Economic Analysis of Food Security Determinants In Tertiary Institutions (A Case Study Of The University Of Maiduguri Staff Members)

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ABSTRACT

This paper examined the determinants of food security among university of Maiduguri staff members Borno State, Nigeria. Data for the study were selected from 110 academic and non-academic staff members using purposive and muliti-stage random techniques. Descriptive statistics, Cost-of-calories method, Logit model and household dietary diversity scores were used as analytical techniques for the study. Based on the recommended daily energy levels of 2260 kcal, a food security line of ₦ 34571.04 per year per adult equivalent per year was obtained for the households. The about 78% of the sample households are therefore food secure. The Logit analysis revealed that the major determinants that positively influence food security in the study area are income, level of education, value of assets and access to credit. Based on the findings, households were encouraged to practice family planning and women were encouraged to intensify their income generating activities with a view to generating more income, thus, enhancing food availability in households.

INTRODUCTION

One of the key objectives of the agricultural sector in Nigeria is the provision of sufficient food at all times for the ever-growing population. Food is any substance consumed to provide nutritional support for the body. In order to maintain good health and optimal performance, food has to be provided in adequate quality and quantity, hence, the need for food security. According to The World Food Summit 1996 "Food security exists when all people, at all times have physical and economic access to enough safe and nutritious food to meet their dietary needs and food preferences for an active and healthy lifestyle". It the access by all people at all times to enough food for an active and healthy life (LeBlanc *et al.,* 2003). The Food and Agricultural Organisation (FAO) (1998) defined food security as a condition in which all people at all times have access to sufficient and safe diet. Food security is not only the availability but also the accessibility, procurement and intake of adequate food in both

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quality and quantity by individuals, households, communities or regions (Nwajiuba, 2000).

In the history of man, there has never been enough food available to properly feed the whole human family (Peter, 1992). Poverty and hunger which are all resultant effects of food insecurity impose deadly consequences on individuals, households, societies and the world at large. The socio-economic effects of food insecurity on the economy are undesirable. More than 800 million of the world's population do not get enough healthy food and are therefore exposed to the risks of ill health and shorter life expectancy (World Bank, 2010). In most economies, the vulnerable and food insecure include the poor, small holder farmers, children, pregnant women, lactating mothers and the elderly (FAO, 2004).

Nigeria's food production after independence was characterized by high production achieved by mobilizing small scale farmers. Food supply was high and it satisfied demand without resort to import. There also existed good foundation for research and export as well (FAO, 2006). However, with the advent of commercial oil exploration in the early 1970s, the fortunes of agriculture started to dwindle with a resultant downward decline in productivity. According to World Bank, (2010) about 60.8% Nigerians are said to be mal-nourished.

In Nigeria, the issue of food in security is of a major concern. Despite Nigeria's endowment in food supply, it has remained one of the poorest economies of the world with about 70% of the

population living on less than ₦100 (0.7 US Dollars) per day (Fakiyesi, 2004). In recent times, there have been threats of hunger and poverty. Of the entire population of farmers in Nigeria, small holder farmers constitute 80% with inefficient production systems which has resulted in a sustained fall in the Net Domestic Product (NDP) of the economy. Food import has also become a feature to rely upon and this is no other name than food insecurity. This is particularly more in the northern Sudan Savannah and Sahel zones which have the highest prevalence of under nutrition (FAO, 1998) and where the study area lies. Against the above background, this research was undertaken to analyze food security status among staff members in the University of Maiduguri in Jere Local Government of Borno state, Nigeria. The specific objectives were to: examine the socio-economic characteristics of the respondents in study area; measure the food security status of respondents; identify the determinants of food security; and measure the food diversity intake of respondents in the study area.

METHODOLOGY

The Study Area

The study was carried out on the university of Maiduguri campus, located in in Jere Local Government Area, Borno state. The study area has an estimated population of about 25,000 (university statistics) of which 20% consist of members of staff mostly resident in the university with families, friends and relatives. The staff members are either of the senior or junior categories. The kinds of food accessible in this

area include roots and tuber, cereals, vegetables, fruits, legumes, meat and fish products, already processed foods and a host of others.

Data Collection

Both purposive and multistage random sampling techniques were used to collect data from 55 junior and senior staff households used for the study. These include both academic and non-academic staff in the university. Structured questionnaire was used to collect primary data from the respondents. Descriptive statistics was used to examine the socio-economic characteristics of respondents. Cost of Calorie (COC) function was used to measure the calorie intake and food security status of respondents, defining food security line as proposed by Greer

and Thorbecke (1986). The COC function is given by:

$$\ln X = a + bC \quad - \quad - \quad - \quad -- (1)$$

Where: X= Adult equivalent of food expenditure (₦), C= Actual calorie consumption per adult equivalent of a household (Kcal). The calorie content of the recommended minimum daily nutrient level is 2260kcal. The food security line, (Z) was computed using:

$$Z = e^{(a+bL)} \quad - \quad - \quad - \quad - \quad - (2)$$

Where: Z = Cost of buying the minimum calorie intake, a= Intercept, b= Coefficient of the calorie consumption and L = Recommended minimum daily energy level (2260kcal).

Table 1: Conversion factors for calorie requirement for different age groups

Years of age	Male	Female
0-1	0.27	0.27
2-3	0.45	0.45
4-6	0.61	0.61
7-9	0.73	0.73
10-12	0.86	0.78
13-15	0.96	0.83
16-19	1.02	0.77
20 and above	1.00	0.73

Source: FOS, (2004)

Logit regression model was used to identify the determinants of food security among respondents. The implicit form of the model is expressed as;

$$L_1 = ln\frac{p}{1-p_l} = b_0 + \sum_{j=1}^{m} b_i Xjl = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + e \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - (3)$$

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Where;

L_i is the observed response for the ith observation (i.e., the binary variable, $L_i = 1$ for a food secure household and $L_i = 0$ for a food insecure household); I_i is an underlying and unobserved stimulus index for the ith observation for each household; if $I_i^* \geq I_i$ the household is observed to be food secure, if $I_i^* \leq I_i$ the household is observed to be food insecure; X_i = vector of explanatory variables which are defined as: X_1 = Age (AGE) in years; X_2 = Monthly income (HHINC) in Naira; X_3 = Household size (HHSZ); X_4 = Value of assets (HHAST); X_5 = Educational level (EDUC) in years; X_6 = Gender (GEND); X_7 = Access to credit (CREDIT) D=1 if yes, otherwise D = 0.

***A priori* Expectations:** It was expected that the independent variables such as age, household size and sex would have positive influence on the level of food security while income, marital status, educational level, value of assets and access to credit would have positive influence on food security in the study area.

Household Dietary Diversity Score (HDDS): Dietary diversity was measured by summing the number of foods or food groups consumed over a reference period. The HDDS which ranged between 0-12 was used to measure household's dietary diversity and also ranked accordingly into high dietary diversity (6-12) and low dietary diversity (0-5) (FAO, 2008). HDDS indicator for sample population was also measured by the sum of HDDS of households divided by the total number of households. Twelve (12) food groups included in the HDDS were: Cereals; roots and tubers; Vegetables; Fruit; Meat, poultry, offal; Eggs; Fish and sea foods; Legumes, nuts and seeds; Milk and milk products; Oils and Fat; Sugar/honey; condiments; and Beverages (FAO, 2007). These food groups were used to identify food intake quality of the households. Foods locally consumed in these food groups were determined and considered for the measure of food intake diversity in the study area.

RESULTS AND DISCUSSION
Socioeconomic Characteristics

The results of the socioeconomic characteristics of respondents examined are presented in Table 2. Distribution of household heads based on age revealed that about 46 percent of the household heads fell within the age bracket of 40-49 years. The mean age of household heads in the study area is about 47 years. Households in the study area may likely be food secure because majority of the household heads are still in their active ages with strength and vitality to support the household economy. Most households (66.4%) have less than five members. This may be due to the educational level of respondents and awareness of the implication of large household size both socially and economically. The study revealed that no household (0%) earn below ₦20,000 per month in the study area. Majority of the households (73.6%) earn above ₦99,000 per month. This could be as a result of the level of education and the civil service wage structure.

The average income in the study area is ₦ 85,640.5.

Table 2: Summary Statistics of Socio-economic Characteristics of Respondents

Variables	Frequency	Percentage	Mean	Standard deviation
Age(years)				
20-29	4	3.6		
30-39	24	21.8	47.43	13.432
40-49	51	46.4		
50-59	23	20.9		
60 Above	8	7.3		
Household size				
Less than 5	73	66.4		
5-9	34	30.9		
10-15	2	1.8	4.4532	1.3342
Above 15	1	0.9		
Monthly Income				
Less than 20000	0	0.0		
20000-39000	2	1.8		
40000-59000	4	3.6		
60000-79000	9	8.2	85640.5	21341.1
80000-99000	14	12.7		
Above 99000	81	73.6		

Source: Field Survey 2012.

Also, results in Table 4 showed the sex distribution of the households' heads in the study area. About 89 percent of the household heads were males and only 11 percent were females. Households in the study area are guided by religious beliefs and cultural inclinations regarding household headship, however, those headed by females could be as a result of death of spouse or separation. About 97 percent of the household heads were married. This is because majority of the household heads in the study area have attained the marriageable age and are employed which ensures a means of sustaining the family. Majority (91.8%) of the household heads had attained the tertiary level of education. This is because the study area is an academic environment that requires mostly the attainment of tertiary educational level in order to belong to the community. The results also showed that about 64 percent of the sampled respondents did not have access to credit. Considering the nature of the study area, respondents may likely have no interest in credit and/or may have other informal ways of accessing credit.

Table 3: Other Socio-economic Characteristics of Respondents

Variables	Frequency	Percentage
Gender		
Male	98	89.1
Female	12	10.9
Marital status		
Married	107	97.3
Single	3	2.7
Educational level		
Primary	3	2.7
Secondary	6	5.5
Tertiary	101	91.8
Access to credit		
Yes	40	86.4
No	70	63.6
Types of assets		
Land	35	31.8
Bicycle	65	59.1
Motor vehicle	97	88.2
Motor cycle	45	40.9
Radio/TV set	110	100.0
Livestock	34	30.9
Shares	43	39.1

Source: Field survey 2012

Furthermore, the study revealed that the entire population (100%) in the study area had radio/TV sets. This is necessary for the dissemination of information more especially because of the insecurity state of the study area. About 88 percent own motor vehicle which makes mobility less stressful. It could also be a reflection of class and style in the study area.

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Nature/depth of food security among respondents

Table 4: Summary Statistics of Food Security Status

Variables	Value
Cost-of-calorie equation	ln X=a+bc
Constant	4.480 (53.615) *
Slope coefficient	0.0000 (3.296) *
FAO recommended daily energy levels (L)	2260 Kcal
Food security line (Z)	₦102.89 per day
	₦ 720.23 per week
	₦ 2880.92 per month
	₦ 34571.04 per year
Percentage Household	22% (food insecure) 78% (food secure)
Aggregate income gap	-755.04

Source: Calculation from OLS estimates and Cost-of-Calories equation, 2012

*Figures in parenthesis are t-values.

As presented in Table 4, based on the recommended daily energy level (L) of 2260 Kcal, the food security line (Z) for the households in the study area was found to be ₦102.89 per day per adult equivalent. The study revealed that 78 percent of the households sampled were food secure. This implies that only 22% of the entire households in the study area were food insecure. More so, the aggregate income gap of -755.04 indicates that a food insecure household will require ₦755.04 to meet their monthly basic food requirements.

Determinants of Household Food Security

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Age: The coefficient of age showed a negative sign as expected and significant at 1% level. This implies that as the ages of household head increases, the food security level of household reduces. The older the household head, the less active, less strength and vigour required to support household economy. **Monthly income**:

As expected *a priori*, a positive relationship existed between income and food security level at 1% level of significance. This indicates that with an increase in household income, the probability of household food security tend to increase. It is expected that an increase in income ensures a better access to food supply.

Table 5: Logit parameter of the Determinants of Food Security

Variables	Coefficients	Standard error	t-values
Constant	1.309	0.2098842	6.263***
Age	-1.005	0.122	-8.237***
Monthly income	0.123	0.031	3.978***
Household size	-0.065	0.015	-4.248***
Value of asset	0.123	0.042	2.931***
Educational level	0.162	0.022	7.330***
Gender	-1.208	0.327	-3.694***
Access to credit	0.277	0.112	2.473**

***=significant at 1%, **= significant at 5%

Source: Computer Printout, 2012

Household size: As expected, the coefficient of household size was negative and significant at 1% level. It implies that an increase in household size will result in a reduction in the household food security level especially when some household members are mainly dependants. **Value of assets**: The coefficient of value of assets was positive as expected and significant at 1% level. . It implies

that the more the assets households own, the higher the probability of being food secure. Assets are wealth and sometimes investments, households with assets earn returns on investment. Assets could be liquidated in times of difficulty thereby ensuring security in household food supply. **Educational level**: As *a priori* expected the coefficient of educational level had a positive relationship with food security and was significant at 1% level. It implies that as the educational level

of household head increases, household food security also increases. This affirms the expectation that the more educated a household head is the higher the likelihood of getting better job opportunities and earning higher incomes which ensures adequate food provision. **Gender**: The coefficient of gender was negative as expected and significant at 1% level. This implies that food security status of a household reduces with a female as household head. This conforms with the findings that unlike men, there is a limit to the extent at which women diversify their sources of income. This in turn limits their purchasing power and their capability of providing adequate food. **Access to credit:** In conformity with the *a priori* expectation, the coefficient of the value of the value of access to credit had a positive relationship with food security and was significant at 5% level. Households are exposed to more income generating activities which improves their purchasing power and ultimately households' food security.

Table 5: Summary Statistics of the Dietary Diversity among Households

No of food groups	Diet diversity	Frequency	percentage
1-5	Low	10	9.1
6-12	High	100	90.9
Total		110	100

Source: Field survey, 2012

Results in Table 5 showed that about 91 percent of the households in the study area belong to the high dietary diverse group. This result was expected because majority of the households in the area were highly educated, knowledgeable in food and nutrition and are able to make use of cheaper food group substitutes. Also, most respondents have household gardens to cater for their vegetable needs. The income level of respondents is also an important contributory factor to their high quality dietary intake. Quality food intake connotes both physical and economic access. The result implies that most households in the study area consumed most of the food groups obtained through own-production and/or purchased food items.

CONCLUSION AND RECOMMENDATION

The study examined the determinants of food security in tertiary institutions. The results of the study showed that the major determinants of food security in the study area were age, monthly income, household size, value of assets, educational level and Access to credit. Also, the

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study established that households were highly food diverse. This suggests that there may likely be a relationship between dietary diversity and the level of food security. Based on the findings of the study, the following were recommended:

•Respondents should be encouraged to practice family planning. This will further improve households' living standard and also ensure food security.

•Women should endeavour to engage in income generating activities with a view to increasing the household income which will also increase economic access to food.

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