

Assessment of Food Security Among Households in Kano State

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Abstract

The study assessed the food and nutritional status among households in Kano State, Nigeria, employing a multi-stage sampling technique. Ten percent of the 44 local governments in Kano were selected, resulting in the choice of five local governments for the study. Primary and secondary data were utilized, with primary data collected through structured questionnaires and secondary data obtained from various sources such as journal articles, books, the internet, unpublished theses, and periodic reports. Descriptive statistics incorporated both qualitative and quantitative approaches, revealing significant demographic characteristics of the sampled households. The mean age of household heads was 47 years, with an average of 25 years of farming experience. The mean household size was 10 persons, and the mean years of educational experience were 10 years. Notably, 97% of respondents were male household heads, while 2% were women household heads. Furthermore, the majority of respondents were married (97%), and 29% had tertiary education. The Food Security Index (FSI) exposed critical insights, indicating an incidence level (Po) of 0.48%, Food Insecurity Depth (P1) of 0.20%, and Severity Level (P2) of 0.05%. Results indicated that 51.44% of households experienced food insecurity, while 48.56% were deemed food secure. The marginal condition that majority of households find themselves indicates the stretch on their resources to feed themselves. This study recommends lying of sound macroeconomic policies that would ease high price effect, improve growth and promote general welfare of the households to prevent more households from looming into food crisis in addition to the existing one.

Introduction

Availability of food requires the consistent flow of food supply over long period of time. USAID defines food security as a situation where people at all times have physical and economic access to sufficient food that meets their dietary needs for a productive and healthy life. The total supply of physical food must be sufficient enough and easy to access by household through various sources like by producing it themselves or buying from market and to meet the dietary needs food must be adequately utilized. FAO(2002) defines food security as when people at all times have access to sufficient food supply in its physical, social and economic form which should be safe and nutritious enough to meet their dietary needs and food preferences for an active and health

life. Food security is a concept that refers to the condition in which all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Food security is a global concern and is often measured at different levels, from the individual and household level to national and global scales. It's a multifaceted issue that requires addressing not only agricultural production but also economic, social, and political factors that influence access to food. Efforts to achieve food security often involve a combination of strategies, including: Agricultural development, Food distribution and trade, Social safety nets such as school feeding programs to help vulnerable populations access food, Nutrition education, Environmental sustainability, and Conflict resolution and peace building. Food security is a fundamental aspect of human well-being and is closely tied to broader issues such as poverty, health, and sustainable development. International organizations like the United Nations Food and Agriculture Organization (FAO) and non-governmental organizations play significant roles in addressing food security challenges globally.

Food security in Nigeria has been a persistent challenge, with various factors contributing to the complexity of the issue. While Nigeria has made efforts to improve its food security situation, there are still significant concerns and vulnerabilities in the country. Like many other countries, the country faces several food security problems that affect its population such as insufficient food production, poor access to market, malnutrition, conflict and insecurity. World Bank (2012) estimates that Nigeria accounts for 47% of West Africa's total population. As the population increases, the country's demand for food increases. In contrast, the ability to produce Food diminishes because pressures from the growing population in desertification, climate change, and erosion also impact the already diminishing resources and further threaten food production. Food security involves access and availability of foodstuff, stability of supplies, and diet quality (Truninger, *et.al* 2018) . According to FAO, Nigeria has an energy intake of 1730Kcal and an average protein supply of 64g per capita per day, far below the 2500 – 3400Kcal minimum recommended daily intake. This shows that Nigeria faces the challenge of an unbalanced diet leading to various malnutrition symptoms (FAO 2014). GFSI (2015), assessed Nigeria to be 91st with a 37.1 score based on affordability, availability, quality, and safety indices.

To address these food security challenges, Nigeria has implemented various initiatives, including efforts to modernize agriculture, improve storage and transportation infrastructure, promote sustainable farming practices, and invest in nutrition programs. Additionally, there is a need for policy reforms, increased investment in agriculture, and coordinated efforts among government agencies, NGOs, and international organizations to combat food insecurity in the country. Addressing food security in Nigeria requires coordinated efforts among government agencies, non-governmental organizations, international organizations, and the private sector to enhance agricultural productivity, reduce post-harvest losses, improve access to nutritious food, and tackle the root causes of food insecurity, such as poverty and conflict. Despite numerous research in food security in Nigeria, the country still faces immense threat especially in food access and utilization having a Global Food Security Index (GFSI) score of 42.0 out of 113 countries. This means that 12.9% of people living in extreme poverty around the globe are in Nigeria (Mojeed 2023). On this

note, this paper seeks to assess the food security index of households in Kano state. The specific objectives of the paper is to

- i. describe the socioeconomic characteristics of the households heads,
- ii. analyze the food security index of the households, and
- iii. suggest some recommendations.

Methodology

Primary and secondary sources were used to collect data. Standard questionnaire was administered

to source information about households based on their food availability (crop production/purchase),

access (Income, food prices) and utilization (nutritional status). Multistage sampling technique was

used to select household in the study area. The first stage involved selection of 10% of the 44 Local Government Areas (LGAs) of Kano State. Giving a total of five (5) LGAs. The five LGAs were randomly selected namely Bebeji, Dawakin Tofa, Kiru, Nasawara and Sumaila. A sample size

of 381 was determined using Krejcie, R.V., & Morgan, D.W. (1970) table of random numbers.

Literature Review

Asayehgn (2016) attempted to find and understand the relationship between food availability and economic growth. A review of existing secondary studies indicates that food insecurity, low food intake and the variable access to food endemic in Ethiopia, is not due to the lack of economic growth and income distribution. Ojimadu and Ogu (2022) examined the food security and economic development in Nigeria from 1980-2018 using the Auto Regressive Distributed Lag (ARDL) analysis. Result revealed positive insignificant long run relationship between food production and economic growth. Increased food production did not have an impactful effect on overall growth of the Nigerian economy over the years. This is evident from the high import volume of key staples in the country. Abba *et.al* (2022) analyzed household food and nutrition security status in Sudano Sahelian Region of Northern Nigeria using Household Dietary Diversity Score (HDDS), Coping Strategy Index (CSI), Household Hunger Scale (HHS) and Food Consumption Score (FCS).

Mutea, *et.al* (2019) analyzed the livelihoods and Food Security among Rural Households in the North Western Mount Kenya Region using Spearman's rank-order correlation and student's T-

test. Households in the humid agro-ecological zone were found to be food insecure than those in semi-humid and semi-arid regions. Alternative off-farm source of income was recommended with further support to improve sustainable agricultural management.

Availability: This dimension concerns the overall food supply. Food should be available in adequate quantities, whether through domestic production, imports, or food aid. Sufficient food should be accessible to meet the needs of the population.

Access: People must have the economic and physical means to obtain the food they need. Access can be hindered by factors such as income, employment opportunities, transportation, and market accessibility. Food should be affordable and within reach for all segments of the population.

Utilization: It's not enough to have access to food; people must also be able to utilize it effectively. This dimension focuses on the nutritional quality and safety of the food supply. Adequate nutrition and safe food handling and preparation are essential for food security.

Stability: Food security should be maintained over time. It's not just about having enough food today but also ensuring that it will be available in the future. Stability involves safeguarding against shocks and disruptions, including natural disasters, economic crises, or conflicts.

To address these food security challenges, Nigeria has implemented various initiatives, including efforts to modernize agriculture, improve storage and transportation infrastructure, promote sustainable farming practices, and invest in nutrition programs. Additionally, there is a need for policy reforms, increased investment in agriculture, and coordinated efforts among government agencies, NGOs, and international organizations to combat food insecurity in the country (Lawal,*et.al.*2018). Addressing food security in Nigeria requires coordinated efforts among government agencies, non-governmental organizations, international organizations, and the private sector to enhance agricultural productivity, reduce post-harvest losses, improve access to nutritious food, and tackle the root causes of food insecurity, such as poverty and conflict. Despite numerous research in food security in Nigeria, the country still faces immense threat especially in food access and utilization having a Global Food Security Index (GFSI) score of 42.0 out of 113 countries. This means that 12.9% of people living in extreme poverty around the globe are in Nigeria (Mojeed 2023). On this note, this paper seeks to assess the food security index of households in Kano state.

Theoretical Framework

The concept of food security is complex and multidimensional in nature. It encompasses the availability, accessibility, utilization and stability of food for household consumption. This paper focus on the UN Sustainable Development Goal (SDG 2) which focuses on ending hunger, achieving food security, improving nutrition and promoting sustainable agriculture. global hunger and food insecurity has shown an alarming increase since 2015, and by 2022 9.2% of world population found themselves in chronic hunger due to lack of food availability and low access (UN 2023). To measure food security of households, the Food Security Index was adopted for the study

which assesses the state of households being food secured or otherwise, evaluating the various factors that contribute to or hinder food security using the four basic pillars of food security.

Food Security Index

Food insecurity index gives a vector of suitable measure of well-being. It is generally given as (Jabo, Abubakar and Okebiorun, 2021)

$$P = \frac{1}{N} \sum_{i=1}^q (z_i^\alpha)$$

Where

P = Food Insecurity Index (Foster, Greer and Thorbecke index) ($0 \leq P \leq 1$)

N = Number of respondents

q = respondents below food insecurity line

z = food insecurity line

y_i = per capita household expenditure of the i th household

α = non-negative food insecurity aversion parameter (0, 1 or 2)

Food insecurity has been decomposed into incidence of food insecurity (P_0), insecurity food depth (P_1) and severity of food insecurity (P_2)

If $\alpha = 0$ then $P_0 = \frac{q}{n}$ ie. The Headcount ratio: percentage of households below the food insecurity line

If $\alpha = 1$ this shows the proportion of households' food insecurity incidence and depth ie the proportion of the food insecurity line that the average poor will require to attain to the food insecurity line.

If $\alpha = 2$ this shows the severity (mean square proportion of food insecurity gap)

To obtain the percentage required to push poor households out of food insecurity line, this mean square proportion would be multiplied by 100.

Head count ratio (H) is calculated as (Khatri-Chatrri & Maharjan, 2006). One of the limitation of this method is that it is crude and insensitive to the distribution of income among poor (Sen, 1981).

$$H = \frac{M}{N}$$

Where

M = number of food insecure households

N = number of observations

Food Insecurity Gap calculated as:

$$FIG_i = \frac{TCR_i}{T_i}$$

Where

FIG_i = Food Insecurity Gap of the i th food insecure household

TCR_i = Total calorie requirement for the i th food insecure household

FCC_i = Total calorie consumption of the i th food insecure household

The total food Insecurity gap show extent households find themselves to be food insecure (Sen, 2009). Therefore, TFIG is given as

$$TFIG_i = \sum_{i=1}^n \frac{TCR_i}{TCR_i}$$

Where

$TFIG_i$ = Total food insecurity gap, which indicates the depth of food insecurity among the food insecure households

n = Number of food insecure households

Squared Food Insecurity Gap (Jabo, et.al) indicates the severity of food insecurity among households given as:

$$SFIG = \sum \frac{(FIH_n)^2}{FIH}$$

Where

$SFIG$ = Squared Food Insecurity Gap

The index reflects the actual severity of food poverty and its distribution among the poor households.

Table 1: Age of Household heads, Farming Experience, Household size, Years of education

Variable	Frequency	Percentages	Mean	Minimum	Maximum	Standard deviation
Age (years)			47.00	24.00	71.00	11.16
24-33	48	12.6				
34-43	101	26.5				
44-53	112	29.4				
54-63	91	23.9				
64-73	29	7.6				
Farming Experience (years)			25.00	1.00	58.00	11.79
1-12	72	18.9				
13-24	113	29.7				
25-36	123	32.3				
37-48	57	15.0				
49-58	16	4.2				
Household size (persons)			10.00	1.00	35.00	4.68
1-7	168	44.1				
8-14	173	45.38				
15-21	34	8.9				
22-28	5	1.31				
29-35	1	0.3				
Years of Education			10.00	1.00	22.00	5.38

(years)		
1-5	77	20.2
6-10	76	19.9
11-15	128	33.6
16-20	94	24.7
21-25	6	1.6
Total	381	100

Source: Survey Data, 2022

Age of Household Head

According to the findings, 89.8% of the respondents fall within the ages of 34 and 63 years which shows majority falling within the active age. Only 19.2% constitute the dependents. The average age of the household head is 47 years. By implication, most of the households in the study area are active, indicating the ability to be productive and cater for household responsibilities. Young and agile household heads are more likely to be up and about because they are in much healthier state than older household heads. This is likely obtainable in Kano because more than 50% of Nigerian population fall within the young and active group, hence their ability to impact positively in their effort to provide for their dependents. The result from this finding agrees with Isaac (2015) who discovered that the mean age of household head was above 43years in Kaduna State.

Farming Experience of Household Heads

The results show that 62% of the respondents have about 36 years of farming experience. The average farming experience was 25 years, implying that most of the household heads have extensive experience in farming activities, which may help to increase the level of output and income to meet the needs of the study area's household members.

Economy of Kano largely depend on agriculture, hence households with higher experience in farming are likely to be evident. Households also tend to show more resistance to negative factors that would likely discourage them from maintaining their farm activities. The findings are similar to those of Audu *et al.* (2017), who discovered that the average farming experience in Nassarawa State, Nigeria, was more than 20 years.

Household size

The number of people living in the house, including women, children, and dependents, is referred to as the household size. Household size is critical because it determines the supply of labour to the farm to a large extent. Large households with many dependents (children and the elderly, for example) may be of little or no benefit to the farming household in terms of food security. In fact, it can be a disadvantage because it means there will be more nonproductive mouths to feed. Table 11a shows that 89.48% of respondents maintain an average household size between 1 to 14 members. Only 1.61% have a household size of 22 to 35 members. This shows that household heads have fewer members to cater for. Larger household members imply more catering arrangement that would be required.

Due to cultural and religious reasons, households are not limited as to number of people to have and the average household size of 10 members, imply a medium household size in the study area.

Larger household size would increase household food needs and if the household is not financially stable it could result in food insecurity at household level associated with small farm size. The result of the study further shows how households are likely to maintain their food security status since the probability of a household to maintain food security depends on the size of the household. In this present economic condition large households find it difficult to cater for the basic needs of their members which prompt them to seek alternative means of survival. The findings agree with Ayodele (2019), who discovered that the majority (36.15%) of respondents in Kaduna have households with 6-10 members. The household size is commensurate with the age of household head across the study area which is an acceptable number in northern part of Nigeria. In other words, households cater for moderate to large number of members and take responsibility in providing their basic needs. It is expected therefore, that household heads engage in activities that fetch adequate income necessary for maintaining their standards.

Years of Education

Years of Education are the number of years an individual spent in school to obtain an educational qualification. According to the findings in Table 16a, 58.3% of respondents have attained up to 20 years of educational experience while 40.1% have attained a minimum of 10 years educational experience. The average number of years of education in the study area is 10, implying that the majority of household heads spent more years in school, which could contribute to their level of exposure within their community, as well as their ability to manage household members effectively in terms of food security challenges.

The higher the years of education the higher the probability of households to be food secure. It is expected that households would earn nutritional knowledge and become more sensitive to the dietary changes in their household food composition and provide career opportunities for households to gain knowledge of better nutritional requirements. Education opens more opportunities for families to become conscious of their eating habit to avoid low quality diet. Children are taught about balanced diet in school to show them the essence of maintaining good eating habits. Furthermore, households that are more health conscious are likely to live an active life. The average years of education clarifies that most households are not ignorant of the type of food they consume that is essential for healthy growth.

Food Security Status of Households

This section discusses the result of household food security status. Here the incidence, depth and severity of household exposure to food insecurity are revealed. The gap(depth) in food insecurity among households is measured using the food security index. These are presented explicitly below.

The result in Table 2 shows the incidence, depth and severity of food insecurity among households in the study area. In order to measure household food security, a food security index (FSI) was developed. The quantity of crops produced and purchased for consumption was converted to kilogramme and further to calorie and then divided by household sample size adjusted. To obtain the calorie consumed per day per household, the result was further divided by 30 days and then compared with the standard (2250kcal). The nutrient composition of commonly eaten foods in Nigeria was used to estimate the calorie intake of household. The households whose daily per

capita calorie intake was up to 2250kcal were regarded as food secure while those below 2250kcal were regarded as food insecure.

Table 2: Incidence, Depth, and Severity of Food Insecurity Households in the Study Area

Variables	Dawakin											
	Pooled		Bebeji		Tofa		Kiru		Nasarawa		Sumaila	
	F	%	F	%	F	%	F	%	F	%	F	%
Food Insecure	196	51.44	26	13.27	24	12.25	24	12.25	83	42.34	39	19.89
Food Secure	185	48.56	25	13.51	41	22.16	47	25.4	58	31.53	14	7.56
Po	0.48		0.49		0.63		0.66		0.411		0.264	
P1	0.20		0.21		0.25		0.23		0.19		0.14	
P2	0.05		0.05		0.07		0.06		0.04		0.02	

Source: Field Survey, 2022

Discussion

The result presented in Table 2 shows that about 48.56% of the respondents were food secure while 51.44% were found to be food insecure. This implies that most of the households in the study area were food insecure. The difference between the food secure and food insecure household imply high chance of becoming food insecure within a short period of time. It also implies that the majority of households in study areas were below the daily per capital calorie intake of 2250kcal. The results from this finding is in line with Abdulrazak *et al;*(2022) who discovered that 30.4% and 69.6% of households in Jigawa State were food secure and insecure respectively. The findings also corroborates with that of Ibrahim *et al;* (2016) where they observed that 73% of households in Katsina State, Nigeria were food insecure. The findings from this study also agrees with Ahmed and Abah (2015) where they observed that 39% of the households in Borno State were food secure, while 61% were food insecure, The results thus shows that majority of the households do not meet up the recommended calorie requirement. The head count refers to the households whose food consumption or the daily per capital income is below the recommended daily allowances. The result in Table 2 shows the incidence of food insecurity among households in the study area. The incidence for the pooled results shows that 51.44% of the households in the study area were food insecure, which implies that 51.44% of the sampled household did not meet up the calorie requirement of 2250kcal. The incidence of food insecurity within the Kano State varies across the five Local government areas. The incidence of food insecurity was 13.27% for Bebeji local government area, which means 13.27% of the household sampled in Bebeji did not meet up the recommended daily per calorie of 2250kcal. The incidence of food insecurity in Dawakin-Tofa local government area was 12.25%, which implies that 12.25% of the sampled household were food insecure, the result for food security incidence for Kiru local

government area was also 12.25%, which implies that 12.25% of the sampled household were food insecure. The result of food security incidence in Nasarawa local government area was 42.34%, which implies that 42.34% of the sampled households were food insecure, while in Sumaila Local government area, the food insecurity incidence was 19.89% which means 19.89% of the sampled

households were food insecure. The results from the findings shows that Nasarawa and Sumaila Local government areas comprised of the households with high incidence of food insecurity in the study area, which means these locations were not able to meet up the daily recommended calorie of 2250kcal. This result agrees with the findings of Jabo *et al*;(2021) who observed that the incidence of food insecurity among farming households in Sokoto was 48.18%. The result is also similar to that of Ahmed & Abah (2014) where they observed that 61% of household in Maiduguri were food insecure. This result also implies that there is a rising trend in food crisis in the northern part of Nigeria with the inability of households to be economically buoyant to access enough food and live a productive life.

The food insecurity gap index provides an estimate of the average gap between the expenditure of the poor households and the food insecurity line. The coefficient of food insecurity depth (gap) among the household in the study area is presented in Table 2. The result shows that the estimated pooled food insecurity gap in the study area is 0.2022, which implies that 20.22% are below the recommended daily calorie requirement of 2250kcal in the study area. The results for food insecurity depth for Bebeji local government area was 0.2095, which implies that 20.95% of sampled households are below the recommended daily calorie requirement. The results for food insecurity depth for Dawakin-Tofa local government area was 0.2507, which implies that 20.95% of the sampled households were below the daily calorie requirement. The results for food insecurity depth for Kiru local government area was 0.2308, which implies that 23.08% of the sampled households are below the recommended daily calorie requirement. The results for food insecurity depth for Nasarawa local government area was 0.1965 which implies that 19.65% were below the recommended daily calorie intake, while the food insecurity depth for Sumaila local government area was 0.1471, which implies that 14.71% of the sampled household within this location were below the recommended daily calorie requirement. These results agrees with Jabo *et al* (2021) who observed that food insecurity depth in Sokoto State was 0.19, which implies that 19% of farming households were below the daily recommended calorie requirement.

The food insecurity squared gap index is often described as a measure of the severity of food insecurity among the food insecure households. Food insecurity gap is the distance separating the poor from the food insecurity line. The squared food insecurity gap of the households is presented in Table 2. The result shows that the pooled severity of food insecure indices was 0.05436. This implies that 5.4% of the households in the study area were more food insecure. The squared food insecurity gap for Bebeji local area government was 0.0542, which implies 5.42% of the sampled household in the location were more food insecure, The squared food insecurity gap for Dawakin-Tofa local government 0.0775, which implies 7.75% of the sampled household in the location were food insecure, the squared food insecurity gap for Kiru local government 0.0659, which implies 6.59% of the sampled household in the location were food insecure, the squared food insecurity gap for Nasarawa local government 0.0488, which implies 4.88% of the sampled household in the location were food insecure, while squared food insecurity gap for Sumaila local government 0.0255, which implies 2.55% of the sampled household in the location were food insecure. This result is in line with Jabo *et al*;(2021) who discovered that 3.4% of the farming households were food insecure in Sokoto State, Nigeria.

This implies that households are limited in terms of their ability to spend on enough food to contain the gap that leads to food insecurity, in other words, households are financially unstable to buy enough food for an active and healthy life.

Conclusion

In conclusion, the evaluation of the status of household food security has opened up silent features that are evident when measuring how households have engaged in income fetching activities to contain the gaps between being food secured and otherwise. The more households gain economic access to food the more chances they have to consume nutritionally enriched food that would positively enhance their productive capacity. The food security status of households as measured in the study shows that households have to stretch resources in order to make ends meet. Socio economic problems have compounded the ability of households to create more wealth, although diverse income sources were created to compensate for income gap.

Recommendation

1. The fear of more households falling into food insecurity can be mitigated by creating diverse income sources that would support household resources. Households can then improve food availability and their dietary change.
2. The result of the study observed neglect in production of key staple crops as millet and maize. Cereal has proved to be one of the most consumed food group, therefore, production of crops must be an all-inclusive one due to differences in taste and consumer preferences. More research is needed in this area to promote crop diversification.
3. The marginal condition that majority of households find themselves indicates the stretch on their resources to feed themselves. This study recommends lying of sound macroeconomic policies that would ease high price effect, improve growth and promote general welfare of the households to prevent more households from looming into food crisis in addition to the existing one.

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