DETERMINATION OF ELASTICITY OF DEMAND AMONG FISH CONSUMERS IN UKWUANI LOCAL GOVERNMENT AREA, DELTA STATE, NIGERIA

Kaine, A. I. N
Department of Agricultural Economics and Extension, National Open University of Nigeria, Kaduna, Nigeria
+2348038822372.Email: akaine@noun.edu.ng or kainatonne@gmail.com

ABSTRACT
The study was conducted in Ukwani Local Government Area, Delta State, Nigeria. It examined the elasticity of demand among fish consumers in the study area. Sixty (60) respondents were used for the study and were randomly selected using the probability (multistage random) sampling technique. Data for the study were collected using structured questionnaire and interview schedule. Descriptive statistic and regression analysis were used to analyze the data collected. The result revealed that majority 56(93.33%) of fish consumers in the study area had formal education. Respondents were found to be low income earners. The result also showed that forty six (76.67%) of the respondents had income of one hundred thousand naira (₦100, 000) and above witha mean income of one hundred and fifty thousand naira (₦150, 000).The result of the multipleregression analysis showed that own price elasticity of fish was negative but significant at P<0.10(10%). Cross price elasticity of demand as was established in the study confirmed thatbeef (0.210), chicken (0.491), and goat meat (0.117) with positive signs were close substitutes to fish. Income elasticity of demand was established to be positive (1.126) indicating that fish in the study area was a normal good. The study advocated the need to develop strategies that will boost creation of income – enhancing jobs and training through capacity building. It also recommended that diversification and off farm income generation should be carried out. Government – private sector participation in the establishment of small and medium scale enterprises as well as the provision of storage facilities was also recommended.
Keywords: Demand, consumption, household, income, fish and elasticity.

INTRODUCTION
Agriculture has been the major source of human existence. It is the bedrock of economic development. Kaine and Ume (2017) reported that agricultural sector is the only sector that provides the basic necessities of man which includes food, shelter and clothing. This sector is regarded as the most important non-oil economic activity in Nigeria that provides the largest employment opportunity of over 70% (Kaine and Awolumate 2017 and National Bureau of Statistics (NBS) 2007). This is why Ike (2012) and Agenor *et al*., (2004) reported that agriculture is seen as the most important vehicle in reducing poverty. Imodu (2005) and Alabi (2023) pointed out that agriculture is an important organ in provision of food, security, employment generation, domestic and foreign income generation. Ume and Kaine (2017) pointed out that agriculture is the major sector of the economy that contributes up to about 48% of the nation's Gross Domestic Product (GDP), provides employment (75%) of the population and generates over 25% of foreign income.

The agriculture sector is composed of crops, livestock, fisheries and non-traditional animal production like snails, honeybee, rabbits and grass cutter among others. Both the crop and animal sector provides the much needed food for growth and development of the body. On the other hand, the livestock and fisheries sector provides animal protein and calories for the growing population (Kaine, 2017). The protein requirement of the body is derived from both plant and animal sources. The animal proteins are obtained from either macro-livestock such as cattle, sheep, pigs and goat or micro-livestock like fisheries, snails, rabbits and grass cutter. The fisheries subsector is an important component of the Nigerian economy as it is rated the third after crop and livestock in the contribution to GDP (Bassey *et al.,* 2014).

Traditionally, fish has been a major ingredient in the diet of people living in areas traversed by rivers, creek and coastal communities. Researchers have shown that fish is now a major source of food for both rural and urban dwellers. Fish plays an important role in individual body development. Olagunju *et al., (2007)* observed that fish provide the much needed protein required for growth and development of the body. Fish is low in fat and calories, high in protein, minerals, vitamin and polyunsaturated fatty acids. World Health Organisation (WHO) (2011) observed that fish demand and supply globally is increasing at the rate of 3.6% since 1961 while the world population within the period is increasing at the rate of 1.8%. Amao *et el.,* opined that the explosive increase in demand and consumption of fish was due to the increase in general awareness of the nutritional and health values of fish. Fish production is important in reducing unemployment and providing domestic and foreign earnings. FAO (2005) opined that fish plays an important role in areas of trading and concluded that thirty percent (30%) of fishery commodity produced in developing countries is exported for foreign exchange. This is important in boosting investment and economic development of the various countries.

Demand for fish is concerned with consumer's behavour towards the product and the actions in buying the product. The demand for fish around the world tends to have increased tremendously over the

past 15 years resulting to increase in its price (Amao *et al* 2006). The increase in demand for fish could be attributed to increase in responsiveness of the nutritive and health values of the products such as low in fat and calories, high protein, vitamins, minerals and polyunsaturated fatty acids. Faturoti (2010) reported that the demand for fish and investment in it in Nigeria is increasing at the rate of 25 to 33 percent annually. Food and Agriculture Organisation (FAO) (2005) however attributed the increase in demand for fish in developing countries to growth in population, urbanization and in per capita consumption.

Demand for fish is concerned with the relationship of consumers towards fish and its products and actions in consuming it. In Nigeria demand for fish is achieved through domestic production and importation from other countries. Domestic production is derived from artisanal, industrial and fisheries culture. Olaoye *et al* (2017) reported that artisanal fish production accounted for up to 85% of the total fish produced while industrial fisheries accounted for 1% and culture fisheries accounted for 14%. Elasticity of demand is used to represent the relationship that exist between demand and change in price. It is the responsiveness of demand to change in price.

Several studies have been conducted in fish production, processing, marketing and storage, however little or no study have been conducted with respect to elasticity of demand among fish consumers in Ukwani Local Government Area there by creating research gap in this area. It is against this background that this research was carried to ascertain the socio-economic characteristics of the respondents, elasticity of demand and the constraint to demand for fish in the study area.

Methodology
The study, determination of elasticity of demand among fish consumers in Ukwuani Local Government Area Delta State, Nigeria was conducted between June, 2017 and December, 2017. The total population of the people as recorded is one hundred and nineteen million and thirty four (119,034) people at the 2006 census, with fifty eight thousand, eight hundred and ninety male and sixty thousand, one hundred and forty four female (Federal Republic of Nigeria Official Gazette, 2009). Agriculture is the major occupation of the people. Crops cultivated include cassava, maize, *eguisi*melon, okra, yam among others as arable crops. Oil palm and rubber form a good cash crop enterprise in the area. The people of Ukwuani Local Government Area are also involved in post-harvest handling and storage of agricultural produce. They also engage in other economic activities or business enterprise outside farming. Macro livestock (such as goat, pigs and poultry) and micro livestock (fish and snail) production is also encouraged in the area. Five communities, Akoku, Obiaruku, Amai, Ezeonum and

Abbi were randomly selected using probability random sampling technique that resulted to a total sample size of sixty (60). Structured questionnaire were used to collect the data required for the study. Questions were designed to provide information on the socio-economic status of the respondents, demand for fish and constraints to fish demand in the study area. The analytical techniques employed include descriptive statistics and regression analysis. Descriptive statistics such as frequency counts, percentages, means, and Tables were used to measure the socio-economic variables of the respondents. Multiple regression analysis was used to determine the elasticity of demand.

Model Specification
Multiple regression analysis is a model useful for estimating the relationship between dependent and independent variables. A multiple regression model consisting of quantitative and qualitative variables, known as the analysis of covariance model, was used to identify factors that influenced fish demand.
The demand function that was estimated is implicitly specified generally as:
$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, D_1, D_2, D_3, \mu)$.
Where:
Y = Elasticity of demand.
X_1 = Retail price of fish in naira (kg).
X_2 = Retail price of beef in naira (kg).
X_3 = Retail price of chicken in naira (kg).
X_4 = Retail price of goat meat in naira (kg).
X_5 = Monthly disposable income (Naira).
X_6 = Household size (No.).
X_7 = Level of education (years).
D_1 = Quantity of fresh fish demanded (Kg).
D_2 = Quantity of smoked fish demanded (Kg).
D_3 = Quantity of fried fish demanded (Kg).
μ = Random error term.
f = Functional notation.
The above demand function was estimated using Cobb-Douglas (double log) functional form.

RESULTS AND DISCUSSION
Socio-economic characteristics of fish consumers in the study area
Socio-economic characteristics of fish consumers in the study area were presented in Table 1. The findings of the age of the respondents revealed that majority (15) (50%) of the respondents were within the age bracket of 41 – 50 with a mean age of 40 years. The study revealed that respondents were in economic and active age. Kaine and Chukwuma (2017) observed that farmers within the active age are more receptive to technological change and adoption. The result also showed that (38) (63.33%) of the respondents were males while (22) (36.67%) of the respondents were females. Further analysis of the marital status of respondents indicated that (24) (40%) of fish consumers in the study area were married, (20) (33.33%) were single, (6) (10%) were divorces while (10) (16.67%) were widows/

widowers. A detailed analysis of the educational attainment of the respondents showed that literacy level of respondents was high as (56) (90.33%) acquired formal education. Formal education enhances one's ability to understand and apply technological innovations, as well as management of resources. Table 1 also revealed that the respondents were well experienced. Most of the respondents (33)

(60%) had over eleven (11) years of experience with a mean experience of 10 years. The household size analysis indicated that mean household size was six (6) persons. The findings further revealed that fish consumers in the study area were operating at a low income level with a mean income level of one hundred fifty thousand naira (N150, 000).

Table 1: Socio-economic characteristics of respondents (n= 60)

Variables	Frequency	Percentage	Mean
Age (years)			
31-40	7	22.33	40
41-50	15	50.00	
51-60	5	16.67	
Greater than 60	3	10.00	
Gender			
Male	38	63.33	
Female	22	36.67	
Marital status			
Married	24	40.00	
Single	20	33.33	
Divorced	6	10.00	
Widowed/widower	10	16.67	
Educational level			
No formal	4	6.67	
Primary	18	30.00	
Secondary	20	33.33	
Tertiary	18	30.00	
Experience (years)			
1-5	10	16.67	10
6-10	14	23.33	
11-15	30	50.00	
16-20	2	6.67	
More than 20	1	3.33	
Household size			
1 – 4	20	33.33	6
5 – 8	24	40.00	
9 – 12	14	23.33	
13 and above	6	10.00	
Level of Income			
N100,000–N200,000	14	23.33	N150,000
N201,000–N300,000	28	46.67	
Above N300,000	18	30.00	

Source:*Field survey data 2017.*

Elasticity of Demand for Fish
Elasticity of demand expresses the relationship of consumer's behavour (expenditure or consumption) towards any change in price of a commodity. It shows the degree of responsiveness of demand to change in price. The findings as indicated in Table 2 showed that disposable income (1.126) (2.181), household size (2.163) (8.174) and level of education (3.138) (0.244) were positive significant determinants of demand for fish while price of fish was a negative (-0.126) (-0.137) significant determinant.

The result of the own price elasticity of demand for fish as indicated in Table 2 was negative (-0.126). This was however significant at $P<0.10$(10%).The result indicated that there was an inverse relationship between the commodity (fish) and its price. This finding was in conformity with economic principles. It therefore implied that an increase in price of fish will lead to decrease in consumption of fish all things being equal.
A detailed analysis of cross price elasticity of other animal protein sources determined in Table 2 revealed that beef (0.210), chicken (0.491), and goat meat (0.117) showed positive signs. This implied

that fish was a close substitute to these other animal sources of protein in the study area. This result was not in consonance with that of Joseph (2004) who pointed out the existence of a complementary relationship between fish and other sources of animal protein. Further investigation of income elasticity of demand determined (Table 2) showed that the coefficient of income elasticity of demand was positive (1.126). The positive sign exhibited indicated that fish was a normal good in the study area. This also implied that an increase in income will lead to increase in quantity of fish consumed. This result was in consonance with that of Amao *et al.,* (2006) and Joseph (2004).

Table 2: Cobb-Douglas functional form of elasticity of demand for fish (n=60)

Predictor	Regression coefficient	t – ratio
Constant term (α)	0.852**	0.583
Price of fish (X_1)	-0.126**	-0.137
Price of beef (X_2)	0.210*	3.214
Price of chicken (X_3)	0.491ns	0.023
Price of goat meat (X_4)	0.117 ns	0.521
Disposable income (X_5)	1.126**	2.181
Household size (X_6)	2.163**	8.174
Level of education (X_7)	3.138*	0.244
Fresh fish (D_1)	5.251 ns	1.213
Smoked fish (D_2)	12.081ns	0.432
Fried fish (D_3)	-1.814 ns	-0.713
$R2 = 0.699$	F- ratio = 26.512***	

Source: Field survey data 2017 ** = Significant at P<0.05, * = Significant at P<0.10, ns = not significant.

Constraints to Demand for Fish

Table 3 showed the constraints to fish consumption in the study area. The result showed that insufficient number of fish markets was one of the constraints to fish demand in the study area. This was indicated by twelve (12) (20%) of the respondents in the study area. Tabor (1990) in his study asserted inefficient marketing system as a constraint to fish demand. Further analysis of the constraints to fish demand in the study area reveled that fifteen (15) (25%) of the respondents indicated that low fish supply (especially fresh fish) was a constraint to demand and consumption of fish in the study area. It implied that the supply of different varieties of fish at a given time may not be adequate. This means that consumers may tend to maximize protein utility by consuming different supplements to fish. It also implied that consumers may be forced to buy varieties of fish they have no preference for. Table 3 also revealed that fifty two (87%) of the respondents attributed the constraint to demand in the study area to rapid fish spoilage. This implied that fish required immediate post-harvest handling attention after harvesting. This also implied that post-harvest storage facilities were either inadequate or not available. This means therefore that fish consumers in the study area may not want to buy large quantities of fish for fear spoilage and waste of scarce resources. Fish consumers in the study area may therefore, resort to buying only the quantity they needed at a given time. Further investigation on the constraints to fish demand in the study area showed that fifty eight (58) (96%) of the respondents indicated high prices of fresh and smoked fish as a constraint to fish demand in the study area. This may be due to scarcity or insufficient supply of the commodity in the market. The high cost of fresh and smoked fish may lead to low demand of the commodity in the area. This is in consonance with the law of demand that stipulates that the higher the price the lower the quantity demanded. Table 3 also revealed that forty one (41) (68%) of the respondents identified low level of income as a challenge to fish demand. This implied that consumers in the study area especially the low income earners may sometimes not have the need to demand and consume fish. The implication of this is that consumer may seek for alternative source of animal protein to satisfy the protein requirement of the body. Other major constraints to fish consumption in the study area as was identified in the study area include:lack of storage facilities identified by fifty two (52) (87%), inadequate preservation facilities (20) (33%) transportation problem which was indicated by forty (40) (67%) and price fluctuation. Thirty six (60%) of the consumers in the study area indicated that price fluctuation was a major constraint to fish consumption

Table 3: Distribution of respondents according to constraints to fish demand (n=60)

Constraints	Frequency	Percentages
Insufficient number of fish markets	12	20
Low supply	15	25
Rapid fish spoilage	52	87
High prices	58	96
Low level of consumers' income	41	68
Inadequate preservation facilities	20	33
Lack of storage facilities	52	87
Transportation problem	40	67
Price fluctuation	36	60
	*	*

Source: Field Survey data 2017. *Multiple responses.

CONCLUSION
The study established that fish consumers were relatively young with a mean age of forty (40). The result further established that fish consumers in the study area were low income earners with a mean income of one hundred and fifty thousand naira (₦150, 000) and a mean household size of six (6).About 93.33% of the fish consumers acquired formal education. The result of the own price elasticity of demand for fish was negative (-0.126) but significant at P<0.10(10%).The result indicated that there was an inverse relationship between the commodity (fish) and its price. The cross price elasticity of other animal protein sources determined established that beef (0.210), chicken (0.491), and goat meat (0.117) were close substitute to fish. The result of income elasticity of demand established that the coefficient of income elasticity of demand was positive (1.126) and that fish was a normal good in the study area. The major constraints to fish demand in the study area were rapid fish spoilage, high prices of fish, low level of consumer's income and lack of storage facilities.

RECOMMENDATIONS
Since the study established that fish consumers in the study area wererelatively young and active, it is recommended that fish production should be encouraged. Enlightenment campaign on the need to go into fish production should also be carried out. When this is done, it is hoped that fish will be available and that will curtail the problem of low supply of fish as well reduce the price of fish asidentified in the study area. The study established that fish consumers in the study area were low income earners.The recommendation here is that principles of diversification and off farm income generation should be carried out.Government – private sector participation in the establishment of small and medium scale enterprises as well as the provision of storage facilities are recommended.

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