

Analysis of Catfish Marketing in Borgu Local Government Area of Niger State, Nigeria

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ABSTRACT

This study analysed catfish marketing in Borgu Local Government of Niger State, Nigeria. The specific objectives were to: describe the socioeconomic characteristics of catfish marketers in the study area, estimate the cost and returns of catfish marketing, identify the determinant of profit in catfish marketing, identify the marketing structure of catfish marketing and identify the constraints faced by the marketers. A multistage random sampling technique was used to select 120 catfish marketers. A structured questionnaire was used to collect data. Descriptive statistics, Gross margin, and mean score from Likert type of scale were used to analyze the data collected. The results showed that the mean age of catfish marketers was 37 years, (62%) of the marketers were male and (68.3%) were married. The household size was 5 persons. Most (35.8%) of the respondents had secondary school education with an average farming experience of 1-10 years, their source of credit is mostly from the bank. The benefit cost ratio of catfish marketing in the study area was 1.99 which implies catfish marketing is profitable. The factors that significantly influenced the profitability of catfish marketing was quantity of fish. The result of Gini coefficient was 0.44. The major constraints encountered include inadequate credit facilities, high cost of feed, and inadequate fish pond. The study recommended that feed should be subsidized to farmers in order not to increase the price of fish. Marketers should also form marketing cooperative as this would increase their access to credit from financial institution and hence alleviate the problem of inadequate capital.

Key words: catfish, marketing, profitability, marketing structure

INTRODUCTION

The Agricultural sector comprises of crop, livestock, fisheries, wildlife and forestry subsectors. The fishery subsector plays significant role in the sector. Agriculture contributes about 21.9 % to the gross domestic product (GDP) and generates employment to over 70% of the population (World Bank, 2020).

Fish products has numerous benefits such as nutritional, recreational, and medicinal value which has made fishery subsector indispensable. Fish serve as an alternative source of animal protein in developing countries. Besides, there is no religious or cultural belief limiting one from the consumption of fish and this is seen in Nigeria where roughly 60% of the people depend on fish for over 30% of their animal protein supplies (Ugwumba, 2011).

Catfish (*Suluriformes*) belongs to the family Clarias and consist of different species ranging from *Clarias gariepinus*, *Heterobranchus bidorsalis*, *Clarias X Heterobranchus* hybrid (*Heteroclarias*) and *Clarias nigro-digitatus*. *Clarias gariepinus* (sharp tooth catfish) is one of the most adaptable and widely spread fish in Africa. Catfish are of commercial importance compared to other farmed fishes like tilapia and are widely consumed due to its nutritional, medicinal benefits and higher market value (FAO 2009).

Marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society (American Marketing Association, AMA, 2007). Marketing channel comprises of Source to wholesalers to Consumers, Source to retailers to Consumers, Source to wholesalers to retailers to Consumers, Source to Final Consumers. All of these players play important role in the marketing of catfish. The wholesaler who get from the farm gate, then sell to small scale retailers who further sells to the consumers (Ike-Obasi, 2021).

Catfish marketing is a lucrative venture. It has the potential of increasing the GDP of the country through provision of employment, income for the family and huge profit (Olagunju 2019, Abah *et al.*, 2013).It is pertinent to note that catfish marketing in Nigeria has not been fully explored when compared to the market potential for its production and marketing. However, Catfish marketing is bedeviled by numerous factors such as lack of

market information, poor market structure which leads to price instability, poor road network, high cost of transportation, and low income of the farmers can affect marketing efficiency (Njoku and Offor, 2016).

Several studies were centered only on fish farming in Borgu local government area of Niger state and also other states (Mathias *et al.*, 2020, Ige 2020., and Gomna *et al.*,2020,Abah *et al.*, 2013, Adebayo *et al.* ,2013) leaving out the marketing aspect .This is an important sector because marketing complement production. Moreover, a lot of studies looked at a general spectrum but this study tries to be specific in its approach (catfish) in Borgu local government of Niger State.

Studies were limited to cost and returns of catfish marketing. It is an established fact that catfish marketing is a viable business. The study tend to look beyond the profit that emanates from catfish marketing by analysing the market structure of catfish in Borgu Local Government Area of Niger State using Gini coefficient (Njoku and Offor,2016., Daniel *et al.*,2019, Ike-Obasi,2021)

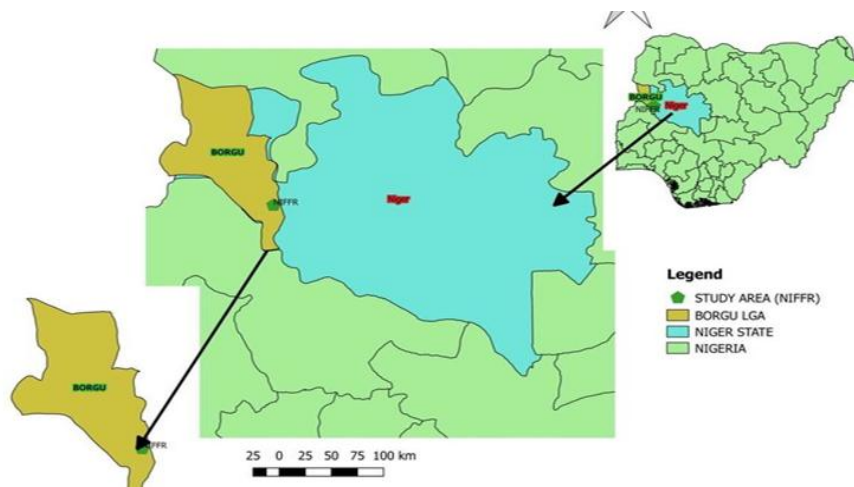
.Market structure is the degree and nature of competition for goods and services. It is the characteristics which influences the behavior and outcomes of every market

It is against this backdrop, the study seeks to provide answers to the following specific objectives:-

- I. describe the socioeconomic characteristics of catfish marketers in the study area
- II. estimate the cost and returns of catfish marketing
- III. identify the determinants of profit in catfish marketing
- IV. Identify the marketing structure of catfish marketing?
- V. describe the marketing constraints faced by catfish marketers in the study area

METHODOLOGY

This study was carried out in Borgu Local Government Area (LGA) of Niger State, Nigeria. Borgu local government lies between 9°N and 11°N and longitude 2°E and 4°E . It is bounded to the north by Kebbi State, to the south by Kaima and Baruten Local government area of Kwara State, to the west by Benin Republic and to the east by River Niger and Magama local government area of Niger State (Adekunle, 2004). It has a population of 1,722,835 according to 2006 census. The headquarter of Borgu local government area is in New Bussa. (Agboarumi, 1997). Borgu is strategic for fishery development because of the presence of Kainji Lake measuring $1,240\text{km}^2$. The people are known for crop farming, fishery and livestock rearing (Okoye 1992).



Map of Borgu Local Government of Niger State.

Source: Wikipedia 2020

Sampling Technique

A multistage sampling technique was adopted in selecting the respondents for the study. In the first stage, two districts were purposively selected (Wawa and Babana Districts). This is due to the abundance of catfish production in the area. In stage two, three markets were purposively selected from each district making a total of six markets.

Stage three involves the random selection of twenty (20) catfish marketers from each market, making a total of one hundred and twenty (120) respondents for the study.

Data Collection

Both descriptive and inferential statistics were used appropriately for the analysis of the primary data Collected. Data was collected with the aid of structured questionnaire. The information were collected on (a) Marketer's socio-economic characteristics such as age, household size, educational status, marketing experience, amount of credit received, and years spent on the cooperative. (b) Constraints faced by the Marketers. (c) Costs and total return to the Marketers.

Objective 1 was achieved using descriptive statistical tool. Gross margin technique was used to achieve objective two. Multiple regression was used to analyze objective three, Gini coefficient was used to achieve objective four while Likert scale was used to achieve objective five

Gross margin technique used in this study is specified below:

$$GM = TR - TVC$$

Where GM = Gross Margin (₦)

TR = Total Revenue (₦)

TVC = Total Variable Cost (₦)

Multiple regression was adopted from a study titled cost and returns analysis of catfish marketing in Aba South Local Government Area of Abia state, Nigeria carried out by Njoku *et al.* (2016). Implicitly, the model is specified as follows;

$$Y = (X_1, X_2, X_3, X_4, X_5)$$

Where: Y = net returns; X₁ = marketing experience (years); X₂ = age (years); X₃ = household size (number of persons); X₄ = educational level (years); X₅ = quantity of fish handled (kg).

Three functional forms were tried via, linear, semi –log, double log and exponential as specified below:

$$\text{Linear function: } Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e_i$$

$$\text{Semi-log: } Y_i = \beta_0 + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + \beta_5 \log X_5 + e_i$$

$$\text{Double log: } \log Y_i = \beta_0 + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + \beta_5 \log X_5 + e_i$$

Gini Coefficient

Gini coefficient was used to estimate and identify the marketing structures of catfish. It is a measure of statistical dispersion most prominently used as a measure of inequality of wealth or product distribution. Mathematically, the Gini coefficient computation adopted from Ihenacho (2005) was expressed as follows:

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

Where: GC = Gini Coefficient, X = Proportion of Marketers, Y = Cumulative Proportion of Sales, \sum = Summation Sign, and 1 = constant or unity.

The closer the value to unity, the greater the degree of inequality, and therefore, the higher the level of concentration and vice-versa.

RESULTS AND DISCUSSION

Socioeconomics Characteristics of Respondents

Majority (56.7%) of the respondent had age range of 31-50. The mean age was 37 years. This is an indication that majority of the respondents were in their middle and active age of life. Majority (61.7%) of the respondent in the study area were male while (38.3%) were female. This implies that fish marketing in the study area is dominated by male. This findings is supported by the work of Ali *et al.*, (2008) who reported that male marketers dominates in this study area compared to the female marketers and this might be due to the environment where likely the female are not allowed to mingle.

Majority (68.2%) of fish marketers in the study area were married. This suggests that fish marketing in the study area is dominated by married couples. Married people tend to have more household responsibilities than single people, thus pushing them to be more productive in their ventures in order to meet up with the demands of family life. This is in line with Ahituv *et al.*, (2005) who reported that marital status have a way of interfering with productivity and this has led to debates on how to encourage healthy marriage. Majority (75.8%) of the respondents had 1-5 persons in their household. This may be due to the fact that they want to take care of their large household. It is also expected that, a household with higher household size is likely to have more helping hands in fish marketing. This findings is in agreement with Olagunju (2019) who reported that majority of catfish marketers have household sizes within the range of 3-5 persons.

Results showed that 35.8% of the respondents had secondary education, clearly, the level of education among the respondents was high. Level of education plays an important role in influencing profitability of catfish marketing. Education plays a major role in acquiring more marketing skills that will increase profitability. This findings is in consonance with Inoni *et al.*, (2017). The result showed that (77.5%) of the fish marketers had marketing experience ranged between 1-10 years. This implies that majority of the marketers have acquired high number of years of experience in fish marketing enterprise. It is expected that experienced marketers would earn more profit. This is in agreement with Oluwasola and Ige (2015). The results also shows that 62.5% of the respondents belong to cooperative. According to Akinnagbe (2010), being a member of a cooperative would enable the farmers have access to timely funds and materials needed for production and access to information on improved technologies and markets for farm produce Result showed that bank were their major source of capital. This indicates that majority of the fish marketers have a reliable source of credit. This finding agrees with Muhammad-Lawal *et al.*, (2017) who reported that credit access has a great contribution to boosting the business of the respondents.

Table 1: Distribution of socioeconomic characteristics of respondents

Variable	Frequency	Percentage	Mean/mode
Sex			
Male	74	61.7	Male
Female	46	38.3	
Total	120	100.0	
Age			
21-30	41	34.1	37 year
31-50	68	56.7	
51-70	11	9.2	
Total	120	100.0	
Marital status			
Single	25	20.8	Married
Married	82	68.3	
Divorced	8	6.7	
Widowed	5	4.2	
Total	120	100.0	
Household size			
1-5	91	75.8	5 persons
6-10	23	19.2	
11-15	6	5.0	
Total	120	100.00	
Level of education			
No formal education	15	12.5	
Primary education	24	20.0	
Secondary education	43	35.8	
Tertiary education	27	22.5	
Quranic Education	11	9.2	
Total	120	100.0	
Marketing experience			
1-10	93	77.5	9 years
11-30	21	17.5	
31-50	2	1.7	
51 and Above	4	3.3	
Total	120	100	
Cooperative society			
Yes	75	62.5	
No	45	37.5	
Total	120	100.0	
Sources of capital			
Banks	80	66.7	
Cooperative Society	34	28.3	
Government	6	5.0	
Total	120	100.0	

Source: Field Survey, 2020

Costs and Returns of Catfish Marketing

The average cost and returns in fish marketing in the study area is presented in Table 2.

Table 2: Average cost and returns in Fish Marketing (kg)

Items	Quantity	Price	Amount (₦)
A. Returns			
catfish sold	700	12200	840,000
Total Returns			840,000
B. Variable Cost			
Cost of Catfish purchased	40	5348	213, 920
Cost of feed(kg)			132, 554
Cost of water			11, 179
Cost of preservation and storage			24,312
Cost of transportation			13, 145
Cost of labor			2500
Charge			3000
Fuel			3000
Total variable cost			403,610
Fixed cost			
Basket			4000
Fish net			10000
Broom			500
Wheelbarrow			3000
Total fixed cost			17500
Total cost(TVC+TFC)			421110
GM			436,390
BCR = TR/TC			1.99

Source: Computed from Field Survey, 2020

Gross margin analysis of catfish marketing is presented in Table 2. The average total variable cost incurred by the marketers was ₦403,610 while total revenue of ₦840,000 was realized thereby returning gross margin of ₦436,390. The benefit cost ratio of 1.99 implies that for every ₦1 invested in catfish marketing, a return of 99 kobo which further confirmed that catfish marketing enterprise is profitable and viable. Similar finding was reported by Abah, Zaknayiba and Simon (2013) and Similarly, Olagunju (2019) who reported that catfish marketing is profitable.

Determinants of Profit in Catfish Marketing

The regression results of the determinants of profit in catfish marketing is presented in Table 3.

Table 3: Regression results of the determinant of profit in catfish marketing

Variables	Linear	Exponential	Semi-log	Double
Constant	1.400(157114.719)*	31.498(11.556)*	-2.152(-733224.777)*	16.422(8.293)*
Age	0.515(0.046)	1.470 (0.167)	-1.094(-0.094)	-0.222(-0.011)
Household size	0.366(0.024)	-0.238(-0.020)	0.363(0.022)	-0.091(-0.003)
Level of education	-0.670(-0.038)	0.106(0.008)	0.240(0.013)	0.058(0.002)
Marketing experience	-0.947(-0.090)	-0.546(-0.067)	0.921(0.080)	0.141(0.007)
Quantity of fish	12.969(0.825)*	7.555(-0.615)*	13.742(0.813)*	27.430(0.943)*
R² Value	0.639	0.418	0.668	0.888
Adjusted R²	0.624	0.392	0.655	0.883
F – Value	40.438	16.112	43.832	172.331

Source: Computed from field survey, 2020, values in parenthesis are t-values

*** = Coefficient significant at 1% level of significance, (that is, 99% confident)

** = Coefficient significant at 5% level of significance, (that is, 99% confident)

From the OLS estimates, the Double-log functional form was chosen as the lead equation based on the number of significant variables, the R² value, the F-ratio and *a priori* expectation. The output of the double-log model showed an R² value of 0.883 which implies that 88.3% of the change in total profit of catfish marketers in the study area was explained by the independent variables, this includes, age of marketers, household size, level of education, marketing experience and quantity of fish. F-value of 172.331 which was significant at 1% indicates the significance of the entire model. However, it should be noted that since R² is 88.3%, there are some other factors which determine catfish profitability in the study area. These factors accounted for the remaining 11.7%. Out of the five independent variables included in the model, quantity of fish had significant influence on catfish marketing. The coefficient of age, household size was negatively influencing catfish marketing. This conforms to *a priori* expectation. It implies that as the marketers' age increases, their net incomes reduce due to the fact that there is reduction in energy and capability of participating in marketing activities as one gets older.

Level of education was found to be positive but not significantly related to net return in catfish marketing. This implies that farmers with more years of education tend to be more efficient in resource allocation, probably due to their enhanced managerial ability. The educated farmers are able to gather, understand and use information from research and extension more easily than illiterate farmers can. Moreover, educated farmers are very likely to be less risk averse and therefore more willing to try out modern technologies. This result is in agreement with Olagunji (2019) who in their independent studies found a positive relationship between education and marketing activities.

The coefficient of quantity of fish was positive and significant at 1%. This in agreement with Njoku and Offor, (2016) who reported that quantity of fish handled was significant at 1% and positively related to net income of the marketers. The coefficient of marketing experience was found to be positive. This implies that marketers with more years of marketing experience are expected to be more efficient. It is possible that such marketers gained more marketing experience through “learning by doing” and thereby becoming more efficient. The result agrees with similar findings by Adeleke and Afolabi (2012) that marketing experience is a significant factor in increasing sales revenue.

Marketing Structures of Catfish Marketing

The marketing structures and performance of catfish marketing in the study area is presented in Table 4. The Gini-coefficient was found to be 0.44; indicating high concentration. This implies that catfish market in the study area is controlled by a few marketers, the existence of a weak inequality (weak Oligopoly). This gives room for price determination by the marketers rather than the forces of demand and supply. The marketers also decide the quantity as well as the price for their products to some extent. This is in agreement with Oparinde and Ojo (2014) and Irhivben *et al.*, (2015), who reported Gini coefficients of 0.70 and 0.64 for the catfish markets in Oyo and Ondo States, respectively.

Table 4: Borgu Catfish Market Structures

Income sales	No of seller (f)	Proportion of sellers(x)	Cumulative freq.	Total sales	Proportion of sale (y)	Cumulative proportion of sales	EXY
1-20000	3	0.025	3	30000	0.004	0.004	0.0001
20001-40000	9	0.075	12	240000	0.034	0.031	0.0025
40001-60000	59	0.49	71	2700000	0.394	0.432	0.2116
60001-80000	19	0.158	90	1325000	0.193	0.625	0.0987
80001-100000	30	0.25	120	2565000	0.374	0.999	0.2497
Total	120			6860000			0.56

Source: Computed from field survey, 2020

$$\begin{aligned} \text{Gini Coefficient} &= 1 - \text{Aggregate Score} \\ &= 1 - 0.56 \\ &= 0.44 \end{aligned}$$

Marketing Constraints Faced By Catfish Marketers

The mean score of the constraints facing fish marketers in the study area is presented in Table 5.

Table 5: Mean score of the constraints faced by Catfish Marketers

Constraints	Major Problem	Some Problem	Minor Problem	Not a Problem	Mean
Inadequate credit facility	58	34	19	9	3.2**
Inadequate fish pond	24	52	40	4	2.8**
High cost of feed	18	56	41	5	2.7**
Unorganized market	3	36	73	8	2.3
Price instability	5	21	87	7	2.2
Flooding	2	16	91	11	2.1
High cost of stall rent	1	46	59	14	2.3
High cost of transportation	8	20	77	15	2.1
Poor storage facilities	1	27	65	27	2.0
High cost of labour	1	11	72	36	1.8
Inadequate Standard measuring instrument	1	25	58	36	1.9
Poor Sales	1	2	63	54	1.6

Source: Field Survey, 2020

**** = Major Problem.**

Decision rule; Any mean score above or equal to 2.5 is a major problem

From the result, inadequate credit facility, inadequate fish pond, High cost of feed were ranked the major constraints while Unorganized market, Price instability, Flooding , High cost of stall rent, High cost of transportation, Poor storage facilities, High cost of labor, Inadequate Standard measuring instrument, Poor Sales were ranked as minor constraints. This was most likely perceived as a minor problem faced by catfish marketers

Finance (credit and/or capital) is seen as a prerequisite for any successful business .Money is needed for the day-to-day running of fresh fish marketing beginning from transportation to procurement, marketing costs and others. This is in accordance with the finding of Esiobu and Onubuogo (2014).

The importation of most commercial feed into the country and problems associated with importation and distribution could be the main reasons for the hike in feed prices. These commercial feed possess floating and high protein qualities and are therefore preferred by fish farmers. Ugwumba and Nnabuife (2008) also identified high cost of feed as serious setback to profits realizable from fish farming. Good quality fish feed are expensive are as a result of high cost of most fish feed ingredients particularly fish meal. Also, there are few commercial fish feed producers in Nigeria and Niger State in particular and this makes a lot of fish farmers to depend on imported quality fish feed which are very expensive. This increases their cost of production and reduces their profit margin.

Dada (2009) noted that despite the profitability of the catfish enterprise, fish farmers are still poor and sell their products below its value. The problems most farmers encountered were the lack of market orientation and most farmers are not market wise oriented, this make them to face many difficulties in marketing (Ali *et al.*, 2008). Lack of skill make the fish farmers undergo much stress and make them feel that marketing of catfish is a difficult task (Adewumi and Olaleye, 2011). Similarly and Ugwumba, (2011) identified transportation cost as a major constraint to fresh fish and live-catfish marketing respectively. Catfish are transported in large, wide and round containers due to their shapes and delicate nature, adding to the cost of transportation.

CONCLUSION AND RECOMMENDATIONS

Catfish marketing is a viable business in Borgu Local Government Area of Niger State with a gross margin of ₦155,690. Furthermore, for every ₦ 1 invested on catfish marketing, ₦1.99 was realized. The net returns of catfish marketers was determined by the quantity of fish. Profitability in catfish marketing was however constrained by inadequate credit facility, inadequate fish pond, and high cost of feed were the major problems facing catfish marketers. Based on findings from this study, the following recommendations are made:

1. Government should encourage marketers by giving them soft loans and this will aid them in expanding their business.
2. Marketers should form marketing cooperatives as this would increase their access to credit from financial institutions and hence help alleviate the problem of inadequate capital.

REFERENCE

- Abah, S.E., Adepoju, S.O Umar, A.G and Agun, J.O. (2013). An Appraisal of women in Kano Agricultural and Rural Development Authority (KNARDA) Extension Delivery programmes. *Journal of Agricultural Extension*, Vol. 10. 2013, pp 20-26
- Abah, D , .Zaknayiba,D.E and Simon.E (2013) Economic Analysis of Fish Marketing in Lafia Local Government Area of Nasarawa State, Nigeria .*Journal of Production Agriculture and Technology 9 (2):53*
- Abah, W., Zaknayiba, D., and Simon, B.S. (2013). Portable Water Availability and Consumption Pattern in Ilorin Metropolis, Nigeria. *Global Journal of Human Social Science*, 10(6): 44 – 50.
- Adebayo, O. O and Daramola, O. A(2013) Economic analysis of catfish (*Clarias gariepinus*) production in Ibadan metropolis. *Discourse Journal of Agriculture and Food Sciences* Vol. 1(7): 128-134
- Adekunle, J. (2004) Politics and Society in Nigeria’s Middlebelt:Borgu and the emergence of a political identity ,Africa Word Press Pp 131-134

- Adeleke, M. L and Afolabi, J. A.(2012). Appraisal of Fresh Fish Marketing in Ondo State, Nigeria.: The Economics of Sustainable Fisheries, Aquaculture and Seafood Trade: *Proceedings of the Sixteenth Biennial Conference of the International Institute of Fisheries Economics and Trade* July 16-20, Dar es Salaam, Tanzania.
- Adewumi,A.A and Olaleye ,V.F (2011):Catfish culture in Nigeria progress, prospects and problems” *African journal of Agricultural Research*,6(6):1281-1285
- Ahituv, O. J., Ashley-Dejo, S. S., and Adelaja, O. A. (2005). Assessment of SocioEconomic Analysis of Fish Farming in Oyo State, Nigeria. *Global Journal of Science Frontier Research Agriculture and Veterinary*, 13(9):1-12.
- Ali, N.V., Zimmerman, M. and Snow, B. (2008). A Fresh Perspective: Sustainable Food Systems In An Introduction to Nutrition. Teresa Fung, Melissa Lingohr-Smith, Lisa Benjamin, and Danielle Dresden Eds. Unnamed Publishers pp 56
- American Marketing Association
(2007)<https://www.ama.org/listing/2007/12/24.definatioj-of-marketing-2> visited 11/05/2021
- Banrie (2012). <https://the fishsite.com/articles/catfish-farming-business-in-Nigeria>
- Cheke, M. (2012). Women’s traditional fishery and alternative aquatic resource livelihood strategies in the southern Cameroonian Rainforest. *Fisheries Management and Ecology*, 17: 221 – 230.
- Daniel A. O, Abdulhameed A. O, Emmanuel D, Edward A. A, Uzoamaka A, Stephen A. A (2019) *International Journal of Research and Innovation in Social Science (IJRISS)* |3(4)
- Eniola, F. (2016). Education for Rural People and Food Security: A Cross Country Analysis. Food and Agriculture Organization of the United Nations Rome. University Roma Tre/ Department of Economics. pp 1 - 67
- Esiobu NS, Onubuogu GC. (2014) Socio-economic Analysis of Frozen Fish Marketing in Owerri Municipal Council Area, Imo State, Nigeria: An Econometric Model Approach. *Scholarly Journal of Agricultural Science*. 4(8):449-59.
- FAO, (2009) The state of world fisheries and aquaculture. FAO Fisheries and Aquaculture Department, FAO, Rome.
- Federal Department of Fisheries (2018) Fisheries and Aquaculture FAO 2016 report

- Ike-Obasi, J.C (2021) Assessment of Catfish Marketing Approach in Obio Akpor Local Government of Rivers State, Nigeria. . *Journal of Fisheries and Aquaculture* 12(3):96-101
- Inoni, R, Branch, T.A, Ernst, B, Magnuisson, A; Minte-vera, C.V. Scheurell, M. D. and Valera, J.L. (2017) State of the World's Fisheries Annual Review Environment and Researches 28: 151-154pp.
- Irhivben, B. O., Enyoiko, O., Oluwafemi, Z. and Yusuf S. A., (2015) The Structure and Performance of Catfish Market in Ibadan Metropolis, Oyo state, Nigeria. *International Journal of Social Science and Human Research*, 3(3): 428-433.
- Lareau, E.F. (2003). Proximate composition of catfish (*Clarias gariepinus*) smoked in Nigerian stored products research institute (NSPRI): Developed kiln. *International Journal of Fisheries and Aquaculture* 3(5):96-98
- Ngeywo, O.K., Ganiyu O.I. and Olugasa B.O. (2015).Comparative evaluation of productivity and cost effectiveness of Catfish fingerling production in Earthen Pond and Recirculation System in Ibadan, Nigeria. *Nigerian Veterinary Journal*, 32 (1):5–8.
- Njoku, M.E. and 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.
- Njoku, S.B and Offor, S.O. (2016). Economics of Catfish Farming in Rivers State, Nigeria; *Acad. J. Plant Sci.* 2 (1): 56-59.
- Nwankwo NTO, Oghenehogagame P, Ugwumba COA (2017) Price Efficiency and Profitability of Fresh Fish Marketing in Delta State, Nigeria. *Journal of Agriculture and Veterinary Sciences* 4(4):160-166.
- Olagunju, T. A. (2018): The role of middlemen in fish marketing in Igbokoda fish market, Ondo State, Nigeria. *Journal of Development and sustainability.* 1(3): 88-97
- Oluwasola, O. and Ige, A. (2015). Integrated Fish Farming Averitable tool for poverty alleviation/Hunger eradication in the Niger Delta Region Pp40-41. In A.A. Eyo and J.O. Atanda (eds). *Conferences proceeding of Fisheries Society of Nigeria*, Owerri, Nigeria. Pp. 40-41.
- Ugwumba, C.O.A., Okoh, R, N., Uzuegbunam, C.O (2011): "Market Structure of Live Catfish in Anambra State,*Nigeria journal of Agriculture and social Sciences*, 7 (1): 25 – 29
- World Bank (2020) Agriculture, forestry and fishing, value added (% of GDP). <http://data.worldbank.org/indicator/NV.AGR.TOTL.ZS>