Journal of Agricultural Extension
Vol. 26 (2) April, 2022
ISSN(e): 24086851; ISSN(Print); 1119944X
Website: https://journal.aesonnigeria.org; https://www.ajol.info/index.php/jae
Email:editorinchief@aesonnigeria.org;agricultural.extension.nigeria@gmail.com

Households Food and Nutrition Security in Enugu State, Nigeria

https://dx.doi.org/10.4314/jae.v26i2.2
Received: 17th September, 2021
Revisions: 29th October, 2021, 12th November, 2021, 15th November, 2021, 21st November, 2021, 28th November, 2021, 13th December, 2021, 20th February, 2022
Accepted: 20th February, 2022
Published: 13th April, 2022

Chiemela, Stella Nwawulu
Department of Agricultural Economics, University of Nigeria Nsukka
Email: stella.chiemela@unn.edu.ng; Phone: +2348055310389
https://orcid.org/0000-0002-2922-3182

Chiemela, Chinedum Jachinma
Department of Agricultural Economics, University of Nigeria Nsukka
Corresponding author
Email: chinedum.chiemela@unn.edu.ng; Phone: +2348032906932
https://orcid.org/0000-0002-8605-0871

Apeh, Chikamso Christian
Department of Agricultural Economics, University of Nigeria Nsukka
Email: apehchikamso@yahoo.com; Phone: +2348068481106
https://orcid.org/0000-0002-5133-5746

Ileka, Chikaosolu Maryqueen
Department of Agricultural Economics, University of Nigeria Nsukka
Email: chikaosolu.ifiorah@unn.edu.ng; Phone: +2348093794866
https://orcid.org/0000-0002-3881-809X

Abstract
The study used household data from 240 randomly selected respondents to assess the food and nutrition security of households in Enugu State. The Household Food Insecurity Access Scale (HFIAS) and Household Dietary Diversity Score (HDDS) were used to describe households' food security levels. Descriptive statistics, such as percentages, were also utilized to describe households' food sources, as well as their understanding of food nutrition and balanced diet, while the Likert scale was employed to identify the variables influencing their food choices. Only 30% of the respondents were food secure. The mean score of the dietary diversity of households was 5.95 out of 12. The respondents had little or no knowledge of food nutrition and balanced diet. Educational programmes on food and nutrition security should be conducted and encouraged by extension agents, governments and non-governmental agencies to enlighten households.

Keywords: Food insecurity; HFIAS; HDDS; adequate nutrition

Introduction
The Global Report on Food Crises for 2021 emphasizes the alarming intensity and amount of people in crisis or worse throughout the world (Food Security

Information Network and Global Network Against Food Crises, [FSIN and GNAFC], 2021). With an estimated 720 million undernourished people in the world in 2020 attributed to the impact of COVID-19 pandemic and other factors such as climate change and economic difficulties, an estimate of 660 million people has been projected to face hunger in 2030 globally (FAO, IFAD, UNICEF & WFP, 2021). The prevalence of moderate or severe food insecurity has also been on the rise since 2014 but the increase in 2020 equalized that of the previous five years combined. This represents nearly one in three people in the world (2.37 billion) not having access to adequate food, i.e., an increase of almost 320 million people in just one year (FAO, IFAD, UNICEF & WFP 2021).

Food is a basic human need and a major source of nutrients for existence. It is also of high importance for human well-being and economic productivity (Agada & Igbokwe, 2016). Food demand has generally grown faster than total supply, contributing to food insecurity.

Food security is a situation that exists 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 (Peng & Berry, 2019). This definition therefore depicts the multidimensionality of food security. The major elements of food security are; food availability, food access, food utilization and protection of access (Agada & Igbokwe, 2016). Therefore, the inclusion of utilization underlines that nutritional security is as important as food security. Nutrition is the bridge between agriculture and health. Yet malnutrition remains the world`s most serious health problem and the single biggest contributor to child stunting and death (FSIN & GNAFC, 2021).

Nigeria has an extremely high poverty and food insecurity levels (Ike *et al*., 2017) and approximately 15% undernourished population, that is, 29.4 million undernourished people despite being one of the largest economies in Africa (FAO, IFAD, UNICEF &WFP 2021). This is as a result of conflicts, climate extremes and economic downturns. The country's economic recession, the COVID-19 pandemic, high inflation, and conflicts especially farmers-herders clashes in almost all the states in the country especially Enugu State have become key drivers of poverty, food insecurity and hunger in the country. In addition, nutritional information, affordability, convenience, taste, and the physical and social surroundings have all been found to influence households' food choices (Pawlak & Kołodziejczak, 2020).

The problem of food and nutrition security in Nigeria, at the national and State levels has not been adequately and critically analysed despite various approaches at addressing the challenges. Government has introduced several agricultural productivity projects and programmes to improve food production and security in the country. However, the results of these programmes are poor Matemilola & Elegbede (2017). Meanwhile, key studies on food security in Nigeria have focused more on food production, income, and calorie intake (Ike *et al*., 2017), neglecting the importance of household food security analysis. Households are the most significant social unit for food preparation and consumption, hence, the need for a paradigm shift in food security programming, moving from a

generalized national assessment to a more direct household analysis approach, which would help remove the bottle necks in programme implementation and efficient outcome.

Food and nutrition security studies have been done in the country (Kassy *et al*., 2021; Egwue et al., 2020; Onunka *et al.,* 2018, Obasan *et al*., 2017), but none have assessed/ the country's current food security condition, particularly in Enugu State. Furthermore, the need of conducting frequent assessments of food security to improve mitigation, readiness, and actions to avert food insecurity cannot be overstated (Kassy *et al.,* 2021). As a result, using food accessibility and dietary diversity as proxies, this study identified households' food security, as well as their food sources, the variables that influenced their food choices, and their understanding of food nutrition and a balanced diet.

Methodology

This study was conducted in Enugu State, Nigeria. The State is geographically situated between latitude 6° 21′N and 6° 33′N, and longitude 7° 25′E and 7° 38′E on the northwestern fringe of southeastern Nigeria. The study used a multi-stage sampling procedure. Three local government areas (LGAs) were chosen in stage one: Oji River, Enugu East and Uzo-uwani. The second stage consisted of selecting two town community from each of the LGAs, for a total of six towns. In the third stage, two villages were chosen at random from each of the town, and then 20 households were randomly chosen from each community, totaling 240 households. Male and female headed households were considered in the selection of respondents because of the significance of gender in household decision making.

A structured questionnaire was used to gather data. Percentage was used to analyse the households' food sources, and their knowledge of food nutrition and balance diet. Food security status was determined using the Household Food Insecurity Access Scale (HFIAS) using two of its indicators namely, the Household Food Insecurity Access Prevalence (HFIAP) and Household Food Insecurity Access–related Domains (HFIA-D) in addition to the Household Dietary Diversity Scale (HDDS) (Jonathan & Wade, 2014; Ike *et al*., 2017). The factors that affect respondents' food security were determined using a 4-point Likert rating scale with a mean score of 2.5.

HFIAS measures the degree of food insecurity during the month prior to the survey. It is calculated for each household based on the household's answers to nine questions of frequency of occurrence. The scale gives a picture of households in different food security levels based on their position on the scale of 0 – 27 (Coates *et al*., 2007). Food insecurity increases as the number of positive responses increase; zero (0) being most food secure and 27 being most food insecure.

The HFIAP uses the responses to the HFIAS questions to group the households into four categories of food insecurity namely, food secure, mildly food insecure,

moderately food insecure and severely food insecure (Coates *et al*., 2007). The categories and their corresponding adjusted score ranges are as follows:

Category 1 - High food security: households had no problems or anxiety about accessing food. They have steady access to adequate food (0-6).

Category 2 - Mild food insecurity: households had rare or occasional anxiety and problems in accessing adequate food, but their food intake (quantity, quality, and variety) was not significantly reduced (7-12).

Category 3 – Moderate food insecurity: the quality, variety and desirability of the food consumed by these households were significantly disrupted, but the quantity and eating patterns of their meals was not significantly disrupted (13-18).

Category 4 – Severe food insecurity: the eating patterns of one or more household members were disrupted at times, and the quantity of their food also reduced due to lack of resources or money for food (19-27).

Furthermore, the households were categorized into 3 domains referred to as HFIA-D, namely, Anxiety and uncertainty, Insufficient quality and Insufficient food intake and its physical consequences (Coates *et al*., 2007).

HDDS assesses household food diversification. It refers to the number of food groups out of 12 groups each household consumed within the previous 24 hours. The questionnaire elicited information on consumption of 16 food groups over the reference period which is submerged into 12 for scoring (Table 1). Using FAO's classification, the minimum score for this indicator is 0 for households that ate nothing, and the maximum score is 12 for households that ate all the food groups. This approach is designed to capture the nutritional aspect of food security (FAO, 2011).

Table 1: Food groups consumed by households in the past 24 hour

16 food group	12 food groups (yes = 1; no = 0)
Cereals and grain	Cereals and grain
Roots and tubers	Roots and tuber
Vegetables rich in Vitamin A	Vegetables
Green leafy vegetables	
Other vegetables	
Legumes and nuts	Legumes and nuts
Vitamin A rich Fruits	Fruits
Other fruits	
Organ meat	Meat
Flesh meat	
Eggs	Eggs
Fish and sea food	Fish and sea food
Milk and other dairy products	Milk and other dairy products
Oil/fat/butter	Fats/oil
Sweets	Sweet
Spices, condiments, Beverages	Spices, condiments, beverages

Results and Discussion

Socioeconomic Characteristics of Households

Studies conducted in Nigeria have shown that in addition to other factors, food and nutrition security of households are influenced by socioeconomic factors such as household size, income and the occupation of the household head (Abu & Soom, 2016; Muhammad & Sidique, 2019). Results in Table 2 show that most of the households had more of 5-10 members (55%). Household size is a crucial factor because the number of persons in the household impacts the consumption demand on household resources, most notably food, hence a high dependence ratio is a good indicator of food insecurity.

The result show that more than one third (40.8%) earned ₦30,000 or less monthly. Income influences household's daily food expenditure. There is likelihood of households with low monthly income to be food insecure than those with high monthly income, *ceteris paribus*.

As shown in Table 2, the respondents were mainly civil servants (22.5%), farmers (20.8%), artisans (18.3%) and traders (20.8%). Some of the respondents were government employees, earning stable income while many were daily earners making them vulnerable to food insecurity. The daily earners are more disadvantaged since their work is not secured; hence their food and nutritional consumption will be negatively influenced. However, it can be argued that both government employees and other occupational statuaries are vulnerable as a result of the current inflationary pressures on products and services, particularly food prices.

Table 2: The socioeconomic characteristics

Socioeconomic characteristic	Percentage (n = 240)
Household size	
≤ 5	38.3
5-10	55
10 and above	6.7
Monthly income (₦)	
≤10000	2.5
11000-20000	5
21000-30000	33.3
31000-40000	15
41000-50000	13.3
Above 50000	30.8
Major occupation	
Civil servant	22.5
Farmer	20.8
Private sector	15.8
Artisan	18.3
Trader	20.8
Student	1.7

Households' Source of Food

A large number of the respondents (45.83%) grew their foods (on farm lands and home gardens) and was the most identified non-market source by the respondents. However, notwithstanding that some of the households produced their food, all the households (100%) still purchased food from the local markets (Table 3). This implies that household production was not enough for them to solely depend on, for their food needs. Farm-based pathways to food and dietary variety, which may not be sufficient for household food security, need households to compensate for their low productivity and lack of production diversity by purchasing a diverse range of food categories (Fraval *et al.,* 2019). The discovery of Ogundari (2017) highlights the reality that home-produced foods are insufficient to provide household food security. In Hetherington *et al.* (2017), for example, households that had a livestock component to their farm consumed more animal products owing to their on-farm availability. Other sources will be used to meet the rest of the household's food demands. On the other hand, it indicates that households must have enough money to buy food in order to be food secure.

Table 3: Household sources of food

Source	Percentage (n = 240)
Market Sources*	
Supermarket	5.0
Local market	100.0
Food vendors (Fast food)	46.6
Non market Sources*	
Grew it	45.83
Gift from friends and other households	5.83
Food remittance	5.83
Charitable source	1.67
Primary Source	
Own production	31.6
Purchased	68.33

***Multiple response questions**

Food Security Categories

Using the Household Insecurity Food Access Scale Score (0-27), four categories of respondents can be observed (Table 4): respondents A were classified as food secure having HFIAS score of 0-6, respondents B were mildly food insecure having HFIAS Score of 7 - 12, respondents C were moderately food insecure having HFIAS score of 13–18 and respondents D were severely food insecure having HFIAS score of 19-27. The results show that 30% of the respondents were food secure, 15.8% were mildly food insecure and 25.8% were moderately food insecure while the remaining 28.3% of the respondents were severely food insecure. This means that more than two-third of the households (70%) suffered some form of food insecurity. Some studies corroborate the current findings. For instance, Kassy *et al.,* (2021), a study conducted in Enugu State in 2018 utilizing the Freedom from Hunger measure, revealed 61.1%. According to a research done in the state during the peak of the COVID-19 epidemic in 2020 by Egwue *et al*., (2020), 69.5% of households in the state were food insecure. Nevertheless,

the results of this study differ with the 42% reported in Onunka *et al.*, (2018), a study conducted in a local government in Enugu State. The disparity between prior studies and the current study can be linked to Nigeria's current food price increase. This suggests that food insecurity in the state has grown over time and has stayed constant since the apex of COVID-19 in 2020, a period connected with the shutdown of the majority of the nation's economic operations.

Table 4: Food security levels of households

	Percentage (n = 240)
Respondents A	30.0
Respondents B	15.8
Respondents C	25.8
Respondents D	28.3

A = Food secured B =Mildly food insecure C =Moderately food insecure and D = Severely food insecure.

Table 5 shows the distribution of households based on the HFIA-D. This groups the respondents' behaviour into three domains; anxiety and uncertainty, insufficient quality, and insufficient food intake and its physical consequences. The result shows that 66.7% belong to the anxiety and uncertainty group, an average of 60.6% belong to Insufficient quality, while an average of 41.16% belong to insufficient food intake and its physical consequences (Table 5). The insufficient food intake result shows that, some of the respondents took less of the possible nutritional requirement due to lack of resources. With the majority of the domains having above average responses, it implies that majority of them were food and somehow nutritionally insecure.

Table 5: Food insecurity domains

Responses to food insecurity	Percentage(%)
In the last month, did you:	
Worry that your household would not have enough food?	66.7
Not eat the kinds of food you preferred because of lack of resources?	62.5
Eat limited variety of foods due to lack of resources?	60.0
Eat food you did not want to because of lack of resources to obtain other types of food?	59.3
Eat smaller meals than you needed because there was not enough food?	64.2
Eat fewer meals in a day because there was not enough food?	60.8
Eat no food of any kind because of lack of resources to obtain food?	35.8
Go to sleep hungry because there was not enough food?	30.8
Go a whole day and night without eating anything?	14.2

Rice, *garri/fufu* (processed from cassava) and bread were the dominant foods consumed by households. Beef and fish were the common form of animal protein. However, the respondents' preference for animal protein is transiting to pork due

to increasing cost of other animal sources of protein. Common plant protein were beans and *okpa* (bambara nut). The vegetable variety include *Ugu* (Fluted pumpkin), *Onugbu* (Bitter leaf), *Oha*, and African Spinach "Green". The common fruits featured in the responses were tomatoes, oranges and pears.

The result of the HDDS shows that out of the total score of 12, the households on the average scored 5.95. The minimum score recorded was 3 and the maximum was 9. Meanwhile, the female headed household average score was 5.5 while the male headed households average score was 6.4 (Figure 1). This means that the male headed households on average had a higher dietary diversification than the female headed households. Gender has been highlighted as an important predictor of household food security status (Ngema *et al*., 2018). The difference in the scores could be because the male headed households are more likely to provide adequate labour for agricultural production and other income earning activities, thereby, enhancing their households' food availability, accessibility and affordability. They are also culturally more favoured in resources ownership and entrusted with the responsibilities of fending for their families. Ngema *et al.* (2018), also found that the HDDS of households are affected by other factors such as household size, income, education status, employment status and access to credit.

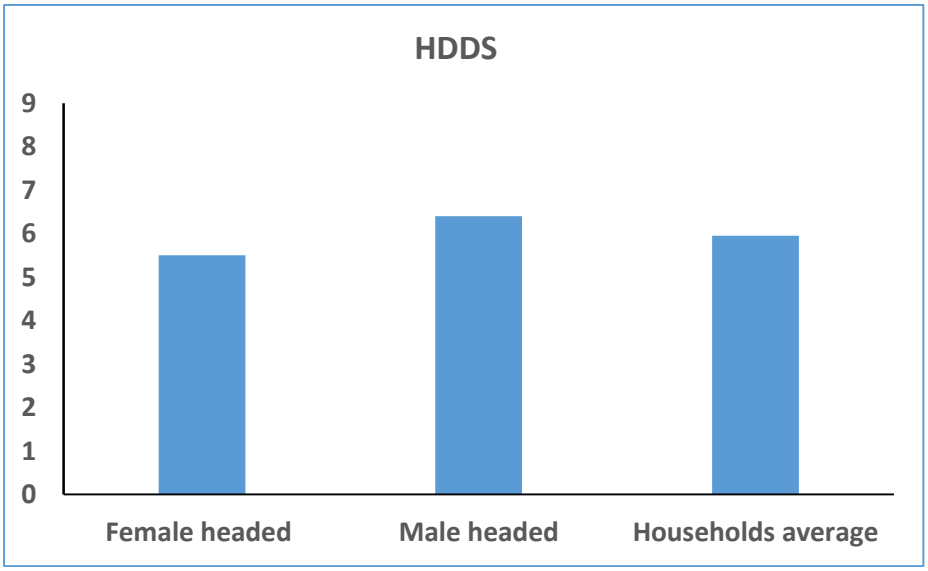

Figure 1: HDDS of households

Factors that Affected Households' Food Choice/Combination in the Previous Year

From Table 6, the factors found to affect household food choices/decisions in the previous year were, low farm yield ($\bar{x}$ = 2.62), monthly income ($\bar{x}$ = 3.22), household size ($\bar{x}$ = 2.91), educational level ($\bar{x}$ = 2.53) and convenience ($\bar{x}$ = 2.86), with mean scores above 2.5.

Since most of the farmers were subsistence farmers whose own farm produces were not enough for their household food consumption dependence, they get their food from non-farm sources such as through market purchases. Davis *et al*., (2017) supports this finding that in developing countries, only few households

depend on their farms as the main source of their household food. This low yield is usually as a result of the effects of land fragmentation, climate change/variability and low adoption of improved innovations/techniques.

More so, household income has shown to greatly affect households' ability to purchase food (Table 6). About one third of the total respondents were found to be earning the nation's minimum wage or less. This conforms to the initial report of this study on the income level of the respondents, that some of the households earned less than Nigeria's minimum wage of ₦30,000/month and some lived below 1.9 USD/day poverty line. While income has remained constant for some people in the State especially formal employees, the economic downturn of the country has resulted to inflation of prices of goods and services. This has reduced the purchasing power of households thereby affecting their food security. Studies have supported this finding that household income strongly affects their food security (Akukwe, 2020; Etea *et al*., 2019).

The relatively high household size is not a good food security sign with increased dependency (Obi & Tafa, 2016) and the possibilities of those households to be poor are high. Going by the household size of 10 members and above, each member of the households spends ₦100 naira or less on feeding daily i.e. approximately 20 cents with an exchange rate of ₦507/USD. Considering the World Bank international poverty line of 1.9USD/day, majority of the households can be classified as poor and food insecure (World Bank, 2021). However, a higher household size could equally imply more labour availability which could lead to improved food production or diversified sources of household income.

The educational status of household head has effect on household food security (Table 6). Studies have shown that the educational level of household members particularly the household head have positive relationship with households' decisions on food consumption (Adjimoti & Kwadzo 2018). In line with this opinion are the studies that have found that education positively influences income, and household food security (Ike *et al*., 2017).

As can be observed in Table 6, households consider the convenience of preparing a particular food in their decision making and this may be attributed to lack of nutritional knowledge which affects household preference, attitude and food consumption behaviour (Weerasekara *et al*., 2020).

However, monthly income, occupation, availability of time, educational level, and health status had their standard deviations greater than 1. This implies that the individual scores of the respondents on each factor varied much from the average score of the factor (Table 6).

Table 6: Factors that affected choice of food in the previous year

Factors that affect food choices/decisions	Mean	Standard deviation
Low farm yield	2.62*	0.451
Monthly income	3.22*	1.224
Age of household members	1.31	0.814
Occupation	1.66	1.156
Household size	2.91*	0.913
Educational status	2.53*	0.589
Time required to prepare the meal	1.69	1.136
Health status	1.67	1.125
Festivals	1.33	0.858
Culture	1.15	0.564
Convenience	2.86*	0.748

***≥ 2.5 (has an effect on household food choice)**

Households Level of Knowledge of Food Nutrition

Result shows that 37.5% of the respondents had no knowledge of what food nutrition was (Table 7). Of the 62.5% of respondents who claimed to understand food nutrition, 40% gave an excellent explanation, including the relative nutrient content of known foods in their daily meals, while the other 60% gave an unclear explanation.

Most of the respondents (91.25%) had some knowledge of a balanced diet (Table 7). Most of them (66.67%) gave a good definition on balanced diet and some (50.67%) were able to list the six basic classes of food with their examples while the rest provided insufficient or no information. This implies that some of the respondents lack the basic knowledge on food nutrition and balanced diet. Although relatively better, this finding is in line with the finding of Weerasekara *et al*., (2020) that about 71% of the respondents did not know about food nutrients while about 57% did not know what a balanced diet was. This lack of knowledge has been linked to factors such as educational level, attitude towards nutrition, perception of food quality, area of residence and income (Weerasekara *et al*., 2020).

Table 7: Knowledge of food nutrition and balanced diet

Question	Percentage yes (n = 240)
Do you know what food nutrition is?	62.5
Do you know what balanced diet is?	91.25

Conclusion and Recommendations

The majority of households in Enugu State are in the state of food insecurity due to poor access to food, unaffordability of food, and poor dietary diversification. These were influenced by factors such as farm yield, monthly income, household size, educational level and convenience. All the households purchased their foods from their local markets implying that majority of their incomes are spent on what they consume or food. Therefore, only those households with access to adequate income have any chance of holding food insecurity at bay. In addition, poor level

of food nutrition knowledge is an issue that may hinder household consumption of balanced diet and food security.

Extension agents and other development agents must find ways to encourage households that are farmers to improve their farming systems through diversification to increase dietary diversity, as well as ways to improve their source(s) of income, which can be through livelihood diversification, in order to achieve the second goal of the Sustainable Development Goals, Zero Hunger. Households' sensitization on healthy eating and food diversification is needed to enhance their knowledge of nutrition and possible food combinations for improved household diet and nutrition. Likewise, policy makers should develop appropriate nutrition programmes or food insecurity mitigation strategies based on this and other empirical findings.

References

Abdullah, Zhou, D. Shah, T., Ali, S., Ahmad, W., Din, I. U., & Ilyas, A. (2019). Factors affecting household food security in rural northern hinterland of Pakistan, *Journal of the Saudi Society of Agricultural Sciences,* 18(2), 201-210. https://doi.org/10.1016/j.jssas.2017.05.003

Abu, G.A. & Soom, A. (2016). Analysis of factors affecting food security in Rural and Urban farming households of Benue state, Nigeria. *International journal of food and agricultural economics*, 4: 55-68.

Adjimoti, G. O. & Kwadzo, G. T. (2018). Crop diversification and household food security status: evidence from rural Benin. *Agriculture and food security,* 7(82):1-21.

Agada, M. & Igbokwe, E. (2016). Influence of food culture and practices on household food security in north central Nigeria. *Journal of food Security*,4(2)36-41.

Akukwe, T. I. (2020). Household food security and its determinants in agrarian communities of southeastern Nigeria*. Journal of tropical agriculture, food, environment and extension*, 19(1), 54-60.

Davis, B., Di Giuseppe, S. & Zezza, A. (2017). Are African households (not) leaving agriculture? patterns of households' income sources in rural sub-Saharan Africa. *Food Policy.* 67:153–174.

Egwue, L. O, Agbugba, I. K., & Mukaila, R. (2020). Assessment of rural household's food insecurity during COVID-19 pandemic in south-east Nigeria. *International journal of research-granthaalayah*, 8(12), 182-194. doi.org/10.29121/granthaalayah.v8.i12.2020.2713

Etea, B. G., Zhou, D., Abebe, K. A. & Sedebo, D. A. (2019). Household income diversification and food security: Evidence from rural and semi-urban areas of Ethiopia. *Sustainability*, 11, 3232, doi.10.3390/su11123232.

Fraval, S., Hammond, J., Bogard, J. R., Ng'endo, M., van Etten, J., Herrero M., et al. (2019). Food access deficiencies in Sub-saharan African: Prevalence and implications for agricultural interventions. *Frontier sustainable food system,* 3:104. https://doi.org/10.3389/fsufs.2019.00104

Food and Agricultural Organisation, International Fund for Agricultural Development, United Nations International Children's Emergency Fund & World Food Program (2021). The state of food security and nutrition in the world 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all. Rome, FAO. https://doi.org/10.4060/cb4474en

Food Security Information Network & Global Network Against Food Crises (2021). Global report on food crises 2021. Rome. http://https://www.fsinplatform.org/sites/default/files/resources/files/GRFC2021.pdf Accessed on the 29th October, 2021

Hetherington, J. B., Wiethoelter, A. K., Negin, J., & Mor, S. M. (2017). Livestock ownership, animal source foods and child nutritional outcomes in seven rural village clusters in Sub-Saharan Africa. *Agric. Food Security* 6:9. doi: 10.1186/s40066-016-0079-z

Ike, C.U, Jacobs, P. T. & Kelly, C. (2017). A multidimensional approach to measuring household food security in Taraba State, Nigeria: Comparing key indicators. *Development in Practice*, 27:2, 234-246, DOI:10.1018/09614524.2017.1281225.

Kassy, W. C., Ndu, A. C., Okeke, C. C., & Aniwada, E. C. (2021). Food Security Status and Factors Affecting Household Food Security in Enugu State, Nigeria. *Journal of Health Care for the Poor and Underserved, 32(1), 565–581.* doi:10.1353/hpu.2021.0041

Matemilola, S. & Elegbede, I. (2017). The challenges of food security in Nigeria. *Open Access Library Journal*, 4: e4185. https://doi.org/10.4236/oalib.1104185.

Muhammad, N. A. & Sidique, S. F. B. A. (2019). Determinants of Food Security Among Households in Nigeria. *Pakistan Journal of Nutrition,* 18: 1042-1052. 10.3923/pjn.2019.1042.1052

Ngema, P. Z., Sibanda, M. & Musemwa, L., (2018). Household food security status and its determinants in Maphumulo local municipality, South Africa. *Sustainability*, 10(3307), 1-23, doi:10.3390/su10093307

Obi, A. & Tafa, S. (2016). Determinants of household poverty in South Africa. *Afr. Public Serv. Deliv. Perform. Rev*. 2016, 4, 516–538.

Ogundari, K. (2017). Categorizing households into different food security states in Nigeria: the socio-economic and demographic determinants. *Agric Econ* **5(**8). https://doi.org/10.1186/s40100-017-0076-y

Onunka, C., Ihemezie, E. J., & Olumba, C. C. (2018). Household level analysis of food insecurity and coping strategies: Evidence from Enugu State, Nigeria. *Advances in social sciences research journal*, 5(6): 330–340. DOI: https://doi.org/10.14738/assrj.56.4764

Pawlak, K. & Kołodziejczak M. (2020). The role of agriculture in ensuring food security in developing countries: Considerations in the context of the problem of sustainable food production. *Sustainability, 12, 5488; doi:10.3390/su12135488*

Peng, W. & Berry, E.M. (2019). The concept of food security. In: Ferranti, P., Berry, E.M., Anderson, J.R. (Eds.), Encyclopedia of food security and sustainability, vol. 2, pp. 1–7.

Weerasekara, P.C., Withanachchi, C.R., Ginigaddara, G.A.S., Ploeger, A. (2020). Food and nutrition-related knowledge, attitudes, and practices among reproductive-age women in marginalized areas in Sri Lanka. *International journal of environmental research and public health*; 17(11), 3985. doi: 10.3390/ijerph17113985.

World Bank (2021). Poverty and equity brief: Western and central Africa. https://databank.worldbank.org/data/download/poverty/987B9C90-CB9F-4D93-AE8C-750588BF00QA/AM2020/Global_POVEQ_NGA.pdf. Accessed on the 11th of November 2021.