integrity Research Journals

Global Journal of Fisheries Science
Volume 8(5), pages 138-145, October 2026
Article Number: 3770D8C44
ISSN: 2782-750X
https://doi.org/10.31248/GJFS2026.118
https://integrityresjournals.org/journal/GJFS

Full Length Research

Economic assessment of catfish marketing in Kano metropolis, Kano State

Isiyaku, M. S.* and Sudawa, M. H.

Department of Fisheries and Aquaculture, Bayero University, Kano, Nigeria.

*Corresponding author. Email: imsani.faq@buk.edu.ng; Tel: +2348035337548.

Copyright © 2026 Isiyaku and Sudawa. This article remains permanently open access under the terms of the Creative Commons Attribution License 4.0, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Received Date: 10 September 2026 | Accepted Date: 06 October 2026 | Published Date: 30 October 2026

ABSTRACT: A study was conducted to analyse catfish marketing in the Kano metropolis of Kano, Nigeria. The objectives were to describe the socioeconomic characteristics of catfish marketers, estimate costs and returns from catfish marketing, describe the marketing structure, and assess constraints faced by catfish marketers in the study area. One hundred catfish marketers were sampled using a multistage random sampling technique, while data were gathered with the aid of a structured questionnaire. Descriptive statistics, gross margin analysis and mean scores computed from a Likert- type scale were used to analyse the data collected. The descriptive statistics indicated that 100 per cent of respondents were males with a mean age of 35years. Most of the respondents were married (69%), with formal education (57% had attained a secondary leaving certificate). Fish marketing was found to be the major source of income of respondents. Results from profitability analysis revealed that the purchase of fish constituted 88.9 per cent of the total marketing costs, followed by rent, which was 6.5 per cent, and transportation, 3.6 per cent. Average revenue of 357,239.75 naira was greater than average total marketing costs of 350,859.00 naira; hence, fish marketing generated a positive net return. A distribution-based coefficient of 0.3297 was obtained from the reported marketer-frequency classes; because the table does not contain sales shares, this value is interpreted only as a descriptive indicator of the distribution of marketers across sales classes, not as a direct measure of revenue inequality. The major constraints faced by marketers, which cut across more than 75% of respondents, were inflation (93%), inadequate capital (80%), price fluctuation (79%) and high marketing cost (76%). It was concluded that catfish marketing is profitable in Kano, but there is a need to redress inequalities in distribution, inadequate capital, and other constraints faced by marketers for more efficiency and welfare.

Keywords: Catfish, marketing, marketing structure, profitability.

INTRODUCTION

Agriculture is central to many developing economies and includes five main areas: crops, livestock, forestry, wildlife, and fisheries. This sector is a major economic force, making up about 21.9% of GDP and supporting the livelihoods of over 70% of the population (World Bank, 2020). Within this framework, the fishery subsector is essential. Fish provides not only basic sustenance but also recreational, medicinal, and significant nutritional benefits. In developing countries, it constitutes a vital and accessible source of animal protein. Furthermore, fish is largely exempt from the religious or cultural taboos that may limit the consumption of other meats, resulting in widespread acceptance. This is particularly evident in Nigeria, where nearly 60% of the population depends on fish for more than 30% of their total animal protein intake (Ugwumba, 2011).

Fish farming contributes significantly to the economy, creating employment opportunities in rural and urban areas, serving as a viable source of protein nutrients in Nigerian households and improving national food security. In 2009, fish accounted for 16.6 per cent of the world population's intake of animal protein and 6.5 per cent of all proteins consumed (FAO, 2012).

According to the American Marketing Association (AMA, 2007), marketing encompasses the systems, institutions, and activities involved in creating, communicating, delivering, and exchanging valuable offerings for consumers, clients, partners, and society. In the catfish

trade, distribution channels vary—ranging from direct farm-to-consumer sales to multi-tier routes involving wholesalers and retailers. Wholesalers typically buy directly at the farm gate and sell to small-scale retailers, who then distribute to the final consumer (Ike-Obasi, 2021).

Catfish marketing is a highly lucrative business with immense potential to boost national GDP by creating jobs, boosting household incomes, and generating strong profit margins (Abah *et al.,* 2013; Agbebi and Fagbote, 2012). However, the catfish market in Nigeria remains significantly underdeveloped relative to its true production and trade potential. Its efficiency is currently hindered by several operational bottlenecks, including limited market data, poor market structures leading to price volatility, bad road networks, high transport costs, and low financial capacity among farmers (Njoku and Offor, 2016).

Efficient marketing requires relevant quantitative and qualitative information that will be reliable at the lowest cost (Ebe, 2007). Inefficiencies in the marketing of live catfish in Kano State are primarily driven by several factors. A significant challenge is the lack of comprehensive market information and a poorly structured market, which collectively contribute to price instability. Furthermore, the region suffers from an inadequate road network and high transportation costs, directly impacting the accessibility and affordability of products. The low income of farmers also limits their capacity to invest in better marketing practices. The concentration of live catfish markets in urban areas of Kano State necessitates that participants travel considerable distances for transactions, often leading to discrepancies between supply and demand and subsequent price escalations. Catfish is a perishable agricultural commodity; its handling, packaging, transportation, and sales processes are subject to various pressures that negatively affect market prices. Additionally, substandard storage facilities combined with improper handling and transportation methods result in reduced quantities and significant losses, thereby diminishing market margins and farmer returns. The inherent perishability of fish, due to rapid enzymatic and microbial degradation, leads to undesirable changes in taste, smell, and texture, ultimately reducing consumer acceptance (Falodun, 2011). Consequently, to ensure the preservation of fish freshness, it is essential that the catch undergoes either preservation or processing. Various techniques are employed for this purpose, including fermentation, drying, frying, canning, salting, and smoking. Despite the importance of catfish marketing in Kano Metropolis, empirical evidence integrating profitability, market structure, and marketing constraints remains limited. This gap justifies a focused assessment of catfish marketing in the study area. In view of the foregoing, the following research questions arise:

1. What is the degree of seller concentration of catfish marketing?
2. What is the profitability of catfish marketing?
3. What is the structure of catfish marketing?
4. What are the problems associated with catfish marketing in the study area?

For many developing nations, catfish trade represents a significant source of foreign currency earnings in addition to the generation of income, a source of employment and a provider of food security and nutrition (FAO, 2006). This is largely because catfish is one of the most commercially important freshwater fish in Africa. The total catfish reported in 2011 was 29,250 t. The countries with the largest catches were Mali (150,91 t) and Nigeria (9.994 t). Catfish has been imported for purposes of aquaculture and game, marketed live, fresh and frozen; eaten broiled, fried and baked. Given this context, the study aims to address the following specific objectives

1. To examine the socio-economic characteristics of catfish marketers operating within the Kano Metropolis.
2. To estimate the costs, returns and profitability of catfish marketing in the Kano Metropolis.
3. To analyse the prevailing marketing structure of catfish in the Kano Metropolis.
4. To identify and describe the challenges and constraints encountered in catfish marketing within the study area.

METHODOLOGY

Study area

This study was carried out in Kano Metropolis, situated between latitudes 12.000°N and longitudes 8.517°E within the Sudan Savanna region, just south of the Sahel. Historically, Kano served as a major hub along the trans-Saharan trade routes and has been a vibrant centre for commerce and human settlement for centuries. Geographically, it is located in the North-West geopolitical zone of Nigeria, sharing borders with Katsina, Jigawa, Kaduna, and Plateau States. Kano is a city in northern Nigeria and the capital of Kano State (Encyclopaedia Britannica*,* 2021*).* It is the second largest city in Nigeria after Lagos, with over ten million citizens living within 449 km^2 or 173 sq mi *(*Statista*,* 2023*).* Kano city lies south of the Sahara Desert in the Sudanian Savanna region that stretches across the south of the Sahel. Situated near the confluence of the Kano and Challawa rivers, which originate from the southwest, the city is positioned where these waters merge to form the Hadejia River. This river subsequently flows eastward, eventually terminating in Lake Chad. The Kano Metropolis is also referred to as Kano City. Initially, it was the area that lies within the ancient city walls of Kano, but as development, as well as a rapid increase in urbanisation activities and population

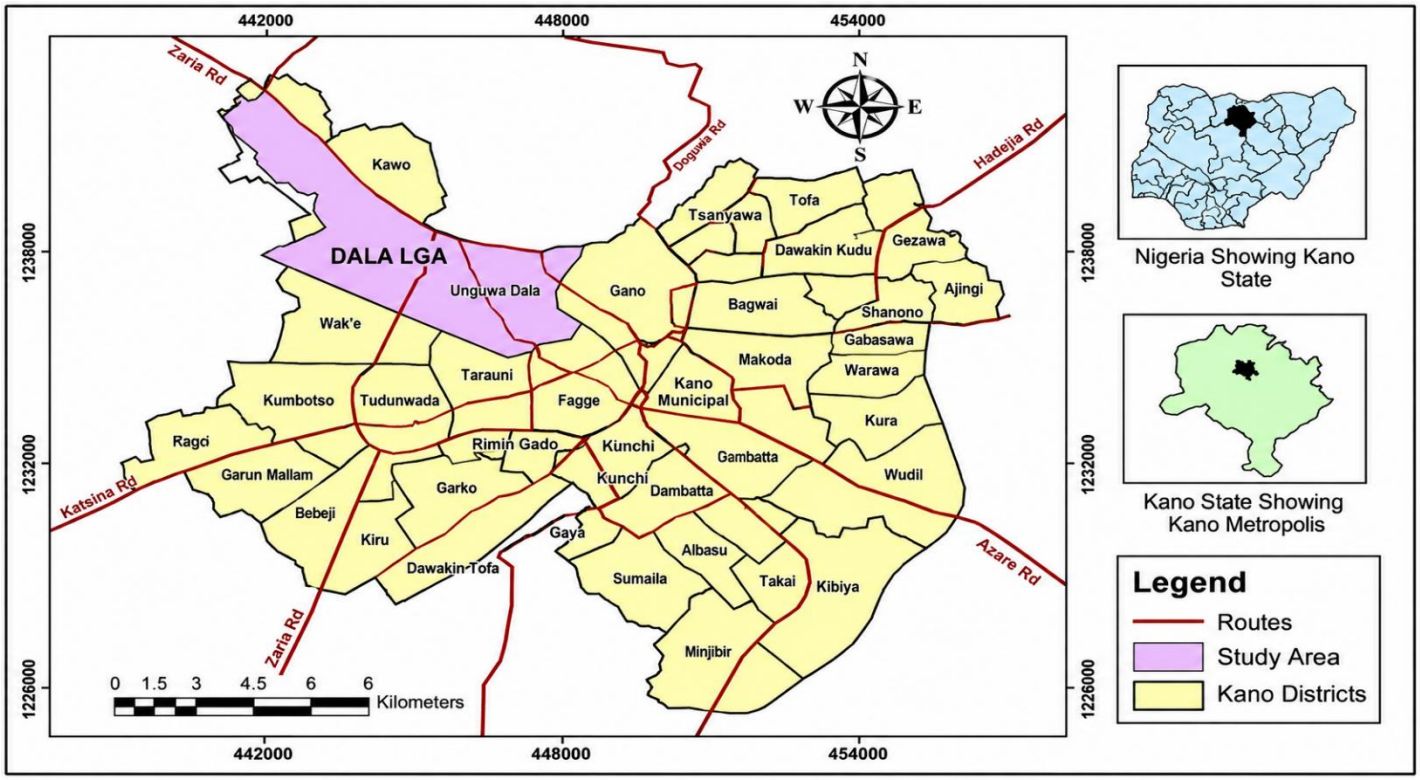


Figure 1. Map of Kano Metropolis.

explosion, more areas are being included in the Kano Metropolis. Presently, the Kano Metropolis has about eight local government areas of the state, namely: Kano Municipal, Gwale, Dala, Nasarawa, Tarauni, Fagge, Kumbotso, and Ungoggo Local Government Areas (Figure 1).

Data collection

Data for this study were collected from both primary and secondary sources. The Primary data were collected from a cross-sectional sample of representative marketers through questionnaires. A self-designed survey questionnaire was developed and administered in order to cover all aspects of the research questions. The target population comprised 400 catfish marketers operating in Galadima, Yankura, Taruni and Court Road Market during 6 months. The sampling frame was 100. Respondents were selected using purposive and simple random sampling techniques. The questions were structured to provide answers to the objectives of the study. The data gathered for the study encompassed various socioeconomic variables, including the participants' age, educational attainment, household size, market-related constraints, and their specific information needs and sources. Before embarking on the collection of the actual primary data, strong attention was paid to formulating questions with respect to clarity and logical order. Secondary data sources were obtained from both districts, governmental and non-governmental institutions, including both published and unpublished documents regarding the baseline general information to support the primary data. Data collected were then cleaned, coded, analysed, and interpreted.

Data analysis

To address the study's goals, descriptive statistics were used to summarise the socioeconomic characteristics of marketers; gross margin analysis was used to estimate costs, returns and profitability; the reported marketer-frequency distribution and a descriptive coefficient were used to discuss market structure; and a Likert scale was used to assess constraints.

Gini coefficient

The reported coefficient was used as a descriptive indicator of the distribution of marketers across the sales-value classes shown in Table 3. In the available table, X denotes the proportion of marketers in each class, and Y denotes the cumulative proportion of marketers, not the cumulative proportion of sales. Therefore, the coefficient should not be interpreted as a direct measure of sales or

revenue inequality. A revenue-based Gini coefficient would require the sales share contributed by each class.

$GC = 1 - \Sigma X_{ab} Y_{ab}$

Where: GC = descriptive coefficient, X = proportion of marketers in each class, Y = cumulative proportion of marketers, Σ = summation sign, and 1 = constant or unity.

Because Y is a cumulative proportion of marketers rather than a cumulative proportion of sales, the reported value of 0.3297 should be treated cautiously as a descriptive distribution indicator. It should not be used alone to claim inequality in earnings, sales concentration, collusion or market inefficiency.

RESULTS AND DISCUSSION

Socio-economic characteristics of catfish marketers (Qualitative)

The distribution of qualitative socioeconomic characteristics of fish marketers in Kano State is shown in Tables 1a and 1b. The study found that the largest segment of respondents (36%) was aged between 28 and 42, with an average age of 35, indicating a workforce primarily composed of individuals in their peak productive years. Notably, the entire sample (100%) consisted of men, confirming that catfish marketing in the region is exclusively a male-driven enterprise.

This finding is supported by the findings of Deji *et al.* (2013), who reported that the majority of fish marketers in Ondo State, Nigeria were males. This is also in line with the findings of Deji *et al.* (2013), who stated that the majority of agricultural enterprises, such as fish farming, are dominated by males. This is contrary to the general notion that more women are involved in the marketing of agricultural produce, as pointed out by other researchers such as Oyesola (2018).

The study found that a substantial proportion of fish marketers (69%) were married, indicating that the industry is a primary source of income for those with significant domestic obligations. This high rate of marriage suggests that family commitments act as a powerful economic incentive, driving marketers to maximise their productivity and earnings to sufficiently support their households. This is in line with Olaoye *et al.* (2013), who reported that marital status has a way of interfering with productivity, and this has led to debates on how to encourage healthy marriage. The survey indicated that 56% of participants maintained households of 1 to 5 individuals, suggesting a demographic profile focused on manageable family units. Larger family structures are typically viewed as a potential source of unpaid labour, which can significantly bolster the efficiency of fish marketing activities. This observation is consistent with research by Agbebi and Fagbote (2012), which identified a similar trend of household sizes between 3 and 5 members among catfish marketers.

Table 1a. Socio-economic profiles of catfish marketers in Kano (Qualitative).

Variables	Frequency	Percentage
Gender		
Male	100	100.00
Female	0.00	0.00
Marital status		
Single	31	31.00
Married	69	69.00
Level of education		
Informal education	23	23.00
Primary	9	9.00
Secondary	57	57.00
Tertiary	11	11.00
Major occupation		
Farming	16	16.00
Fish marketing	84	84.00
Membership to group		
Member	82	82.00
Non-member	18	18.00
Total	100	100.00

The data revealed that a majority of the participants (57%) had completed secondary education, reflecting a commendable level of formal schooling within the marketing community. As noted by Inoni *et al*. (2017), higher educational levels are instrumental in the development of sophisticated marketing competencies that enhance financial returns. Moreover, 42% of the surveyed marketers reported between 1 and 10 years of professional involvement, indicating that a large segment of the market possesses significant practical knowledge of the catfish trade. This depth of experience is likely to result in improved economic performance, supporting the assertions of Oluwasola and Ige (2015). The study also highlighted strong professional integration, with 82% of the respondents participating in cooperative societies. According to Akinnagbe (2010), being a member of a cooperative would enable farmers to have access to timely funds and materials needed for production and access to information on improved technologies and markets for farm produce. Results showed that banks were their major source of capital. These findings suggest that a large proportion of fish marketers have access to dependable credit facilities. This observation aligns with the research of Muhammad-Lawal *et al.* (2009), who emphasised that credit availability significantly enhances the commercial operations and growth of the respondents' businesses.

Profitability analysis of catfish marketing

The result in Table 2 shows the profitability analysis of

Table 1b. Socio-economic profiles of catfish marketers in Kano (Quantitative)

Variable	Frequency	Percentage	Mean	Minimum	Maximum
Age					
15 - 27	35	35.00	35	15	20
28 - 42	36	36.00			
43 - 57	21	21.00			
58 - 72	8	8.00			
Household size					
1 -- 5	56	56.00	6	1	27
6 -- 10	28	28.00			
11 – 15	7	7.00			
16 – 20	6	6.00			
21 – 25	2	2.00			
26 – 30	1	1.00			
Marketing experience					
1 – 10	42	42.00	16.5	3	50
11 – 20	28	28.00			
21 – 30	19	19.00			
31 – 40	8	8.00			
41 – 50	3	3.00			
Total	100	100.00			

Table 2. Profitability analysis of catfish marketing.

Variables	Average cost	Percent
Cost of fish purchase	312240	88.99
Transportation	12772	3.64
Packaging	663	0.19
Sorting	123	0.04
Tax	2031	0.58
Rent	23030	6.56
Total marketing cost	326800.03	
Revenue generated	357239.75	
Marketing margin	30439.72	

Source. Computed from field survey, 2024.

catfish marketing in Kano Metropolis. The purchase of fish accounted for 88.99% of total marketing cost, followed by shop rent at 6.56% and transportation at 3.64%. Total revenue was 357,239.75 naira, while total marketing cost was 350,859.00 naira, giving a positive marketing margin (net return) of 6,380.75 naira. The benefit–cost ratio, calculated as total revenue divided by total marketing cost, was 1.02, while the return on investment, calculated as net return divided by total marketing cost and multiplied by 100, was approximately 1.82%. These results indicate a positive but modest return from catfish marketing.

Market structure of catfish farmers in Kano State

Table 3 presents the distribution of catfish marketers across sales-value classes. The first class contains 48% of marketers, the first two classes contain 77%, and the first three classes contain 91%. The reported coefficient of 0.3297 is calculated from the marketer-frequency distribution shown in the table. Since the table does not report each class's share of total sales or revenue, the coefficient cannot establish sales inequality, market concentration, collusion or market inefficiency. A definitive concentration or revenue-inequality analysis would require the underlying sales or revenue data. The results indicate positive but narrow profitability during the study period. A benefit–cost ratio of 1.02 means each ₦1.00 of marketing cost was associated with ₦1.02 in revenue, leaving approximately ₦0.02 net return per naira of cost. The 1.82% return on investment likewise indicates modest returns and limited room to absorb cost increases or price

Table 3. Distribution of catfish marketers across sales-value classes in Kano Metropolis.

Classes	Frequency	X	Y	XY
1 – 200000	48	0.48	0.48	0.23
200001 – 400000	29	0.29	0.77	0.22
400001 – 600000	14	0.14	0.91	0.13
600001 – 800000	1	0.01	0.92	0.01
800000 & above	8	0.08	1	0.08
Total	100	1	4.08	0.6703
Gini Coefficient				0.3297

Source. Computed from field survey, 2024.

Table 4. Constraints of catfish marketing.

Constraints	frequency	percentage
Storage and preservation challenge	59	59.00
High cost of transportation	53	53.00
Price fluctuation	79	79.00
High marketing cost	76	76.00
Inadequate capital	80	80.00
Inflation	93	93.00

shocks. The distribution of marketers across sales-value classes indicates that most respondents operated within the lower sales brackets. Nearly half (48%) reported sales in the ₦1–₦200,000 class, while 77% were in the first two classes and 91% in the first three. This pattern suggests that the sample was dominated by marketers reporting lower sales values. The coefficient of 0.3297 was derived from the frequency distribution of marketers across the sales-value classes. Because the table does not show each class's share of total sales or revenue, this coefficient should be interpreted only as a descriptive summary of the grouped marketer distribution; it does not establish inequality in sales income or market concentration. This distinction is important when comparing the result with previous fish-marketing studies. Adeleke and Afolabi (2012), for example, calculated a Gini coefficient of 0.5292 using both the proportion of sellers and the cumulative proportion of total sales, while Irhivben *et al*. (2015) reported a coefficient of 0.70 for catfish marketing in Oyo State based on revenue data. Olagunju (2019) also reported a coefficient of 0.74 for catfish marketers in Ondo State. These studies provide context showing that sales/income-based inequality has been examined in Nigerian fish markets; however, their coefficients are not directly comparable with the present frequency-based coefficient because the underlying inputs differ. A comparable sales-inequality estimate for the present study would require the total sales or revenue contributed by marketers in each class.

Constraints of catfish marketing in Kano State

The results in Table 4 show the constraints faced by catfish marketers in the study area. The results show that inflation and inadequate capital are the major constraints faced by 93% and 80% of the fish marketers, respectively. The results also indicated that 79% of the marketers are affected by price fluctuations in fish, while 76% are affected by the high cost of marketing. This finding is in line with the National Bureau of Statistics (2012), which states that prices for fresh fish products respond to the law of demand and supply, as no price regulation mechanism exists. The study findings indicate that approximately 80.0% of the surveyed catfish marketers identified capital shortages as a primary obstacle, ranking it as the second most significant constraint to their business operations and expansion. This lack of capital was largely driven by inadequate access to credit facilities. Furthermore, while the supply of high-quality fish by producers generally led to more favourable market prices, the burden of high transportation costs persisted, likely as a consequence of poor road infrastructure in the region. Most of the roads that lead to the farm gates are bad and difficult for vehicles to pass through, thereby discouraging these marketers from going to the farm gate to buy before processing. This could also be attributed to the fact that the farther the distance between the farm and the market, the higher the transportation costs incurred. This is in line with the findings of Basappa (2004) and Seid *et al*. (2013), who

found inadequate storage facilities, inadequate transport facilities, pests and diseases to be significant factors contributing to post-harvest losses of perishable products. Similarly, Ugwumba (2011) and Adewumi and Olaleye (2011) identified transportation cost as a major constraint to fresh fish and live catfish marketing.

Conclusion and Recommendation

In conclusion, catfish marketing has potential for further development and commercialisation in Kano Metropolis. The reported figures show a positive but modest return: total revenue averaged 357,239.75 Naira, total marketing cost averaged 350,859.00 Naira, and the resulting net return was 6,380.75 Naira. The benefit–cost ratio was 1.02, and the return on investment was approximately 1.82%. The principal reported constraints were inflation, inadequate capital, price fluctuation and high marketing costs. Based on the findings of this study, the following recommendations were made:

1. The government should support marketers by providing low-interest "soft" loans, which would facilitate business expansion and growth within the sector.
2. Marketers are encouraged to establish or join marketing cooperatives to enhance their collective bargaining power and improve access to credit from financial institutions, thereby mitigating the challenges posed by capital shortages.
3. The government should provide adequate storage facilities and good roads for easier supply of catfish within the state metropolis to promote investment and development of small-scale catfish marketing.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

REFERENCES

Abah, D., Zaknayiba, D. B., & Simon, E. (2013). Economic analysis of fish marketing in Lafia local government area of Nasarawa State, Nigeria. *Production Agriculture and Technology*, *9*(2), 54-62.

Adeleke, M. L., & Afolabi, J. A. (2012). Appraisal of fresh fish marketing in Ondo State, Nigeria. IIFET Tanzanian Proceedings.

Adewumi, A. A., & Olaleye, V. F. (2011). Catfish culture in Nigeria: Progress, prospects and problems. *African Journal of Agricultural Research*, *6*(6), 1281-1285. https://doi.org/10.5897/AJAR09.361

Agbebi, F. O., & Fagbote, T. A. (2012). The role of middlemen in fish marketing in Igbokoda fish market, Ondo State, Southwestern Nigeria. *International Journal of Development and Sustainability*, *1*(3), 880-888.

Akinnagbe, O. M. (2010). Constraints and strategies towards improving cassava production and processing in Enugu North Agricultural Zone of Enugu State, Nigeria. *Bangladesh Journal of Agricultural Research*, *35*(3), 387-394. https://doi.org/10.3329/bjar.v35i3.6445

American Marketing Association (AMA) (2007). Definition of marketing. Retrieved from https://www.ama.org/the-definition-of-marketing-what-is-marketing

Basappa, G. (2004). Post-harvest losses of maize crop in Karnataka: An economic analysis. *Master Thesis, College of Agriculture, University of Agricultural Sciences, Dharwad*, Dharwad, Karnataka, India.

Deji, O. F., & Koledoye, G. F. (2013). Gender analysis of fish farming technologies adoption by farmers in Ondo State. *Scientific Research and Essays*, *8*(26), 1219-1225. https://doi.org/10.5897/SRE12.697

Ebe, F. E. (2007). *Economic study of fuel wood marketing and consumption in Enugu State, Nigeria* (Publication No. 28249495) [Doctoral dissertation, University of Nigeria, Nsukka]. UNN Institutional Repository.

Encyclopaedia Britannica (2021). The Editors of Encyclopaedia Britannica. Encyclopaedia Britannica. Retrieved from https://www.britannica.com/place/Kano-Nigeria

Falodun, O. M. (2011). *Analysis of marketing channels and efficiency of marketing system for smoked fish market in Ogun State, Nigeria* [Unpublished bachelor's project]. Federal University of Agriculture, Abeokuta.

FAO (2006). *Nigeria's fisheries profile*. Food and Agriculture Organisation. Food and Agriculture Organisation of the United Nations.

FAO. (2012). *FAOSTAT database on agriculture production*. Food and Agriculture Organisation. Retrieved from https://www.fao.org/faostat/en/#data

Ike-Obasi, J. C. (2021). Assessment of catfish marketing approach in Obio Akpor Local Government of Rivers State, Nigeria. *Journal of Agriculture Research and Life Sciences*, *2*(3), 96-101.

Inoni, O. E., Ekokotu, P. A., & Idoge, D. E. (2017). Factors influencing participation in homestead Catfish production in Delta State, Nigeria. *Acta agriculturae Slovenica*, *110*(1), 21-28. https://doi.org/10.14720/aas.2017.110.1.3

Irhivben, B. O., Enyioko, O., Oluwafemi, Z., & Yusuf, S. A. (2015). Structure and Performance of Catfish Market in Ibadan Metropolis, Oyo State, Nigeria. *International Journal of Social Science and Humanities Research*, *3*(3), 428-433.

Olagunju, O. (2019). Profitability assessment of catfish marketing in Ondo State, Nigeria. International Journal of Agricultural Science Research and Technology in Extension and Education Systems, 9(3), 163-169.

Muhammad-Lawal, A., Omotesho, O. A., & Falola, A. (2009). Technical efficiency of youth participation in agriculture: A case study of the youth-in-agriculture programme in Ondo State, South Western Nigeria. *Nigerian Journal of Agriculture, Food and Environment, 5*(1), 20-26

National Bureau of Statistics (2012). Annual abstract of statistics, 2012. Federal Republic of Nigeria. Retrieved from https://www.nigerianstat.gov.ng/download/253

Njoku, M. E., & Offor, E. I. (2016). Cost and returns analysis of catfish marketing in Aba South Local Government Area of Abia State, Nigeria. *Agro-Science: Journal of Tropical Agriculture, Food, Environment and Extension*, *15*(2), 9-14.

Olaoye, O. J., Ashley-Dejo, S. S., Fakoya, E. O., Ikeweinwe, N. B., Alegbeleye, W. O., Ashaolu, F. O., & Adelaja, O. A. (2013). Assessment of socio-economic analysis of fish farming in Oyo State, Nigeria. *Global Journal of Science Frontier Research*

Agriculture and Veterinary, *13*(9), 44-55.

Oluwasola, O., & Ige, A. O. (2015). Factors determining the profitability of catfish production in Ibadan, Oyo State, Nigeria. *Sustainable Agriculture Research*, *4*(4), 57-65. https://doi.org/10.5539/sar.v4n4p57

Oyesola, L. Y. (2018). *Marketing analysis of frozen fish in Kaduna metropolis* [Unpublished Higher National Diploma project]. Department of Agricultural Extension and Management, Federal College of Forestry Mechanisation, Afaka, Kaduna.

Seid, E., Ahmed, M., & Ibrahim, A. (2013). Determinants of market participation and supply chain efficiency of smallholder agribusiness producers. Journal of Biological, Agriculture and Healthcare, 3(12), 45-53.

Statista (2023). Number of social media users in Nigeria as of January 2023. Statista. https://www.statista.com/statistics/972907/number-of-social-media-users-nigeria/

Ugwumba, C. O. A. (2011). Analysis of catfish farming system and its impact on net farm income in Anambra State, Nigeria. *Journal of Agricultural and Biological Science*, *6*(2), 5–12.

World Bank (2020). *Agriculture, forestry, and fishing, value added (% of GDP)*. World Bank Data. Retrieved from http://data.worldbank.org/indicator/NV.AGR.TOTL.ZS.