

Quantitative Analysis of Fish Consumption in Rivers State, Nigeria

Abstract

The determinants of demand for fish in Rivers State were isolated in this study. Structured questionnaire was used in eliciting information from the respondents. Cross sectional data were randomly collected from 210 respondents from the three senatorial zones. Multiple regression analysis was used in analyzing the data. Results showed that age, household size, income, price of beef, and sex of the consumers were the major determinants of fish consumption in the State. The demand for fish was relatively income inelastic. Beef was a close substitute to fish therefore an increase in the price of beef leads to a corresponding increase in the quantity of fish demanded. Fish was a normal good. Policies and programmes aimed at raising the income of households such as credit liberalization should be implemented by the government. In addition the level of education of the citizens should be raised through compulsory secondary education so as to increase the level of their nutritional enlightenment which is expected to boost their levels of protein intake.

Keywords: **Quantitative, Determinants, Consumption, Fish.**

Introduction

Fish is adjudged to be nutritionally superior to other sources of animal protein, containing most of the essential amino acids particularly lysine, leucine, valine, methionine and tryptophan and hence fish is regarded as first class protein producer [1]. This implies that fish possesses the requisite potential of bridging the gap in the inadequate protein intake of most Nigerians when properly harnessed.

Considering the extensive mangrove ecosystem available in the country, Food and Agricultural Organization [2], identified Nigeria as one of the countries in the Sub-Saharan Africa with great potential to attain sustainable fish production through agriculture. Furthermore, available statistics points to the fact that Nigeria is the largest fisheries producer in Africa, with an annual output of more than 635,399 tonnes which constitutes about 4 percent of the nation's GDP [3]. Regrettably, Nigeria is one of the largest importers of fish in the developing world with annual imports of about 560,000

tonnes of fish [4].The analysis of agricultural contributions to Nigeria's GDP between 1960-2008 periods and showed that the fishery sub-sector made the list contributions to the agriculture share of the GDP [5]. The foregoing scenario is suggestion of the fact that the fish demands of Nigerians' have not been met. Therefore, one is not surprised that Nigeria is highly deficient in animal protein security with the per capita consumption put at 9.3g/day as against the 34g/day recommended by the FAO to be the minimum requirement for the growth and development of the body [6]. At this juncture, it becomes apposite to ascertain the factors driving the demand for fish in the polity ostensibly to make recommendations for appropriate policy interventions. Such factors may be domiciled in the socio-economic cum cultural characteristics of the consumers or the macroeconomic milieu. This study is however tailored towards examining the socio-economic factors driving fish demand in Rivers State.

Table 1. Components of Agriculture share of Nigeria's GDP (1960-2008)

Source: Computed from Central Bank of Nigeria, Statistical Bulletin, 2008.

Methodology

Rivers State lies between longitude 6° 50¹ E and Latitude 4° 45¹ N and is bounded on the South by the Atlantic Ocean, to the North by Imo and Abia States, to the East by Akwa Ibom State and to the West by Bayelsa and Delta states. The state is made up of 23 Local Government Areas (LGAs) [7]. There are 23 LGAs, in the state made up of fifteen upland and 8 Riverine LGAs.

54 One L.G.A. was **purposively** selected from each senatorial zone of the state namely Port
55 Harcourt from Rivers East senatorial district, Ahoada East from Rivers West senatorial
56 district and Oyigbo from Rivers South senatorial district. From each of this L.G.As,
57 seventy households were randomly selected for the study. This gave a total of two
58 hundred and ten (210) respondents. Using structured questionnaire, data on level of
59 education, income, sex, age of household head, household size, consumption of meat and
60 fish and their various prices were collected between July and September, 2012.

61 Multiple regression analysis was used in analyzing the data generated. It was postulated
62 that the demand for fish in Rivers State was determined by the socio-economic
63 characteristics of the respondents, such as level of education, annual income, age,
64 household size, sex and prices of fish.

65 The model specified and estimated include,

66
$$\text{Log}Q_{\text{fish}} = \log_a + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_6 \log X_6 + e \dots (1)$$

67 Where

68 Q_{fish} = quantity of fish (Kg) demanded per week

69 X_1 = Age (years)

70 X_2 Level of education (years)

71 X_3 = Household size (number)

72 X_4 = Annual income (N)

73 X_5 = Price of beef per Kg (N)

74 X_6 = Price of fish per Kg (N)

75 X_7 = Sex (1 = male, 0 otherwise)

76 e = error term.

77

78 **Results and Discussion**

79 Table 2 presents the socioeconomic characteristics of fish consumers. The Table shows
 80 that an average fish consumer spent about 14 years in formal education, had a household
 81 size of 5 persons, was aged about 42 years old and had an annual income of N355,828.6.
 82 This result implies that most of the fish consumers are literate enough to understand the
 83 importance of animal protein in their diets. In addition, the average annual income shows
 84 that the fish consumers may be earning about N30,000 per month which may not be
 85 enough to meat up with their household fish demand. Larger household sizes could
 86 translate into increased expenditure on fish consumption. The mean age of the consumers
 87 implies that they are at their active stage of life. The result further showed that more men
 88 (64.3%) consume fish than women (35.7%) in the State.

89 Table 2Socioeconomic Characteristics and elasticities of fish consumers

Variable	Frequency	Percentage	Mean	Elasticity (bX)
Age (Years)				
21-30	23	11	42.1810	0.1687
31-40	79	37.62		
41-50	61	29.04		
51-60	40	19.04		
61-70	7	3.30		
Total	210	100		
Education (Years)			14.3143	0.0429
1-6	78	37.1		

7-12	60	28.6		
13-18	72	34.3		
Total	210	100		
Gender			0.3157	0.0285
Male	135	64.3		
Female	75	35.7		
Total	210	100		
Household size			4.9429	0.2175
2-4	93	44.3		
5-7	99	47.1		
8-10	18	8.6		
Total	210	100		
Income			355828.57	0.2856
<100,000	17	8.1		
101000-200000	38	18.1		
201000-300000	75	35.7		
301000-400000	26	12.4		
401000-500000	33	15.7		
501000-600000	9	4.3		
➤ 600000	12	5.7		
Total	210	100		

90 Source: Survey data 2012

91 The results of regression analysis are presented in Table 1. In the linear model, five of the
92 explanatory variables were statistically significant at 5 percent level of probability. They
93 were also positively correlated with the quantity of fish demanded. The semi log model
94 also produced three explanatory variables that were statistically significant at 5 percent
95 level of probability and possessed the expected positive signs. Three and five regressors
96 were statistically significant at 5 percent level of probability in the double log and
97 exponential functions respectively. Similarly, they possess the expected positive signs.
98 The coefficient of multiple determinations for the linear, semi log, double log and
99 exponential functions are 0.336, 0.404, 0.357 and 0.290 respectively. Therefore, the
100 exponential function that produced the highest number of statistically significant
101 regressors that possessed the expected signs was chosen as the lead equation and shall be
102 used for further discussion.

103 In the exponential function, age is statistically significant at 1 percent level of probability
104 and possesses the expected positive sign. This implies that increase in age leads to
105 increase in the quantity of fish demanded. This is possible because in the households,
106 children graduate from being milk consumers as major sources of protein to meat or fish
107 consumers. This finding agrees with [8] in Rivers State, Nigeria, but inconsistent with the
108 findings of [9] in the Gambia.

109 Level of education was positively related to quantity of fish demanded, showing that
110 increase in the level of education leads to increase in the quantity of fish consumed as
111 quality protein but it is however not a significant determinant of fish consumption in
112 Rivers State . This result is also consistent with [8] and [9] in Nigeria and Gambia
113 respectively.

Household size indicates a positive relationship with quantity of fish consumed. Its coefficient is statistically significant at 1 percent level of probability. This shows that an increase in household sizes significantly causes an increase in the demand for fish. The implication of this result is the fact that large households demand more fish than smaller sized households to meet up with their nutritional requirements. Similar result was obtained by [10] in Kano and [11] in Sokoto metropolis, Nigeria, in the demand for soyabean and meat respectively as sources of protein.

Income of fish consumers exhibited a positive relationship with the quantity of fish consumed showing that increase in income of households increases the quantity of fish demanded. The variable income is also statistically significant at 1 percent level of probability. This implies that income is a significant determinant of quantity of fish consumed. Those who receive higher incomes are expected to consume more fish than those who receive lower incomes. It has earlier been reported [12] that growth in per capita income tends to increase the consumption of non-starchy foods such as fish. This result also indicates of the fact that fish is a normal good in Rivers State. This finding is consistent with that of [13] in Delta State, Nigeria, [14] in Calabar, Cross Rivers State, Nigeria, and [8] in Rivers State, Nigeria.

Price of beef was also positively correlated with quantity of fish consumed in Rivers State. It is also statistically significant at 1 percent level of probability. This suggests that increase in the price of beef causes an increase in the quantity of fish demanded showing that beef is a substitute to fish. The result further shows that prices of beef are significant determinants of quantities of fish consumed in the State.

The variable, Sex (X_7) exhibited a positive relationship with quantity of fish demanded, showing that more men consumed fish than women in Rivers State. It is also statistically significant at 1 percent level of probability implying that sex is a significant factor influencing fish consumption in the State. A similar result was obtained in the United States of America by [15] who argued that households with female heads paid substantially less per week for meat and meat alternatives.

Price of fish had the expected negative sign, showing that increase in own price of fish leads to a reduction in the quantity of fish demanded. Ironically it is not statistically significant at 5 percent level of probability implying probably that own price, is not a major factor influencing fish demand in Rivers State.

Table 3: Results of Regression analysis for fish demand in Rivers State, Nigeria.

Variables	Linear	Semi log	Double log	Exponential function
Constant	-2.847	-60.842	-6.266	0.005
X_1 = Age	0.025 (3.007)***	2.752 (2.120)**	0.457 (1.966)**	0.004 (2.787)***
X_2 Level of education	0.006 (0.119)	0.695 (0.279)	0.154 (0.346)	0.003 (0.337)
X_3 = Household size	0.288 (6.102)***	0.122 (0.127)	0.103 (0.595)	0.044 (5.317)***
X_4 = Annual income (N)	6.538 E-7 (2.981)***	1.146 (2.093)**	0.198 (2.020)**	8.896 E-8 (2.293)***
X_5 = Price of beef per Kg	0.000 (3.605)***	10.925 (4.048)***	1.479 (3.092)***	3.416E-5 (3.166)***

X ₆ = Price of fish per Kg	0.004 (1.101)	6.735 (0.650)	0.060 (0.032)	0.000 (-0.292)
X ₇ = Sex	0.459 (2.995)***			0.080 (2.937)***
R ²	0.336		0.357	0.290
F-Ratio	14.608			11.767

** = Significant at 5%, *** = Significant at 1%

Figures in parenthesis are T-ratios.

The price, income and cross-price elasticities are shown in Table 2. The result shows that if the age, years of education, household size, income, price of beef and price of fish increases by one percent the quantities demanded of fish would increase by 0.1687, 0.0429, 0.2175, 0.2846, 0.0430, and 0.00 percent respectively. The result in Table 2 shows that demand for fish is relatively price and income inelastic. The result further shows that both fish and beef are substitutes in Rivers State.

Conclusion and Recommendation

The study shows that age, household size, income, price of beef, and sex of the consumers are major determinants of fish consumption in Rivers State. The demand for fish was relatively income inelastic. Beef was a close substitute to fish therefore any increase in the price of beef leads to a corresponding increase in the quantity of fish demanded. Fish was a normal good.

It is therefore recommended that policies and programmes aimed at raising the income of households be implemented by the government. In addition the level of education of the

citizens should be raised through compulsory secondary education so as to increase the level of their nutritional enlightenment.

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