Journal of Agriculture and Natural Resources (2021) 4(2): 175-185
ISSN: 2661-6270 (Print), ISSN: 2661-6289 (Online)
DOI: https://doi.org/10.3126/janr.v4i2.33739

Research Article

Determinants of food demand among urban households in Minna Metropolis, Niger State, Nigeria

Oyeyode Tohib Obalola[1*], Likita Tanko[2], Kazeem Oriyomi Aboaba[3], Bello Bunza Abubakar[1], Emmanuel Egbodo Boheje ODUM[4], Babatola Olasunkanmi Agboola[5], Kobe Hussein Ibrahim[5], Rabiu Omeiza Audu[5] and Samuel Temitope Danilola[5]

[1]Department of Agricultural Economics, Usmanu Danfodiyo University, P.M.B. 2346, Sokoto, Nigeria
[2]Department of Agricultural Economics and Extension Technology, Federal University of Technology, P.M.B. 65, Minna, Niger State, Nigeria
[3]Department of Agricultural Economics and Farm Management, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria
[4]Department of Agricultural Economics and Extension Services, University of Benin, P.M.B. 1154, Ugbowo, Benin City, Edo State, Nigeria
[5]Department of Agricultural Economics and Farm Management, University of Ilorin, P.M.B. 1515, Ilorin, Kwara State, Nigeria
[*]Correspondence: oyeyodeobalola@yahoo.com
[*]ORCID: https://orcid.org/0000-0002-2015-431X
Received: June 01, 2020; Revised: October 30, 2020;
Accepted: December 15, 2020; Available online: January 01, 2021

ABSTRACT
Agricultural products including rice, yam and cowpea play significant roles in the food consumption of urban dwellers. However, increase in crop production cost has continued to threaten urban food price in Nigeria. This study analyzed the determinants of demand for food commodities among urban households in Minna metropolis. Data were collected from 110 household heads of urban residences, which were selected through a three-stage random sampling technique. Data collected for the study were analyzed using multiple regression technique. The results showed that rice, yam and cowpea were price in-elastic. The cross-price elasticities for rice, yam and cowpea were -0.132, 0.028 and 0.005 respectively. The computed own price, cross price and income elasticity of demand for rice were –0.308, -0.132 and 0.018 respectively. For yam, the computed values were -1.262, 0.028 and 0.289 respectively. While for cowpea, these values were -0.530, 0.005 and 0.002 respectively. For the income elasticity, rice and cowpea were proven to be normal goods and yam as a luxury good. The social protection strategies in form of food aids policy should be put into action to minimize the inflationary pressure on food items in the urban areas.
Keywords: Analysis, Food, demand, Urban, Households

Correct citation: Obalola, O.T., Tanko, L., Aboaba, K. O., Abubakar, B. B., ODUM, E. E.B., Agboola, B. O., Ibrahim, K.H., Audu, R. O. and Danilola, S. T. (2021). Determinants of food demand among urban households in Minna Metropolis, Niger State, Nigeria. *Journal of Agriculture and Natural Resources*, *4*(2), 175-185.
DOI: https://doi.org/10.3126/janr.v4i2.33739

Journal of Agriculture and Natural Resources (2021) 4(2): 175-185
ISSN: 2661-6270 (Print), ISSN: 2661-6289 (Online)
DOI: https://doi.org/10.3126/janr.v4i2.33739

INTRODUCTION

Agriculture is the main stay of the Nigerian economy. It involves small scale farmers scattered over wide expanse of land area, with small holdings ranging from 0.5 to 3.0 hectares per household characterized by rudimentary farming systems, low capitalization and low crop output per hectare (Kolawole & Ojo, 2007). It provides the primary means of employment for Nigerians and accounts for more than one third of her total gross domestic product (GDP) and labour force (Babatunde *et al.*, 2007).

It is estimated that 795 million people globally have no access to food in the right quality and quantity (Elver, 2015; WFP, 2015) and one in every three people suffer from severe malnutrition (FAO, 2014; WFP, 2015). In Nigeria, over 40% of the estimated population is under nourished (Ashagidigbi *et al.*, 2012). As a result of various forms of deprivation of basic amenities of life, the productivity of most households is reduced and their ability to utilize food to their maximum benefit is hampered. The demand for food is mostly determined by three factors: increase in the number of people in term of population growth, infrastructural advancement through urbanization, and of course lifestyle as a result of changes in consumption patterns (Pieters *et al.*, 2013). Considering the supply-side factors, the share of most of these staples production among various grain legumes in Nigeria has increased, thus, making Nigeria one of the leading producing countries in the world (Kormawa *et al.*, 2002). Though relevant for food production and policy planning purposes, there are very few data on the demand factors for these staples.

The traditional theory of demand deals with consumer's demand which is of paramount importance to this study. Nigeria has been experiencing instability of supply and demand for food staples of all the human requirements; food is obviously the most basic need. A number of studies have examined food demand of staples mostly at the regional or zonal and national levels (Tsegai & Kormawa, 2002; Okoruwa & Adebayo, 2006; Ashagidigbi *et al.*, 2012). There has however been a dearth of food demand analysis at the state and household levels in Nigeria. This study therefore leveraged on the shortfall in filling the gaps in literature. The study is of great importance as it examined the urban household demand analysis for rice, yam and cowpea in Minna metropolis, Niger State. It identified those factors that explain the demand differential between the different kinds of food. Outcome could serve as a pointer ingredient of policy and to raise the demand for local staples thereby raising the nation's consumption and also find ways of improving consumers and producer's welfare.

MATERIALS AND METHODS

Study area

Niger State, Nigeria lies on latitude $80^0$20' to $11^0$30' N and longitude $03^0$30' to $07^0$40' E. Kaduna State and the Federal capital territory borders her to the Northeast and Southeast respectively, Zamfara State to the North, Kebbi State to the West, Kogi State to the South and Kwara State to the Southwest (Niger State Ministry of Information, 2005).According to the 2006 census, the state had a population of 3,950,249 persons which is projected to be increasing at an annual population growth rate of 2.38%. Given the population growth rate, the projected population of the state as at 2012 is 4,514,344 (NPC, 2006).

Journal of Agriculture and Natural Resources (2021) 4(2): 175-185
ISSN: 2661-6270 (Print), ISSN: 2661-6289 (Online)
DOI: https://doi.org/10.3126/janr.v4i2.33739

Sampling design

A three-stage random sampling was used in the selection of respondents. The first stage was the purposive selection of Minna metropolis because of the growing population of the state capital compare to other parts of the state. The second stage involved random selection of five (5) wards namely; Bosso low cost, Maikunkele, Saukakahuta, Tunga low cost and Chanchaga from the metropolis. Taking into account the survey frame from each selected ward, there was random selection of twenty two (22) households from each ward giving a total of one hundred and ten (110) households head for the study. Data were elicited through a structured questionnaire and personal interview schedule.

Analytical methods

Multiple regression technique was used to analyze the data of the study. Some of the collected data were used to calculate the average weight of the commodities as well as derive the prices per kilogram of these staple foods as:

Unit price (Naira/kg) $\frac{Value\,of\,the\,staple\,food\,(Naira)}{Weight\,of\,the\,staple\,food\,(kg)}$ ..... (1)

Specification of the model

To estimate household demand elasticity of the three food products, a demand function was fitted for the data following the work of Kassali *et al.* (2010). The implicit form of the demand model is specified as;

$$Q_{it} = f(P_{ic}, P_{is}, Y_{it}, H_{it}, E_{it}, G_i, A_{iT}, F_i, e) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where:

Q_{ij} = Quantity of j^{th} commodity bought by ith respondent (kg)
P_{ic} = Average monthly price of i^{th} commodity (₦/kg)
P_{is} = Average monthly price of j^{th} substitute/compliment (₦/kg)
Y_{it} = Monthly income of i^{th} household in t^{th} period (₦)
H_{it} =Household size of i^{th}respondent (No.)
E_{it} = Level of education of i^{th} respondent
G_i = Gender of i^{th} respondent (dummy)
A_{it} = Age of i^{th} household head in t^{th} period (years)
F_i = Frequency of purchase of commodity by i^{th} household (No of times per month)
e = Error term

The data was fitted to different functional forms and the lead equation was chosen based on the normal economic, econometric and statistical criteria: relative magnitude of the coefficient of multiple determinations (R^2 value); Conformity of signs of estimated regression coefficients to a prior expectation; Magnitudes of estimated regression coefficients; Statistical significance of estimated regression coefficients as well as the F-ratio.

The various functional forms of the model are specified explicitly as:

Linear

$$Q_{it} = \beta_0 + \beta_1 P_{ic} + \beta_2 P_{is} + \beta_3 Y_{it} + \beta_4 H_{it} + \beta_5 E_{it} + \beta_6 G_i + \beta_7 A_{it} + \beta_8 F_i + e \ldots\ldots (3)$$

Cobb-Douglas

$$InQ_{it} = +\beta_1 InP_{ic} + \beta_2 InP_{is} + \beta_3 InY_{it} + \beta_4 InH_{it} + \beta_5 InE_{it} + \beta_6 InG_i + \beta_7 InA_{it} + \beta_8 InF_i + e$$

…… (4)

Journal of Agriculture and Natural Resources (2021) 4(2): 175-185
ISSN: 2661-6270 (Print), ISSN: 2661-6289 (Online)
DOI: https://doi.org/10.3126/janr.v4i2.33739

Exponential

$$InQ_{it} = \beta_0 + \beta_1 P_{ic} + \beta_2 P_{is} + \beta_3 Y_{it} + \beta_4 H_{it} + \beta_5 E_{it} + \beta_6 G_i + \beta_7 A_{it} + \beta_8 F_i + e \ldots (5)$$

Semi-logarithmic

$$Q_{it} = In\beta_0 + \beta_1 InP_{ic} + \beta_2 InP_{is} + \beta_3 InY_{it} + \beta_4 InH_{it} + \beta_5 InE_{it} + \beta_6 InG_i + \beta_7 InA_{it} + \beta_8 InF_i + e$$

…… (6)

Where variables are as previously defined $\beta_0, \beta_1 - \beta_8$ are parameters to be estimated

Data for the three commodities, rice, yam and cowpea were each in turn fitted to the specified models. Rice and yam were considered to be substitutes for each other in this model while soybean was considered as a substitute for cowpea.

Analysis of Elasticity

Price elasticity of demand (e_p)

If we let EpD represent price elasticity of demand, then

$$EpD = \frac{Relativechangeinquantitydemand}{Relativechangeinpriceofcommodity} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

If $e_p = 1$ (unitary demand)
If ep> 1 (elastic demand)
If $e_p = < 1$ (inelastic demand)
If e_p is negative, the good is a normal good, if e_p is positive, it is an inferior good.

Income elasticity of demand (e_y)

$$E_Y = \frac{\%\,\Delta inquantitydemanded}{\%\,\Delta inincome} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)$$

Where E_Y = elasticity of income.
% Δ = percentage change

If $e_y = 0$ (inferior)
If e_y> 1 (luxury)
If e_y< 1 (necessity)

If as income increases, demand decreases = inferior food i.e. if e_y value is negative. If e_y is positive, the good is a normal good.

Cross price elasticity of demand (e_{xy})

$$EXY = \frac{\%\,\Delta inquantitydemandedofcommodityx}{\%\,\Delta inpriceofcommodityy} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$$

The elasticities with respect to the explanatory variables were computed using the following formulas

Linear function:

$$e = \frac{dQ}{dX_i} \cdot \frac{\bar{X}}{Q} = \frac{MP}{AP} \qquad (10)$$

where

e = elasticity; $\frac{dQ}{dX_i}$= the first partial derivative with respect to the i^{th}explanatory variable;

$\bar{X}$ = geometric mean of i^{th}explanatory variable; Q = geometric mean of y

Journal of Agriculture and Natural Resources (2021) 4(2): 175-185
ISSN: 2661-6270 (Print), ISSN: 2661-6289 (Online)
DOI: https://doi.org/10.3126/janr.v4i2.33739

Exponential function:

$e = b_i X_i$ for the ith explanatory variable …… .(11)

Where b_i = estimated regression coefficient with respect to the ith explanatory variable.

Other variables are as previously defined.

Semi-logarithmic:

$$e = \frac{b_i}{Q} \qquad (12)$$

All the variables are as previously defined.

Double logarithmic (Cobb – Douglas)

For the double logarithmic functional form, the estimated regression coefficients are the direct elasticities with respect to each of the explanatory variables.

***A priori* expectation**

From basic economic knowledge, the following signs are expected from the demand study

Table 1: variables and their respective *a priori* signs

Variables	*A priori*	Remark
Price of the commodity	Negative	As price increases, the quantity demanded decreases
Price of substitute	Positive	as price(s) of substitute good(s) increases, the quantity demanded for the other commodity increases
Income	Positive	As income increases, the quantity demanded of the commodity should increase. Normal goods
	Negative	As income increases, the quantity demanded of the commodity decreases. Inferior goods
Household size	Positive	As household size increases, the demand for the commodity should increase
Level of education	Positive	Satisfactory educational level tends to influence quantity demanded positively
Gender	Positive/negative	This tends to flow with the preference as it can either influence quantity demanded positively or negatively
Age	Negative	As the age increases, the quantity of the commodity purchased tends to decrease as older people are likely to resort to traditional staple foods as substitute.
Frequency of purchase	Positive	The frequency of purchase is expected to influence demand positively

Source: Author's design

RESULTS AND DISCUSSION

Estimation of the demand functions for the food Items.

Demand functions were estimated for food items consumed by the respondents. In each case, four different functional forms were fitted to the data and the lead equation was chosen based on the normal economic, econometric and statistical criteria. Results in Table 2 indicated that

Journal of Agriculture and Natural Resources (2021) 4(2): 175-185
ISSN: 2661-6270 (Print), ISSN: 2661-6289 (Online)
DOI: https://doi.org/10.3126/janr.v4i2.33739

the exponential functional form was the "lead equation" (equation of best fit). In this model, out of the eight variables modeled ($X_1 - X_8$), only three, namely, price of substitute, income and house hold size with estimated regression coefficient of -0.265, 0.595 and 0.313 respectively were found to be significantly affecting quantity demanded of rice at 5% and 1% levels respectively. The price of substitute had a negative coefficient. This implies that as the price of substitute decreases, the demand for rice increases. The coefficient with respect to the income of the consumer was found to be positive. The implication is that as the income of the consumer increases the demand for rice increases, suggesting that rice is a normal good.

Table 2: Factors affecting the demand for rice in the study area

Variables	Linear	Semi-log	Exponential	Cobb- Douglas
Constant	1.657 (1.764)	-14.731* (-2.384)	-3.514* (-2.416)	0.629* (2.473)
Price of rice	-0.001 (-0.471)	0.187 (-0.154)	0.22 (0.075)	0.000 (0.340)
Price of substitute	-0.002 (-1.502)	-1.397** (-2.812)	-0.265* (-2.262)	0.000 (-1.303)
Income	5.713E-5**(9.633)	2.423** (7.450)	0.595** (7.771)	1.477E-5** (9.207)
Household size	0.123 ** (2.660)	1.443 ** (2.807)	0.313 ** (2.588)	0.014 (1.149)
Level of education	-0.108 (-1.629)	-0.223 (-0.585)	-0.091 (-1.017)	-0.045* (-2.517)
Gender	-0.195 (-0.857)	0.145 (0.637)	-0.789 (-0.112)	0.006 (0.093)
Age	-0.005 (-0.349)	-0.943 (-1.034)	-0.215 (-1.001)	0.003 (0.682)
Freq. of consumption	0.179 (1.706)	0.194 (0.609)	0.040 (0.529)	0.043 (1.497)
R^2	0.661	0.709	0.713	0.641
R^2 adjusted	0.634	0.671	0.675	0.613
F-ratio	24.635**	18.444**	28.819**	22.548**

Source: Field Survey, 2018.
*Note: * and** implies statistically significant at 5%, and 1% level respectively. Figures in the parentheses are the respective t- ratios.*

This result is informative and consistent with expectation (Omonon *et al.* 2009: Kassali *et al.*, 2010). The coefficient of household size had positive relationship with demand for rice implying that as the household size increases the demand for rice increases. This is also in line with theoretical underpinnings as it conforms to Reardon & Escoba, 2001; Omonona *et al.*, 2009; Abdullahi *et al.*, 2011; Musa *et al.*, 2011; Sampson, 2013; Danquah & Egyir, 2014; Danso *et al.*, 2014 but however, contrary to the work of Almas *et al.* (2019) with household size negatively related to demand based on the household consumption expenditure.

Table 3: Factors affecting the demand for yam in the study area

Variables	Linear	Semi-log	Exponential	Cobb- Douglas
Constant	-4.73 (-116)	3.200** (9.700)	29.944 (1.364)	5.196** (2.870)
Price of Yam	0.003 (0.385)	-0.008** (-9.534)	-15.400** (-9.142)	-1.262** (-9.083)
Price of substitute	0.028* (2.449)	0.001 (0.817)	6.662 (1.930)	0.158 (0.556)
Income	0.000* (5.629)	5.225E-6** (4.022)	2.681 (0.002)	0.289** (4.157)
Household size	-0.176 (-0.841)	-0.007 (0.521)	0.505 (0.737)	0.010 (0.078)
Level of education	0.149 (0.493)	-0.012 (-0.555)	-0.232 (-0.199)	-0.020 (-0.203)
Gender	1.786 (1.749)	-0.020 (-0.340)	-1.320 (-1.132)	0.355 (0.967)
Age	-0.069 (-1.082)	-0.004 (-1.120)	-2.466 (-0.953)	-0.160 (-0.750)
Freq. of consumption	1.109* (2.551)	0.034 (1.298)	0.296 (0.322)	0.046 (0.602)
R^2	0.426	0.729	0.744	0.751
R^2 adjusted	0.38	0.705	0.712	0.720
F-ratio	9.352**	9.352**	23.214**	24.153**

*Source: Field Survey, 2018. Note: * and ** implies statistically significant at 5% and 1% levels respectively. Figures in parentheses are the respective t-ratios.*

Journal of Agriculture and Natural Resources (2021) 4(2): 175-185
ISSN: 2661-6270 (Print), ISSN: 2661-6289 (Online)
DOI: https://doi.org/10.3126/janr.v4i2.33739

The R^2 for the exponential form was 0.713 which means that 71.3% of the variation in the demand for rice consumption was explained by the independent variables included in the exponential regression model. The significance of the fitted model (F= 28.819) was found to be significant at 1% implying that at least one of the explanatory variables coefficients is significantly different from zero, thus a good fit.

Results presented in Table 3 showed that the Cobb-Douglas form was the lead equation. Only two out of the eight variable modeled were found to be significant i.e. price of yam, and income with estimated regression coefficient of -1.262 and 0.289 respectively were found to be significantly affecting quantity demanded of yam at 1% significant level. The price of yam had a negative coefficient, thus conforming to the *priori* expectation. By implication, as price of yam increases, the demand for yam decreases, thus supporting the work of Kassali *et al.* (2010). The coefficient with respect to the income of the respondents was found to be positive implying that as the income of the consumer increases the demand for yam increased, meaning yam is a normal good. The coefficient of multiple determination (R^2=0.751) shows that about 75% of the variation in household demand for yam was explained by the selected variables. The overall significance of the regression equation (F= 24.153) was found to be significant at 1 percent; this means that at least one of the explanatory variables coefficients is significantly different from zero.

Table: 4 Factors affecting the demand for Cowpea in the study area

Variables	Linear	Semi-log	Exponential	Cobb- Douglas
Constant	1.959 (0.918)	-60.339 (-0.958)	-21.305 (-1.001)	0.777 (0.961)
Price of Cowpea	-0.006 (-0.838)	2.532 (0.579)	0.878 (0.594)	-0.003 (-1.006)
Price of substitute	0.004* (2.228)	8.086 (0.797)	2.811 (0.820)	0.002* (2.533)
Income	1.799E-5**(3.746)	-0.214 (-0.200)	-0.058 (-0.161)	6.040E-6**(3.318)
Household size	0.024 (0.476)	-0.998 (-0.823)	-0.414 (-1.009)	-0.007 (-0.386)
Level of education	0.001 (0.011)	-1.037** (-2.706)	-0.299*(-2.307)	0.010 (0.359)
Gender	0.471 (1.868)	0.326 (1.032)	-1.721 (-0.856)	0.209* (2.165)
Age	-0.028 (-1.957)	3.716 (1.866)	1.346 (1.999)	0.011 (1.802)
Frequency of consumption	0.159 (1.487)	2.678 (1.325)	-0.634 (-1.112)	0.072 (1.770)
R^2	0.899	0.881	0.86	0.269
R^2 adjusted	0.865	0.703	0.653	0.211
F-ratio	5.921**	4.945**	4.132**	4.643**

Source: Field Survey, 2018.
*Note *and **implies statistically significant at 5% and 1% levels respectively. Figure in parentheses are the respective t-ratios.*

Table 4 showed that the linear functional form was the lead equation (equation of best fit). In this model, two variables, namely price of substitute and income with estimate regression coefficients of 0.004 and 1.799E-5 were found to significantly affect quantity demanded of cowpea at 5% and 1% levels respectively. The coefficient of price for substitute was positively related to the demand for cowpea. Thus a percentage increase in price of cowpea was expected to decrease its quantity demanded by 0.4%. The coefficient with respect to income of the consumer was found to be positive suggesting that cowpea is a normal good. This corroborates the work of Kassali *et al.* (2010); Diako *et al.* (2010), which indicates that income, was an important determinant. The R^2 for the linear functional form was 0.899 meaning 89.9% of the variation in demand for cowpea consumption was explained by the independent variables included in the linear regression model. The F –ratio was 5.924, which

Journal of Agriculture and Natural Resources (2021) 4(2): 175-185
ISSN: 2661-6270 (Print), ISSN: 2661-6289 (Online)
DOI: https://doi.org/10.3126/janr.v4i2.33739

is statistically significant at the 1% level. This implies that the explanatory variables adequately explained the dependent variable.

Estimated Own Price, Cross Price and Income Elasticity of Demand

The own price, cross price and income elasticity with respect to the commodities (Rice, yam and cowpea) were computed and the results are presented below.

Table 5: Own price, cross price and Income elasticity for commodities

Commodities	Own Price(ep)	Cross Price(ec)	Income elasticity(ey)
Rice	- 0.308	-0.132	0.018
Yam	- 1.262	0.028	0.289
Cowpea	- 0.530	0.005	0.002

Source: Field Survey, 2018.

Results in Table 5 indicated that the computed own price, cross price and income elasticity of demand for rice are –0.308, -0.132 and 0.018 respectively. For yam, the computed values are -1.262, 0.028 and 0.289 respectively. While for cowpea, the values are -0.530, 0.005 and 0.002 respectively. These figures were computed using appropriate formulae. The own price elasticity for all the food under consideration is negative and thus consistent with demand theory as the concavity constraint from utility theory requires that own-price Hicksian or Marshallian demand elasticities be negative (Omonon *et al.*, 2009; Addo, 2016). This implies that the demand for rice and cowpea (-0.308) and (-0.530) respectively are inelastic meaning that a change in price of rice and cowpea will lead to a less than proportionate change in quantity demanded for the products. This is against the findings of Kassali *et al.* (2010) but conforms to that of Korir *et al.* (2018). However, the demand for yam (-1.262) is demand elastic, meaning a slight increase in price would lead to greater fall in demand that is a slight decrease in price would mean a more than proportional increase in demand for yam which would translate into greater revenue for the industry. This corroborate with the finding of Kassali *et al.* (2010).

The cross price elasticities for rice, yam and cowpea are -0.132, 0.028 and 0.005 respectively. This gives a clearer picture of cross-price substitution between commodities, since they are a measure of substitution effects net of income. Positive cross-price elasticities for yam and cowpea indicate that these food groups are substitutes, as would be expected. This is consistent with the work of Korir *et al.* (2018).

Results in Table 5 further indicated that the income elasticity of the demand for rice (0.018) is positive, less than 1 but greater than 0. This means that rice is income inelastic and a percentage change in income will lead to a less than proportionate change in the quantity demanded. Due to the fact that the income-demand relation is positive, rice is a normal good in the study area and can also be a necessity as this was confirmed by a negative price elasticity. This corroborate with the findings of Kassali *et al.*, (2010) and Addo (2016). The demand for yam has a positive income elasticity of 0.289. This means that yam is a luxury food in the study area. This is because of the seasonality of its production (yam was not in production) and inadequate storage facilities to enable its availability at cheaper prices during off season. The income elasticity of demand for cowpea is positive and less than 1 (0.002) but greater than zero (0). Which means that cowpea is income inelastic. This implies that a change in price will lead to a less than proportionate change in quantity demand. The foregoing implies that cowpea is a normal good and a necessity in the study area.

Journal of Agriculture and Natural Resources (2021) 4(2): 175-185
ISSN: 2661-6270 (Print), ISSN: 2661-6289 (Online)
DOI: https://doi.org/10.3126/janr.v4i2.33739

CONCLUSION

The study examined the urban household demand for selected food in Minna Metropolis. The study found out that rice, yam and cowpea are price in-elastic. For the income elasticity, rice and cowpea were proven to be normal goods and yam a luxury. The pattern of food consumption is not so much a matter of price but rather it is a phenomenon linked with socio-economic characteristics of household heads, ease of preparation and urban lifestyles. To improve urban household demand for food, the government should provide appropriate policy framework that will protect consumer. This can be done by providing silos, buying the commodities during the period of glut in the market and resell same to consumers at a subsidized price during the periods of the year when the commodities are not available.

ACKNOWLEDGEMENT

The authors would like to express their gratitude to their field enumerators who assisted with the survey and to the respondents of the study area for providing them valid and valuable information.

Authors' contributions

Obalola, O.T. and Tanko, L. designed the research plan. Kobe, H.I. Aboaba, K.O. and Agboola, B.O. designed the questionnaire and coordinated the data collection process. Bello, B.A. analyzed the data. Audu, R.O. and Danilola, S.T. provided comments and feedback to finalize this manuscript and Odum, E.B.E. wrote the initial manuscript and finalized the manuscript. Final form of manuscript was approved by all authors.

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

REFERENCES

Abdullahi, F.A., Zainalabidin, M., & Ismail, A.L. (2011). The influence of socio-demographic factors and product attributes on attitudes toward purchasing special rice among Malaysian consumers. *International Food Research Journal, 18*(3), 1135-1142.

Addo, A.R. (2016). Analysis of the demand for locally produced rice in Kumasi, Ghana. (MSc. Thesis, Department of Economics, Kwame Nkrumah University).

Almas H., Esfandiar, M., & Guanghua, W. (2019). An Analysis of the Determinants of Household Consumption Expenditure and Poverty in India. *Economies, 7*(96), 1-27. DOI: https://doi.org/10.3390/economies7040096.

Ashagidigbi, W.M., Yusuf, S.A., & Okoruwa, V.O. (2012). Determinants of Households' Food Demand in Nigeria. *World Rural Observation, 4*(4), 17-28.

Babatunde, R.O., Omotesho, O.A., & Sholotan, O.S. (2007). Socioeconomics characteristics and Food Security Status of Farming Households in Kwara State, North-Central Nigeria. *Pakistan Journal of Nutrition, 6*(1), 49-58. DOI: https://doi.org/10.3923/pjn.2007.49.58

Danquah, I.B., & Egyir, I.S. (2014). Factors that influence household demand for locally produced brown rice in Ghana. *Journal of Economics and Sustainable Development, 5*(7), 14-24.

ISSN: 2661-6270 (Print), ISSN: 2661-6289 (Online)
DOI: https://doi.org/10.3126/janr.v4i2.33739

Danso, A.G., Armed, M., & Baidoo, F. (2014). Determinants of consumer preference for local rice in Tamale Metropolis, Ghana. *International Journal of Education and Social Science, 1*(2), 114-122.

Diako, C., Sakyi-Dawson, E., Bediako-Amoa, B., Saalia, F. K., & Manful, J. T. (2010).Consumer perceptions, knowledge and preferences for aromatic rice types in Ghana. *Nature and Science, 8*(12), 12 – 19.

Elver, H. (2015).Why are there still so many hungry people in the World, London, UK: The guardian?

Food and Agriculture Organization of the United Nations (2014).The State of Food Insecurity in the World: Strengthening the enabling environment for food security and nutrition, Rome: FAO.

Kassali, R., Kareem, R.O., Oluwasola, O., & Ohaegbulam, O.M. (2010). Analysis of Demand for Rice in Ile Ife of Osun State. *Journal of Sustainable Development in Africa, 12* (2), 40-79.

Korir, L., Rizov, M., & Ruto, E. (2018). Analysis of household food demand and its implications on food security in Kenya: an application of QUAIDS model. Agricultural Economics Society-AES, 92nd Annual Conference, April 16-18, 2019, Warwick University, Coventry, UK. DOI: https://doi.org/10.22004/ag.econ.273474.

Kormawa, P.M., Chianu, J.N., & Manyong, V.M. (2002).Cowpea demand and supply patterns in West Africa: the case of Nigeria, 376-386.

Musa, M., Othman, N., & Abdul-Fatah, F. (2011). Determinants of consumers purchasing behavior for rice in Malaysia. *American Journal of Contemporary Research, 1*(3), 159 – 167.

National Population Commission (NPC) (2006). Nigeria's National Census NPC, Abuja.

Niger State Ministry of Information. (2005). Background information on Niger state, the history and location.

Okoruwa, V.O., & Adebayo, E.A. (2006). Household Food Demand Analysis in Adamawa State, Nigeria. *Global Journal of Agricultural Sciences, 5*(2), 109-115.

Omonona, B.T., Nkang, N.M., & Ajao, F.A. (2009). Household food demand analysis: a survey of semi urban and rural households in south-west Nigeria. *Global Journal of Pure and Applied Sciences, 15*(3&4), 315-324. DOI: https://doi.org/10.4314/gjpas.v15i3-4.48545

Pieters, H., Guariso, A., & Vandeplas, A. (2013). Conceptual framework for the analysis of the determinants of food and nutrition security. Food secure, Working papers 13, pp. 1-51. Retrieved from *http://www3.lei.wur.nl/FoodSecurePublications/13_P...ceptualFramework.pdf*

Reardon, T., Berdegue, J., & Escobar, G. (2001). Rural Nonfarm Employment and Incomes in Latin America: Overview and Policy Implications. *World Development*. *29*(3), 395-409. http://www.sciencedirect.com/science/article/pii/S0305-750X(00)00112-1. DOI: https://doi.org/10.1016/S0305-750X(00)00112-1

Sampson, K. (2013).Consumer preferences and willingness to pay for locally produced rice in Kumasi Metropolis of Ghana (Doctoral Dissertation, Kwame Nkrumah University of Science and Technology).

Tsegai, D. & Kormawa, P. (2002). Determinants of urban households' demand for cassava products in Kaduna, Northern Nigeria: The application of AIDS model. Paper presented at conference of International Agricultural Research for Development Witzenhausen, 9-11 October 2002.

United Nations System in Nigeria .(2001). Nigeria Common Country Assessment, March

2001. UNDP, Lagos pp.48

United Nations Organization (UNO). (1991). The causes of Africa's food crisis. *African Development Journal*, *2*, 1631-1645.

World Food Programme. (2015). Food Security Analysis (VAM). Rome, Italy: United Nations World Food Programme.