Research Article   Open Access

Determinants of vulnerability of rural non-farm and farm households to food insecurity in South East, Nigeria

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ABSTRACT

Food insecurity remains a major concern for numerous rural households in Sub-Saharan Africa who rely on agriculture as their main source of livelihood. To ensure food security among rural communities, policymakers need information on the vulnerability and determinants of vulnerability so as to devise strategies that non-farm and farm households can use to cope with economic shock. Using Vulnerability Index (VI) Analysis and OLS multiple regression, we explored the prevalence of vulnerability to food insecurity among rural non-farm and farm households in South East, Nigeria. The results showed that both rural non-farm (0.516) and farm (0.450) households have normal level of vulnerability and are at normal risk of being futuristically food insecure according to UNICEF standard parameters to measure household's vulnerability. The prominent difference in the determinants of vulnerability between both groups is that the value of access to credit, age of household head and membership of social organization was significant among the rural farm households and not among the rural non-farm households. Likewise, households dependency ratio, years of primary occupational experience and households size was significant among the rural non-farm households but not in the rural farm households. In both cases, increasing educational level and household income could help to reduce vulnerability to food insecurity. The results highlight the need for policies and programs to help rural non-farm and farm households to improve their overall food security and develop resilience strategies to food insecurity.
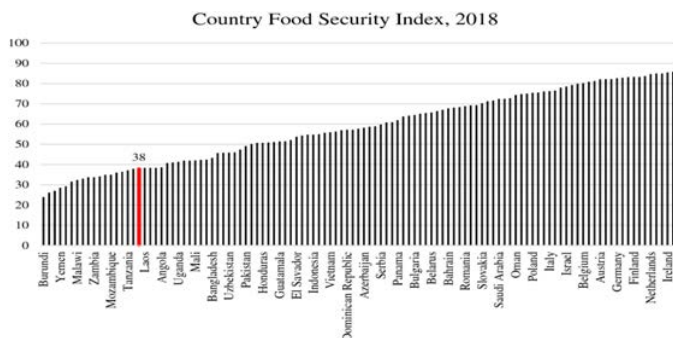
Keywords: Food security, Food insecurity, Vulnerability, Non-farm, Farm households

INTRODUCTION

One of the most pressing current issues in the world today is food insecurity as well as ensuring food for all. This is why there is an increasing growth of hunger in most parts of the world, especially in developing countries (Clover, 2003; Hadebe and Mpofu, 2013). The problem of food insecurity has presented a huge challenge to all levels of governments, especially in developing nations. For instance, about 795 million people are estimated to be undernourished globally Food and Agriculture Organization (FAO, 2020, Osuafor et al., 2020). Achieving food security remains challenging in many rural areas of Sub-Saharan Africa. The importance of access to food and food security has been emphasized by the second Sustainability Development Goals (SDGs) which aims to end hunger and achieve food security by 2030. The 1996 World Food Summit defined food security as existing "when all peo- ple, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (World Food Summit, 1996). This definition of food security rests on four pillars: food availability, accessibility, utilization, and stability. Availability means physical presence of adequate food, accessibility denotes access by individuals to adequate resources for obtaining suitable foods for a nutritious diet, utilization means having sufficient energy and nutrient intake combined with good biological absorption of the food consumed, and stability entails access at all times and not losing such access. Each pillar is necessary but alone not sufficient to ensure the achievement of food security (Barrett, 2010). Appropriately measuring food security implies putting into simultaneous consideration all pillars in order to direct food security policies to the right target group.

It is therefore not surprising that with the observed large increases in the country's population, Nigeria faces a crisis in terms of access to food and general food availability. Nigeria's population is approximately 198 million people, making it the most populous country in Africa and the seventh most populous country in the world. Currently, according to statistics from the Intelligence Unit of The Economist, Nigeria is ranked at 38 out of 100 according to its food security status. This is illustrated in Figure 1. This low rank status is indicative of the challenges that the country experiences with food security.

Figure 1: Global Food Security Statistics

The major factor contributing towards food insecurity and under nutrition is poverty and its effects spread beyond very low caloric intake (Food and Agriculture Organisation, 2020; Obot, Osuafor, Nwigwe and Ositanwosu, 2021). Furthermore, given the reduced capacity of farmers and non-farmers to cope and the possibility that additional shocks will occur, Nigerian households faces a credible risk of famine, and this may increase the size of the food insecure population. Also, due to a persistent lack of access to adequate food and income over the past years, most Nigerian households are left with little ability to manage future shocks. However, when a household have enough assets to cushion the shocks or risk to livelihood, they may still experience losses including reduction in quality and quantity of nutritious food intake; or sometimes their children (school age) may temporally or permanently stop schooling. By doing so, the human capital base of the affected household will be reduced, thereby making them food insecure (Omonona and Agoi, 2007). More so, this could create a huge food insecurity gap among households.

Vulnerability refers to people's propensity to fall or stay below a pre-determined food security line. The food security line could be caloric based (i.e., food requirement) or it could include all basic needs (Zeller, 2006). The concept of vulnerability is used with different connotations. A fundamental difference exists between vulnerability as defenselessness vis-à-vis a harmful event (for example vulnerability to drought) and vulnerability to a specific negative outcome, following a harmful event for example vulnerability to food insecurity. Vulnerability is a function of exposure to risks/shocks and the resilience to these risks. Risks/shocks are events that threaten households' food access, availability and utilization and hence their food security status. Resilience in the food security context is determined by the effectiveness of risk manage-

ment strategies (through prevention, mitigation and coping) and by the resources that can be drawn upon. Vulnerable groups comprise people with common characteristics, who are likely to fall or remain below the welfare threshold in the near future. While most of those who are presently below the threshold level may face a high probability of being so in the future, food security and poverty are not static (Lovendal and Knowles, 2005).

Vulnerability can be thought of as a continuum. The higher the probability of becoming food insecure, the more vulnerable one is. Being food insecure today does not necessarily indicate vulnerability, because the food situation could improve, in particular if looking beyond the very short run. Chronically food insecure people are living below the food security line today. Potentially food insecure people are living on the edge. Although they are not food insecure today, they face a high probability of becoming so (Babatude, Omotesho, Olorunsanya and Owotoki, 2007).

The probability of becoming food insecure in the future is determined by the present condition, the risks potentially occurring within a defined period and the capacity to manage the risks. These risks cause food insecurity by lowering food production, reduce income, reduce assets holding, increase indebtedness and reduce uptake of macro and micro-nutrients (Lovendal et al., 2005).

While considerable attention has been given to the study of food insecurity in developing countries, there are relatively fewer empirical studies, in the literature, on the vulnerability of rural households to future food insecurity. Yet, reducing vulnerability is a pre-requisite for achieving global and national food security targets (Lovendal et al., 2005).

Nigeria during the past decades has focused exclusively on determining the food security line and estimating the proportion of the population that are food secure and food insecure (Babatude et al., 2007). Not much has been done to examine the factors which determine vulnerability to food insecurity among rural households in South East Nigeria and this study will add to such knowledge.

This underscores the need for this study. The general objective to examine the determinants of vulnerability of rural non-farm and farm households to food insecurity in South East, Nigeria

The Specific Objectives Were

To analyze the determinants of vulnerability among the rural non-farm and farm households in the study area; To examine the vulnerability status of rural non-farm and farm households in the study area;

Literature Review

Conceptual and theoretical framework: The definitions of food security are many and varied, and they depend on the theoretical approach taken to assess and measure food security. According to Pinstrup-Anderson (2009), food security was originally described as whether a country has enough access to food to meet its food energy requirements. Thus, food security implied the ability of a nation to meet the food needs of its populace, suggesting self-sufficiency. According

to Duhaime and Godmaire (2002), food security analysis must now include accessibility, consumption, production, and circulation, or availability of stocks. Accessibility and individual consumption are based on the dynamics of relationships between and within institutions where food circulation takes place

Another pertinent issue that arises in the household food security approach is that of stability of access to the food needed to attain food security (Jrad et al., 2010). From here comes the notion of livelihood security of households; that is the adequate and sustainable access to income and resources to meet basic needs. Thus, a household may decide to reduce its food intake in order to preserve other assets, or may, on the other hand, decide to diversify livelihood activities. The primary conceptual framework in this study will make use of the nexus among the various dimensions of well-being as identified in theory.

Empirically, most of the world's poorest countries are in Africa and many of these face chronic poverty and food insecurity. Agriculture, of which 85-90% is rain fed in Sub-Saharan Africa, accounts for 35% of the region's gross national product (GNP), 40% of exports and 70% of employment Clover (2003) and Babatunde et al. (2007) are some of the works that have examined food security in developing countries. The authors argue that domestic policies in many developing countries have contributed very marginally to food security especially in Africa, and that, despite the growing global food production, hunger, malnutrition and famine are prevalent in many developing countries. From their analysis it is evident that improvement in food production in Sub-Saharan Africa will boost per capita GDP, raise purchasing power and access to food. Their major conclusion is that research is needed on new technologies that are output driven, ecologically friendly, acceptable and affordable to the resource poor farmers. Finally, they argue that good governance and stable political governance system will provide an essential and enabling environment for food security in Sub-Saharan Africa.

Determinants of Food Security in Nigeria

The different dimensions of food security from the definitions available are availability, accessibility, utilization, sustainability as well as safety (Omonona et al., 2007; Ayantoye et al, 2011 and Jrad et al., 2010). All these studies have shown that access to food is a very important dimension of food security. Food security is determined by various socio-economic, natural and political factors. These include income, education, age, availability of infrastructure, availability of extension services, government policies on trade, agricultural land area under cultivation, and social safety net (Rose et al., 1998; Mano et al., 2003; Makombe et al., 2011). In Nigeria, determinants of food security are stability of access, household economic status, household income variability, quality of household human capital, degree of producer and consumer price variability, food storage and inventory, household size, and access to social capital (Olayemi, 1998; Amaza et al., 2006; Ayantoye et al., 2011; Oni et al., 2011). Food security has also been found to be both temporal and spatial in nature (Johnson-Welch, 1999; Ayantoye et al, 2011; Devereux et al., 2004). This definition integrates stability, access to food, availability of nutritionally adequate food and the bi-

ological utilization of food. As a result, a synthesis of these definitions, with the main emphasis on availability, access, and utilization, serves as working definition in projects of international organizations. In the view of Babatunde et al. (2007), among the developmental problems facing Nigeria, food security problem ranks topmost. Available statistics show that the Nigeria food security picture is pathetic as more than 70% of the populace live in households too poor to have regular access to the food that they need for healthy and productive living (Aletor, 1999) ascribing Nigeria with highest incidence of food insecurity in Africa (FAO, 2005). For many years now, the price of the symbolic bread has gone beyond the reach of most Nigerians and it has disappeared from the breakfast menu. This statement is underpinned by the now universal 001; 101; 010; 110 etc menu formulae adopted not by students alone, but workers and indeed many households, whereby meals are skipped out of sheer necessity to ensure the availability of another days maintenance ration (Aletor, 1999).

METHODOLOGY

Study Area

The study area is South-East geographical zone of Nigeria. South-Eastern Nigeria is an area covering about 76,358 km2 east of the lower Niger and south of the Benue valley. The region is located between latitudes 4 and 7 degrees north of the Equator and between longitudes 7 and 9 degrees east. In geo-political terms, it contains five out of the 36 states of the nation, namely Abia, Anambra, Ebonyi, Enugu and Imo States. The area is one of the most populous regions in the country with a population of 22,000,000 in the 2006 census approximately 88.5 million people nationwide, or 25 percent of the population of Nigeria (Clement, 2015).

Data Collection

The target population of this study consists of all rural farm registered in the Agricultural Development Programmes (ADPs) of various South-Eastern States of Nigeria and Non-rural farm households. The sample frame for the rural farmers was a list of rural farm households from ADPs while the sample frame for non-rural farm households was a list obtained by community heads in specific LGAs of the randomized selected States. A multi-stage sampling process was used to select a sum total of 180 rural farm households and 180 non-rural farm households with a grand total of 360 respondents for the study. The research relied on primary data which was collected from sampled farmers by 15 well trained enumerators, five from the three purposively selected States and who were all graduate students. A semi structured questionnaire containing both open and close ended questions was used to collect data. Each question in the questionnaire was developed to address a specific objective of the study.

Analytical Technique

Objective 1: Determinants of vulnerability

OLS multiple regressions: An Ordinary Least Squares (OLS) regression model was used. The explicit form of the model is stated as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$$

$$+ \beta_5X_5 + \beta_6X_6 + B_7X_7$$

$$+ \beta_8X_8 + \beta_9X_9$$

$$+ \ldots + \beta_{12}X_{12} + e$$

The dependent variable, Y is the weighted sum reflecting the frequency and severity of using the coping strategies. It is an index which is based on how the households adapt to the presence or threat of food shortages and it is used as a measure of vulnerability to future food insecurity (Babatunde et al., 2008).

The index was computed by using data generated from a series of questions regarding how households were responding to food shortages. This included questions on consumption of less preferred foods, reduced quantity of food to men/women, reduced quantity of food to children and skipping meals etc. The weighted sum of these different coping strategies was computed for a period of 7 days where the weights reflect the frequency of use by the households. The weighted sum reflecting the use of the coping strategies was also computed. The vulnerability indicators that were used to measure the farm households' level of vulnerability to socio-economic shocks or their adaptive capacity to food security in South East Nigeria included:

X1=Education level (number of years spent in school)

X2=Years of primary occupational experience (years)

X3=Access to credit (dummy variable: 1= access; 0=otherwise)

X4=Household income (Naira)

X5=Membership of social organization (dummy variable: 1=yes; 0=otherwise)

X6=Adult household members (number of adult members in the household)

X7=household dependency ratio (ratio of those not working over those working)

X8=Household size (total number of persons within a particular household)

X9=Age of household heads (years)

X10=Food expenses (Naira)

X11=Gender (Dummy variable:1=male; 0=female)

X12=Susceptibility of household head to sickness (Susceptibility of household's head to sickness is a measure of the probability that the household head is likely to fall sick in the future based on his present health condition).

Objective 2: Vulnerability index 6 analysis: The vulnerability indicators assessed in this study included: educational level of the respondents, land ownership status of the farmer, access to credit, total household income, membership of social groups, number of adult members of households, estimated value of productive assets and household size etc. The assumption is that most of these factors either reduces or increases respondents' vulnerability to economic shocks. As presented in Table 1, the actual values of the asset base indicators are in different units and scales. For the vulnerability indices to be obtained on each of the indicators, the methodology used by United Nations Devel-

opment Programme (UNDP, 2020) for assessing Human Development Index was followed to normalize and standardize the values to lie between 0 and 1.

Table 1: UNDP Parameters to measure household's vulnerability

Variability levels	Range (SCR/CCD)	Description
5	V ≥ 0.8	Highest level, Highest risk
4	0.8>V ≥ 0.6	High level, High risk
3	0.6>V ≥ 0.4	Normal level, Normal risk
2	0.4>V ≥ 0.2	Low level, Low risk
1	V<0.2	Lowest level, Lowest risk

Source: UNDP 2020; Range=Standard calorie consumption/calorie consumed per day (SCR/CCD). Where SCC=2,100 Kcal.

However, a value less than 0.4 implies that the household is not vulnerable to economic shocks, while value greater than 0.6 indicates that the household is vulnerable to economic shocks. The most preferred and natural candidate for the vulnerability threshold is between 0.4 and 0.6 (average 0.5) which is the midway. The midway dividing point has an attractive feature; it makes intuitive sense to say a household is 'vulnerable' if it faces a 50% or higher probability of falling into poverty in the near future which means that the households will not be able to feed themselves in the near future. The underlying logic is that "the observed poverty rate represents the mean vulnerability level in the population; anyone whose vulnerability level lies above this threshold faces the risk of poverty that is greater than the average risk in the population and hence can be legitimately included among the vulnerable."

RESULTS AND DISCUSSION

Table 2 shows that majority (42%) of the non-farm respondents were between 40 and 49 years of age, while 52% of the farming respondents were within the age range of 50 and above years of age. The study also showed that about half (50%) of the non-farm respondents had primary education and 43% of the farming respondents also had primary school education. This situation has serious consequences on the level of agricultural production and hence food security at household level. Bzugu et al., (2005) and Idrisa et al., (2007) had earlier recognized that low level of formal education among farmers make the introduction of improved agricultural technologies by extension agents difficult. As it could be seen from Table 2, that (67%) of the non-farming respondents were not engaged in farming while 76% of the farming respondents were engaged in farming as primary occupation with majority of them operating at subsistence level. Record of family size also revealed that 58% of the non-farm respondents had within 4-6 persons per family and 53% of the farming respondents had 4-6 persons. Majority (55%) of the non-farm respondents depended on annual income of within N51, 000

– 100, 000 and 46% of the farming respondents depended on annual income of not more than N50, 000. Both family size and level of income could affect the food security status at the family level. According to Olayemi (1998) and Ali (1994), the urban poor do spend a high proportion of their income on social services and only a little could be left for the purchase of food, or investment in production. The consequence is more serious when the income is "low" and family size is "high" as portrayed by this study.

Table 2: Social-economics characteristics household types

	Non-farm households		Farm households	
	Frequency	**Percentage (%)**	**Frequency**	**Percentage (%)**
Age (in years)				
20-29	60	17	35	10
30-39	98	27	43	12
40-49	150	42	94	26
50 and above	52	14	188	52
Educational level (number of years of schooling)				
Primary Education	180	50	153	43
Secondary Education	80	22	123	34
Tertiary Education	100	28	84	23
Primary Occupation				
Farming	120	33	274	76
Non-farm	240	67	86	24
Household size (number of persons)				
1-3 persons	120	33	85	24
4-6 persons	210	58	194	53
7-9 persons	24	7	67	19
10 persons and above	6	2	14	4
Estimated annual income				
N0.00 – 50, 000	88	24	166	46
N51,000 – 100, 000	197	55	97	27
N101, 000 – 150, 000	67	19	90	25
>N151, 000	8	2	7	2
Percentage distribution on the basis of their socio-economic characteristics (n=360)				

Determinants of Vulnerability among Rural Non-farm and Farming Households in South-East, Nigeria

The prominent difference in the determinants of vulnerability between both groups is that the value of access to credit, age of household head and membership of social organization were significant in rural farm households and not in rural non-farm households. Likewise, household dependency ratio, years of primary occupational experience and household size were significant among the rural non-farm households but not in the rural farm households. In both, increasing educational level and household income could help to reduce vulnerability to food insecurity.

Educational Level

Education was significant and negative at 10% level for farming households but not significant for non-farming households, indicating a relationship with vulnerability. Education and training produce a labour force that is more skilled and adaptable to the needs of a changing economy. It enhances the rural farm household's head ability to understand and evaluate new business production tech-niques. This translates into higher income and productivity. The implication of the result is that as level of education increases, vulnerability to food insecurity decreases. This also is in agreement with Gross, Schultink and Kielmann, (1999) that a highly educated rural farm household would have enough money to finance production requisites and thus, be less vulnerable to food insecurity.

Household Income

This variable was measured as the sum of income of the household head from both off-farm and farm sources per month and reported in naira. The coefficient of households' income was statistically significant for both non-farm and farming households and had a negative effect on vulnerability to food insecurity in the study area. The result means that for every unit increase in household income, vulnerability to food insecurity decreases. This implies that the higher the income of the household head, the lesser the probability of the household being vulnerable. Hence, household who earns high income are significantly more likely to be less vulnerable to food insecurity. This outcome echoes the findings of (Idrisa, Gwary and Ibrahim, 2006)

who reported in their studies in Nigeria that households with increased farm income are more likely to diversify in off-farm income generating activities so as to complement farm income which will lead to increased income and less

vulnerability to food insecurity. Therefore, indicates that, the higher the farmers' income, the higher his farm business performance and increased food security (Table 3).

Table 3: OLS Multiple regression of determinants of vulnerability to food Insecurity among rural non-farm and farm households

Socio-economic parameters	Rural Non-Farm Households		Rural Farm Households	
	Coefficients	t-value	Coefficients	t value
Education level	-0.022	-0.902	-0.020**	1.023
Years of primary occupational experience	-0.302	-0.392	0.920	1.759
Access to credit	-0.102	-2.003	-0.920***	-3.012
Household income	-10.323**	-3.392	-5.203*	-2.300
Membership of social organization	-0.390	-1.203	-0.321***	-0.743
Adult household members	-2.340	-0.394	3.304	0.930
Household dependency ratio	0.295*	0.302	2.930	0.113
Household size	0.767***	0.732	0.493	0.840
Age of household heads	0.749	1.974	-2.932*	-1.203
Food expenses	0.839	1.642	-0.769	-2.100
Gender	3.203	0.106	0.323	0.290
Susceptibility of household head to sickness	0.849	1.200	1.236	0.903
Constant	0.139***		0.034***	
R-Squared	0.79		0.85	
Adjusted R-Squared	0.76		0.82	
F-Statistic	11.20***		18.40***	

HOUSEHOLD DEPENDENCY RATIO

This variable was estimated as the ratio of non-working members to working households' members. The coefficient of dependency ratio was found to have significant and positive relationship at 10% for non-farm households and not significant for farming households. The result in means that for every unit increase in household dependency ratio, the coefficient of household vulnerability to food insecurity increases by 0.295. By implication, higher dependency ratio positively impact on the probability of the household being vulnerable to food insecurity. The possible explanation is that in a household where there are more non-working or unemployed household members, the burden on the employed members in meeting the cost of household's food and nutrition needs would be high hence, the less likely for such household to escape food insecurity.

Household Size

The coefficient of household size (0.767) was positive and significant at 1.0% risk level showing direct relationship with vulnerability to food insecurity for non-farm households but not significant for farming households. The positive coefficient implies that a unit increase in the household size will raise rural non-farm households' vulnerability to food insecurity. This implies that as household size increases, the vulnerability to food insecurity will increase. This is in conformity with a prior expectation and in agreement with (Haddinott and Yohannes, 2002). That found household size to be positively related to vulnerability to food insecurity.

Access to Credit

The coefficient of access to credit (-0.920) was significant

at 1% level of probability and had a negative effect on farmers' vulnerability to food insecurity for farming households but not significant for non-farming households. The sign of the variable is in consonance with normal expectation. It implies that rural farm household's vulnerability to food insecurity decreases with access to credit. Access to credit have been identified as an important factor in farm sector business start-up especially in the case of self-employment activities and useful in funding transaction cost for wage activities especially in developing economies like Nigeria were the credit market is undeveloped (Henneberry and Carrasco, 2013). It also regarded as one of the key elements in raising productivity and income as such reducing vulnerability to food insecurity (Global Hunger Index Report, 2012). Access to credit will empower the farming households, expand and improve their farm businesses and as well as diversify their income generating activities, thus making such household food secure. Lack of credit access prevents poor households from diversifying into income generating activities that can safeguard them from shocks.

Age of Household Head

Specifically the coefficient of age of the farm households (2.932) was negative and statistically significant at 90.0% for farming households which was in variance to result obtained for rural non-farm households whose coefficient positively influenced vulnerability to food insecurity. The sign of the variable is in consonance with a priori expectation. This implies that the older the farmer, the more experience gained in marketing, hence, increased in net return. The experience gained as a result of old age and

also while operating in the business would thus make significant impact. This is an index of entrepreneurial success (Ingawa, 2002). This shows that an increase in age of the rural farmers would stir up increased income from farm business. It is likely that the older farm households in the study area are still economically active with high income earning opportunities and have made several income generating investments which accounted for the posture of this result. Increasing age could mean increase in experience in a particular farm enterprise. This will increase expertise and income generated therein. The ability to work declines with age, so as age increases, income shrinks, which automatically reduces per capita expenditure and increase vulnerability to food insecurity.

Membership of Social Organization

Membership of social organization such as cooperative society gave a negative coefficient (-0.769) and was significant at 5.0%, for farming households but not significant for non-farming households indicating that being a member of cooperative society decreases farmers probability to food insecurity. This presupposed that membership of cooperative society aids in receiving and evaluating information for business improvement and productivity (Ajagbe, 2012). This is not unexpected as low participation in cooperative societies can have negative implication on household access to agricultural inputs, innovations and market information, thus such household are less likely to escape food insecurity. Group membership or association provides a ground for the exchange of information about emerging markets giving farmers links on how to make good sales (Table 4).

**Table 4:** Vulnerability status of farm and non-farm households in South-East Nigeria

Vulnerability Index								
	Rural Non-Farm Households				Rural Farm Households			
V1 Ranges	Frequency	Percentage	Mean V1	Standard Deviation	Frequency	Percentage	Mean V1	Standard Deviation
V ≥ 0.8	13	7.2	0.87	0.927	11	6.1	0.82	0.812
0.8 > V ≥ 0.6	53	29.4	0.65	0.722	42	23.3	0.63	0.723
0.6 > V ≥ 0.4	37	20.6	0.51	0.302	39	21.7	0.41	0.412
0.4 > V ≥ 0.2	31	17.2	0.38	0.203	27	15.0	0.27	0.218
V < 0.2	46	25.6	0.17	0.102	61	33.9	0.12	0.193
T value= 1.302	180	100.0	0.516		180	100.0	0.450	

Rural Non-Farm and Farm Households' Vulnerability in South-East Nigeria

The result on Table 1 showed that both rural non-farm (0.516) and farm (0.450) households have normal level of vulnerability and are at normal risk of being futuristically food insecure according to UNDP standards. In practice, therefore most of the empirical studies adopted the vulnerability threshold of 0.5 and the study revealed rural non-farm households to be more vulnerable to food in-

security than rural farm households based on their mean vulnerability index of 0.516 and 0.450 respectively (Food and Agriculture Organisation, 2020). From Figure 2, there exist significant different in the vulnerability index of rural non-farm and farm households in South-East. The Figure 2 also shows a downward slope from left to right with vulnerability level 2 being the nearest intercept in terms of low risk or vulnerability. The different kinds and magnitude of risks faced by both rural non-farm and farm households in

the study area may lead them to a wide variation in their income from year to year. This income variation could lead to loss of productive assets (Food and Agriculture Organization, 2020).
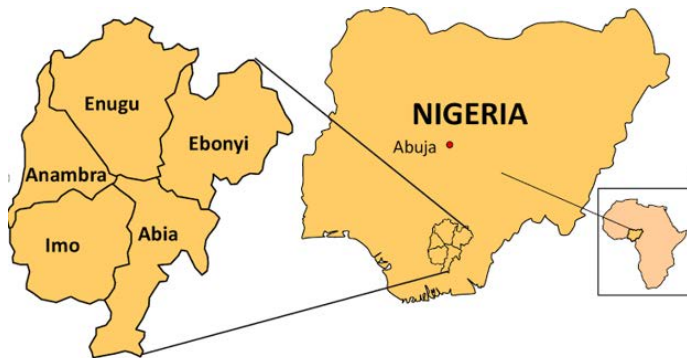

Figure 2: Map of south-east, Nigeria; source: maps.Nigeria.com

CONCLUSION AND RECOMMENDATION

The study concludes that both rural non-farm and farm households have normal level of vulnerability and are at normal risk of being futuristically food insecure and there exist significant differences in the vulnerability index of rural non-farm and farm households in South-east, Nigeria and vulnerability to food insecurity of rural non-farm households was influenced by education level, household income and years of primary occupational experience, household dependency ratio and household size. Similarly, for rural farm households' education level, access to credit, household income, and age of household head and membership of social organization were determinants of vulnerability to food insecurity. The results point to the need to develop policies, programs and strategies that

Help rural non-farm and farm households to improve their overall food insecurity as well as to increase their resilience to extreme economic shocks.

Based on the findings of the study in Figure 3, the following recommendations geared towards ensuring food security among rural farm and non-farm households in Nigeria are made:
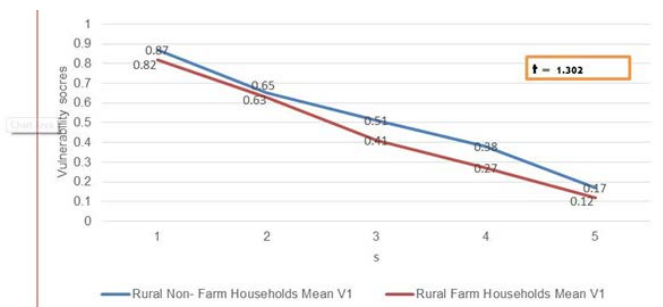
Figure 3: Vulnerability index of rural non-farm and farm households

a)   Identified vulnerability to food insecurity among non-farm and farming households should be targeted for improvement to ensure that there is improved access to credit facilities especially in the rural South-eastern of Nigeria.

b)   There should be intensification of enlightenment campaigns and programs on birth control measures and on the benefits of small household size.

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