Proceedings of the Annual Conference of the Agricultural Extension Society of Nigeria
Number: Thirty-First Annual Conference
Theme: Strengthening the Agricultural Extension Innovation Systems for Greater Development Impacts
Date: 12th to 15th April 2026
Venue: Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria
ISSN: 1595 – 1421.
Website: https://info@ajol.org,
Email: agricultural.extension.nigeria@gmail.com; editorinchief@aesonnigeria.org

Market Linkage Mechanisms among Catfish Farmers in Edo South Agricultural Zone, Edo State, Nigeria

https://dx.doi.org/10.4314/jae.v31i1.12S

Konkwo Stephen Onyeka[1]* and Obanor Jonathan Oshoke[2]

[1,2] Department of Agricultural Extension and Rural Development, Faculty of Agriculture, University of Benin, Benin City

*Correspondence and presenting author: stephen.konkwo@uniben.edu, +2348036174481; [2]obanorjonathan@gmail.com, +2348146780662

Abstract

The study focused on market linkage mechanisms among catfish farmers in Edo South Agricultural Zone, Edo State, Nigeria. A multi-stage sampling procedure was applied for a proportionate simple random sampling of 80 catfish farmers. Data for the study were collected using structured questionnaire and were analyzed using percentages, mean scores and Spearman rank correlation analysis. Results showed that most (96.2%) of farmers sold their catfish at local markets through direct contacts/phone calls (98.7%) linkage mechanism. Also, contacts/phone calls ($\bar{x}$= 4.21) was perceived to possess the strongest linkage strength. High transportation cost ($\bar{x}$= 4.39) was the major constraint encountered by catfish farmers. There was a significant and positive relationship (r = 0.694; p = 0.000) between the perceived linkage strength and constraints encountered by the catfish farmers. The study concluded that direct contacts/phone call was the most explored linkage mechanism and also perceived as possessing the strongest strength. Thus, it is recommended that relevant stakeholders like extension workers should provide policy framework to ensure the strengthening of those linkage mechanisms perceived to be weak without neglecting the established strong ones.

Keywords: Market linkage, catfish farmers, marketing mechanism

Introduction

Recent revolution in global marketing system offers tremendous opportunities as well as challenges to farmers especially in developing nations like Nigeria. Rapid changes have been witnessed in the way business transactions are operated globally such that most producers no longer rely solely on physical locations and facilities to market their products, but rather integrate multiple marketing channels such as online platforms and other virtual resources. This scenario is either absent or scantly experienced in the agricultural marketing of produce today especially among catfish farmers.

Catfish (*Clarias gariepinus)* has become a viable business, with numerous smallholder farmers engaged in the enterprise (Nwoye et al., 2022). According to

Olagunju and Babatunde, (2023), the high production of catfish stems from relative ease of management and perceived high acceptance in both local and continental dishes, thereby projecting it as one of the most preferred cultured species of fish among farmers. Nwoye et al., (2022) posited that most farmers cultivate catfish due to its efficient food conversion ratio (FCR) and rapid growth rate that allow for two cycles to be accomplished in a year. It also relatively has the capacity to withstand different adverse environmental conditions. Nigeria is recognized as one of the most suitable regions in the world for the production owing to prevailing good climatic conditions, favorable land and desirable aquatic resources (Ogunji and Wuertz, 2023). However, despite the numerous benefits of catfish farming, the industry faces significant challenges, particularly in terms of market access and inefficient linkage mechanisms (Chukwuone et al., 2022).

Market linkage refers to support and collaborative relationship between two or more individuals or organizations to expand the reach of their goods and services beyond the local environment to new categories of clients (Maina et al., 2024). By efficient linkage, farmers are able to balance supply and demand of produce in markets, thus, avoid glut and surpluses with the corresponding fluctuation in prices (Konkwo and Michael, 2021). Agricultural research and extension are examples of two systems that can be linked by information flow and feedback. The farmer falls in between them and is therefore expected to be the main target and beneficiary of their activities (Nemassan, 2025). However, rather than profitably enjoy the outcome of this relationship and meaningfully engage in markets, Cardell and Michelson (2022) posited that most farmers frequently partake in "distress selling" immediately after harvest due to pressing financial needs at home and poor storage facilities. Such category of farmers is trapped to accept whatever price that is offered and rarely have access to reliable market information for an informed decision. This possibly creates room for the exploitative activities of middlemen, who take advantage of information asymmetry to offer unfavorable prices. This condition not only reduces farm income but also perpetuates rural poverty and food insecurity.

In recent times, poor market linkage system has been identified as one of the major setbacks to the effective realization of agricultural development by extension workers in Nigeria. While previous extension guidelines had focused on improved production methods, there appears to be scanty literature on the aspect of linking farmers to the market. The reality is that many people in extension are ill-prepared for extension and communication jobs. In fact, most agents responsible for marketing information dissemination are not trained for the task but rather recruited from disciplines almost unrelated to the field (Konkwo and Michael, 2021). Therefore, the traditional way in which catfish farmers engage in production without prior knowledge of critical market information such as where to sell, who the buyers are, as well as the prevailing or expected prices of their output could be addressed through efficient linkage mechanisms that guarantee farmers' sustainable access to market. This situation therefore was ascertained in this study by examining the market linkage mechanisms among catfish farmers in Edo South Agricultural Zone, Edo State, Nigeria. The specific objectives of the study were to:

1. identify existing markets utilized by catfish farmers;
2. examine mechanisms for linking farmers to markets;
3. ascertain linkage strengths of the identified mechanisms; and,

4. examine constraints to effective market linkages by catfish farmers.

Hypothesis

There is no significant relationship between the perceived linkage strength and constraints encountered by catfish farmers.

Methodology

The study was conducted in Edo South Agricultural Zone, located between latitudes 5º44′N and 6º87′N and longitudes 5º00′E and 6º43′E, covering an estimated land area of 8,778.921 km². The zone comprises seven Local Government Areas (LGAs): Uhunmwode, Orhionmwon, Ikpoba-Okha, Oredo, Egor, Ovia North East, and Ovia South West. The major occupation of residents is arable crop farming, with catfish farming increasingly gaining prominence due to its rising demand for affordable animal protein. A multi-stage sampling procedure was adopted for the proportionate simple random sampling of 80 respondents. In the first stage there was a purposive selection of four (4) out of seven (7) LGAs in Edo South based on their significant level of involvement in catfish farming. In the second stage, a comprehensive list of 140 registered catfish farmers was obtained from office of the Edo State Agricultural Development Programme (ADP), Edo State. In the third and final stage, a proportionate simple random sampling of 70% of catfish farmers from each of the four (4) selected LGAs employed which give a total of 80 farmers for the study. Collected data were analyzed using frequency counts, percentage, mean scores and the Spearman Rank correlation analysis.

Results and Discussion

Existing Markets Utilized by Catfish Farmers

Result in Table1 shows that most (96.2%) of the catfish farmers utilized local markets for sales of catfish. This was closely followed by the majority (71.2%) of the farmers who engaged in farm gate sales, while less than half (46.3%) the proportion of farmers utilized urban markets. This result implies that most catfish farmers sold their output at local markets. This result is in tandem with the work of Busari et al. (2021) who observed that catfish farmers preferred local markets due to proximity and lower transportation costs, while urban markets were not fully explored due to logistic challenges. The absence or poor utilization of export markets and modern retail chains suggests the existence of weak linkage and potential barriers, such as: lack of access to larger markets, inadequate infrastructure, or limited knowledge about these channels (Olagunju and Babatunde, 2023).

Table 1: Existing markets utilized by catfish farmers

Existing markets	Percentages (n = 80)
Local markets	96.2
Urban markets	46.3
Farm gate	71.2
Export markets	0.0
Supermarkets and retail chains	8.8
Restaurants and food service industry	22.5
Fish processing factories	11.3
Trade fares	1.3
Online platforms	10.0

Source: Field survey, 2025

Mechanisms for Linking Farmers to Markets

As shown in Figure 1, result indicates that most (98.7%) farmers had direct contact with buyers of catfish. This was followed by more than half (55.0%) who utilized linkage through extension workers. Others utilized mechanisms such as cooperatives (45%), leading farmers (42.5%), social media (28.8%), middlemen (21.3%), and market associations (20%) among others. However, none of the farmers utilized both e-commerce platforms and digital market information systems. The result therefore implies that most farmers in the study area relied on direct sales as their primary means of market linkage. This approach poses a significant limitation, as it confines farmers to local markets and restrict their ability to benefit from relative price variations across different locations. This result aligns with findings from Adedigba et al., (2024), who reported that catfish farmers often prefer direct sales to consumers to maximize profits and maintain control over pricing. However, non-use of digital and e-commerce platforms highlight a significant gap in the adoption of modern technologies for facilitating market linkages, as noted by Uwana et al., (2023) and the Food and Agriculture Organization (2023). According to Chijuka and Konkwo (2026), digital and e-commerce platforms enable farmers to promote their products, receive real-time market information, and sell directly to buyers in local, regional, and even international markets. Furthermore, Shehrawat (2024) submitted that many farmers lack the necessary skills to effectively use digital tools and platforms, which constrains adoption and optimal utilization. Hence, while digital tools are reliable channels of information, the role of extension workers remains pivotal in helping farmers interpret and effectively apply this knowledge (Sasmita, 2025).

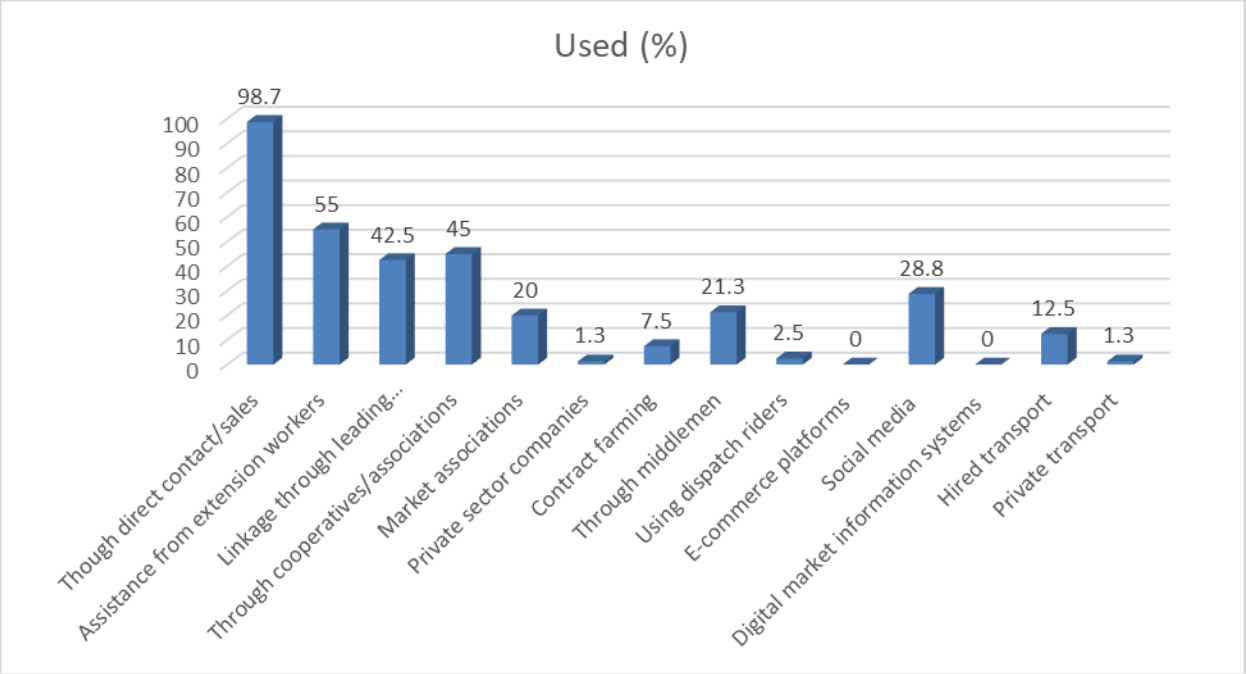

Figure 1: Mechanisms for linking farmers to markets
Source: Field survey, 2025

Perceived Linkage Strengths of the Identified Mechanisms

The result in Table 2 shows that direct contact/phone calls ranked the highest mean score of 4.21 and a standard deviation of 0.610, indicating that face-to-face and uninterrupted contact between buyers and sellers instills business trust thereby maintaining the strongest market linkage strength. This was followed by linkage with buyers through dispatch riders with mean of 4.05 and standard deviation of 0.614, digital/social media platforms ($\bar{x}$ = 3.88 $\pm$ 0.786) and middlemen ($\bar{x}$ = 3.73 $\pm$ 0.763). This result suggests that catfish farmers considered market linkage through direct contact or phone calls to be the most effective means of reaching customers within the area. According to Subbu, et al., (2025) direct sale strengthens farmer-to-customer relationship and trust thereby eliminating the activities of middlemen and ensuring fair share of prices to the farmer. Traditional agricultural marketing in which farmers depend on middlemen to sell their produce are inefficient, as they frequently take advantage of farmers' low access to information (Kumbhar et al., 2021). Farmers have little negotiating strength because of the opaque price, which makes the problem worse. According to studies, the advent of mobile phones has decreased farmers' reliance on middlemen thereby facilitating direct sales from farmers to consumers (Oke et al., 2022).

Table 2: Catfish farmers' perceived strength of linkage mechanisms

Strength of Linkage Mechanisms	Very weak	Weak	Neutral	Strong	Very Strong	Mean	Standard deviation	Rank
	% (n = 80)							
Direct contact/Phone calls	0.0	1.3	6.3	62.5	30.0	4.21*	0.610	1st
Dispatch riders	0.0	1.3	12.5	66.3	20.0	4.05*	0.614	2nd
Digital/Social media platforms	0.0	6.3	18.8	56.3	18.8	3.88*	0.786	3rd
Through middlemen	0.0	8.8	20.0	61.3	10.0	3.73*	0.763	4th
Linkage through leading farmer	7.5	8.8	12.5	51.3	20.0	3.68*	1.123	5th
Extension workers	3.8	7.5	20.0	57.5	11.3	3.65*	0.915	6th
Cooperative/Market associations	6.3	12.5	18.8	58.8	3.8	3.41*	0.977	7th
Contract farming	16.3	26.3	22.5	27.5	7.5	2.84	1.216	8th
Private sector companies	18.8	27.5	32.5	16.3	5.0	2.61	1.119	9th
Government agency	30.0	36.3	27.5	6.3	0.0	2.10	0.908	10th

Source: Field survey, 2025

Constraints to Effective Market Linkages by Catfish Farmers

Result in Table 3 presents that high transportation cost ($\bar{x}$ = 4.39) was a major market linkage constraint faced by catfish farmers with a standard deviation of 0.539 and was ranked first (1st) among other constraints. This was followed by poor road infrastructure ($\bar{x}$ = 4.18 ± 0.522), limited access to finance ($\bar{x}$ = 4.14 ± 0.470), and price fluctuations ($\bar{x}$ = 4.14 ± 0.568). This result infers that the most serious constraint faced by catfish farmers for effective market linkage was high transportation cost. It also corroborates with the findings of Agunbiade and Siyan, (2025) where poor transportation networks contributed to inefficiencies in the fish value chain, further hindering the profitability of smallholder farmers. According to Konkwo et al., (2022) efficient transportation system influences the value of an agricultural output by ensuring reduced wastage and safety of produce. With reliable transportation, catfish and its products are brought to the market for onward sales and distribution to the final consumers.

Table 3: Constraints to effective market linkage

	Not serious	Slightly serious	Neutral	Serious	Very serious		Standard deviation	
	____%____							
Constraints	**(n = 80)**					**Mean**		**Rank**
High transportation cost	0.0	0.0	2.5	56.3	41.3	4.39*	0.539	1st
Poor road infrastructure	0.0	1.3	2.5	73.8	22.5	4.18*	0.522	2nd
Limited access to finance	0.0	0.0	5.0	76.3	18.8	4.14*	0.470	3rd
Price fluctuations	0.0	0.0	10.0	66.3	23.8	4.14*	0.568	4th
Unavailability of storage facilities	0.0	0.0	20.0	56.3	23.8	4.04*	0.665	5th
Inadequate market information	2.5	6.3	11.3	63.8	16.3	3.85*	0.858	6th
Unavailability of reliable buyers	0.0	11.3	8.8	63.8	16.3	3.85*	0.828	7th
Competition from imports	2.5	10.0	15.0	50.0	22.5	3.80*	0.986	8th
Seasonal demand	0.0	6.3	27.5	48.8	17.5	3.78*	0.811	9th
Inadequate policy support	1.3	10.0	11.3	66.3	11.3	3.76*	0.830	10th
Poor extension services	1.3	11.3	17.5	52.5	17.5	3.74*	0.924	11th
Limited consumer awareness	6.3	5.0	20.0	55.0	13.8	3.65*	0.995	12th
Intermediaries' dominance	*2.5*	*11.3*	*22.5*	*55.0*	*8.8*	*3.56**	0.898	*13th*

. P≤ *0.01, %* = ***Percentages*
Source: Field survey, 2025

Relationship between Constraints Encountered by Catfish Farmers and Perceived Linkage Strength

Result shown in Table 4 indicates a significant and positive relationship (r = 0.694, p ≤ 0.01) between constraints encountered by catfish farmers and perceived linkage strength. The positive relationship infers that the more constraints encountered by catfish farmers, the greater their quest for efficient market linkage mechanisms to overcome them. Similar study by Nemassan, (2025) identified poor market access as a major constraint to farmers participation in catfish marketing. Barbier, (2023) posited that most farmers in developing and emerging economies are significantly constrained in accessing markets, largely due to factors such as their location in remote areas, information asymmetry, high transaction costs and insufficient business skills (Dey & Singh, 2023, Gurmu et al., 2024). Reliable access to extension services can enhance market linkages, providing farmers with relevant information on market trends, pricing, and opportunities on how to sell their produce.

Table 4: Relationship between constraints encountered by catfish farmers and perceived linkage strength

	Linkage strength	
Variable	**Coefficient (r)**	**Probability level**
Constraint	0.694**	0.001

**. P≤ *0.01*

Conclusion and Recommendations

The study concluded that most farmers utilised local markets for the sale of catfish, while market linkage through direct contacts/phone calls was perceived to have the strongest mechanism. The high cost of transportation was the major constraint encountered by catfish farmers, and there was a significant and positive relationship between perceived linkage strength and constraints encountered by catfish farmers. The study therefore established that direct contacts/phone calls was the most explored linkage mechanism and also perceived as possessing the strongest strength. It then recommended that relevant stakeholders like extension workers should provide policy framework to ensure the strengthening of those linkage mechanisms perceived to be weak without ignoring the established strong ones.

References

Adedigba, B. K., Jatto, K. A., Olaitan, A. A., and Oke, D. O. (2024). Determinants of market outlet among catfish farmers: Empirical evidence from Kwara State, Nigeria. *Discovery Agriculture, 10*(1), 1559.

Agunbiade, O., & Siyan, P. (2025). Empirical analysis of the impact of road transportation on poverty reduction in the rural areas of the Federal Capital Territory of Nigeria. African *Journal of Economics and Sustainable Development, 8*(4), 38-56. doi: 10.52589/AJESDIMVPLWA6

Barbier, E.B., (2023). Overcoming digital poverty traps in rural Asia. *Revolutionized Development Economies. 27*(1), 1403–1420. https://doi.org/10.1111/rode.12962.

Busari, K. M., Badmus, A. O., Adeniyi, A. O., & Busari, A. O. (2021). Economic analysis of catfish production among fish farmers in Osogbo metropolis, Osun State, Nigeria. *Journal of Agricultural Economics and Rural Development, 7*(2), 234-245.

Cardell, L., & Michelson, C. (2022). Why farmers might prefer to sell at harvest: Evidence on price risk and storage from Sub-Saharan Africa, supported [in part] by the U.S. Department of Agriculture, Economic Research Service, *VoxDev*, 1(1): 1- 8.

Chijuka, M.I., & Konkwo, S.O. (2026). *Agricultural Finance* (1st ed.). University of Benin Press.

Chukwuone, N.A., Onyia, C.C., & Aniokoh, C.D. (2021). Determinants of catfish farmers' use of sustainable environmental management practices in Enugu State, Nigeria, *Journal of Agricultural Extension, 25*(4), 143-152. https://dx.doi.org/10.4314/jae.v2- 5i4.15

Dey, S., & Singh, P.K., (2023). Market participation, market impact and marketing efficiency: an integrated market research on smallholder paddy farmers from Eastern India. *Journal of Agribusiness Development of Emerging Economies* https://doi.org/10.1108/JADEE-01-2023-0003.

Food & Agriculture Organization (FAO). (2023). The catfish aquaculture value chain in Nigeria. *FAO Fisheries and Aquaculture Circular No. 1234.*

Gurmu, H.R., Boka, S.K., & Shate, A.E., (2024). Determinants of potato market participation among smallholder farmers in Mida Kegn, Ethiopia. *Cogent Food Agriculture 10*(1), https://doi.org/10.1080/23311932.2023.2293330.

Konkwo, S.O., & Michael, C.O. (2021). Agricultural marketing information transmission channels to smallholder arable crop farmers in Imo State, Nigeria. *Ethiopian Journal of Environmental Studies and Management, 14*(4), 401 – 412. doi: https://ejesm.org/doi/v14i4.1

Konkwo, S.O, Onyemekihian F., & Tuoyo A.W. (2022). Marketing extension needs of pork marketers in Warri South Local Government Area, Delta State, Nigeria. *Ethiopian Journal of Environmental Studies and Management, 15*(6), 815-824, doi: https://ejesm.org/doi/v15i6.10

Kumbhar, S. S., Kumbhar, A. S., & Kumbhar, S. S. (2021). "AgroMarket: A digital platform for direct farmer-to-consumer transactions," *2021 International Conference on Agriculture and IT*.

Maina, C. W., Gichohi, P. M., & Kanyiri, A. (2024). Market linkages and growth of small and medium enterprises: Insights from County Government Support Programs. *Journal of Strategic Management, 4*(3), 1-12.

Nemassan, N.O. (2025). Extension services delivery and national food security, Lead paper presented at National Conference of the Agricultural Extension Society of Nigeria, at Idris Waziri's Hall, Taraba State University Jalingo, Taraba State, Nigeria, 6th – 10th April, 2025, 1 – 8.

Nwoye, I.I., Onubogu, O.H., & Uzochukwu, I.E. (2022). Availability and utilization of digital marketing tools among fresh African catfish marketers in Omambala region of Anambra State, Nigeria, *Journal of Agricultural Extension, 26*(2), 61–69, https://dx.doi.org/10.4314/jae.v26i2.7

Ogunji, J., & Wuertz, S. (2023) Aquaculture development in Nigeria: The second biggest aquaculture producer in African Water, 15(24):4224. https://doi.org/10.3390/w15244-224

Olagunju, O. F., & Babatunde, R. O. (2023). A national survey data for the technical and economic assessment of African catfish farming in Nigeria, *Data in Brief, 45*, 108567.

Oke, F.O., Arowolo, A.O., Olorunsogo, G.O., & Akerele, D. (2022). Information Communication Technologies Utilization and Profitability of Catfish Farming in Ijebu-Ode Zone of the Agricultural Development Programme, Ogun State, *Journal of Agricultural Extension, 26*(2), 53-60.

Shehrawat, P.S., Aditya, Singh, S., & Arulmanikandan, B. (2024). Farmers' awareness level and adoption regarding usage of ICT for crop production, *International Journal of Agriculture Extension and Social Development, 7*(11), 167-173.

Sasmita, H.O. (2025). Factors influencing digital technology adoption among young farmers in Indonesia. *Journal of Agricultural Extension, 30*(1), 94-105.

Subbu, L.T.C., Maha, A.S., & Karthigai, L.P. (2025). Enhancing farmers' direct market access: A pathway to sustainable agriculture, *International Journal of Research Publication and Reviews, 6*(4),1112-1117.

Uwana, G. E., Omoregie, P., & Omoregie, O. (2023). The use of mobile phones by catfish farmers at Uteh fish farming cluster, Edo State, Nigeria. *Open Journal of Agricultural Science, 1(1)*, 1–10.