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**ASSESSMENT OF EXPENDITURE ON FOOD AMONG URBAN HOUSEHOLDS AND IT'S IMPLICATION FOR FOOD SECURITY: EVIDENCE FROM BENUE STATE, NIGERIA**

**Iorlamen TR<sup>1\*</sup>, Abu GA<sup>1</sup> and WL Lawal<sup>1</sup>**



**Rhoda Torkwase Iorlamen**

\*Correspondin author email: [doowueseiorlamen@yahoo.com](mailto:doowueseiorlamen@yahoo.com)

<sup>1</sup>Department of Agricultural Economics, University of Agriculture, Makurdi, Benue State, Nigeria.

## ABSTRACT

The study assessed expenditure on food among urban households in Benue State of Nigeria. This was done with the view to assess household food expenditure and its implications for food security status of the households; identify and assess determinants that influence household food demand; and analyze the determinants of food security of household urban population. The selection of the sample for the study involved a three-stage sampling technique. Data was collected from 150 households through a structured questionnaire. Descriptive statistics, food security index, multiple linear regression and logit regression were employed to analyze data. The results indicated a mean household expenditure on food that stands at N21,748.00 (140.3 USD) per month. Based on the food security index the households that spent at least N14, 498.67 (93.5 USD) on food per month were categorized as food secure and those who spent below this value were categorized as food insecure. Furthermore, 67.3% of the households were food secure, while 32.7% were food insecure. The study revealed that size of household, income of the household head and price of food commodities were identified as major factors influencing household food demand decisions in the study area. Moreover, size of the household and income of the household head were the main determinants of food demand in the study area ( $F = 19.78$ ;  $p \leq 0.05$ ) just as age and income of household head as well as household size influence the probability that a household will be food secure ( $\chi^2 = 13.77$ ;  $p > 0.05$ ). The study recommends that household heads should be educated on the need to control family size and to be self-empowered without necessarily depending on government as a way of enhancing their income to improve the household and economic conditions. The government should strengthen its policy on grain reserves in order to control food prices during scarcity and subsidize farm inputs and availability to boost food production and thus lower food prices.

**Key words:** Food security, Urban, Household, Expenditure

## INTRODUCTION

Agriculture is one of the most important sectors of the Nigerian economy because it is the main source of food for the population and the source of livelihood for over 70% of the population [1]. Furthermore, the sector is a major source of raw materials for the agro-allied industries and a source of much needed foreign exchange. The agricultural sector in the periods immediately after independence performed the roles highlighted above to such an extent that the regional development witnessed during these periods were linked directly to the sector. Agriculture before independence and in the early 60's contributed over 60% of gross domestic product [1]. However, over the years, the sector has witnessed a tremendous decline in its contribution to national development. The decline is attributed to the boom and growth in both the petroleum and industrial sector. [2].

Providing food, both in good quality and good quantity to meet the increasing food demand for the growing population in Africa is a major concern of national governments and development partners.

Food security as a concept entails the ability of the households to secure, either from own production or through purchase adequate food for meeting the dietary needs of all its members [3]. It is a situation where households are not at risk of losing access to safe nutritious food to maintain a healthy and active life. Households are thus, food secure when they have year round access to the quantity and variety of foods their members need to maintain active and healthy lives [4]. Available statistics shows that about 852 million people world-wide were chronically undernourished between 1980 and 2005. About 800 million hungry people live in developing countries [5]. Furthermore, available statistics show that at least 41 percent of the Nigerian population is food insecure with 16% being severely undernourished [6]. The incidence of household food insecurity in Nigeria rose from 18 percent in 1986 to 40 percent in 2005[7].

There exists a generally held notion that food insecurity is more prevalent in the rural areas based on low income and the poor socioeconomic conditions of the rural inhabitants. This has skewed focus of food security research in favour of the rural areas. However, increasing rural- urban migration, low level of employment opportunities, high cost of living, and poor economic infrastructure are factors that are likely to predispose urban households to a large extent to food insecurity. Gurkan [8] aptly demonstrated the complexity of food security matrix by pointing out that food security is consistently not only linked with food production but also general economic and social development variables. Food insecure people are usually those who cannot meet their needs from the market [9]. Thus, the food security situation of urban households has remained largely unassessed in the study area. It is against this backdrop that this study was done with a view to assessing expenditure on food among urban households and its implication on food security. The objectives were to:

- i assess the household food expenditure in Benue State and its implication on food security status

- ii identify and assess determinants that influence household food demand
- iii analyze the determinants of food security of households in the study area.

## MATERIALS AND METHOD

**The Study Area:** This study was conducted in Benue State, Nigeria. The State derives its name from River Benue, the largest river in Nigeria and lies between longitude 6°35'E and 8°10'E of the Greenwich and latitude 6°30'N and 8°10'N of the equator, at an elevation of 97 meters above sea level in the Southern Guinea Savannah agro-ecological zone. The State is located in the North-central zone of Nigeria and is referred to as the "Food Basket of the Nation" because of the fact that it is a major producer of food in Nigeria. Major crops produced in the State include: cassava, yam, rice, benniseed, maize, sweet potatoes, millet, soybeans and a wide range of tree crops like mango, citrus, oil palm and bananas. Others include livestock production and fishing. The State is administratively divided into three zones namely; Zone A (Eastern zone), Zone B (Northern zone), Zone C (central zone), and has twenty three (23) local Government Areas [10].

**Data collection:** The population for this study comprised urban households in Benue State. Data were collected on monthly household expenditure on food and non food items. A multi-stage sampling technique was used to select 150 urban households through a well structured questionnaire. In the first stage a purposive sampling of one local government area each (Katsina- Ala, Markurdi and Otukpo, respectively) was drawn from each of the zones based on the fact they consist of major urban centers in the State; In the second stage a purposive selection of one town from each of the selected Local Government areas while in the last stage a random selection of 50 households from each town was made to give a total of 150 households.

**Food security index:** The household was classified into food secure and food insecure households using food security index, given by:

$$F_i = \frac{\text{per capita food expenditure for the } i\text{th household}}{2/3 \text{ mean per capita food expenditure of all household}}$$

Where  $F_i$  = food security index

When  $F_i \geq 1$  = food secure ith household

$F_i < 1$  = food insecure ith household.

According to Omonona and Agoi [11], a household is considered food secure if it attains at least two – thirds of the average per capita food expenditure per month of the sampled households and considered food insecure if it falls below two-thirds of the average per capita food expenditure.

**Regression Model:** The commonly used linear functional form was employed. The linear function used in this study is expressed as:

Linear:  $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_6 X_6 + e$

Where Y = Total household expenditure on food per month in naira

$\beta_0$  = constant term

$\beta_n$  = coefficient to be estimated

$X_1$  = Age of household head (years)

$X_2$  = Gender of household head (1, if male and 0, if Female)

$X_3$  = Household size in number

$X_4$  = marital status of household head (1, if married and 0, if Otherwise)

$X_5$  = Household income (N) per month

$X_6$  = Educational level of household head (Number of years of formal Education: no formal education, 0; Primary School Certificate, 6; Junior Secondary School Certificate, 9; Senior Secondary School Certificate, 12; National Diploma, 15; Higher National Diploma/Bachelors Degree, 17; Masters Degree, 19; and Doctor of philosophy, 22 years).

e = Error term.

**Logit Regression Model:** Based on the household food security status, the determinants of food security in the study area were estimated using an econometric approach and Logit Regression Model was adopted to identify the factors that influenced the food security status of the households in the study area which is a dichotomous dependent variable.

The model uses various household resources as factors influencing food security status [12]. The Model is expressed as

$$P_i = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x_{i1} + \dots + \beta_k x_{ik})}}$$

Where,

$P_i$  = probability that food security occur

$\beta_0$  = constant term

$\beta_i$  (i=1, 2 ...k) = regression coefficients to be estimated

$X_i$  (i=1,2.....k) = independent variables

i = i<sup>th</sup> observation.

Let  $z_i = \beta_0 + \sum \beta_k X_k$

Then  $P_i = \frac{1}{1 + e^{-z}}$

As  $z_i$  ranges from  $-\infty$  to  $+\infty$ ,  $P_i$  ranges from 0 to 1 and  $P_i$  is non-linearly related to  $z_i$ . The Logit of the unknown binomial probabilities, for example, the Logarithms of the odds are modeled as a linear function of the  $X_i$ . In estimable form, the model is expressed as,

$$\text{Logit} ( P_i ) = \text{Ln} \left\{ \frac{P_i}{1-P_i} \right\} = \beta_0 + \beta_1 X_1 + \dots + \beta_k X_k + U_i$$

The unknown parameters  $\beta_i$  are usually estimated by Maximum likelihood. Thus, the model is explicitly expressed as

$$z_i = \beta_0 + \beta_1 X_1 + \dots + \beta_k X_k + U_i$$

Where,

- $z_i$  = Food security status of  $i^{\text{th}}$  households
- $\beta_0$  = Constant term
- $\beta_i$  ( $i = 1, 2, \dots, 6$ ) = vector of the parameter to be estimated
- $X_1$  = Age of household head (years)
- $X_2$  = Gender of household head (1, if male and 0, if Female)
- $X_3$  = Household size in number
- $X_4$  = Marital status of household head (1, if married and 0, if otherwise)
- $X_5$  = Household income (N) per month
- $X_6$  = Educational level of household head (Number of years of formal Education: no formal education, 0; Primary School Certificate, 6; Junior Secondary School Certificate, 9; Senior Secondary School Certificate, 12; National Diploma, 15; Higher National Diploma/Bachelors Degree, 17; Masters Degree, 19; and Doctor of philosophy, 22 years).
- $U_i$  = Independent distributed error term.

## RESULTS

Tables 1 and 2 summarized household expenditure on food and its implication on household food security status. The result in table 1 shows that 40% of the households spent between N10001 to N20000 (64.52USD – 129USD) on food. Also, about 20% and 25% of the households spend N1000 or less ( $\geq 64.51$ USD) and between N20001 to N30000 (129USD – 193.5USD) respectively on food. However, only 14.6% of the households in the study area spent above N30000 on food per month. The result showed the average food expenditure of the households to stand at N21748.00 (140.3USD). Furthermore, the results in table 2 showed that 67.3% of the households were food secure while 32.7% were food insecure.

Table 3 summarizes factors influencing households' food demand. The results revealed that 35% of the sampled households food demand decision was affected by size of the family; 19.1% was affected by income of household head; 16.5% was affected by price; 11.0% was affected by season; 17.3% was affected by taste and 1.1% was affected by other factors.

Table 4 presents the results of regression analysis that assessed causal relationship between socio-economic factors and food demand expenditure of urban households in



the study area. The results revealed that out of the six regressor variables included in the model, only household size and income were found to be statistically significant at the 5 percent level. The estimate of regression coefficient of household size and income were 788.10 and 0.23, respectively. The regression F-value was significant ( $F = 19.78$ ;  $p = \leq 0.05$ ).

The stepwise binary logistic regression model was used to assess factors influencing food security and the result is presented in Table 5. The Hosmer-Lemeshow chi square statistics was non significant at  $\chi^2 = 13.77$ ;  $p > 0.05$ . The result furthermore shows that the coefficient of age (0.065), income (0.001), and household size (0.284) were positive and statistically significant at 5%.

## DISCUSSION

**Households' Expenditure on Food and its Implication on Food Security Status of the Household:** The result indicates that most households (40%) spent between N10001 to N20000 on food per month. Based on index used by Omonona and Agoi [11], a household is considered food secure if it attains at least two – thirds of the mean per capita food expenditure per month of the sampled households. Consequently, the households that spent at least N14,498.67 on food per month were categorized as food secure and those who spent below this value were categorized as food insecure. The results (Table 2) showed that 67.3% of the households in the study area were food secured while 32.7% were food insecure spending less than N14,498.67 on food per month.

**Factors influencing Households Demand for Food:** The size of household, income of the household head and price of food commodities were major factors influencing household food demand decisions in the study area. These observations are consistent with the opinion of World Bank [13] that food security is associated with high food prices and inadequate income or poverty.

**Determinants of Household Demand for Food:** Data were fitted to linear, double-log, semi-logarithm and quadratic functional forms and the linear model was chosen as the model of best fit based on the significance of the regression ( $F = 19.78$  at  $p = \leq 0.05$ ) and the highest value of the coefficient of multiple determination ( $\text{Adj. } R^2 = 0.43$ ). The significance of F statistics implies that all the independent variables in the model significantly contributed to the explanation of the dependent variable relative to the null model (model with only constant). The estimate of regression coefficient of household size (788.10) revealed that for a unit increase in size of a household food demand expenditure of that household increases by about N788.10. Similarly, the estimate of regression coefficient of household head income (0.23) indicated that for every Naira increase in income of household head, the expenditure on food of the household increased by about 23 kobo (100kobo makes N1).

**Determinants of Food Security Status of Households:** The non-significance of Hosmer-Lemeshow chi statistics ( $\chi^2 = 13.77$ ;  $p > 0.05$ ) implies that the model

described by the data is not significantly different from the standard model. The result implies that age, income and household size influence the food security of respondents in the study area. The result further implies that an increase in age by a year raises the probability of a household being food secure by 0.01. Similarly, every unit increase in income and household size increased the probability of household being food secure by 0.001 and 0.059, respectively.

## CONCLUSION

The study reveals that 32.7% of Benue households are food insecure and most households spend N10001 to N20000 on food. It was discovered that household size and income were determinants of household demand for food while age, income and size of household were determinants of food security in Benue State.

The study recommends that household heads should be educated on the need to control family size through seminars, radio and television advertisement, massive campaigns and to be self-empowered without necessarily depending on government as a way of enhancing their income and economic condition of their households. Government should strengthen policies on grain reserves in order to control food prices during scarcity and subsidize farm inputs and availability to boost food production and thus lower food prices.



**Table 1: Distribution of households by their monthly expenditure on food**

Expenditure on Food(N)	Frequency	Percent
≤10,000	30	20.0
10001-20000	60	40.0
20001-30000	38	25.3
30001-40000	8	5.3
>40000	14	9.3
<b>Total</b>	<b>150</b>	<b>100.0</b>
<b>Mean Food expenditure =N21,748.00</b>		
<b>Standard Deviation =14499.30</b>		
<b>Minimum =1500.00</b>		
<b>Median =18435.00</b>		
<b>Maximum =80000.00</b>		

Source: Field survey 2009

**Table 2: Distribution of households by their food security status**

Food Security status	Frequency	Percent
Food insecure	49	32.7
Food secure	101	67.3
Total	150	100.0

**Source:** Field Survey 2009

**Table 3: Factors influencing households' food demand**

Factor*	Frequency	Percentage
Income	52	19.1
Family size	95	35.0
Price	45	16.5
Season	30	11.0
Taste	47	17.3
Others	3	1.1
Total	272	100

**Source:** Field Survey 2009

\*Multiple responses

**Table 4: Parameter estimates of linear regression model of determinants of household food expenditure**

Variables	B	Standardized. Coefficient
Constant	326.130 (0.052)	
Age	35.068 (0.414)	0.028
Household size	788.099* (2.578)	0.169
Education	370.084 (1.320)	0.097
Income	0.229* (8.698)	0.605
Sex	-2615.776 (-1.087)	-0.076
Marital status	-253.740 (-0.102)	-0.008
F = 19.778; p > 0.05		
R <sup>2</sup> = 0.454		

Source: Analysis of field data, 2009

Figure in parenthesis are t-values

\*significant at 5% level

**Table 5: Parameter estimates of logistic regression analysis of determinants of food security of households**

Variable	B	S.E	Wald	Exp(B)	Prior prob. (P <sub>1</sub> )	P <sub>2</sub>	Change in Prob. (P <sub>2</sub> - P <sub>1</sub> )
Age	0.065	0.021	9.457	1.067*	0.67	0.684	0.014
Income	0.001	0.001	13.683	1.000*	0.67	0.669	0.001
Household size	0.284	0.090	9.937	1.329*	0.67	0.729	0.059
Constant	-6.500	1.516	18.384	0.002	0.67	0.003	-0.667

Hosmer and Lemeshow Chi square =13.77; p > 0.05

Source: Field Survey 2009

\*significant at 5% level

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