



## Demand Analysis for Household Consumption of Garri in Imo State

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### ABSTRACT

The study analyzed the demand Analysis for household consumption of garri in Imo State. A multi-stage sampling technique was used to select 180 garri consumers from the state and the primary data were collected with structured questionnaire from the respondents. Descriptive and Inferential statistical tools such as means, standard deviation, percentage, multiple regression and logit regression analysis were used to achieve the specific objectives of the study. The result showed total expenditure on garri and fufu was ₦2, 056.75 of which yellow garri has the highest share of ₦1,092.88 (53.14%), followed by white garri that was ₦588.88 (28.63%), and fufu's share was ₦ 375 (18.23%), It further showed that garri is a normal, price inelastic good that has strong degree of competitiveness and substitutability with fufu and income elastic. Age of the household head, household monthly income and price of garri are important factors influencing preference of yellow garri consumption. It was recommended that Price of garri should be stabilized across the markets to ensure consumers' greater access and affordability, Households should be encourage to aggressively engage in cassava production and processing into preferred types of garri, fufu and other cassava products to stem ensure all year round availability of garri and other products in the country.

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### Introduction

Declining productivity in the agricultural sector, resulting in rising food prices and increasing food import bills have become permanent features in Nigeria despite vast Agricultural resources available in the country. Evidence had shown that food production in Nigeria has not kept pace with the increasing population going by the annual growth rate of the food sub-sector at the rate of 2.0 percent while the annual population growth rate is 3.3 percent (NBS, 2002). This presupposes that a wide gap existed between food supply and the demand for food by the nation's populace which is a glaring indication of food insecurity among the Nigerian populace. Garri (a processed cassava product) has a resounding potential should the reversal of food insecurity at the household level is something to be given that it accounts for about 70% of the total calories intake of more than half of the Nigerian population (Nneoyi *et al.*, 2008; Onyemauwa, 2010; Ezeh *et al.*, 2012). However, large quota of garri produced for domestic markets now finds its way to emigrant Nigerian communities in the United States of America and Europe which also contributed to widen food insecurity at the domestic level (Lemchi, 1999; Dipeolu *et al.*, 2002). The seasonality of agricultural products (cassava and its products inclusive) causes price instability as evidences has shown that periods of surpluses are usually supplanted by periods of scarcity which has resulted in the unpredictable fluctuations in the demand and supply (Ezeh *et al.*, 2012). The persistent rise in the price of food especially carbohydrates has been fingered to cause households' food demand instability in Nigeria and other parts of the world following a limited global food reserve and amplified demand (FAO, 1999).

In addition, there are other factors that influence the purchase decision of consumers such as organoleptic features as colour, taste, aroma, texture, physio-chemical and hydrogen cyanide (HCN) residues. The demand for energy-supplying food commodity such as garri (with close substitutes which includes semovita, fufu, rice) is dependent on the preference for the commodity, the substitutes, the income level of the consumers and the price of the product (Olayemi, 2003). Though garri may seems cheaper than its rival energy foods but increasing market price as a result of inefficient production, processing and marketing could influence the demand structure at the household level leading to increase in the demand of the other substitutes. Estimating food demand functions at household level is a necessary and sufficient condition for Income and price elasticities are needed to formulate policies, set priorities, and engender investments in the food subsector of the economy (Ezedinma, *et al.*, 2006). Hence, an understanding of household consumption patterns of garri, especially the effects of income and price, preference and available substitute commodities on garri demand and the impact of demographic factors on garri household consumption could provide important policy insights for Nigeria. The significance of this study will to a large extent contribute to good farm policy formulation and market strategies that will enhance the growth of the food sector and translate to improved demand of foods at the household level, Therefore, the study investigates demand Analysis for household consumption of garri in Imo State with specific objectives to estimate the level of consumption of garri and its close substitute in the area; determine factors that influence preference for a yellow garri brand in the study area,

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determine the level of household demand for garri, hence estimate price, income, own and cross price elasticities of demand for garri in Imo State.

### Research Methodology

Imo State lies in the south East geopolitical zone of Nigeria of Nigeria with Owerri as its capital and largest city. The State lies within latitudes 4°45'N and 7°15'N, and longitude 6°50'E and 7°25'E with an area of around 5,100 sq. km. It is bordered by Abia State on the East, by the River Niger and Delta State on the west, by Anambra State to the north and Rivers State to the south. Imo State is composed of three Agricultural zones namely; Owerri, Okigwe and Orlu and it is subdivided into 27 Local Government Areas (LGAs). The State has a total population of 3,934,899 persons with a population density that varies from 230 persons per square kilometer in the densely populated areas (NPC, 2006). The main staple food crops consumed in the State include rice, cassava, cocoyam, yam, maize, melon, okra and vegetables (green, fluted pumpkin, water-leaf and bitter leaf) and animal protein sources in the diet of most households are beef, fish, mutton, chicken and pork. The state is predominately occupied by public servants, traders, private practitioners and artisans with presence of staple foods markets spread across the urban and rural areas of the state.

This study adopted multi-Stage sampling technique to select 180 respondents for this study, Stage one involved the random selection of one state in each agricultural zone of the state (Owerri Municipal in Owerri, Nwangele in Orlu and Okigwe in Okigwe Agric. Zone respectively). The second stage involved selection of in 9 communities each in each of the 3 L.G.As selected this followed by purposive selection of a 4-day market from each community to have 27 markets for the study; the last stage involved purposive selection of a major retailer based on number of patronage from each of the selected 27 markets and consumers will be routed through each of the 27 garri retailer with proportionate to size sampling to select 180 garri consumers that purchase garri from the selected retailers.

Data used for this study were sourced from primary and secondary data. Primary data were collected through structured questionnaire and interview schedule consisting of information on the socio-economic characteristics of the household head which include their age, sex, educational status, household size, monthly household income, quantity of garri consumed per month, monthly budget share on garri, type of garri consumed, colour, texture, taste, unit price of garri and unit price of a substitute goods (fufu) consumed. However, the secondary data such as empirical and theoretical literature were obtained from the textbooks, journals, internets and publications. The study employed both descriptive, inferential statistical tools (Logit and OLS regression) to achieve the objectives of the study.

### Analytical Techniques

Demand function of Household Garri Consumption level As indicated by Ezech *et. al.* (2012); the implicit model of the ordinary least square (OLS) multiple regression is stated thus;

$$Q = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 \quad (1)$$

Where Q = Monthly Budget share of garri (₦)  
 $X_1$  = Years spent in school (years);  $X_2$  = Age of the consumer (years);  $X_3$  = Household size (no of persons);  $X_4$  = price of garri (₦);  $X_5$  = Household income per month (₦) and  $X_6$  = price of close substitute (fufu).

The demand function was regressed using four different functional forms namely linear, exponential, double log and semi-log and the one with the best fit in terms of a priori expectation, statistical and econometric criteria was used as the lead equation.

### Estimates of Price, Cross and Income elasticities

From the estimated model in eq 1 above, the elasticities indicators were achieved as follows:

- i. Garri own price slope =  $\beta_4 \times \left(\frac{P}{Q}\right)$
- ii. Cross elasticity of garri with fufu =  $\beta_6 \times \left(\frac{P_y}{Q}\right)$
- iii. Household income =  $\beta_5 \times \left(\frac{I}{Q}\right)$

Where Q = quantity of household demand of garri,  
 P = unit price of garri,  $P_y$  = unit price of fufu and  
 I = household income.

Preference function of type of Garri consumed by the Household Logit model was used to isolate the factors determining the preference for the type of garri consumed by the household. The logit model of the regression analysis is explicitly stated as follows;

$$Y = \frac{p_i}{1-p_i} = e^{x_i \beta} \quad (2)$$

by log transformation becomes eq3

$$Y = \log\left(\frac{p_i}{1-p_i}\right) = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 \dots b_6 x_6 + u \quad (3)$$

Y = Preference type of garri consumed (dummy variable, yellow garri = 1 and zero to other type)

P = probability of preference of yellow garri; 1-P = probability of preference of other type of garri;  $X_1$  = price of garri (₦);  $X_2$  = Colour of garri (Dummy: yellow = 1; white = 0)  $X_3$  = Taste (Dummy: sweet taste = 1, sour = 0);  $X_4$  = Texture (Dummy: fine = 1; Gritty = 0);  $X_5$  = Age of the household head (years);  $X_6$  = Number of years spent in school,  $b_0$  = constant;  $b_1 - b_6$  = logistic regression coefficients

## Results and Discussion

### Garri and Fufu consumption in the study Area

The estimates of the consumption and expenditure pattern on garri and fufu were reported in Table 1, it showed that the mean estimates of yellow, white garri and fufu (close substitute of garri) consumed by households per week were 12.49kg, 6.73kg and 15 wraps respectively, the range of yellow, white garri and fufu (close substitute) consumption were 4 – 23kg, 3 – 13kg and 4 – 25 wraps per week respectively. Based on the expenditure on garri and fufu consumption per week; yellow garri has the highest share of ₦ 1,092.88 (53.14%), followed by white garri with about ₦ 588.88 (28.63%), and fufu's share was ₦375 (18.23%) and the percentage of income spent on the yellow, white and fufu were 5.53%, 2.98% and 1.90% of total weekly household income (₦19,759.04). This indicated that the household spent higher income on yellow garri than white garri and lowest income was spent on fufu (close substitute of garri).

Total expenditure on garri+fufu = ₦ 2,056.75

Weekly income = ₦19,759.04

% of income on garri + fufu expenditure= 10.41%

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\* unit of fufu is in wraps.

**Table 1. Estimate of Household Garri and close substitute (fufu) consumption per week.**

Parameters	yellow garri	white garri	fufu*
Mean Quantity (Kg)	12.49	6.73	15.00
Unit price (₦)	87.50	87.50	25.00
Minimum Quantity (kg)	5.00	3.00	4.00
Maximum Quantity (kg)	23.00	13.00	25.00
Amount spent on garri (₦)	1,092.88	588.88	375.00
% of household income	5.53	2.98	1.90
Share in household expenditure (%)	53.14	28.63	18.23

Source: Field Survey Data, 2015

### Determinants of Garri Demand by the household in the area

The regression result of determinants of garri household consumption was presented in Table 2, socio – economic factors such as age, educational level, household size, price of garri, household income and price of fufu were subjected to multiple regression analysis; The linear, semi log and Cobb-Douglas functional forms of the production function were tried using Ordinary Least Square Technique, the Double log functional form was selected as the lead equation based on the significance of the coefficients and follow a priori and economical rationale. The result shows that the estimated coefficient of multiple determinations (R<sup>2</sup>) indicates that the postulated regressors (i.e included variables in the model) explained 47.1% in the variation of the regressand (i.e quantity of garri demanded). The F- value of 13.140 was statistically significant at 1% which implies that the model is best fit and hence explaining the variation in quantity of garri demand. Four (education, household size, price and income) out of six explanatory variables used in the model were statistically significant and hence explained the variation in quantity of garri consumed by the households in the area.

The Coefficient of education was positive and significant at 1% level of significant which implies that as the educational level of a consumer increases, its quantity demand of garri increases, this is indicative of the fact that the educated consumer would increase his consumption of quality garri since he is aware of the importance of garri as a good

energy source which is always availability and affordable in the market, this is consistent with Ezeh *et. al.*, (2015) that consumers with high level of education are expected to evaluate food product by their prices and specific nutritive quality rather than by popularity before allocating a given share of the monthly budget to the commodity.

The Coefficient of household incomes had positive sign and significant at 1% level of significant, this means that increase in household income tends to increase the quantity of garri demanded. The result also revealed that as a result of income elastic nature of garri produce in that for a unit increase in disposable income of the household head results in 184.3% increase in quantity demanded of garri. Household size had positive signs and significant at 5%. This means that a large household size tend to consume more garri than low household size. This is because there is more mouth to feed in a large household hence more expenditure on garri consumption. The coefficient of price of garri had negative sign and significant at 5%. This implies that the higher the price of garri, the lower the quantity demanded. This is follows that garri is a price elastic commodity in that a unit change in price of garri would reduce the quantity demanded by 41.2%.

**Table 3. Estimates of Own Price, Cross and Income Elasticities of Garri.**

Elasticities	Own	Cross	Income
Garri	-0.412	0.300	1.843

Source: Field Survey Data, 2015

The Double -log functional model selected as the lead equation possess unique a characteristic in that its estimated parameters simply represents the corresponding elasticities (Koutsoyiannis, 1979 and Ohajianya, 2005).

As shown in Table 3, the own price elasticity of garri was -0.412, this indicates that garri is a normal and price inelastic good since its coefficient is negative and lesser than unity, it means that a 100% increase in the price of garri results a less proportionate reduction in the quantity demanded by mere 41.2%. This is consistence with Ezeh, *et. al.*, (2012) and Olga, (2013) who established similar findings, The value of cross price elasticities of demand for garri with fufu (close

**Table 2. Regression result of the demand function of Garri in the study area.**

Variables	Linear	Exponential	Semi-log	Double-log
Intercept		5.524	5.098	7.692
	(2.774)	(3.672)	(0.140)	(1.416)
Education	9.901	1.080	5.901	4.960
	(2.488)***	(1.342)	(1.655)*	(9.307)**
Age	0.097	6.987	9.966	0.076
	(0.048)	(4.088)***	(4.529)***	(0.232)
Household size	0.007	0.012	8.007	1.406
	(0.071)	(0.003)	(1.999)**	(2.349)**
Price of garri	-2.982	-0.098	2.982	-0.412
	(-5.482)***	(-0.105)	(4.441)***	(-4.102)**
Household income	0.847	0.184	0.847	1.843
	(1.443)	(0.658)	(1.459)	(1.995)**
Price of fufu	0.002	0.811	0.016	0.300
	(0.264)	(0.749)	(0.002)	(0.289)
R Square	0.743	0.526	0.555	0.471
Adjusted R Square	0.723	0.489	0.520	0.108
Standard Error	0.754	1.108	0.638	0.439
F-value	13.616	13.514	13.075	13.140

Source: Field Survey Data, 2015\*\*\* = significant @ 1%,

\*\* = significant at 5, \* = significant at 10%

t-values are figures in parentheses.

substitute) was 0.30, this positive magnitude implies that a one percent increase in price of garri, will increase the consumption of fufu by 30%. This indicated a strong degree of competitiveness and substitutability of fufu with garri. The income elasticity of demand for garri is the income elasticity of demand for garri was 1.843 implied that garri is a luxury food item (income elasticity greater than unity) i.e income – elastic, this result is consistent Engel’s law in terms of elasticity agrees that food items is income elasticity as reported by Ezeh *et. al.* (2012) and Olga (2013)

#### Factors influencing the preference for Yellow Garri in the study area

The logit regression results of factors influencing the preference of garri household consumer for the demand of yellow garri brand was presented in Table 3, the values of The log-likelihood of -8.755, the Pseudo R-square of 0.847 and the LR (Chi2) of 96.96 which is significant at 1% level as indicated by Prob>chi2 of 0.000 implies that the overall model

is fitted and the explanatory variables used in the model were collectively able to explain the factors indicated actually influenced demand for yellow garri in the study area. The variables such as age and monthly income were statistically significant at 1% level of significant and price of garri was significant at 10% level of significant. The coefficient of price

of garri is negative which indicated that as the price of yellow garri increase, preference for yellow garri reduces, this followed the theory of demand that the higher the price, the lower the quantity demanded which is a function of preference of garri demanded. The coefficient of age was negative which indicates that as the age increases, the preference for demand for yellow garri reduces, this implies that aged individuals consumed less than younger ones, this is consistent with Ezeh *et.al.*, (2015) who opined that, older consumers tend to evaluate food products by price and specific qualities than by popularity and band-wagon movements. However, the coefficient of household income is positive which indicated that as the income of the consumers rises, their willingness and preference for yellow garri tends to spend higher. This is also in line with Ezeh *et. al.*, (2012) that found out that increase in the income of moderate income earners, tends to increase the preference for garri. It is also showed that taste, texture and education do not significant influence the preference of yellow garri in the study area.

**Table 4. Logistic regression of the factors influencing the preference for yellow garri brand.**

Variables	Coefficients	Standard error	z	P> z
Price of garri	-0.188	0.103	-1.823*	0.068
Taste	-5.371	3.454	-1.555	0.329
Texture	1.465	1.494	0.980	0.327
Age	-1.188	0.154	-7.693***	0.000
Education	-0.489	0.375	-1.303	0.193
Monthly income	0.549	0.139	3.950***	0.000
Constant	33.147	21.590	1.535	0.125

\*\*\* = significant at 1%, \* = significant at 10%

LR chi<sup>2</sup>(6) = 96.96; Prob > chi<sup>2</sup> = 0.000; Pseudo R<sup>2</sup> = 0.847; Log likelihood = -8.755

Source: Field Survey Data, 2015.

#### Conclusion and Recommendation

Garri is a normal, price inelastic good that has strong degree of competitiveness and substitutability with fufu and income elastic, therefore could be replaced by fufu or any other energy –supplying food item if the price goes far beyond the reach of household income. Age of the household head, household monthly income and price of garri are important factors influencing preference of yellow garri consumption. It was recommended that Price of garri should be stabilized across the markets to ensure consumers’ greater access and affordability. Households should be encourage to aggressively engage in cassava production and processing into preferred types of garri, fufu and other cassava products to stem ensure all year round availability of garri and other products in the country.

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