



HOUSEHOLD DEMAND FOR FISH IN OSHIMILI NORTH LOCAL GOVERNMENT AREA OF DELTA STATE, NIGERIA

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Abstract: The primary purpose of this research was to examine the household demand for fish in Oshimili North Local Government Area of Delta State, Nigeria. A multistage sampling procedure was used to select 120 respondents for the study. Both inferential and descriptive statistics were used to achieve the objectives of the study. The result from the study revealed that the mean age of the respondents was 44 years and were mostly female (69.2%). Majority of the respondents were married (64.2%), 16.7% were single, 3.3% were divorced, 7.5% widowed while 8.3% were separated. The mean household size was 5 persons. About 1.7% of the respondents had no formal education, 5.8% had primary education, 9.2% had secondary education while 83.3% had tertiary education. Result reveals that 45.0% of the respondent preferred dried fish as their best form fish for consumption. The result of the multiple regression analysis showed that the R² for the double log function was 0.902. Age, household size, price of fish and beef were statistically significant at 5%, 10%, 5% and 1% probability levels respectively. The study recommended that grants, loans and subsidies should be given to fish farmers and marketers to enable them purchase modern tools and infrastructures in order to increase supply.

Keywords: Household, Demand, Fish, Dried fish, Multiple regression

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1. Introduction

Fish and fish products are known worldwide as a very important diet because of their highly nutritional quality and significance on improving human health (FAO 2018). According to Ikpoza et al., (2021) fish consumption affects people all through different phases of life including pregnancy and youth. Notwithstanding the way that fish is most devoured and extraordinary wellspring of animal protein in Nigeria, the degree of consumption is still far beneath the world average (FAO 2020). To this end, considerable extent of the fish consumed in Nigeria is as yet being imported. Hence the need to expand local production to save the country from avoidable negative balance of payment. Currently, fish globally represents about 16.6 percent of animal protein supply and 6.5 percent of all protein of human consumption (FAO, 2018). Fish is normally low in saturated fats, carbohydrates and cholesterol and offers high benefit protein as well as a wide scope of fundamental micronutrients including minerals and polyunsaturated omega-3 unsaturated fat (Ikpoza et al., 2021).

The significance of fish itself can't be overemphasized.

According to Ikpoza et al., (2021) it gives food to the general population, it considers further improved protein nutrition since it has protein retention in the body, higher protein osmosis when contrasted with other protein sources, low cholesterol content and perhaps the most secure source of animal protein. In Nigeria, fish supply is from four major sources viz; artisanal fisheries, industrial fisheries, aquaculture and imported sardine and mackerel. Production from aquaculture is increasing compared to artisanal sources (FAO, 2020). Apart from human consumption, fish is also used for feed formulation, as source of raw materials in allied industries (FAO, 2020). The species of fish commonly cultured in Nigeria at commercial scale include catfish (*Clarias gariepinus*) tilapia (*Oreochromis niloticus*) and carp (*Cyprinus carpio*). However, most fish farmers in Nigeria focus on catfish production due to its ability to adapt well to culture environment, has highest acceptability and can easily retailed and attracts premium price. Catfish are appropriate for stocking in tanks and they endure low dissolved oxygen better than different species in Nigeria. Fish farming is slowly



becoming a vibrant and dynamic commercial sector in Nigeria, so as to meet up with the demand that keeps rising. Industrial data shows that fish consumption is only met by additional imports of about 740,000 metric tons per year (Nasr-Allah et al., 2020). Therefore, making locally produced fish all the more promptly accessible to Nigerian consumers will guarantee quicker and fresher access to probably the best source of animal protein.

The low level of animal protein consumption in Nigeria as detailed by the FAO (2020) uncovered that the eating regimen of an average Nigerian contains about 20% below the recommended requirement. Fish consumption pattern has shown increasing trend in the past four decades with an increasing steady average of 9.9kg in the 1960s and reaching 16.4kg in 2005 (Achike et al., 2021). The total demand for fish was estimated at 164.3 metric tons in 1979 and 74.3 million metric tons in 2015 (Achike et al., 2021). Despite this increase it was reported that the variation in demand with respect to supply was high, yet it still falls short of FAO's minimum requirement of 65grams of protein and 2500k to calories of energy per head per day.

Nigeria fishery statistics report 2016 (FAO, 2020) stated that the whole fish demand for Nigeria in respect to the 2014 population estimate of 180 million persons was 3.32 million metric tons. Nigeria produces around 1 million metric tons of fish per year: over 750,000 metric tons from capture fisheries and roughly 310,000 metric tons from aquaculture, leaving the deficit to importation of frozen, canned and stock fish, despite its huge drain on the economy (Ikpoza et al., 2021). Thus, if adequate steps are taken to reduce the wide gap between demand and supply of fish through studies such as household demand for fish in Oshimili North Local Government Area of Delta State, the food insecurity problem in Nigeria could be alleviated. Therefore, this study tends to; examine the socioeconomic characteristics of fish consumers in the study area; ascertain the preferences in the demand for fish; and determine the effect of consumers socioeconomic characteristics on the quantity of fish demanded.

2. Materials and Methods

The study area, Oshimili North Local Government Areas (LGA) is one out of the 25 local government areas in Delta State, Nigeria. Delta State is made up of three Senatorial Districts which are Delta North, Delta South and Delta Central. The State is one of the oil producing states in Nigeria located in the Niger Delta region in the south-south geo-political zone. The State covers an area of 17,698 km² with a coordinate of 5°30'N 6°00' with 25 local government areas. According to the National population commission (NPC 2017), the main ethnic groups in the state are Igbo, Urhobo, Ijaw, Isoko and Itsekiri. It has a minimum annual temperature of 32.8 °C and annual rainfall amount of 2673.8mm (NIMET, 2015). It has a population of 4,112,455 comprising of 2,069,309 males and 2,043,136 females. The major occupations of

the people in Oshimili North LGA are crop farming, fishing and trading. The major livestock reared include poultry, piggery and goat while major crops produced are cassava, oil palm, melon, yam, maize. The various types of fish available to consumers include; catfish stockfish, tilapia, prawn, crab, lobster, periwinkle etc. The available forms in which fish is consumed in the study area include; dried, fried, grilled, smoked and boiled fish. Oshimili North LGA is made up of eight (8) communities namely; Akwukwu-Igbo, Ebu/Ukala/Illah, Ibusa, Nsukwa, Ogwashi-Uku, Oko-Okwe, Okpanam/Ugbolu and Ubuluwhile.(NPC 2017).

Data Collection

Primary data were collected for the study through trained enumerators with the use of well- structured questionnaire. Multistage sampling technique was used to select the respondents for the study. Six (6) communities were randomly selected from Oshimili North LGA. Thereafter, twenty (20) fish consumers were randomly selected from each of the six (6) communities to arrive at a total of one hundred and twenty (120) respondents that were used for the study.

Data Analysis

The socioeconomic characteristics of the respondents and the preferences in the demand for fish were realized using descriptive statistics such as percentage, mean and frequency distribution, while the effect of consumers socioeconomic characteristics on the quantity of fish demanded was analyzed using multiple regression models.

The implicit form of the model is given as (equation 1);

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9) + e \quad (1)$$

Where;

The linear form was expressed as (equation 21):

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + e \quad (2)$$

The semi-logarithm form was expressed as (equation 3):

$$Y = \log b_0 + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_6 \log X_6 + b_7 \log X_7 + b_8 \log X_8 + b_9 \log X_9 + e \quad (3)$$

The double-log form was expressed as (equation 4):

$$\log Y = \log b_0 + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_6 \log X_6 + b_7 \log X_7 + b_8 \log X_8 + b_9 \log X_9 + e \quad (4)$$

exponential function (equation 5):

$$\log Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + e \quad (5)$$

Where;

Y = Qty of fish demanded (catfish, stockfish, tilapia, sardine and mackerel and shell fish (kg)
 X_1 = age (years)
 X_2 = household size (number of persons in household)
 X_3 = gender (dummy; male = 1; female = 0)

X4 = educational level (years) X5 = price of fish (₦)
 X6 = price of beef (₦) X7 = poultry (chicken) X8 =
 Molluscs (snail) X9 = income (₦)
 b0 = intercept
 b1 - b9 = coefficients e = Error term

3. Results and Discussion

3.1. Socio-Economic Characteristics of the Respondents

The result in Table 1 shows that 30.8% of the respondents were males while 69.2% were females. This therefore reveals that majority of the respondents were females. This corroborates with the findings of Wake & Geleto (2019) who observed that women in sub-Sahara Africa contributed 70 to 75% of fish producers and consumers in rural areas. The highest percentage distribution of respondents according to age was 31-40years (33.3%) and lowest was 71years and above (2.5%). This reveals that majority of the respondents were young adults, this was also reflected in the mean age distribution of 44years. This result is in line with that of Nwuba et al., (2022) whose result revealed that the mean age the fish consumers in the study area was observed to be 40.5 years showing that they are in their dynamic and useful age. The amount and nature of protein prerequisite of individual is now and again controlled by age of the individuals from the family. This is on the grounds that food consumption design by and large follows the body syntheses.

The study also revealed that majority of the respondents were married (64.2%), 16.7% of the respondents were single, 3.3% of the respondents were divorced, 7.5% of the respondents widowed while 8.3% were separated.

This result supports the findings of Nwuba et al., (2022) in an overview of feature and issues of fisheries expansion in Nigeria that the study area was overwhelmed by married individuals which means that the way that many of the respondents are stable and consume more fish. The mean household size was 5 persons, It was also found that the households with family size of 1-3 persons was 20.8% while those within the ranges of 4-6 persons and 7-9 persons were 45.8% and 31.7% respectively. This means that most household sizes in the study area are large. This is a very significant factor because the greater the household size, the higher their level of consumption. Analysis indicated that small numbers of persons were recorded for most households during the study. Similarly, Agbugui et al., (2021) reported that 60 percent of the respondents have less than nine household members.

The percentage distribution of the respondents in order of their level of education and were; no formal education (1.7%), primary education (5.8%), secondary education (9.2%) and tertiary education (83.3%). High proportion of the respondents had formal education. This infers that there are more learned individuals in the study area which is additionally reflected by the low rate (1.7%) of

unlearned family heads. The event of greater part with tertiary training have great inclination of impacting their fish consumption and request since consumers with a significant degree of formal education are more worried about their wellbeing than those with a low degree of schooling and this is in accordance with the discoveries Gbigbi (2020), Anyim et al 2019 and FAO 2018.

Most (40.0%) of the respondents were farmers. About 15.8% of the sampled population were civil servants, 10.8% were into fishing, 9.2% of the respondents were teachers while 7.5% were into the food industry business. This showed that the highest major occupation in the sampled population was farming followed by civil service. This distribution could be an indication that all classes of the society are interested in the consumption of fish in the study area. According to Agbugui et al., (2021) the primary occupation of the respondents who consumed fish in South-west region of Nigeria cuts across diverse professions.

3.2. Form of Fish Most Preferred by Respondents

The distribution of respondents according to their preference for form of fish is presented in Table 2. Result reveals that most (45.0%) of the respondent preferred dried fish (without moisture content in them) as their best form fish for consumption. This could be due to the longer time dried fish can be preserved if not consumed immediately; 19.2% of the respondents preferred grilled fish as their favorite while 7.5% of the respondents in the study area preferred smoked fish as their favorite. This could be due to the fact that smoking of fish with different wood types had significant differences in taste, color, aroma and texture of fish which may not be appealing to the consumer (Gbigbi 2020).

Table 1. Socioeconomic characteristics of the respondents

Variables	Frequency	Percentage	Mean
Gender			
Male	37	30.8	
Female	83	69.2	
Age			
Less than 30 years	17	14.2	
31-40 years	40	33.3	
41-50 years	26	21.7	44.33 years
51-60 years	25	20.8	
61-70 years	9	7.5	
71 years and above	3	2.5	
Marital Status			
Married	77	64.2	
Single	20	16.7	
Divorced	4	3.3	
widow	9	7.5	
Separated	10	8.3	
House hold size:			
1-3 persons	25	20.8	
4-6 persons	55	45.8	5 persons
7-9 persons	38	31.7	
above 9 persons	2	1.7	
Education Level:			
No formal education	2	1.7	
Primary Education	7	5.8	
Secondary Education	11	9.2	
Tertiary education	100	83.3	
Primary Occupation:			
Mining	4	3.3	
Farming	48	40.0	
Fishing	13	10.8	
Automotive	5	4.2	
Electrician	2	1.7	
Chemical industry	4	3.3	
Food industry	9	7.5	
Civil servant	19	15.8	
Teaching	11	9.2	
Textile industry	5	4.2	

Table 2. Form of fish most preferred by respondents

Variable	Frequency	Percent	Mode
Dried fish (without moisture content)	54	45.0	Dried fish
Fried fish	22	18.3	
Grilled fish	23	19.2	
Smoked fish (with moisture content)	9	7.5	
Boiled fish	12	10.0	
Total	54	45.0	

3.3. Factors That Affect the Demand for Fish

Demand functions were estimated for fish consumed by respondents. For this study, four (4) different functional forms were fitted to the data and the lead equation was chosen based on the normal econometric and statistical criteria.

The results of regression analysis on fish demand in the study area are presented in Table 3. The result shows that in the double log functional form, one (1) explanatory variable was statistically significant at 1%, two (2) explanatory variables were statistically significant at 5% and one (1) explanatory variable was statistically significant at 10% probability levels. The coefficient of multiple determination for the double log function was 0.902 and a Durbin-Watson Statistic of 1.8, which as a rule of thumb is that test statistic values in the range of 1.5 to 2.5 are relatively normal Nwuba et al., (2022). Hence the double log model was chosen as the lead equation and used for further analysis of the data. In the model age, household size, price of fish and beef were statistically significant at 5%, 10%, 5% and 1% probability levels respectively. This implies that age, household size, price of fish and beef are major determinants of fish demand in the study area.

Age: Age ($B = 0.884$; $p < 0.05$) was not only significant but positively correlated with quantity of fish demanded. The positive value of the Beta coefficient indicates that increase in age of respondents will lead to an increase in quantity of fish demanded. This implies that older people demand fish more than younger ones in the study area. This result corroborates with the findings of Nwuba et al., (2022), whose result revealed that age of fish consumers was positively related to the quantity of fish demanded.

3.3.1. Household size

The Beta weights as seen in Table 3 showed that household size ($B = 1.875$; $P < 0.1$) is a positive predictor of quantity of fish demanded and hence contributes to it. The positive value of the Beta coefficient indicates that increase in household size will lead to an increase in the quantity of fish demanded. Large household size are expected to result in high demand of fish, this is in line with the result obtained in this study. This result is consistent with Bradley and Byrd (2020). It implies that large households demand more fishes than smaller households.

3.3.2. Price of beef

The price of beef ($B = 17.036$; $P < 0.01$) was a significant determinant of fish demand in the study area. It is positively correlated with the quantity of fish demanded. This implies that increase in the price of beef will result to an increase in the quantity demanded for close substitute (fish). This result is in accordance with economic theory and agrees with Nwuba et al., (2022)

Price of fish: Price of fish ($B = -1.013$; $p < 0.05$) was also a significant determinant of fish demand in the study area. It is negatively correlated with the quantity of fish demanded. The negative value of the Beta coefficient indicates that increase in price of fish will lead to a decrease in its demand. This result is in line with that of

Wake and Geleto (2019) who stated that increase in price of fish may lead to low demand of fish by some of the respondents especially the low income group

3.3.3. Household income

Income ($B = 1.705$; $p < 0.01$) was a significant determinant of quantity of fish demanded in the study area and it was positively related to the quantity of fish demanded. The positive value of the Beta coefficient indicates that increase in household income will lead to an increase in the demand of fish. This implies that increased income may lead to increase in quantity of fish demanded. Wake and Geleto (2019), in their study on income and consumption generally concluded that the level of income and household size both had positive influence on level of fish consumption and this study is in concordance with that.

4. Conclusion

The primary purpose of this research was to examine the household demand for fish in Oshimili North Local Government Area of Delta State, Nigeria. The study concludes that the consumers of fish in Delta State preferred catfish as their best form of animal protein due to its relative cheapness compared to other types of fish and its mostly preferred in the dried form (without moisture dryness). As this form encourages longer storage before consumption in the home. Furthermore, the respondents' socioeconomic characteristics such as age, household size, price of fish, price of beef and income greatly affects their demand for fish. The study recommends that grants, loans and subsidies should be given to fish farmers and marketers to enable them purchase modern tools and infrastructures in order to increase supply.

Table 4. Factors that affect the demand for fish

Variables	Linear	Exponential	Semi-log
Age	0.001 (1.443)**	-1.250 (-0.677)	0.061 (0.884)**
Household size	0.010 (1.542)	1.757 (1.422)	0.087 (1.875)*
Gender	0.009 (0.553)	1.632 (1.202)	0.022 (0.425)
Educational level	0.001 (0.209)	3.719 (1.474)	0.144 (1.515)
Price of fish	2.202E-06 (0.836)	-0.805 (-0.869)	-0.035 (-1.013)**
Poultry (chicken)	0.562 (0.876)	0.589 (0.632)	0.457 (0.748)
Price of beef	2.179E-05 (12.440)***	19.806 (13.686)***	0.928 (17.036)***
Price of molluscs	5.653 (0.457)	8.352 (1.854)	2.354 (0.865)
Income	-1.002E-06 (-0.691)	1.833 (0.756)	-0.076 (1.705)***
R ²	0.816	0.794	0.902
Adjusted R ²	0.811	0.788	0.898
Durbin-Watson	1.552	1.937	1.838

F-ratio 77.479***, 47.077***, 28.088***, * = significant at 10%, ** = significant at 5%, *** = significant at 1% Figures in parenthesis are t-ratios

Author Contributions

The percentages of the authors' contributions are presented below. All authors reviewed and approved the final version of the manuscript.

	E.A.I.	V.C.O.	A.O.D.	E.E.	A.T.
C	30	30	20	10	10
D	80	20	10	10	
S	40	30			
DCP			40	30	30
DAI		100			100
L	20	20	20	20	20
W	20	20	20	20	20
CR	20	20	20	20	20
SR	20	20	20	20	20
PM	20	20	20	20	20
FA	20	20	20	20	20

C=Concept, D= design, S= supervision, DCP= data collection and/or processing, DAI= data analysis and/or interpretation, L= literature search, W= writing, CR= critical review, SR= submission and revision, PM= project management, FA= funding acquisition.

Conflict of Interest

The authors declared that there is no conflict of interest.

Ethical Consideration

This study obtained approval from the Ethics Committee of the Dennis Osadebay University Asaba (approval date: September 14, 2024, protocol code: 11). The study participants were also informed about the purpose of the study and responded to the questionnaires anonymously, and they were allowed to skip any item they did not wish to answer. The information supplied by the respondents was strictly treated with utmost confidentiality.

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