

Investigation of price fluctuation in retail fish species marketing in Ibadan, Oyo State

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ABSTRACT: This study investigated price fluctuation in retail fish marketing in Ibadan metropolis for two years. A total of 120 respondents were interviewed in the study and primary data was used through questionnaires with interview. Data obtained were analyzed using descriptive statistics and regression model. The questionnaires were distributed randomly in ten selected markets chosen cut across five local governments in Ibadan metropolis. The descriptive statistics showed that 95.0 percent of the fish sellers were women and 5.0 percent were male. The respondents were married, 9.2 percent had no formal education, 30 percent had primary education, and 14.2 percent had secondary education while 4 percent had tertiary education. Also, about 65.8 percent of the respondents were with 1 to 10 years experience in fish marketing while 3 to 4% had 21 to 30 years of fish marketing experience. Double-log model was found to be the lead equation among the four models fitted. The model indicated a relationship between the determinants of fish price fluctuation in retail fish marketed (Y) and some explanatory variables which include trading experience (X_1), Education level (X_2), Average stocks (X_3), hoarding quantity (X_4), government daily tax rate (X_5), and fuel price (X_6). All these were found to be significant at 1 percent level. The elasticity of all variables determining fish price fluctuation was less than one. This means that they were inelastic. Thus, a unit increases in the trading experience lead to ₦0.1974 decrease in fluctuation of price of fish between the two years. Also, a unit increase in the quality of stock hoarded lead on the average of ₦0.3078 unit increase in the fluctuation in price within two years. Some of the major problems faced by fish retailers in the study area include: problem of middlemen, storage facilities, erratic power supply and government rate/tax.

Keywords: Fish product forms, fish retailers, frozen fish, wholesaler.

INTRODUCTION

Fish supply in Nigeria is from four major sources via artisanal fisheries, industrial trawler, aquaculture and imported frozen fish (Akinrotimi et al., 2011). The Niger delta contributes more than 50% of the entire domestic Nigeria fish supply, being blessed with abundance of both fresh, brackish and marine water bodies that are inhabited by a wide array of both fin fish and non-fish fauna that supports artisanal fisheries (Akankali and Jamabo, 2011).

Fish marketing is the activities involved in the flow of fish and fish product from the point of initial production to the final consumers. Fish marketing becomes effective where there is an establishment of a market, therefore markets

exist whenever buyers (consumers) and sellers (fish marketers) can be in touch with one another and it is not necessary that both of them meet face to face, before a market can exist (Quote reference).

Huss et al. (1993) observed that fish to be sold must exist and there must be fish marketers and consumers where both must agree on a price at which each fishery product is sold to the consumers. The price is usually fixed but there is flexibility to allow for changes in the market condition (e. g supply and demand) at different seasons. Prices are differentiated according to fish species, weight, size, quantity and the source of supply which may vary

from one producer (fish marketer) to another (Harrison, 2007). However, some fish marketers specialize in the importation of certain fish species or get it from fisherman at landing site.

Fish is the cheapest animal protein source; it is regarded as having the potential to solve pervasive protein malnutrition. This study therefore helps to analyze the socio-economic characteristics of fish retailers, know the factors affecting the increase in price of retail fish sales in order to make even more accessible for the poor, identify problems facing fish marketing in the area and as well recommend possible solution to solve the factors responsible for price fluctuation in marketing of fish.

MATERIALS AND METHOD

Study area and population

The study covers Ibadan metropolitan city, in Oyo State, South Western Nigeria. Ibadan is the largest city in Africa. The study population consist one hundred and twenty fish retailers cut across ten spatially separated markets in the following geographical areas (Figure 1):

1. Bodija market and Sango market (Ibadan North Local Government).
2. Oja-Oba market and Challenge market (Ibadan South East Local Government).
3. Oje market and OritaAperin market (Ibadan North East Local Government).
4. Bere market and Eleyele market (Ibadan North West Local Government).
5. Oke-Ado market and Aleshinloye market (Ibadan South West Local Government).

Primary data source

This was obtained with the use of a comprehensive structured questionnaire with interview using a simple random technique. The questions were asked based on the objectives of the study, data on general information i.e. demographic factors such as age, sex, educational level and years of experience. It also provides information on their sources of supply (distribution channel), variation in price of fish yearly, monthly income derives, and also the problems encountered by fish retailers.

Analytical techniques

Both numerical and statistical analyses of data were being employed. These involved descriptive analysis of data by calculating parameters such as means, frequency distribution, simple proportion, percentages and the use of tables. Tables are presented where necessary to relate one variable to another. Also, percentage was employed

to test variables. Ordinary least multiple regression analysis was employed to estimate the determinant of change in price fluctuation of retail fish sales. The socio-economic characteristics of the fish marketers was analyzed through the use of descriptive statistic.

Information on retailer

Data collected from the fish retailers include the source of their fish supply, various species of fish sold, quantity bought for sales, cost of fish bought per carton in years ago and in the present year.

Model specification and statistical operation

The model stated below was used in identifying the determinants of change in price fluctuation of retail fish marketing. They are estimated in four different functional equations with the best fit (Lead equation) chosen:

Linear: $Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + e_1$

Exponential: $\log Y = b_0 + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_6 \log X_6 + e_1$

Semi-log: $Y = b_0 + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_6 \log X_6 + e_1$

Double log: $\log Y = b_0 + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_6 \log X_6 + e_1$

Where: Y = fluctuation in price of fish marketed, X_1 =Trading Experience, X_2 = Education years, X_3 = Average Stock, X_4 = Hoarding Quantity, X_5 = Government rate, X_6 = Fuel price and e_1 = Error term.

The statistical tools employed in this study are T- Statistic, F- Statistics, co-efficient of determinant (R^2), and adjusted R (R^2). The E-statistics was carried out in other to determine how significant or otherwise each independent variable is in the function. F- Test was used to test the significance of R. R^2 tells us the proportion of the variability in the quantity of fish price fluctuation that was explained by all the independent variables included. The elasticity co-efficient of the four functional forms can be calculated from Table 1.

RESULTS AND DISCUSSION

Socioeconomic characteristics of fish retailers in Ibadan metropolis

Fish retailers were asked for information about their gender, educational status, age distribution, marketing experience, household size, marital status and their

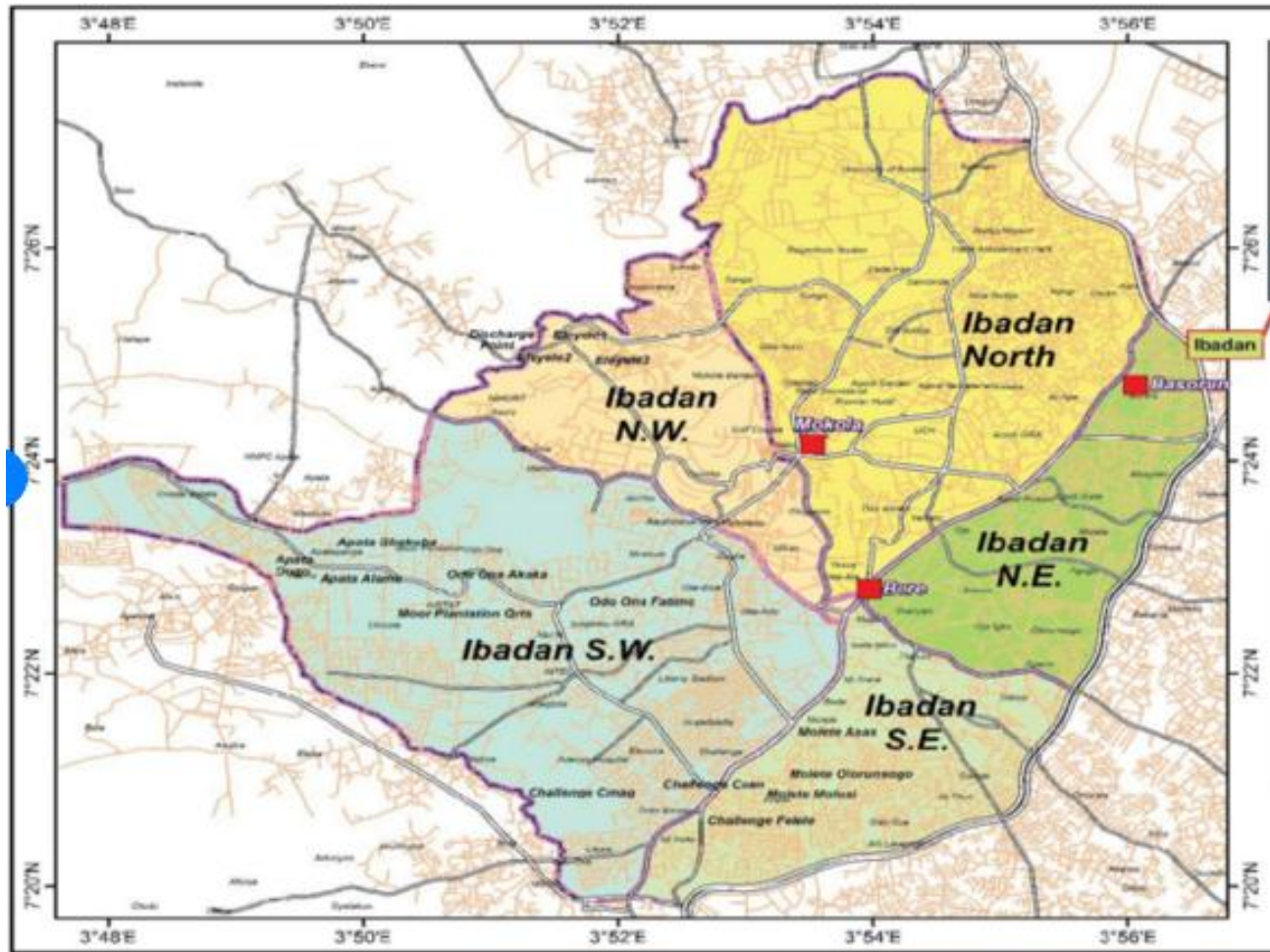


Figure 1. Map of Ibadan metropolis (Salami et al., 2016).

Table 1. Elasticity co-efficient of the four functional forms.

S/N	Functional form	Equation	Elasticity
1	Linear	$X = b_0 + b_1 x_1 + e_1$	$B_1 x_1/Y_1$
2	Exponential	$\log y = b_0 + b_1 x_1 + e_1$	$B_1 x_1$
3	Double Log	$\log y = b_0 + b_1 \log x_1 + e_1$	B_1
4	Semi -log	$Y = b_0 + b_1 \log x_1 + e_1$	B_1/y

monthly income. The distribution of the respondents is presented in the Table 2.

Table 2 shows that a high percentage of fish sellers were within the age range of 41 to 50 and 31 to 40 at 35.83 percent and 35.0 percent respectively, while the respondents within the age range of 51 to 60 and above were also fairly represented at 27.5 percent and the respondents with age range of <30 were quite low in the distribution at 1.67 percent, showing that most fish sellers in the study area were above 30 years of age. It further explained that teenagers do not really go into fish retailing, thereby recommending that if young school leavers could

engage in fish marketing, the age and level of education might allow them to adopt modern market techniques in the study area.

The Table 2 also shows that out of the total respondents, about 9.2 percent of the respondents are illiterate that is, no formal education, while 17.5 percent have attempted primary education, 25 percent of the respondents were fairly represented to have attempted secondary education and 4.10 percent attained tertiary education level.

The majority of the respondent in the study area had primary education level, which represent 30 percent of the total respondents. This confirms that most of the fish

Table2. Socio-economic characteristics of respondents.

Characteristics	Frequency	Percentage (%)
Age (years)		
≤30	02	1.67
31-40	42	35.00
41-50	43	35.83
51-60	33	27.50
Total	120	100
Educational level		
No formal education	11	9.20
Attempted primary school	21	17.50
Primary	36	30.00
Attempted secondary	30	25.00
Secondary	17	14.20
Tertiary	5	4.10
Total	120	100
Gender		
Female	114	95
Male	6	5
Total	120	100
Marketing Experience Interval (yrs)		
1-10	79	65.8
11 -20	37	30.8
21 – 30	4	3.4
Total	120	100
Household size		
1-4	22	18.33
5-8	94	78.34
9-11	4	3.33
Total	120	100
Income (₦)		
≤7000.00	9	7.5
8000 -20,000	81	67.5
21,000 -30,000	21	17.5
31,000 – 40,000	9	7.5
Total	120	100

marketers in the study area have at least primary education. Adeosun and Bankole (2012) reported that high literacy level of 79.0% of fish retailers in Ibarapa area of Oyo state is enough to support information on technology use. Ridler and Hishamunda (2001) reported that successful cage farmers in Niger Republic is at minimal literate and this corroborated in Fawole and Fashina (2005) on association of education with the use of technology on organic fertilizer.

Most of the fish marketers were females. About 95 percent were women and the male respondents have 5

percent; the only 6 males sell smoked dried fish. The females who were engaged in fish marketing do so in order to take care of their various homes, while majority of their male counterparts were engaged in farming which is believed to be more important and serve as a source of food for household consumption. Lawal and Idega (2004) also found out that 90% of women participated in fish marketing in Benue State. The work of Madugu and Edward (2011) revealed that both men (50%) and women (50%) are involved in fish marketing in Adamawa State.

The respondents with 21 to 30 years of experience were

Table 3. Problems confronting fish retailers in the study area.

Fish retail constraint	Frequency	Percentage (%)
Middlemen	10	8.33
Storage facilities	22	18.33
Erratic power supply	40	33.33
Government rate	15	12.50
Cartel	15	12.50
Short supply	11	9.17
Strategic sale point	4	3.34
Delay stock delivery	3	2.50
Total	120	100

Table 4. Fish products forms in the study area.

Products form	Frequency	Percentage (%)
Frozen	70	58.34
Fresh	10	8.33
Smoked	40	33.33
Total	120	100

3.4 percent, 30.8 percent of the respondents with 11 to 20 years of marketing experience were also fairly represented in the distribution, while the categories of respondents within the marketing experience of 1 to 10 years dominated the distribution (65.8%), as they have least years of marketing experience.

The results reveal that most of the fish retailers in the study area were not engaged in fish marketing at their early age, which shows that they might have engaged themselves in some other business or activities before embarking on fish marketing. Adeosun and Bankole (2012) reported that in Ibarapa area of Oyo state more than half of the fish marketers (51.0%) were between the ages of 41 to 50 while those between 31 to 40 and 51 to 60 years were 21.0 and 20.0% respectively. This implies that most of the marketers are in their active economic years. Sevilleja (2000), Edwards (2000) and Dey et al. (2000) agreed that experience is crucial and is contributing to the success of Asian aquaculture.

The household size distribution of respondents reveals that the household size with 5 to 8 has the highest number of population with 78.34 percent while the household size of 9 to 11 has the lowest number of population with 3.33 percent. The results reveal that the population of the household size of fish marketers is minimum and this will be significant to the income generating from fish marketed by the respondents to cater for the family size.

Income distribution of respondents shows that 17.5 percent of fish retailers that were within this range generate ₦21,000 to ₦30,000 as their monthly income derived from fish marketing while the highest respondents with 67.5 percent generated ₦8,000 to ₦20,000 as their monthly income. This shows that most of the fish

marketers in the study area generate at least ₦20,000 as their monthly income, thereby showing that fish marketing is a lucrative business in the study area.

Problems confronting fish traders in the study area

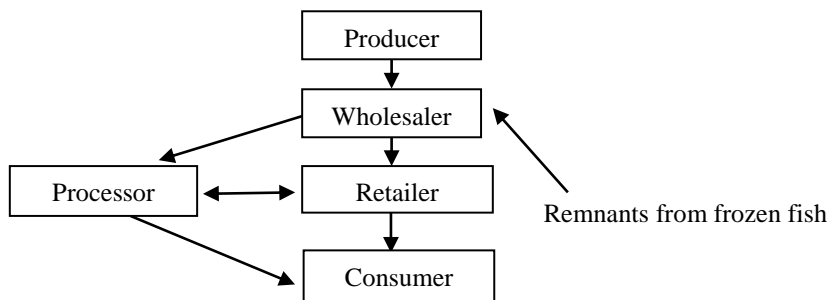
Table 3 shows that the most prevalent problem confronting fish traders in the study area are those of unstable power supply which constituted 33.33 percent, while that of problem of storage facilities is the second major problem facing fish traders with 18.34 percent. This reveals that unstable power supply is common place in Nigeria where entrepreneurs have to rely on privately owned diesel-powered generating sets for electrical power. This corroborated the findings of Adeosun and Bankole (2012) that unstable power supply, storage facilities etc were the major problems facing fish retailers in Ibarapa area of Oyo State. The burden of these problems which is majorly that of wholesalers is transferred through the retailers via the medium of high overhead cost, e.g. storage cost to the consumers.

Fish products and species for sale in the study area

The forms of fish species in the study area are presented in Table 4. Table 4 reveals that frozen fish, the most product form sold in the study area recorded 58.34 percent, followed by smoked fish with 33.33 percent while the fresh fish recorded the lowest (8.33 percent). It was observed that majority of the fish retailers sell frozen fish which they believe to be cheaper, affordable and

Table 5. Available fish species in the study area.

Common name	Local name	scientific name
Sardine	Sardine	<i>Sardinella spp</i>
Stock fish	Panla	<i>Pollachiusvirens</i>
Mackerel	Alaran	<i>Scomberscombrus</i>
Bonga	Agbodo	<i>Ethmalosa Fimbriata</i>
Tilapia	Epiya	<i>Tilapia spp</i>
Catfish	Aro	<i>Clariasspp</i>

**Figure 2.** Frozen Fish distribution channel in Ibadan metropolis.

consumed mostly by their customers or consumers in the study area compared to other product from.

Available fish species in the study area

The available fish species in the study area are presented in Table 5. The same fish species were found in Ibadan metropolis which may be due to their source of supply. The source of supply of fish for retailers was discovered to be from the cold room dealers. This shows that cold room dealers are the sole distributors of frozen fish in the study area. This will also affect transportation cost incurred by the fish sellers and consequently affect retail price of fish and the smoked fish sellers themselves. The few fresh fish sellers identified their source of supply as fish farm e.g. from fish farm owners.

Distribution channel for frozen fish in the study area

Figure 2 shows the distribution channel for frozen fish in the study area. The wholesalers in the study area obtained their supplies from the coastal cities of the country namely Lagos and Port-Harcourt every five days.

These wholesalers who have their cold stores located in the central part of the city (near the central market) feed the numerous retailers and processors i.e. an average of 1 wholesaler to 15 people. The retailers are distributed throughout the town and can be accessible by a consumer within 5 to 10 minutes' walk. The retailers buy in cartons from the wholesalers and sell in pieces to the consumer on the average, a retailer may sell 3 cartons in a day while on

market days the rate of sales could double, while the leftovers are returned to the cold rooms or sold to processors for smoking.

Regression analysis result

The total number of price difference in fish retailing depends on a number of socio economic factors. The model applied in dictated a relationship between fluctuations in price of fish marketed (Y) and some explanatory variables which include: trading experience (X_1), education year (X_2), Average stock (X_3), Hoarding quantity (X_4), and Government daily rate (X_5), Fuel price (X_6). To determine the impact of factor, a multiple regression was used. Four alternative model or functional forms were experimented with, and these are linear, double log, semi- log and exponential function. The result is presented in the Table 6.

Table 6 shows the multiple regression result of fluctuation of price of fish in nominal term between 2 years among retailers in the study area. Four equations were fitted to the data as indicated on the Table 6. Based on the magnitude of the co-efficient of multiple determinations (R^2), the sign of variables and their respective significance, the best equation was adjusted to be double-log. Of all the variables modeled, trading experience (in years), average stock in hand, quantity of fish hoarded, and ratio of fluctuation, have respective significance at the three conventional levels of 1, 5 and 10%. A unit increase in the trading experience of respondents in years leads on average to 0.1974 decreases in fluctuation of price of fish between 2 years of research.

Also, a unit increase in the average stock in hand leads

Table 6. Ordinary least regression analysis of determinant of change in retail price of fish.

Functional form dependent variables	Linear	Double-log in Y	Semi-log Y	Exponential in Y
Constant	3634.6160 ^{xx} (864.0718)	8.5210 (1.9841)	2744.3055 (3055.8210)	8.3235 (0.5557)
Trading Experience (in yrs) X ₁	-11.1075 (21.9541)	-1.1974 (0.0410) ^{xx}	-276.7649 (217.1923) ^{xx}	-0.0042 (0.0141)
Education years X ₂	-9.8098 (36.5128)	-0.1269 (0.0883)	-86.9025 (290.0415)	-0.0028 (0.0234)
Average stock X ₃	1.5287 (0.4611) ^{xx}	0.3078 ^{xxx}	447.1979 (616.7343)	-0.0019 (0.0011) ^{xx}
Hoarding Quantity X ₄	136.5186 (239.8203)	0.1059 ^{xx} (0.0829)	218.2467 ^{xx} (127.7205)	0.1217 (0.1542)
Government Daily Rate (%) X ₅	-18.8876 (11.6587)	0.0906 ^{xx} (0.0666)	-1444.3795 (127.7205)	-0.0098 (0.0074) ^x
Fuel price X ₆	-19.5807 ^x (10.5985)	0.2951 ^{xx} (0.1168)	-239.7748 ^x (179.9420)	-0.0100 (0.0068)
R ²	32.2800	47.34	42.3800	18.9600
R ⁻²	27.6200	42.42	37.7300	14.1300
F	2.64	4.49	2.66	1.88

Figures in parenthesis are standard errors. ^{xxx}Significant at 1%; ^{xx}Significant at 5%; ^xSignificant at 10%.

to 0.3078 unit increase in price fluctuation in 2 years of research. More so, a unit increase in the quantity of stock hoarded leads on the average to 0.3078 unit increase in the fluctuation in price in 2 years of research. A unit increase in the daily rate of tax collected from retailers in the specified years leads on average to 0.1059 increase in the fluctuation in nominal value of Naira.

Lastly, a unit increase in price of fuel (N0.2951) leads on the average to increase in the fluctuation of price of fish in nominal currency value. About 47 percent of dependent variables were explained by independent variables.

Alapan et al. (2016) reported that quality of fish with mean value of 4.9, location (mean value = 4.75); weather condition (mean value = 4.65), price demand (mean value = 4.45) and water pollution (mean value = 4.15) were factors affecting the market price of fish in the northern part of Surigao Del Sur, Phillipines. The findings of Omar et al. (2014) revealed that all intermediaries who were involved in the buying and selling of Hilsha fish in Bangladesh followed the open bargaining method for fixing the price of their products. He stated that the fish farmers enjoyed low bargaining power because of perishability of product, absence of storage facilities and immediate need for cash. Also, the number of buyers attending the market and the volume of product offered for sale affect the price at market level. He stated further that in the wholesale market, price varied with the variation of quality of and size of fish. FAO (2001) revealed that bargaining, in terms of eye estimation, is still the common practice for pricing fish in some Asian countries. The report further stated that prices of fish are determined by the direct interplay of demand for and supply of fish in the retail markets.

Conclusion

From the findings of this study, it could be concluded that the major factors contributing to price fluctuation in retail fish marketing in the study area are increase in fuel price, reduction in quantity of fish supply for marketing, and hoarding of fish stock delivery. Retail fish marketing is a lucrative business in the study area especially frozen fish which most of the people in the study area preferred. The study further revealed that the major problems facing fish marketers in Ibadan metropolis are instability of electric power supply, lack of storage facilities and poor delayed supplies and if effort is not being taken to solve the problems facing fish marketers in Ibadan metropolis marketers will be forced to dispose their fish at cheaper rate.

Recommendation

The study recommended that there should be an improvement and expansion of fish market systems (wholesaling and retailing) in the study area for all kinds of fisheries products, both with regard to good storage facilities, unfailing power supply, and stability in quantity of fish supplied in order to reduce fluctuation in fish price.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

REFERENCES

- Adeosun, O., & Bankole, A. F. (2012). Determinants of income from fish marketing in Ibarapa Area of Oyo State, Nigeria. *Science Journal of Agricultural Research & Management*, 135(6), 6p.
- Akankal, J. A., & Jamabo, N. A. (2011). A review of some factors militating against sustainable Artisanal fisheries Development in Niger Delta, Nigeria. *Asian Journal of Agricultural Sciences*, 3(5), 369-377.
- Akinrotimi, O. A., Abu, O. M. G., & Aranyo, A. A. (2011). Environmental friendly aquaculture key to sustainable fish farming development in Nigeria. *Continental journal of Fisheries and Aquatic Science*, 5(2), 17-31.
- Alapan, M. P., Arpilleda, E. L. I., Altizo, K. J. R., Frias, G. K. R., Ravelo, J. D., & Cuartero, O. L. (2016). Factors affecting the market price of fish in the Northern part of Surigao Del Sur, Philippines. *Journal of Environment and Ecology*, 7(2), 34-41.
- Edwards, P. (2000): Aquaculture, poverty impacts and livelihood. Overseas Development Institute No.56 June Pp. 1-8.
- FAO (2001). Production, accessibility, marketing and consumption patterns of freshwater aquaculture products in Asia: A Cross-Country Comparison *FAO Fisheries Circular No. 973*.
- Fawole O. P., & Fashina. O. (2005). Factors predisposing farmers to organic fertilizer use in Oyo State, Nigeria. *Journal of Rural Economics and Development*, 14, 81-90.
- Harrison, K. (2007). Marketing problems associated with small farm agriculture, ADC, Seminar report No.5 New York.
- Huss, H. H. (1993). Fresh fish quality and quality changes. FAO fisheries series.
- Lawal, W. L., & Idega, E. O (2004). Analysis of fish marketing in Benue State. Proceedings of the 2004 Annual Conference of the National Association of Agricultural Economists (NAAE) held at ABU Zaria, Nov. 3rd – 5th 2004
- Madugu, A. J., & Edward, A. (2011). Marketing and distribution channel of processed fish in Adamawa State, Nigeria. *Global Journal of Management and Business Research*, 11(4), Retrieved from <https://journalofbusiness.org/index.php/GJMBR/article/view/481>.
- Omar, M. I., Haque, S. A., Sharker, M. R., Islam, M. F., & Alam, M. A. (2013). Marketing system, seasonal price variation and market integration of hilsha (*tenualo sailisha*) fish in some selected areas of Bangladesh. *British Journal of Marketing Studies*, 2(1), 101-116
- Ridler, N., & Hishamunda, N. (2001). Promotion of sustainable commercial aquaculture in Sub-Saharan Africa. Vol.1 Policy Framework FAO. Fisheries Technical Paper, No 408/1 FAO, p. 16.
- Salami, R. O., Von Meding, J. K., & Giggins, H. (2016). Assessing habitats of vulnerability in African cities: A case of poverty housing in Ibadan metropolis, Nigeria. Available at <https://www.researchgate.net/publication/303697456>.
- Sevilleja, R. O. (2000). Adoption and economics of Tilapia farming technology in the Phillippinnes. *IIFET 2000 Proceedings*. Available at https://ir.library.oregonstate.edu/concern/conference_proceedings_or_journals/pc289j81t. Accessed on 3/28/2012.