Determinants of Household Food Insecurity in Nigeria

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Abstract: Food insecurity is increasingly being recognized by many development economists, policy makers and policy analysts as both a policy and an economic problem. Arguably, an understanding of the determinants of food insecurity is critical for policy analysis and the design of effective food security strategies. Thus, this study examined the determinants of household food insecurity in Nigeria based on data from the 2009/2010 Harmonized Nigeria Living Standard Survey (HNLSS) obtained from the National Bureau of Statistics. Multinomial logit regression was employed to examine the determinants of household food security status. To derive food insecurity status, two objective measures of food insecurity were combined- household Food Expenditure(FE) and Dietary Diversity Score (DDS) to yield four possible scenarios viz., completely food secure; food insecure based on food expenditure only; food insecure based on dietary diversity score only; and completely food insecure households The determinants of household food insecurity status showed that the odds ratio of households being food insecure relative to completely food secure increased significantly with household size, among rural households, among households in the northern region but decreased with higher income and improvement in educational status. This study therefore recommends that government should put in place policies that contribute to the earning capacity of the households. In addition, huge investment in agricultural sector in all the regions is needed to achieve local self-sufficiency in food production.

Keywords: Food Insecurity; Household food expenditure, Dietary diversity score.

JEL Classification: Q18

Introduction

One target of the Sustainable Development Goals is to completely eradicate hunger and poverty by 2030 (IFPRI, 2016). The 2017 Global Hunger Index (GHI) indicates that worldwide levels of hunger and undernutrition have declined over the long term. Despite this improvements, a number of factors, including deep and persistent

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inequalities, undermine efforts to end hunger and undernutrition worldwide (IFPRI, 2017). In early 2017, the United Nations declared more than 20 million people were at risk of famine in four countries: Nigeria, Somalia, South Sudan and Yemen. These crises are largely "manmade," the result of violent conflict and internal strife that are preventing people from accessing food and clean water. Therefore, completely eradicating hunger is a major challenge for policymakers. Food is regarded as one of the major key for sustaining life through the provision of life's essential nutrient for maintenance of good health, labour productivity, and human well-being. . In the 1996 World Food Summit in Rome Italy, food security was defined as situation when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meet their dietary needs and food preferences for an active and healthy life (FAO, 1996). Embedded in this definition are three components; availability, accessibility and food utilization. Availability connotes the physical presence of food in large amounts, accessibility suggests sufficient purchasing power or ability to acquire quality food at all times while utilization demands sufficient quantity and quality of food intake. Food insecurity on the other hand, according to Mushir Ali *et al.* (2012) exists when people are undernourished as a result of the physical unavailability of food, their lack of physical, social or economic access to adequate food and inadequate food utilization.

Global food insecurity is an issue that can no longer be ignored. Essentially, it has become a major problem in Nigeria (Ibrahim et al., 2009). More so, meeting the food needs of households in Nigeria is also a serious challenge, (Akarue &Bakporhe,2013). Empirical evidence has shown that household food insecurity is not only prevalent among rural households but in urban ones as well. Urban areas are faced with the problem of increasing population, increasing inaccessibility to social services, unemployment and underemployment and consequently inadequate supply of food items. Many urban households and individuals in Nigeria merely eat for survival despite their involvement in urban agriculture, just like many rural households whose occupation is predominantly believed to be agriculture. Although there are research findings on the comparative analysis of household food security status between rural and urban areas in literature, but there exist some gaps. Most studies like Babatunde et al (2008), Oluwatayo (2009), Adepoju and Adejare (2013), Omonona et al (2007) and Iorlamen et al (2013) on household food insecurity used a data set that is neither nationally representative nor large enough to generalize the findings as to what categories of households; urban or rural household; female or male headed household; a one-person household or multi- person household; are worst hit by food insecurity. Further, various studies on the extent of household food insecurity in Nigeria have employed different measures. While studies like Oluwatayo (2009), Adepoju and Adejare (2013) among others used an objective measure, Babatunde et al (2008) employed a subjective measure (coping strategy

index). An obvious shortcoming of the subjective measure of food insecurity as stated by the author is that:

> "*It is impractical when it comes to making government policies to reduce food insecurity as there is an obvious incentive for misreporting by the individual able to determine whether he is food insecure and needs government help. Thus the subjective measure limits the usefulness of food insecurity measures in comparing the prevalence of the problem across categories of households or overtime"*

The objective food insecurity measures; dietary diversity and food expenditure measure; employed in this study captures two components of food security; availability and accessibility. According to Ogundari (2013) per capita food expenditure represents food accessibility while dietary diversity score (DDS) represents food availability. Thus, the results generated from the current study better reflects the extent of food insecurity experienced by households in Nigeria and is consistent with food security theory and socioeconomic characteristics of households. Thus, the study accounts for the shortcomings of using an indicator that captures one component of food insecurity (a point of departure from previous studies).

In the light of the foregoing discussions, this study contributes to the literature on household food insecurity status and household socio-economic characteristics using the 2009/2010 Harmonized Nigeria Living Standard Survey (HNLSS) – a nationally representative data.

The rest of the paper is organized as follows: section 2 reviews extant literature on food insecurity. Section 3 focuses on the theoretical framework, methodologies employed as well as data source and description. Section 4 presents the results while Section 5 concludes with policy recommendations.

Literature Review

There have been various theoretical approaches that have drawn attention to different components of food security and in turn, have contributed to the modification and extension of the definition to food insecurity. Two theoretical approaches to food security are presented: Food availability and Entitlement approach.

The first approach to food security is the "food availability" approach. In "*An Essay on the Principle of Population*," published in 1798 by Thomas Malthus, the English economist made public his theory on population dynamics and its relationship with the availability of resources (food). Malthus maintained that the development of

mankind was severely limited by the pressure that population growth exerted on the availability of food. The food availability approach is focused on the (dis)equilibrium between population and food: in order to maintain this equilibrium, the rate of growth of food should not be lower than the rate of growth of population. Until the early 1970s, this was the reference approach for the international community, both at political and academic level. The policy implications of this approach are twofold: On the "demand side", the need to reduce the rate of growth of population–namely the fertility rate–through appropriate policies while on the "supply side", the need to boost (per capita) food production–namely agricultural production. For such purpose, the foremost policy that is generally prescribed and implemented is to increase agricultural productivity. Malthus believed that the world's population tends to increase at a faster rate than its food supply. This indicates that in any country where population grows at a geometric rate without any preventive check, while the production capacity only grows arithmetically, scarce resources will have to be shared among an increasing number of individuals and hence, food insecurity.

The second approach "Amartya Sen's entitlement approach" challenged the popular view that food insecurity is caused by shortage of food. It stressed that people suffer from food insecurity as a result of their inability to have access to food irrespective of food availability (Devereux, 2006). That people suffer from hunger does imply that there is not enough food to go round. On the theoretical level, Sen's 1981 essay on entailment and deprivation posited that food insecurity is more of a demand than supply concern. The entitlement approach concentrates on each person's entitlements to commodity bundles including food, and views starvation as resulting from a failure to be entitled to any bundle with enough food. The most valuable contribution of the entitlement approach to food insecurity theorizing is that it shifts the analytical focus away from a fixation on food supplies—the Malthusian logic of "too many people, too little food"—and on to the inability of groups of people to acquire food. Thus, Food insecurity affects people who cannot access adequate food (e.g. because of poverty) irrespective of food availability— a very crucial insight is that food insecurity can occur even if food supplies are adequate and markets are functioning well.

Various methods have been used in calculating the food insecurity line before identifying the determinants of household food insecurity status (Ravallion and Bidani, 1994; Aigbokhan, 2000; Okurat et al, 2002 as cited by Ayantoye et al, 2011). The Cost of Basic Needs (CBN) approach, the Food Energy Intake (FEI) method used by Greer and Thorbecke (1986), the expenditure method, the per capita daily Ccalorie intake method, dietary diversity measures among others. Oluwatayo (2009) also using household level data employed dietary diversity measure which reflects income, food prices and production to categorize households into food secure and non-food secure groups. In the survey, a number of food consumed by the

respondents were identified. A food secure benchmark of 0.5 was determined based on how varied the diets of respondents are. In all, 15 common food items (with three food items belonging to each of the five classes of food) and water (as the 16th food item) were used. Households with a benchmark greater or up to 0.5 were classified as food secure (1) while those with a benchmark below 0.5 were classified or regarded as food insecure (0). The advantage of dietary diversity measure lies in the simplicity of data collection. Training field staff to obtain information on dietary diversity is straight forward and does not require much technical competence. However, Hodinnoth and Yohannes(2002) observed that dietary diversity is not an adequate indicator of food security as it fails to account for affordability. Omonona et al (2007) and Akarue and Bakporhe (2013) classified households into food secure and insecure based on the expenditure method. A food secure household was then described as one whose per capita monthly food expenditure is above or equal to two-third of the mean per capita food expenditure while a food insecure household was described as one whose per capita food expenditure falls below two-third of the mean monthly per capita food expenditure. One of the main advantages of using the expenditure method is that the food expenditure data are not especially insensitive, that is, people generally have little incentives to misreport how much food they acquire over a short period of time. A major disadvantage of using the method is that it is prone to systematic errors such as telescoping where a respondent may include events that occurred before the recall period, thus inflating estimates of household food expenditures (Smith et al, 2006).

Recent studies have employed ordinary least square (OLS), binary regression technique and multinomial logit regression to examine the determinants of household food insecurity. Studies like Ogundari (2013), Akarue and Bakporhe (2013), Bello (2009), Bhattacharya et al (2004) among others used the regression analysis. Ogundari (2013) employed multinomial logit and fractional regression models to investigate determinants of food-poverty (*FP)* states and the demand for dietary diversity, respectively using 2003/2004 Nigerian Living Standard Survey (NLSS) data. The FP states was derived by combining two food security indicators defined as food expenditure (FOOD exp) and dietary diversity score (DDS), which yielded four possible scenarios viz. completely food secure, food insecure based on FOOD exp only, food insecure based on DDS only, and completely food insecure households in the study. Akarue and Bakporhe (2013), using the binary logistic regression method, identified only income of household head as important determinant of food security. Bello (2009) employed the Ordinary least square method of regression analysis to investigate food insecurity and malnutrition in Nigeria and its implication on wellbeing using secondary data. Bhattacharya et al (2004) adopted the ordinary least square method and logistic regression to examine the relationship between nutritional status, poverty, and food insecurity for

household members of various ages using data from the National Health and Nutrition Examination Survey in United States of America.

A close study of empirical literature shows compelling evidence that food insecurity exists and it is systematically dependent on availability and accessibility amongst other factors. Akarue and Bakporhe (2013) examined the determinants of household food insecurity in Ughelli North Local Government Area of Delta State, Nigeria. They obtained food security index computed from per capita expenditure as well as data on sex of household head, age of household head, level of education of household head, marital status, household size, income of household head. Evidences revealed that households with greater size are more likely to be food insecure as compared with households with smaller size. Another principal determinant of household food security in the study region is the income of the household head.

Studies like Babatunde (2008) and Ayantoye (2011), among others also used primary data based on sample size. Babatunde (2008) carried out a gender based analysis of farming households in Kwara State, Nigeria to examine the determinants of household vulnerability to food insecurity. Primary data collected through a cross section survey of representative farm households in Kwara State. Variables used in the study includes age of household head, household size, off farm income, farm size, education of household head, value of crop output, food expenses, labour hour use, access to extension services, susceptibility to sickness. The study however found that male headed household possessed more resources than female headed households. Female headed households were more vulnerable to food insecurity than male headed households. Farm size and crop output were also significant in determining vulnerability to food insecurity in male headed households. A limitation in this study was the sample size used which cannot be used to test the robustness of findings concerning the impact of gender on vulnerability to food insecurity. More so, Ayantoye *et al* (2011) examined food insecurity dynamics and its correlates among rural households in South- Western Nigeria. Data were collected over two-time period from 292 rural households from September to December 2006 during food crops harvesting season (HS) and from March to May 2007 during food crops planting season. Variables such as households size, educational status, age, marital status, gender, farming experience, dependency ratio, farm size, occupational Status, access to credit, asset ownership were used. They described the movements into and out of food insecurity during the two seasons at which data were collected. Results revealed that more rural households moved into food insecurity during planting season. A general limitation of these studies that used primary data was that it was carried out within some localities in Nigeria. Hence a national survey of the extent and degree of food insecurity is necessary in Nigeria.

Adepoju and Adejare (2013) used the General Household Survey-Panel to analyze the food insecurity status of rural households during the post-planting season in Nigeria. Households were classified as either food insecure or food secure using the expenditure approach to food insecurity. Socio-economic characteristics of respondents including gender, age, marital status, educational status of household head and occupational status of household head were employed in the analysis. Data on food expenditure and non-food expenditure were also utilized. Results showed that almost half (49.4 percent) of rural households in the country were food insecure during the post-planting period. Ogundari (2013) also investigated the determinants of food poverty states and the demand for dietary diversity using 2003/2004 Nigerian Living Standard Survey (NLSS) data. Food insecurity was proxied using food expenditure and dietary diversity score. The study however found out that the odds ratio of households being in state of food insecure relative to completely food secure increased significantly with household size, among households headed by farmers, households that own produced and purchase only food consumed, and households in the rural areas but decreased significantly as income level increased.

Theoretical Framework`

The theoretical framework for examining the relationship between household food insecurity status and household socio-economic characteristics is built within the framework of general household utility model. The household is modelled either as a single unit in the unitary model or as a collection of entities in the collective models

Following Becker (1965), Singh *et al*. (1986) and Behrman and Deolalikar (1988), households obtain utility from the consumption of Z-goods specified as:

(1)

Z_i is a vector of i-*th* household consumption demand which includes consumable goods only. Thus can further be specified as

= (,...) (2)

Therefore,

***U* = , ,...,)** (3)

Where *U* is a utility function that is twice differentiable, increasing in its arguments, and strictly quasi-concave. Taking into consideration the production function of the consumable goods, the household utility function can therefore be specified as:

U = *u*⟨()⟩ (4)

Where represents factor inputs used in the production process and (.) is the production function for the consumable goods.

i = 1, 2, 3,. . ., n

j = 1, 2, 3,. . ., k

U = u { (, ,...), (, ,...),..., (, ,...,) } (5)

For the purpose of this study it is assumed that the household consumes the above bundle of goods subject to his wage (which is determined by Labour supply, Education, Individual Characteristics (IC), Household Characteristics (HC), as well as unobserved factors and random fluctuations in wages (*ew)*) and non-wage income. It is also assumed that the wage earned is spent on consumable goods only. Thus, adding a wage equation of the form yields;

W =*w* (L, E, IC, HC, *ew*)
(6)

The utility function is then maximized subject to the production functions, the wage equation and the budget constraint, which is given as

wL + V)

Where Pz is the price of consumable goods, V is the non-wage income, while *wL* is labour income. The maximization of the problem yields a set of reduced form equations including the equation below, which is of interest to this study.

= (PZ, IC, HC,) (8)

The equation is a reduced form demand function for food security j

Where:

= Food Security (Household food expenditure and dietary diversity score indicators)

PZ = Price of consumable goods

IC = Individual Characteristics

HC = Household Characteristics

= Unobserved Characteristics

Model Specification

From our theoretical framework, a model is constructed to establish a relationship between food security indicators and household socio-economic characteristics. This specification follows Ogundari (2013) as shown below:

Where:+ (9)

i = 1……n

Where Y, the dependent variable is the vector of household food expenditure and dietary diversity score defined as Yi = (HH FOOD EXP, DDS). Households in the sample are first identified as either food secure or not based on certain food security threshold from the food expenditure and dietary diversity score before they are combined. The outcome of the dependent variable has four possibilities based on the indicators used:

Food insecure based on food expenditure but food secure based on dietary diversity

Food insecure based on dietary diversity but food secure based on food expenditure

Completely food insecure from both indicators

Completely food secure from both indicators.

Households in completely food insecure state from both indicators have an outcome of 3, household in food insecure state based on food expenditure and food secure based on DDS have an outcome of 2, household in food insecure state based on DDS and food secure based on food expenditure have 1, and households in completely food insecure state as revealed from both indicators have an outcome of 0

β_0 = Constant term

= Constant term

= Household size

= Income of household head

= Age of household head

= Marital status of household

= Sex of household head

= Area of residence (rural or urban)

=Occupation of household head

= Error term

For the purpose of empirical estimation of the nexus between food insecurity and household socio-economic status, food insecurity is measured in terms of household food expenditure and dietary diversity score. Since the outcome of the dependent variable has four categories, the suitable econometric approach for estimating equation 9 is multinomial logistic regression. A multinomial logistic regression model is used for data in which the dependent variable is unordered or polytomous, and independent variables are continuous or categorical predictors. This type of model is therefore measured on a nominal scale and was introduced by McFadden, (1974). Unlike a binary logistic model, in which a dependent variable has only a

binary choice (e.g., presence/ absence of a characteristic), the dependent variable in a multinomial logistic regression model can have more than two choices that are coded categorically, and one of the categories may be taken as the reference category. The basic compact form of the specification of specification of this regression model is sequentially derived as given below:

In a situation where individual household make the choice j in terms of household expenditure on food, it is assumed that is the maximum utility among the alternatives of the basket of food varieties purchased. This statistical model is anchored on the probability that the household derived utility set as:

$$P(U_{ij} > U_{ih}) \text{ for } h \neq j \qquad (10)$$

It then follows that

$$P_{ij} = \Pr(Y_i = j / J, X) = \frac{\exp(x_{ij}\beta)}{\sum_{h \notin J} \exp(x_{ih}\beta)} \qquad (11)$$

Equation (11) is referred to as conditional logit model in which the regressors vary over the alternatives for each individual household. The numerator on the right hand side of the equation is greater than zero and the probabilities all lie between 0 and 1 and sum to 1. This multinomial logit model is a discrete choice model. That is, the one that specifies the probability that a household may fall under particular alternatives like food secured or insecured, and poor diet or balance diet).

Data Source and Scope

The data used for this study is from Harmonized Nigeria Living Standard Survey (HNLSS) 2009/2010 conducted by the National Bureau of Statistics (NBS). The HNLSS is a combination of the Nigeria Living Standard Survey (NLSS) and the Core Welfare Indicator Questionnaire survey (CWIQ).The data were collected on a quarterly basis, over a one year period from November 2009 to October 2010.

The survey was a nation-wide activity, covering all 36 States of the Federation and the Federal Capital Territory (FCT). The HNLSS was divided into Part A and B. In Part A the welfare approach was adopted, while in Part B it was the consumption approach. It was designed to investigate both urban and rural areas (as classified by the National Population Commission) of all the 774 Local Government Areas (LGAs) of the country. After data cleaning, the data came to 30,651 households. The data is rich in providing general information required for examining the relationship between household food insecurity and socio-economic characteristics. Apart from

the fact that it provides information on the structure and composition of households, it also provides information on the extent of household food insecurity.

The NBS enumerators conducted interviews with household members. The data was collected on a quarterly basis, over a one year period from November 2009 to October 2010. There were 4 interviewer visits per household with 7 day intervals for every 30 days. A diary of daily consumption and expenditure was used to support the interviews and recorded in each household's Diary Record Booklet. Diaries were left with households, with at least one literate individual to complete. For non-literate households, a literate living in the same vicinity assisted the non-literate household to complete their diaries.

The information contained in the HNLSS includes detailed value of own-food produced and expenditure on the type of food purchased by the households. For each household, expenditure profile on the following six food groups were included: (1) staples {i.e., yam, cocoyam, cassava, rice, maize, and millet}, (2) meat and fish, (3) dairy products, (4) fruits and vegetables, (5) fats & oils, (6) sweeteners. And provided also in the dataset are detailed information on the non-food expenditure which includes; expenditure on education, healthcare, housing (i.e., house rent, cost of maintaining the house and the furniture), Clothing (clothes, shoes), utilities, house appliance, transportation (transport fares, petrol purchased, maintenance of cars, bicycles etc.), and communication. Included also are household's socio-economic variables such as: gender, years of education, and major occupation of household head, household with different age composition, and household size.

In this study, analysis is carried out at household level. We focus on the period 2009 – 2010. The choice of the period is guided by data availability considerations.

Estimation Technique

A large number of studies such as Omonona and Adetokubo (2007), Kuku and Liverpool (2010), Ogundari (2013) among others have employed household food expenditure method to estimate the food security line. The food security line was estimated as two-thirds of the mean-per capita monthly expenditure of all households. Households were then classified into their food security status as food insecure and food secure households based on the food security line. A food insecure household was then described as that whose per-capita monthly food expenditure falls below two-thirds of the mean monthly per-capita food expenditure while a food secure household is that whose per-capita monthly food expenditure is above or is equal to two-thirds of the mean per-capita food expenditure. Guided by this we therefore rely on previous literature to define the threshold as two-third of the mean monthly expenditure on food as food security line to classify households in the sample as food secure/insecure. Dietary diversity score is another method of estimating food security line that has been used by researchers. Food items consumed by households are commonly grouped into various food groups to reflect dietary

diversification of the households. Dietary diversity (DD) represents the frequency in which households consume food from different food groups. According to (Smith and Subandoro, (2007) as cited by Ogundari 2013) a household is considered food insecure if their DDS is less than the average DDS of the households in the upper quintile. We also rely on the work of Smith and Subandoro, (2007) in calculating the food security threshold. In calculating the food security status of households, instead of reported income, we use the value of total household consumption (also referred to by many such as Ogundari,(2013), Smith and Subandoro,(2007) among others, as household consumption expenditure). Expenditures are a better representation than income of total resources available to the household because households typically try to smooth consumption over time in the face of fluctuations in income.

Presentation And Analysis Of Empirical Results

Table 1. Determinants of Food Insecurity

Explanatory variables	**Completely Food Insecure (Food Expenditure and DDS)**		**Transitory Food insecure 1 (FE)**		**Transitory Food insecure 2 (DDS)**	
	0dds ratio	Std. Error	0dds ratio	Std. Error	0dds ratio	Std. Error
Household size	61.289***	0.051	18.842***	0.048	2.273***	0.051
Log of household income	0.00001186**	0.361	0.2216***	0.331	0.642	0.353
Nursery/ primary	1.311***	0.088	1.005	0.075	0.946	0.137
Secondary school	1.13	0.099	0.77***	0.084	0.832	0.157
Post-secondary school	1.057	0.113	0.564***	0.096	0.906	0.152
No education	-	-	-	-	-	-
less_25	0.25***	0.173	0.433***	0.136	0.776	0.329
age_25_29	0.803*	0.119	0.918	0.098	0.988	0.207
age_30_34	1.73***	0.112	1.536***	0.096	0.868	0.182
age_35_39	1.473***	0.111	1.286***	0.097	0.722*	0.170
age_40_44	1.278**	0.115	1.225**	0.102	0.705**	0.172
age_45_49	0.827	0.120	0.891	0.107	0.764	0.166
age 50 and above	-	-	-	-	-	-
Occupation (farmer)	0.975	0.072	1.181***	0.061	0.785**	0.121
Non farmer	-	-	-	-	-	-
Gender (female)	0.681***	0.091	0.838**	0.074	1.736***	0.134
Male	-	-	-	-	-	-
LocatiSon (rural)	1.499***	0.078	0.985	0.066	1.15	0.114

Urban	-	-	-	-	-	-
North Central	1.021	0.107	1.192*	0.090	1.488**	0.178
North East	1.597***	0.129	1.607***	0.111	1.635**	0.214
North West	2.261***	0.115	1.837***	0.100	2.899***	0.179
South West	1.304**	0.113	1.31***	0.092	1.202	0.169
South South	1.397***	0.109	0.996	0.089	1.221	0.163
South East	-	-	-	-	-	-
Pseudo R-Square	0 .798					
Likelihood Ratio Tests (P-Value)	38696.675 (0.000)					

*Note: *, **, *** indicate significance at the 10%, 5% and 1% levels of significance respectively*

Source: Author's computation from HNLSS 2009/2010,

The results show that some household socio-economic characteristics have significant relationship with household food insecurity as measured by completely food insecure (dietary diversity score and household food expenditure), transitory food insecure (FE) and transitory food insecure (DDS). The estimation shows that the relationship between household size and food insecurity is statistically significant at 1 per cent level and also positive. This indicates that as household size increases, household food insecurity also increases. The effect of this on economic development in Nigeria is negative as it slows economic development.

Result shows that household income appears to be significant in explaining changes in household food security status at 1 per cent level of significance based on completely food insecure (DDS AND FE) and transitory food insecure (FE). Also worthy of note is that the odd ratio appears with a negative sign which is in tandem with *apriori* expectation. This result however suggests that as household income increases, the odd ratio of being food insecure reduces. Thus, in the Nigerian context, the variable appears to be significant in promoting economic development which implies that increase in household income reduces food insecurity which in turn reduces malnutrition, death among others.

Further, the results show that the odd ratio of household heads being food insecure reduces as household head upgrades his educational status based on transitory food insecure (FE). A significant negative relationship exists between household heads who are less than 25 and household food security status based on completely food insecure (FE and DDS) and transitory food insecure (FE). More so, household head who are in the age bracket (25 years- 29years) are less likely to be completely food insecure based on food expenditure and dietary diversity score at a 10 per cent level

of significance However household heads that are in the age bracket (30-39) years have a significant positive relationship with household food security status while household heads that are in the age bracket (40-44) years are more likely to be food insecure at a 5 per cent level of significance based on completely food insecure (FE and DDS), transitory food insecure (FE) and transitory food insecure (DDS).

The analysis also revealed that household head who are farmers are more likely to be food insecure based on transitory food insecure (FE) at a 1 per cent level of significance and less likely to be food insecure based on transitory food insecure (DDS) at a 5 per cent level of significance. Also a significant negative relationship exists between households who are headed by female and household food security status based on completely food insecure (DDS and FE) and transitory food insecure (FE). However, based on transitory food insecure, households who are headed by female are more likely to be food insecure compared to households headed by males. The result further shows that households in the rural areas are more likely to be completely food insecure based on FE and DDS. We deduce from this result that demographic location is also important in determining food security status as households in the rural areas are more highly impoverished, we can also deduce from our findings that food insecurity in Nigeria is largely a rural phenomenon.

The results also revealed that households in the north central are more likely to be transitory food insecure (FE) and transitory food insecure (DDS) compared to households in the south east. More so, households in the north east and north west are more likely to be completely and transitory food insecure based on food expenditure and dietary diversity score compared to households in the south east. However, households in the south west are more likely to be completely food insecure (FE and DDS) and transitory food insecure (FE) while households in the south south are more likely to be completely food insecure (FE and DDS) only at a 1 per cent level of significance compared to households in the south east.

Conclusion and Policy Recommendation

This study examined the determinants of household food insecurity. The result showed that the odds ratio of household being food insecure relative to completely food secure increased significantly with household size among rural households, among households in the northern region but decreased with higher income, improvement in educational status.

In the light of our empirical findings, it is important for government to create awareness on reproductive health to empower household heads to make quality decision regarding their household size ensuring that a small size of household is maintained by creating health centre with free advice on fertility matters for parents or spouses. Further, since it is clear that household income drives down food

insecurity, it is important government puts in place policies that contribute to the earning capacity of the households. Also job opportunities should be provided so that people with no job can have one and also enhance their food security status.

In addition, we found that educational status of household head is a key factor to improve household food security status based on food accessibility; government should put in place policies to improve the education of household heads so as to improve their chances of accessing the available food produced. Also, education of women should be encouraged especially in the rural areas.

More importantly, there is need for investments in vital agriculture infrastructures, credit linkages and encouraging the use of latest techniques, motivation in each region, location (rural or urban) to achieve local self-sufficiency in food production. Further, food crop production with high potential in the area must be encouraged. Creation of necessary infrastructures will also stimulate private investment for food production on a sustainable basis to create massive employment and reduce the incidence of food insecurity and increase the purchasing power of the people in the country.

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