

HOUSEHOLD FOOD SECURITY: DETERMINANTS AND COPING STRATEGIES AMONG SMALL SCALE FARMERS IN JIGAWA STATE, NIGERIA.

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Abstract

This study analyzes household food security, determinants and coping strategies among small scale farmers. Multistage random sampling technique was used to obtain a sample of 184 respondents. Primary data were collected using structured questionnaire. Data were analyzed using descriptive statistics, logistic regression and food security index. Results revealed that rural farming households head were predominantly male (71.7%) and most (79.9%) were married with one level of education or another (67.4%). The mean age for the households' head was 42 years and the mean household size was 10 persons per household. The mean for farming experience and annual farm income of the respondents were 21.9 years and ₦52,238 respectively. A Logit regression model made up of nine regressors was specified. Households size ($P < 0.01$), farm size ($P < 0.05$), farm income ($P < 0.1$), educational level of the household head ($P < 0.01$) and household head access to credit facilities ($P < 0.05$), were found to determine the food security status of the farming households in the study area. Using the recommended calorie required approach 30.4% and 69.6% of the households were food secure and food insecure respectively. The perceived coping strategies in cushioning the effects of food insecurity include consumption of less preferred food, reduction in quantity and quality of food consumed, borrowing money to buy food, sales of some assets. Based on the recommended energy level of 2,710 Kilocalories per person per day, it could be concluded that the study area is food insecure. The study therefore recommends that formal education be promoted by government and other stakeholders as a means of improving food security, farmers should be encouraged by government and nongovernmental organizations to increase their food crop production by providing subsidized farm inputs, increase in access to credit facilities, enlightenment programmes on health education and birth control measures should be directed at the farming households, this is to reduce the large family size observed in the area which could have effects on household food security, food insecurity coping strategies adopted by the households can only minimize its impact therefore household heads should adopt more sustainable approaches such as, engaging in income generating activities such as petty trading and other off-farm activities.

Keywords: *Determinants, Food Security, Household, Nigeria.*

Introduction

Food security exists when all people have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (Ayele *et al*, 2020). It also combines low food intake, unpredictable food exposure, and susceptibility to a subsistence strategy that provides enough food in good times but is not immune to shock. Globally, the number of people affected by chronic food deficiency increased from 720 million in 2019 to 811 million in 2020 (SOFI, 2023). Overall, food insecurity is much greater in Africa than in other parts of the world. Of a total of 2 billion people worldwide suffering from food insecurity, 1.04 billion (52%) are in Asia, 676 million (34%) are in Africa

and 188 million (9%) are in Latin America. In 2018, acute malnutrition or wasting affected 49.5 million children under five (Giller *et al.* 2021).

A household is said to be food secure if it can reliably gain access to obtain sufficient quantity and quality food for household members to enjoy a healthy and active life (Barret, 2002). Household food security depends substantially on household income and asset (or wealth) of the states. A low-income household is more likely to suffer food shortages than a wealthier household. The relationship between a household's food security states and its purchasing power is far from static it changes over time (Aliber, 2009). Household food security will only be stable when there is good food availability at relatively low prices

In Nigeria the percentage of food insecure household was reported to be 62.4 % in 2024 (NBS, 2024) Agricultural growth is particularly effective in reducing hunger and malnutrition (FAO, 2022). The agricultural growth rate relative to population growth is said to be low in Nigeria Agriculture is reported to grow at a rate of 2.5% per annum as against 3.5% per annum of population growth rate, thus resulting to food insecurity (Word Bank, 2018).

It is obvious that Nigeria is endowed with both physical and human resources and fertile land to produce food for their entire population and even marketable surplus for exports but, nevertheless, food has been imported to support the insufficient domestic production. However, the farming households in Nigeria are poor and subsistence farmers and their food security status always varies (Nnadi et al, 2012).

The supply side approach of measuring food security (e.g. measurement of total food production and availability and food Balance sheet) commonly used in Nigeria only focuses on food availability at the macro or national level and does not satisfactorily capture what happens in terms of food availability, access and utilization at the households and individual levels (Akinyele 2009, Adebayo 2010, Oruche, 2012).. Therefore, it is crucial to identify the determinants of food security at the household level using a household-based cross-sectional study to design appropriate strategies to eliminate the food insecurity problem. .This study would be able to provide latest information regarding food security status of rural households.

The objectives of this study, therefore, were to:

- i. describe the socio-economic characteristics of the rural farming households,
- ii. determine the food security status of the rural farming households, and
- iii. determine the factors influencing food security status of rural farming households
- iv. identify the coping strategies employed among food insecure farming households in cushioning the effects of food insecurity.

Methodology

Description of the Study Area

Jigawa State is located in the North-Western part of the country between latitude 11°N to 13°N and longitude 8°E to 10.15°E, Kano State and Katsina State border Jigawa to the West, Bauchi state to the east and Yobe State to the Northwest. Jigawa state shares an international border with Zinder region in the republic of Niger. The state has a total land area of approximately 22, 410 square kilometers with a population of 4,361,002 according to 2006 census, with a projected population of 6,846,772 in 2025 based on a 3% annual growth rate. The economy of Jigawa State is largely characterized by informal sector activities with agriculture as the major economic activity. The dominant ethnic groups in the state are Hausa and Fulani. Major crops produced in the area include: millet, wheat, sorghum, rice and cowpea. A tropical wet and dry climate prevails over the state and it has two distinct seasons; wet and dry seasons. The wet seasons lasts

between May and early October while the dry season lasts between November and April. The total amount of rainfall ranges from 600mm in the north to 1000mm in the southern part of the state. Average temperature of the state is 29°C with 21.2°C as minimum temperature occurring between November to February and 31.3°C as maximum temperature occurring between March and April. Relative humidity is highest in August with 80% and low in January through March with 23-30%.

Sampling and Data Collection

A multi-stage sampling procedure was used to select one hundred and eighty-four (184) respondents for the study. In the first stage two Local Government Areas (LGAs) from each of the four agricultural zones in the State were selected. Dutse and Jahun in Zone I, Kaugama and Auyo Zone III, Ringim and Taura in Zone II, Kazaure and Roni in Zone IV were selected.

In the second stage, 5% of the list of villages in each of the LGAs was randomly selected. The last stage also involved a random sampling of 10 % of the population of rural farming households from each of the villages selected make a total of one hundred and eighty-four (184) respondents as sample size for the study. Primary data were used for the study. The data were generated using structured questionnaire administered to the respondents with the assistance of trained enumerators.

Data Analysis

Data collected for the study were analyzed using descriptive statistics including Percentages Frequency, Mean and standard deviation, food security index and Logit Regression model. The food security index is given as follows:

$$Z_i = Y_i/R \dots\dots\dots (1)$$

Where: Z_i = Food security index of the household

Y_i = Daily per capita calorie intake of rural farming households

R = Recommended per capita daily calorie intake (2,710 kilo calorie)

$Z_i = 1$ for Y_i greater than or equal to

R $Z_i = 0$ for Y_i less than R

To obtain per capita daily calorie intake (Y_i), daily calorie intake of each household was divided by its household size. To determine recommended per capita calorie intake of the households the FAO (2016) standard of 2,710 kilo calorie was used. The household daily calorie requirement was estimated by first of all categorizing members of each household into different age group based on the fact that different age groups have different calorie requirements. The daily energy (calorie) requirements of various compositions of the households were converted into adult equivalent using the equivalent scales as shown in Table1.

Table 1: Recommended Daily Energy Intake and Equivalent Scale

Age Category (Years)	Average Allowance Per Day	Equivalent Scale
Children(<6)	813	0.3
Children(6-18)	1,897	0.7
Adults(>18)	2,710	1.0

Source: Mukhtar et al (2019a).

Total household composition or calorie requirement was obtained by multiplying the total number of adults in each household by the recommended calorie requirement of 2,710kcal. The total foods requirement for children was converted to adult equivalent; this was done by multiplying the total number of children below the age of six (6) years in each household by recommended daily calorie Requirement of 2,710kcal and a conversion factor of 0.3to obtain their adult equivalent. The total number of children between the ages of 6 to 18 years in each household was also multiplied by the Recommended Daily Requirement of 2,710 kcal and a conversion factor of 0.7 to obtain their adult equivalent. The total daily calorie requirement for each household was obtained by summing up the requirement for the three age groups estimated in table 1. Households' daily food consumption (daily calorie intake) was obtained from household own food production and purchase to supplement own food production. The data on actual food consumed (maize, rice, sorghum, cowpea and millet) by each household per week were obtained and converted into kilogram. The energy content of 1kg of each food stuff was obtained from literatures as shown in Table 2

Table 2: Cereal Equivalent Conversion Ratios

Food Crop	Calorie/kg
Maize	3,590
Rice	3,640
Sorghum	1,190
Millet	2,891
Cowpea	3,340

Source: FAO (2016)

The total quantity of each food (in kilogram) consumed was then multiplied by the energy content. The total kilocalories of maize, sorghum rice, millet and cowpea consumed by each household were summed up and divided by 7 (days in a week to obtain the actual daily calorie intake). Additionally, the head count ratio of food security was calculated for the sample households based on food security line. The headcount ratio (H) measures the percentage of the population of households that are food insecure/secure (Seid, 2007)

The Head Count ratio (H)

$$H = M/N \text{ ----- (3)}$$

Where:

M = Number of food insecure/secured households

N = Number of households in the sample

The logit regression model is specified as follows:

$$Y_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + e \text{ (1)}$$

Where:

Y_i = Food security status of the household (food secured=1, food insecure 2)

x_1 = Household size (number of household members)

x_2 = Age of the head of household (years)

x_3 = Farm size (hectares)

x_4 = Access to extension service (yes = 1, 0 = otherwise)

x_5 = Farming experience (years)

x_6 = on farm income (in Naira)

x_7 = Household head Access to formal education (Yes = 1, O = otherwise)

x_8 = Household head membership of cooperative (Yes = 1, O = otherwise)

x_9 = Household head access to credit (Yes = 1, O = otherwise)

α = constant term

e = error term

Results and Discussion

Table 3 shows the quantitative socioeconomics characteristics of respondents in the study area, the results of the finding show that 27.7% of the household heads were between the ages of 41 and 50 years 26.6% were within 21 to 30 years' age group while 20.7% were between the ages of 31 and 40 years. Hence they are energetic to cultivate large size farms for increased food production and engage in off-farm jobs so as to increase household income. According to Agidew and Singh (2018), the older the household head, the more stable the farm household economy, because older people have relatively richer experiences of the social and physical environment and more experience with farming activities.

The results further revealed that the average household size was 10. This implies that most of the farmers had large household sizes which could probably serve as an insurance against shortfalls in the supply of farm labor. According to Sule, *et al.* (2002) household size plays important role in family labor provision in the agricultural sector.

The average annual income of the households head was found to be N52, 238 which implies that majority of the respondents (76.6%) were low income earners considering the magnitude of their total monthly income from farming which was their major occupation and that might have affected their food security status. The result further showed that majority (63.5%) had at least 27 years of exposure to farming experience which could have exposed them to the skills and knowledge of their chosen profession.

Results in table 4 revealed that majority of the respondents were males (71.7%) while only 28.3% were females out of which (79.9%) are married 9.8% were widows, 6.0% were divorced and 4.3% were single. This finding is in agreement with the findings of Akinsami and Doppler, (2005), that majority of the farming households in Nigeria are married which implies that family size would likely be very large with high demands in terms of food requirements and other socio-economic needs of the households.. According to Kapoor (2019), male-headed households are likely to attract a labor force than female-headed households. Furthermore, Negesse *et al.* (2020) discovered that female-headed households are more likely to be food-insecure than male-headed households due to resource access differences. As a result, male-headed households are considered less likely to be food insecure.

Furthermore about 67% of the households' head have one level of education or the other ranging from primary education (8.7%), secondary education (12.5%) and tertiary education (8.2%) adult education (7.6%), Quranic education (30.49). About 32.6% of the households' head have no education at all. The educational level of the household head could raise awareness of the potential benefits of modernizing agriculture through technological input and diversifying household income, which would improve household food supply (Giller *et al* 2021)

Table 3: Quantitative Socio-Economic Characteristics of Respondents

Socio-Economic Characteristics	Frequency	Percentage	Mean	Standard Deviation
Age (Years)				
21 – 30	49	26.6	41.7	14.069
31 – 40	38	20.7		
41 – 50	51	27.7		
51 – 60	23	12.5		
61 - 85	23	12.5		
Household Size (Person)				
1 – 5	45	24.5	9.61	5.753
6 – 10	66	35.9		
11 – 20	63	34.2		
21 – 30	10	5.4		
Farming Experience (Years)				
5 – 15	6	3.3	21.85	13.128
16 – 26	61	33.1		
27 – 37	38	20.7		
38 – 48	21	11.4		
49 – 59	20	10.8		
60 – 70	38	20.7		
Total Annual Income (Naira)				
1001 – 10,000	44	24.0	52,238	70628.79
10,001 – 20,000	55	29.9		
20,001 – 30,000	42	22.8		
30 001 – 40,000	14	7.6		
40 001 – 50,000	16	7.1		
50,001 and 600, 000	13	8.6		

Source: Field Survey, 2024

The results in table 6 revealed that five out of the nine variables included in the model were significant in explaining the variation in the food security status of the households in the study area. Household size has a negative coefficient that is significant at 1% level, implying that as the household size gets larger the probability of food security decreases. In other word large size households are more likely to be food insecure than small size households. (Babatunde et al, 2007).

Farm size was found to be positive and significant at 5% level ($P < 0.05$). This implies that the likelihood of households being food secured increases with an increase in farm size. This result agrees with the findings of Omotosho et al (2006) who found farm size of household head to be significant and positively related to food security.

Household farm income was positive and significant at 10% level ($P < 0.1$), this indicates that the higher the household income the higher is the probability that the household would be food secured. This could be expected because increased income other things being equal mean increased access to food.

Table 4: Qualitative Socio-Economic Characteristics of the Respondents

Socio-Economic Characteristics	Frequency	Percentage
Sex		
Male	132	71.7
Female	52	28.3
Total	184	100.0
Marital Status		
Married	147	79.9
Single	8	4.3
Divorce	11	6.0
Widow	18	9.8
Total	184	100.0
Level of Education		
Never been to school	60	32.6
Primary	16	8.7
Secondary	23	12.5
Tertiary	15	8.2
Quranic Education	56	30.4
Adult Education	14	7.6

Source: Field Survey, 2024

Food Security Status of Rural Farming Households

Table 5: Summary Statistics of Food Security Status in the Study Area

Variables	Mean		
	Food Secure	Food Insecure	Total
<i>Percentage of Households</i>	30.4	69.6	100
<i>Number of Households</i>	56	128	184
<i>Food security index (Z)</i>	1.52	0.57	
<i>Head count Ratio (H)</i>	0.30	0.69	

Source: Field Survey, 2024

The results showed that the study area could be regarded as food insecure given the fact that only 30.4% of the populations were able to meet the recommended calorie intake of 2,710 Kcal per capita per day while 69.6% could not. The mean food security index of food secured household was 1.52 and 0.57 for the food insecure household.

Table 6: Regression Estimate for Determinants of Food Security Status of Households.

Variables	B	SE	Sig	Exp (β)
Constant	0.844	0.998	0.398	0.430
Household size	-0.233	0.081	0.004***	0.792
Age of Household Head	-0.431	0.352	0.239	0.0095
Farm Size	1.080	0.466	0.020**	2.945
Extension contact	-0.834	0.804	0.300	0.434
Farming Experience	-0.022	0.026	0.405	0.978
Farm Income	2.303	0.868	0.011*	9.050
Educational Level of the household head	0.527	0.170	0.002***	1.694
Membership of cooperative	0.833	0.792	0.293	2.301
Access to credit facilities	1.518	0.631	0.016**	2.413

R-Square= 0.642, R-Square Adjusted = 0.612

*** Significant 1% Level, **Significant at 5% Level, *Significant at 10% level.

Educational level of the household head was found to be positive and significant at 1% level ($P < 0.01$). This implies that households with an educated head are more likely to be food secure than one with uneducated head. Haile et al (2005) in a similar study found that education had significant and positive relationship with household food security.

Household access to credit facilities is also a crucial factor in determining the food security status as it had a positive and significant coefficient at 5% level Babatunde et al., (2007) noted that farming household with good access to credit facilities have greater probability of being food secure than those without credit facilities.

Table 7 above indicated that the major coping strategies employed by households include consumption of less preferred food (27.2%), reduction in quality and quantity of food consumed (14.7%). Due to high food prices and lower income, household resort to the consumption of less preferred food and less expensive food so as to feed and produce more food. (Ibrahim et al, 2019). Other coping strategies employed by the households include reduction in the number of meals per day (11.4%), Diversion of money, meant for other purpose to buy food (14.7%), Borrowing money to buy food, (12.5%), sales of some assets (10.9%). According to Amaza et al, (2021) household assets is considered one of the measures of household resilience, which cushions the effects of adverse circumstances such as crop failure or drought on household food security.

Table 7: Coping Strategies Employed Among Food In Secured Farming Households in Cushioning the Effects of Food Insecurity.

Coping Strategy	Frequency	Percentage	Rank
Reduction in Number of Meal	21	11.4	5 th
Reduction in quality and quantity of food consumed	27	14.7	2 nd
Consumption of less preferred Food	50	27.2	1 st
Borrowing money to buy food	23	12.5	4 th
Sales of some Assets	20	10.9	6 th
Diversion of money meant for other purposes to buy food	26	14.7	3 rd
No Response	17	9.2	7 th
Total	184	100.0	

Source: Field Survey, 2024

Conclusion and Recommendations

Based on the recommended energy level of 2,710 Kilocalories per person per day it could be concluded that the study area is food insecure since a higher proportion of the sample households are food insecure. Also household size, farm size, farm income, educational level of the household head, household head access to credit facilities were significant determinants of households' food security in the study area. From the respondents' opinion consumption of less preferred food, reduction in quantity and quality of food consumed, borrowing money to buy food, sales of some assets were major coping strategies employed to cushion the effects of household food insecurity.

It is recommended that Farmers should be encouraged by government and nongovernmental organizations to increase their food crop production by providing subsidized farm inputs, increase in access to credit facilities, this is necessary for increased per capita food availability that is necessary for food security. Enlightenment programs on health education and birth control measures should be directed at the farming households. This is to reduce the large family size observed in the area which could have effects on household food security.

References

- Adebayo, A.A. (2010). Food security status in Nigeria: Pre and post economic deregulation review. *International journal of economic development research and investment*, 1(1), 132–150.
- Agidew, K.N. Singh, (2018). Determinants of food insecurity in the rural farm households in South Wollo Zone of Ethiopia: the case of the Teleyayen subwatershed, *Agric. Food Econ.* 6 (2018) 1–23, <https://doi.org/10.1186/S40100-018-0106-4/TABLES/6>
- Akinyele, I.O. (2009). Ensuring food and nutrition security in rural Nigeria. An assessment of the challenges information needs, and analytical capacity. IFPRI, 7 (NSSP Background Paper).
- Aliber, M. (2009). Exploring statistics South Africa's national household Surveys as Sources of information about food security and subsistence Agriculture. Pretoria: Human Science Research Council.
- Amaza, P.S., Umeh, J.C., & Adejobi A.O. (2021). Determinants and measurement of food security in Nigeria: Some empirical policy guide. Contributed paper prepared for presentation at the International Association of Agricultural Economists Conference, gold coast, Australia.
- Ayele, A.W. M. Kassa, Y. Fentahun, H. Edmealem, (2020). Prevalence and associated factors for rural households' food insecurity in selected districts of east Gojjam zone, northern Ethiopia: cross-sectional study, *BMC Publ. Health* 20 (2020) 1–13, <https://doi.org/10.1186/S12889-020-8220-0/TABLES/9>.
- Babatunde, R.O., Omotesho, O.A., & Sholatan, O.S. (2007). Factors influencing food security status of rural farming households in North Central Nigeria. *Agricultural Journal*, 2(3):351-357
- Barret, C.B. (2002). Food security and food assistance programme. *Handbook of Agricultural Economics*, 2(4): 2-21.
- Food and Agriculture Organization FAO. (2022). World Food Programme, IFAD. The state of Food Insecurity in the World 2022. Rome: FAO; 2022.
- Food and Agriculture Organisation of the United Nations. (2016). Nigeria food security and vulnerability survey 2016. FAO Rome, Italy.
- Giller, K.E., Delaune, T., Silva, J.V., Descheemaeker, K., G. vandeveen, A.G.T., Schut, (2021). The future of farming: who will produce our food? *Food Secur.* 13 (2021) 1073–1099, <https://doi.org/10.1007/S12571-021-01184-6/FIGURES/8>.
- Haile, H.K., Alemu. G., & Kudhlande, G. (2005). Causes of household food insecurity in koreddegaga peasant association, oromiya zone, Ethiopia, working Paper, Department of Agricultural Economics, Faculty of Agricultural sciences, University of the Free States
- Ibrahim, H., Uba-Eze, N.R., Oyewole, S.O. and Onuk, E.G., (2019). Food security among urban households: A case study of Gwagwalada Area council of the Federal capital territory Abuja, Nigeria. *Pakistan Journal of Nutrition*. 8(6). 810-813.
- Kpoor, A. (2019), Assets and Livelihoods of Male- and Female-Headed Households in Ghana, vol. 40, 2019, <https://doi.org/10.1177/0192513X19868839>, 2974–96.
- Mukhtar, M. (2019). Dietary diversity and food insecurity coping strategies among farming households in Kano, Nigeria. *Lapai International Journal of management and Social Sciences* 11(2), 83-96
- National Bureau of Statistics (NBS) (2024): Fifth edition of the general household survey panel (GHS panel) conducted in November 2024.

- National Population Commission, Census Report, NPC. (2006).30-35.
- Negesse, A. Negesse, D. Jara, D. Jara, Habtamu Temesgen, G. Dessie, (2020). The impact of being of the female gender for household head on the prevalence of food insecurity in Ethiopia: a systematic review and meta-analysis, *Publ. Health Rev.* 41 1–14, <https://doi.org/10.1186/S40985-020-00131-8/FIGURES/3>.
- Nnadi, F.N., Chikaire, J., C.D., Okafor, O.E., Echefama, J.A., and Utazi, C.O. (2012). Role of women in improving household food security in Owerri North area of Imo State, Nigeria. *Scholar link Research Institute Journal*, 3(5): 839-844.
- Omotosho, O.A., Adewumi, M.O., Muhammad A., & Ayinde, O.E. (2006). Determinants of food security among rural farming households in kwara state Nigeria. *African journal of general agriculture*, 2(1):7-15.
- Oruche, E.N. (2012). Impact of the National special programme for food security on livestock farmers in Ideato South Local Government Area of Imo State, Nigeria. (2012), 251–258.
- Seid, F.F. (2007). Food insecurity and its determinants in Amhara Region M.Sc. thesis, Department of economics, Addis Ababa University, Ethiopia.
- SOFI, Food Security and Nutrition Report in the World Google Search, (2021). https://www.google.com/search?q=SOFI%2C+2021%3A+Food+Security+and+Nutrition+Report+in+the+World&rlz=1C1CHBF_enET1034ET1034&oq=SOFI%2C+2021%3A+Food+Security+and+Nutrition+Report+in+the+World&aqs=chrome..69i57.485731j0j4&sourceid=chrome&ie=UTF-8. (Accessed 22 February 2023).
- Sule, O., Ogunwale, F., & Afale. D. (2002). Rural livelihood and food consumption pattern among households in Oyo State, Nigeria: Implications for food security and poverty eradication in degraded economy. *Journal of Social Sciences*, 11 (2). 127-132.
- World Bank. (2018). The fourth Tokyo international conference on Africa development