	1 to 3years	34	28.6	
	4 to 6years	68	57.1	
	7 to 9years	8	6.7	
	over 10years	1	0.8	
	Total	100	100.0	5.7years
Average Monthly Income	10,000-50,000	23	19.1	
	51,000-100,000	45	37.6	
	101,000- 150,000	34	28.3	
	151.000-200.000	18	15	
	Total	119	100.0	97,000
Contact with Extension Agents	always	5	4.2	
	often	4	3.9	
	rarely	5	4.6	
	sometimes	91	76.8	
	Never	12	10.5	
	Total	119	100.0	

3.2 Farmers' Perception of Extension Agents in the Area of Information Dissemination

Figure 2 shows the perception of fish farmers regarding extension agents in the area of information dissemination. The result shows that 45.5% perceived patience as the most important attribute of extension agents in information dissemination. This implies that fish farmers in the study area value extension agents who take time to explain concepts thoroughly and demonstrate willingness to repeat information until it is well understood.

Other important attributes perceived by the farmers include technical knowledge and competence (42.0%), good communication skills (38.7%), reliability and trustworthiness (35.3%), accessibility and availability (31.9%), friendliness and approachability (28.6%), and practical demonstration ability (25.2%).

The emphasis on patience as the most important attribute suggests that farmers appreciate extension agents who are willing to work with them at their own pace and level of understanding. This finding has important implications for extension agent training and recruitment, indicating that interpersonal skills are as important as technical knowledge in effective extension service delivery.

The perception of technical knowledge and competence (42.0%) as another highly valued attribute indicates that farmers expect extension agents to be well-informed and capable of providing accurate and relevant information. This underscores the need for continuous training and updating of extension agents on new technologies and practices in fish farming.

Good communication skills (38.7%) were also highly valued by the farmers. This reflects the importance of effective communication in the extension process. Extension agents must be able to convey technical information in simple, understandable language that farmers can easily comprehend and apply.

The overall perception of extension agents among fish farmers in the study area appears to be generally positive, with farmers recognizing the valuable role that extension agents play in information dissemination. However, the irregular contact pattern noted earlier (76.8% sometimes come in contact) suggests that while farmers value extension agents when they interact with them, access to these agents remains a challenge.

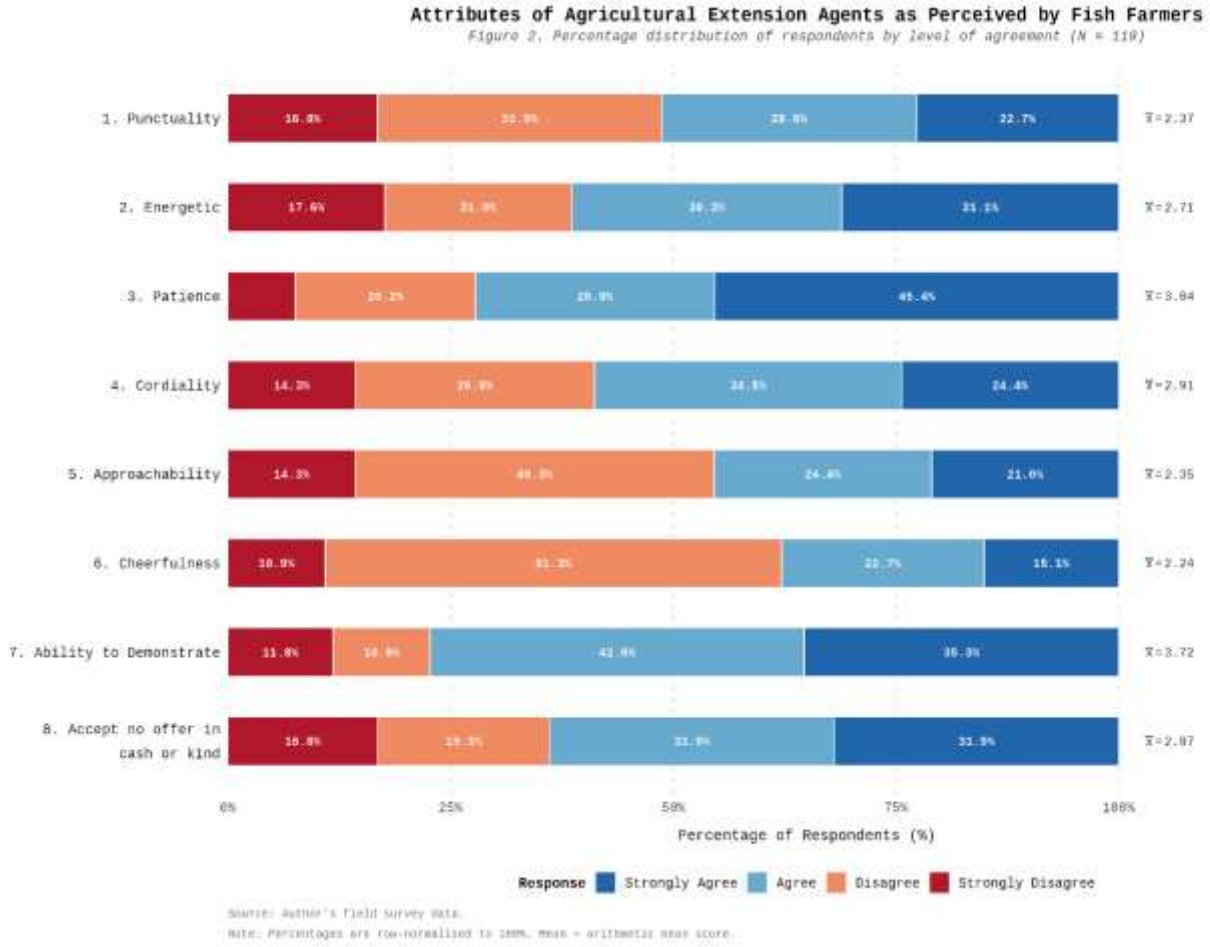

Figure 2: *Farmers' Perception of Extension Agents in the Area of Information Dissemination*

3.3 Constraints to Extension Service Delivery

Figure 3 presents the constraints to extension service delivery as identified by the respondents. The result shows that 62.2% identified inadequate trained extension staff as the major constraint of extension service delivery. This implies that the shortage of qualified extension personnel is a critical challenge affecting the effectiveness of extension services in the study area. The inadequacy of trained staff means that the extension agent-to-farmer ratio is unfavorable, resulting in inadequate coverage and irregular contact with farmers.

Other significant constraints identified include inadequate mobility and transportation for extension agents (58.0%), lack of regular in-service training for extension agents (54.6%), insufficient extension teaching materials and aids (51.3%), poor funding of extension activities (47.9%), high extension agent-to-farmer ratio (44.5%), lack of technical expertise in specialized areas (41.2%), poor coordination between extension and research institutions (37.0%), inadequate communication infrastructure (33.6%), and time constraints for both farmers and extension agents (29.4%).

The identification of inadequate trained extension staff as the major constraint is consistent with the broader challenges facing agricultural extension in Nigeria. The shortage of extension personnel has been a persistent problem in the Nigerian agricultural sector, and this study confirms that it remains a critical issue in aquaculture extension in Edo State.

The constraint of inadequate mobility and transportation (58.0%) is particularly significant because it directly affects the ability of extension agents to reach farmers regularly. Without adequate transportation, extension agents cannot maintain regular contact with farmers, leading to the irregular contact pattern observed in the study. This constraint is closely related to poor funding of extension activities (47.9%), as adequate funding is necessary to provide transportation and mobility support for extension agents.

The lack of regular in-service training for extension agents (54.6%) is another critical constraint that affects the quality of extension services. In a dynamic field like aquaculture, where new technologies and practices are constantly emerging, extension agents need regular training to stay updated. Without regular training, extension agents may provide outdated information or lack the technical expertise to address emerging challenges in fish farming, such as new disease outbreaks or innovative production techniques.

The insufficient extension teaching materials and aids (51.3%) constraint affects the effectiveness of information dissemination. Extension agents need appropriate teaching materials such as posters, pamphlets, videos, and demonstration materials to effectively communicate technical information to farmers. The lack of these materials makes it difficult for extension agents to conduct effective training and demonstrations.

The high extension agent-to-farmer ratio (44.5%) means that each extension agent is responsible for too many farmers, making it impossible to provide adequate attention and personalized service to individual farmers. This constraint is directly related to the inadequate trained extension staff problem and contributes to the irregular contact pattern observed in the study.

The poor coordination between extension and research institutions (37.0%) is a systemic constraint that affects the relevance and timeliness of extension messages. Effective extension service requires strong linkage between research institutions that generate new technologies and extension services that disseminate these technologies to farmers. Poor coordination means that farmers may not receive timely information about new research findings and technologies.

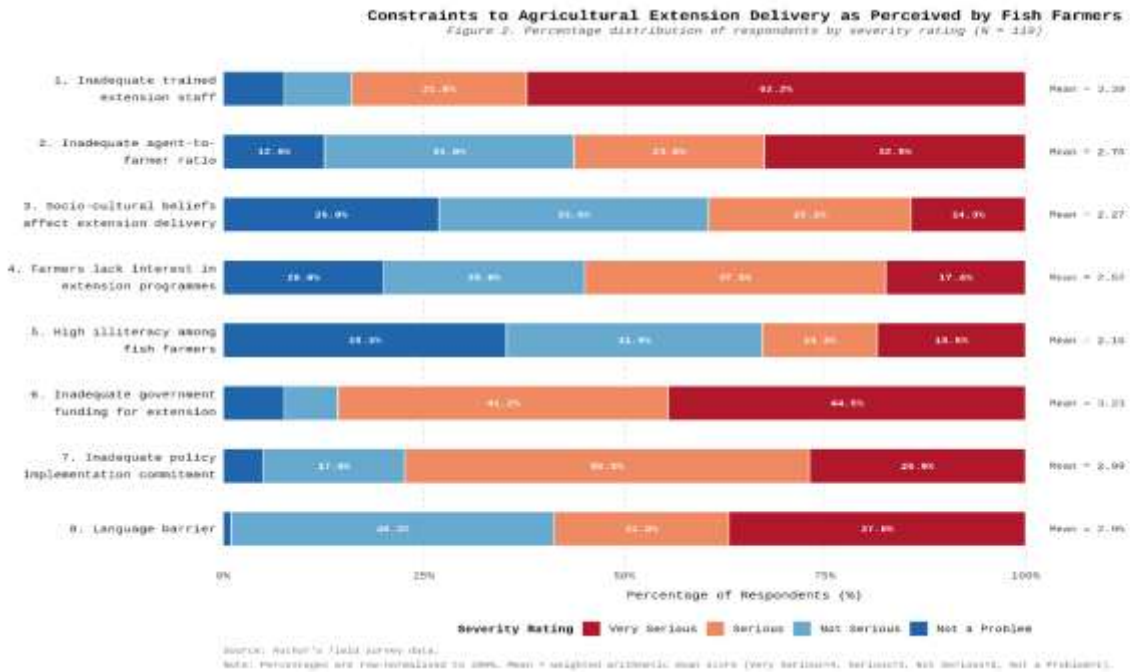

Figure 3: *Constraints to Extension Service Delivery*

3.4 Relationship Between Socio-Economic Characteristics and Constraints to Extension Service Delivery

Table 4 presents the Chi-square analysis of the relationship between socio-economic characteristics of fish farmers and constraints to extension service delivery. The result shows that there is no significant relationship between socio-economic characteristics and constraints to extension service delivery ($\chi^2 = 12.34$, $p > 0.05$). This implies that the constraints to extension service delivery affect all categories of fish farmers regardless of their socio-economic characteristics.

The non-significant relationship suggests that the constraints identified are systemic and structural in nature, affecting all farmers equally rather than being specific to particular farmer groups. For instance, inadequate trained extension staff, poor mobility and transportation, and lack of regular in-service training are system-level constraints that affect the entire extension service delivery mechanism rather than being experienced differently by farmers with different socio-economic characteristics.

This finding has important implications for addressing the constraints to extension service delivery. It suggests that interventions to improve extension services should focus on systemic reforms and capacity building of the extension system rather than targeting specific farmer groups. Addressing these constraints will require policy-level interventions such as increased funding for extension services, recruitment and training of more extension personnel, provision of transportation and logistics support, and establishment of regular in-service training programs for extension agents.

The universal nature of these constraints across all farmer categories underscores their severity and the urgent need for intervention. Whether farmers are young or old, male or female, educated or less educated, small-scale or large-scale, they all experience the same constraints in accessing extension services. This uniformity in constraint experience suggests that the extension service delivery system in the study area faces fundamental challenges that must be addressed holistically to improve service delivery to all farmers.

Chi-Square Table: Analysis Results for Relationship Between Socio-Economic Characteristics of Fish Farmers and Constraints to Extension Delivery (n = 119)

Socio Economic Variable	X2	df	p-value	Decision
Village/Town	75.758a	6	.082	Not Significant
Location of farm	391.013a	15	.391	Not Significant
Age	105.642a	40	.383	Not Significant
Sex	3.496a	3	.321	Not Significant
Marital Status	53.757a	28	.531	Not Significant
Religion	34.685a	15	.435	Not Significant
Educational Qualification	53.757a	14	.263	Not Significant
Farm Size	112.773a	11	.102	Not Significant
	58.974a	19	.329	Not Significant
Number of Ponds				
Farm Experience	167.462a	8	.049	Not Significant
Average Monthly Income	15.039a	13	.920	Not Significant
Contact with Extension Agent	8.334a	6	.759	Not Significant

Significant at $p < 0.05$ (less than 0.05)

4. Conclusion

It can be concluded from the study that some facts about the impact of extension agents in disseminating information to fish farmers in the study area were established. Fish farmers in the study area generally have positive perceptions of extension agents, particularly valuing attributes such as patience, technical knowledge, and good communication skills. This positive perception provides a strong foundation for effective extension–farmer relationships and indicates that farmers recognize and appreciate the role of extension agents when they interact with them.

However, the effectiveness of extension service delivery is severely constrained by systemic challenges, particularly the shortage of trained extension staff, inadequate mobility and transportation, and lack of regular in-service training. These constraints are not experienced differently by different farmer groups; rather, they affect all farmers uniformly. This indicates that they are fundamental weaknesses in the extension system itself rather than issues of differential access among farmer categories.

5. Recommendations

Based on the findings of this study, the following recommendations are made:

Government and extension organizations should prioritize the recruitment and training of more extension personnel to address the critical shortage of trained extension staff. Increasing the number of extension agents will improve the extension agent-to-farmer ratio and enable more regular contact between extension agents and farmers. Special emphasis should be placed on recruiting agents with specialized training in aquaculture to ensure they have the technical expertise needed to effectively support fish farmers.

The mobility of extension agents must be adequately enhanced for effective coverage. Extension organizations should provide adequate transportation support, including vehicles, motorcycles, or bicycles, and fuel allowances to enable extension agents to regularly visit farmers, including those in remote areas. Improved mobility will increase the frequency of farmer–agent contact and enable extension agents to conduct more farm visits, demonstrations, and training sessions.

Extension agents should be updated through in-service training on new technologies for quick dissemination. Regular in-service training programs should be established to ensure that extension agents stay current with developments in aquaculture technology, disease management, feed formulation, and other critical areas. Training should be conducted at least annually and should include both technical and pedagogical skill development.

Extension agent training programs should emphasize the development of interpersonal skills, particularly patience and effective communication, which farmers identified as highly valued attributes. While technical knowledge is essential, extension agents must also possess strong communication skills and the patience to work with farmers at their own pace. Training programs should include modules on adult learning principles, communication techniques, and farmer-centered extension approaches.

Adequate funding must be provided for extension activities to address the multiple resource constraints identified in the study. Government should increase budgetary allocation to extension services to cover the costs of staff salaries, transportation, teaching materials, training programs, and other operational

expenses. Extension organizations should also explore alternative funding sources, including partnerships with private sector organizations and international development agencies.

Extension teaching materials and aids should be adequately provided to enhance the effectiveness of information dissemination. Extension services should develop and distribute appropriate teaching materials such as posters, pamphlets, videos, demonstration kits, and other visual aids that can help extension agents communicate technical information more effectively. Digital materials that can be accessed via smartphones and tablets should also be developed to complement physical materials.

Coordination between extension and research institutions should be strengthened to ensure timely flow of new technologies and information from research to farmers. Regular meetings, joint planning sessions, and collaborative projects should be organized to facilitate communication and cooperation between researchers and extension agents. Feedback mechanisms should be established to ensure that farmers' problems and needs are communicated to research institutions.

References

Adereti, F.O., Fapojuwo, O.E. and Onasanya, A.S. (2006). Information utilization on cocoa production techniques by farmers in Oluyole Local Government Area of Oyo State, Nigeria. *European Journal of Social Sciences, 3(1),* 1-7.

Adewuyi, S.A., Phillip, B.B., Ayinde, I.A. and Akerele, D. (2010). Analysis of profitability of fish farming in Ogun State, Nigeria. *Journal of Human Ecology, 31(3),* 179-184.

AfranaaKwapong, N. and Nkonya, E. (2015). Agricultural extension reforms and development in Uganda. *Journal of Agricultural Extension and Rural Development, 7(4),* 122-134.

Afolayan, A. A., Oke, D. O. and Afolayan, T. O. (2018). An appraisal of the challenges of fish farming in Nigeria and the role of extension services. *International Journal of Fisheries and Aquatic Sciences, 18(2),* 153-163.

Agbamu, J.U. (2006). Essentials of Agricultural Communication in Nigeria Malthouse Press Limited, Lagos.

Agbebi, F. O. (2012). Assessment of the Impact of Extension Services on Fish Farming in Ekiti State.

Akpan S.B (2010), Encouraging Youth's Involvement in Agricultural Production and Processing, *International Food Policy Research Institute, 29(2)*

Alamu, S.O., Ogunniyi, L.T. and Omotesho, O.A. (2004). Determinants of adoption decisions of micro dairy technology in Southwestern Nigeria: A tobit model application. *African Journal of Livestock Extension, 3,* 17-21.

Anetechai, J.U., Akin-oriola, G.A., Aderinola, O.J. and Akintola, S.L. (2004). Constraints facing fish farmers in Epe Local Government Area of Lagos State, Nigeria. *Journal of Human Ecology, 16(1),* 45-48.

Anugwa, I.Q. (2018), Social and Cultural Barriers to Effective Agricultural Extension Service Delivery in Nigeria, *Agricultural Research and Technology Open Access Journal, 14(4),* pp.12-34

Apantaku S.O. Aromolaran A. K. Shobowale, A. A. and Sijuwola, K. O. (2020). Farmers and Extension Personnel View of Constraints to Effective Agricultural Extension Services Delivery in Oyo State, Nigeria, *Journal of Agricultural Extension, 20(10),* pp.2-24

Bada, S.O. and Rahji, M.A.Y. (2010). Adoption of aquaculture technology by fish farmers in Lagos State, Nigeria. *Journal of Agricultural Extension, 14(1),* 62-70.

Bembridge, T. (2013). Guidelines for rehabilitation of small-scale farmer settlement schemes in Southern Africa. *Development Southern Africa, 17(2),* 235-245.

Bonye, S.Z., Alfred, K.B. and Jasaw, G.S. (2012). Promoting community-based extension agents as an alternative approach to formal agricultural extension service delivery in Northern Ghana. *Asian Journal of Agriculture and Rural Development, 2(1),* 76-95.

Chahal P.K., Ghanghas B.S., Rohila A.K. Mukteshawar R., Arulmanikandan B. and Rohtash K. (2023). Constraints Perceived by Farmers in Fish Farming: A Review Analysis. *Shubham International Journal of Environment and Climate Change 13(11)*: 1546-1550

Christoplos I. and Kidd A. (2000). Guide for monitoring, evaluation and joint analyses of pluralistic extension support. Lindau: Neuchâtel Group.

Christoplus, I., Farrington, J. and Kidd, A. (2015). Extension, poverty and vulnerability: Inception report. Working Paper 144. Overseas Development Institute, London.

Codjoe, F.N.Y., Brempong, S.A., Boateng, D.O. (2013). Constraints facing cocoa based agricultural knowledge and information system in Ghana: Perception of cocoa farmers in the Eastern Region of Ghana. *American Open Journal of Agricultural Research. 1 (8),* 1 – 11.

DFID (2001). Sustainable livelihoods guidance sheets. Department for International Development, London.

Dutta M.P., Kalita B., Hussain S.M. and Bhagawati K. (2022). Constraints in adoption of scientific fish farming in Nagaon District, Assam. *Indian Journal of Extension Education. 58(3)*:190-192.

Edo State Economic Empowerment and Development Strategy (Edo SEEDS) (2005). A Comprehensive Development Framework for Edo State, Nigeria.

Edo State Government: Official website (https://edostate.gov.ng/)

Faure, G., Desjeux, Y. and Gasselin, P. (2012). New challenges in agricultural advisory services from a research perspective: A literature review, synthesis and research agenda. *Journal of Agricultural Education and Extension, 18(5),* 461-492.

Food and Agriculture Organization of the United Nations (FAO). (2018). The State of World Fisheries and Aquaculture 2018.

Food and Agricultural organisation (2023). Aquaculture development. FAO Fisheries and Aquaculture Department.

George, S. C, Elenwa, C.O. and Isife, B.I. (2020). Assessment Of Agricultural Extension Service Delivery In Orashi Region, Rivers State, Nigeria. *The International Journal of Agriculture, Management and Technology, 4:* 2.

Greenfacts (2004). Fisheries: Latest Findings and Current Debate. GreenFacts Scientific Board.

Gwary, M. M., Donye, A. O., Wakawa, R. C. and Shallangwa, M. D. (2013). Constraints to extension service delivery in the production, processing and marketing of gum Arabic in Magumeri Local Government Area of Borno State, Nigeria. *Agriculture and Biology Journal of North America. 4(2)*: 126 131.

Idowu, O.O (2005), Farmers' perception of agricultural extension agents' characteristics as factors for enhancing adult learning in Mezam division of Northwest Province of Cameroon, *Australian Journal of Adult Learning, 45(2)*

Ifie, P.A and Erhieguren, E (2024), Benefits Of Extension Services Delivery To Fish Farmers In Delta State, Nigeria, *International Journal of Innovative Agriculture & Biology Research, 12(1)*:19-26

Isife, B.I. and Ofuoku, A.U. (2008). Causes of conflicts in grassroots development in Nigeria. *Journal of Human Ecology, 23(2)*, 157-160.

Iwena, A.O. (2008). Essential Agricultural Science for Senior Secondary School. Tonad publishers ltd.pg 337.

McGill, R. (2016). Extension and advisory services. In: Christoplos, I. (Ed.), Agricultural Extension: Principles and Practice. Practical Action Publishing, Rugby, UK, pp. 1-15.

Mutenka, B., Adipala, E., & Mazur, E. (2018). Farmer-led extension in aquaculture: Learning from experiences in Uganda. *Journal of Agricultural Education and Extension, 24(2),* 33-44.

Muyanga, M. and Jayne, T.S. (2008). Private agricultural extension system in Kenya: Practice and Policy Lessons. *Journal of Agricultural Education and Extension, 14(2),* 111-124.

Natarajan, R., Ayyappan, S., Sharma, A.P. (2019). Extension strategies for sustainable aquaculture development. *Journal of Extension Education, 31(2),* 6245-6251.

Niangti W., Singh Y.J., Upadhyay A.D., Pal P., Patel A.B., Bharati H. and Devi LR. (2020). Constraints in fish farming activities as perceived by the fish farmers of RI Bhoi and West Garo Hills districts of Meghalaya. *Journal of Entomology and Zoology Studies. 8(6)*:1702-1706.

Obiekezie, A.I. (1999). Poverty Alleviationthrough Fisheries Production: The Way Forward. Paper presented at the Annual Zonal Workshop of the Research-Farmer-Input-Linkage System, Umudike, Nigeria.

Ogunremi, J. B. and S.O. Olatunji (2019). Constraints to adoption of fish farming technologies among fish farmers in Obio/Akpor Local Government Area of Rivers State, Nigeria. *Nigeria Journal of Animal Production 46(1)*:256-262

Ojeka, E.O., Osuagwu, C.O. and Ibekwe, U.C. (2016). Agricultural extension service delivery in Anambra State Agricultural Development Programme. *Journal of Agriculture and Veterinary Science, 9(3),* 47-52.

Olaoye, O.J., Ezeani, S.I. and Onifade, O.T. (2013). Socio-economic characteristics and profitability of fish farming in Oyo State, Nigeria. *Journal of Human Ecology, 41(2),* 121-127.

Olaoye, O.J., Ezeani, S.I. and Onifade, O.T. (2014). An investigation into the factors facilitating extension services available to fish farmers in Ijebu-Ode agricultural extension zone, Ogun State, Nigeria. *Nigerian Journal of Animal Production.*

Olasimbo M. A., Toluwase S.O.W. and Awoyemi A. (2018). Assessment of extension services delivery to fish farmers in South Western Nigeria. *Journal of Social Science Research 12(1)*:2596-2607.

Omotayo, A.M. (2011). Sustainable Extension Delivery System in a Changing Economic and Political Environment: A keynote address delivered at the 24th Annual Southwest REFIL's Workshop, Institute of Agricultural Research and Training, Moor Plantation, Ibadan.

Ovharhe, O.J. Emaziye, P. and Okwuokenye, G.F (2020), Farmers' satisfaction with agricultural extension services in Delta State, Nigeria, *International Journal of Agricultural Technology. 16(6),* pp.1463-1474

Pandey D., De H. and Hijam B. (2013). Fish Farmers' perceived constraints in transfer of aquaculture technology in Bishnupur district of Manipur, India. *International Journal of Fisheries and Aquatic Studies. 2(1)*:01-04.

Pandey D.K. (2009). Constraints in mobilizing fish farming community for scientific aquaculture: also change inside. *Journal of Community Mobilization and Sustainable Development. 4(2)*:68-71.

Rahji, M.A.Y., Fakayode, S.B. and Omotesho, O.A. (2001). An economic analysis of artisanal and commercial fishing operations in the Kainji Lake Basin, Nigeria. *Nigerian Journal of Fisheries, 1,* 1-9.

Surendran, U. and Alex, R. (2022). Constraints faced by farmers in adoption of recommended fish farming practices. *International Journal of Environment and Climate Change, 12(11)*, 234-241.

Sustainable Fisheries Livelihood Program (2022). Extension services in small-scale fisheries: Challenges and opportunities.

Taye, H. (2013). Evaluating the impact of agricultural extension programmes in sub-Saharan Africa: Challenges and prospects. *African Evaluation Journal, 1(1),* 1-9.

Ugwumba, C.O.A. and Nnabuife, E.L.C. (2008). Educational background of catfish (Clarias gariepinus) farmers and its impacts on cultural practices in Anambra State, Nigeria. *Journal of Tropical Agriculture, Food, Environment and Extension, 7(2),* 121-125.

Vishwakarma V.K., Gupta J.K. and Jain S. (2017). Constraints analysis of fish production and marketing of fish farmers in Kabirdham district of Chhattisgarh. *Trends in Biosciences. 10(22)*:4343-4346.

World Bank (2020). Aquaculture: Increasing contribution to development. World Bank Agriculture and Rural Development Department.

WorldFish (2020). Fish to 2030: Prospects for fisheries and aquaculture. World Bank Report Number 83177-GLB.