

Analysis of food security production and coping strategies among rural households in Akinyele Local Government Area

Taiye Oluwasola Babatunde*, Adekunle Mustapha Adeleke* and Oluyemisi Omowunmi Babatunde

Federal College of Forestry, *Department of Agribusiness Management, **Department of Statistics, PMB 5087 Jericho Hill Ibadan Oyo State

Corresponding Author: sollybee2012@gmail.com

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Abstract

This study examined the relationship between food security, poverty status, and coping strategies among rural households in Akinyele Local Government Area. Primary data were collected from 120 households across five villages using structured questionnaires, and the data were analyzed using both descriptive and inferential statistical techniques. The analysis provided insights into the socio-economic characteristics of the households and the factors influencing their food security status. The findings revealed that nearly 60% of the household heads were not primarily engaged in farming activities, suggesting the existence of diversified livelihood sources within the rural economy. With respect to age distribution, the majority of respondents (61.7%) were within the age bracket of 41–50 years, indicating that middle-aged individuals constitute the dominant group involved in farming activities in the study area. In contrast, younger farmers aged 30 years and below accounted for only 6.7% of the respondents, highlighting the relatively low participation of youth in agricultural production. Male-headed households constituted 55.8% of the sample, while 68.3% of respondents were married, reflecting the typical demographic composition of rural households. Housing characteristics showed that 40.8% of the surveyed households resided in brick-built houses. Furthermore, a considerable proportion of the households reported having access to toilet facilities, suggesting relatively improved sanitation practices and a reduced reliance on open defecation. This indicates some level of progress in household living conditions and environmental hygiene within the study area. The empirical analysis further revealed that educational attainment and poverty status were statistically significant determinants of household food security. Households with higher levels of education were more likely to experience better food security outcomes, possibly due to improved access to information, income-generating opportunities, and effective resource management practices. Conversely, households experiencing higher levels of poverty were more vulnerable to food insecurity. In addition, that households adopted several behaviors to mitigate the effects of food shortages. The most frequently employed strategies included relying on cheaper or less preferred foods, reducing the number of meals consumed per day, purchasing food on credit, decreasing meal portion sizes, and borrowing food or seeking assistance from friends and relatives. These coping mechanisms highlight the vulnerability of rural households to food insecurity and the extent to which households rely on short-term adaptive measures to manage food shortages. Based on these findings, policy interventions should focus on reducing rural poverty through the promotion of sustainable livelihood opportunities, particularly in agriculture and agro-related enterprises. Improving access to education, agricultural extension services, and credit facilities would enhance household productivity and resilience.

Nomenclature and units

MAHE	=monthly household expenditure
Y1	=Dependent variabable
pn	=Final population
P0	=Initial population
e	= Exponential
r	= Growth rate 3.5%

1.0 Introduction

Food security remains a major challenge in many developing countries and significantly affects the health and livelihoods of rural populations. It is defined as a condition in which all people, at all times, can obtain sufficient, safe, and nutritious food that meets their dietary needs and supports active, healthy lives. This concept includes four essential components: the availability of food, its accessibility, proper utilization, and stability over time (Peng and Berry, 2019). Nigeria continues to struggle with these dimensions due to persistent poverty, economic instability, and structural inefficiencies in its agricultural sector (FAO, 1996).

Households become food insecure when they lack steady access to adequate food, either as a result of insufficient income, limited food supply, or barriers in food distribution systems. Structural barriers such as low farm productivity, fluctuating food prices, and weak rural markets make it difficult for many families to secure the food they need (Usman *et al.*, 2021b). In recent years, rising inflation and security issues have further worsened hunger levels in Nigeria, with millions reported to be at risk of acute food shortages (Reuters, 2024).

The duration and severity of food shortages determine the type of food insecurity experienced. Occasional food gaps may be short-lived and cause temporary distress, but long-term or repeated food deficits can lead to chronic food insecurity, undermining nutritional status and overall health. Chronic food insecurity is strongly associated with poverty and limited access to productive resources, particularly in rural areas where opportunities for income diversification are scant (Godfrey *et al.*, 2012; Ingawa, 2012).

Socio-economic factors such as household size, level of education, off-farm employment, and access to credit have been identified as important determinants of food security at the household level (Usman *et al.*, 2021a). The duration and severity of food shortages determine the type of food insecurity experienced. Occasional food gaps may be short-lived and cause temporary distress, but long-term or repeated food deficits can lead to chronic food insecurity, undermining nutritional status and overall health. Chronic food insecurity is strongly associated with poverty and limited access to productive resources, particularly in rural areas where opportunities for income diversification are scant (Godfrey *et al.*, 2012; Ingawa, 2012). Socio-economic factors such as household size, level of education, off-farm employment, and access to credit have been identified as important determinants of food security at the household level (Usman *et al.*, 2021a).

Households often respond to periods of food scarcity through coping strategies, which are the immediate adjustments families make to manage food shortages and maintain basic needs. Common strategies include eating less preferred foods, reducing

portion sizes or meal frequency, purchasing food on credit, borrowing from friends or relatives, and relying on social support networks. These practices reflect both the severity of food insecurity and the limited resources available to households (Abimbola and Adejare, 2013).

Conceptual Framework

The conceptual framework for this study assumes that the food security condition of a household is largely shaped by its socio-economic characteristics and level of poverty. These factors influence food security directly by determining a household's capacity to obtain adequate food, and indirectly through the coping strategies adopted during periods of food shortage. Socio-economic variables such as education, household size, income level, occupation, and access to productive assets play a crucial role in determining the availability and accessibility of food at the household level (Barrett, 2010; Ehiwario *et al.*, 2024). Research has consistently shown that households with better economic resources and improved access to productive inputs are more likely to maintain stable food consumption patterns.

In addition, these socio-economic conditions influence the type of coping mechanisms households adopt when confronted with food insecurity. Coping strategies represent the behavioural and economic adjustments households make to manage food shortages or rising food prices. Such strategies may include reducing meal portions, purchasing cheaper food items, borrowing money, or engaging in additional income-generating activities (Iboh *et al.*, 2021; Akukwe *et al.*, 2023). Studies have indicated that households experiencing severe poverty often rely on short-term coping mechanisms that may negatively affect their long-term livelihood sustainability and nutritional well-being.

Conversely, households with higher educational attainment, diversified income sources, or better access to economic opportunities tend to employ more adaptive and less harmful coping strategies. These households are generally more resilient and better able to withstand economic shocks such as food price increases or income fluctuations (Zakari, 2025; Olarinre, 2025). Empirical evidence further suggests that factors such as household size, income level, and access to cooperative organizations significantly influence both food security status and the type of coping strategies adopted by households (Olutumise, 2022; Musa & Daniel, 2025).

Although a number of studies have investigated household food security in Nigeria, limited attention has been given to understanding the combined influence of socio-economic factors, poverty status, and coping strategies in rural communities. Existing studies show that food insecurity remains prevalent among many Nigerian households, with many families adopting various coping strategies such as reducing meal frequency, consuming less preferred foods, and borrowing food during periods of scarcity.

Given this gap in the literature, particularly within rural communities such as Akinyele Local Government Area of Oyo State, there is a need for further empirical investigation. Understanding how socio-economic characteristics and poverty

levels shape. coping behaviour and food security outcomes will provide valuable insights for policymakers. Therefore, this study examines the level of food security, poverty status, and coping strategies among rural households in Akinyele Local Government Area. The study also seeks to identify the major socio-economic determinants influencing household food security and to provide evidence-based recommendations that can support effective interventions aimed at improving food access and reducing rural poverty

2.0 Materials and Methods

Study Area

This study was carried out in Akinyele Local Government Area, located in Oyo State in the southwestern part of the country. The local government covers a land area of about 518 square kilometres and lies approximately between latitude 7°23' N and longitude 3°55' E. Geographically, Akinyele LGA shares boundaries with Afijio Local Government Area to the north, Lagelu Local Government Area to the east, Ido Local Government Area to the west, and Ibadan North Local Government Area to the south. The administrative headquarters of the local government is located in Moniya. The climate of the area is typically tropical, characterized by two main seasons: the rainy season and the dry season. The dry season is often accompanied by the harmattan wind, which brings cooler and drier conditions to the region. These climatic conditions generally support agricultural activities within the area (Oyo State Government, 2020). According to the National Population Commission (NPC) 2006 national population census, Akinyele Local Government Area had a population of 211,776 people, consisting of 105,559 males and 106,217 females. Using an annual growth rate of about 3.2 percent, the population was projected to reach approximately 239,745 people by 2010 (National Bureau of Statistics, 2009). Akinyele LGA is one of the eleven local government areas that make up the Ibadan metropolitan region. The local government was officially created in 1976 and is predominantly rural in nature. Agriculture remains the major economic activity of the inhabitants. Most residents engage in farming, producing a variety of crops such as fruits and vegetables. In addition to crop farming, livestock production—including poultry and snail farming—also provides an important source of livelihood for many households in the area (Oyo State Government, 2020; NBS, 2009).

Sample size and technique for sampling.

The research took place in the outlying communities under the administrative authority of the Akinyele local government region in Ibadan, Nigeria. This study employed two-stage sampling. In the first stage, the Akinyele local government was purposefully chosen, along with a diverse selection of villages, taking into account differences in geography, demographics, and agricultural practices to ensure a representative sample. In the second stage, the population of the villages for 1991 was collected from Oyo

State's National Population Commission. Based on this, each village's population was projected for 2024 using the projection technique adopted by Olawuyi *et al.*, (2019).

$$P_n = P_0 e^{rt}$$

Where P_n =Final population, P_0 =Initial population, e =exponential. r = Growth at 3.5% t = Time of projection i.e. $(x-1991)= 2024-1991=33$. The population size of the household heads in the chosen localities was taken into account when calculating the proper sample size for the study using a formula developed by Taro Yamana (1967) and adapted by Suleiman *et al.*, (2017). Sampling error is reduced by the formula, which is expressed as

$$n = \frac{N}{1 + (e^2)N} \dots \dots \dots (1)$$

Where: n = is the sample size to be estimated,

N = is the definite population of the communities

e = is the significance level (0.05)

Table 1: Sampling frame and sample size

Villages	1991population	2024population	Sample size
Ijaiye orile	2,514	7,969	51
Iroko	1,173	3,718	23
Onidudu	832	2,637	17
Agbirigidi	329	1,042	7
Oloje	262	831	5
Akinyele	822	2,606	17
TOTAL	5,932	18,803	120

Source: Author computation

Method of Data Analysis

The data was analysed using descriptive statistics, cost of calorie, FGT and logit regression model.

Food Security line and Food Security status

Cost of calorie method was used to estimate food security status in the study. Therefore, using this method, the food insecurity line is given as;

$$LNx = a + bC \quad (1)$$

where;

X = is the adult equivalent food expenditure (in Naira), and C = is the actual calorie consumption/ adult equivalent of a household (in kcal). The calorie content of the recommended minimum daily nutrient level (L) by [4] was used to determine the food insecurity line (s) using the equation:

$$S = e^{(a+bL)} \quad (2)$$

Where, S = the cost of buying the minimum calorie intake (food insecurity line)

A and b = parameter estimates from equation (1);

L = recommended minimum daily energy (calorie) level (2260 kcal)

Based on the S calculated, households was classified as food secure or food insecure, depending on which side of the line they fall.

Estimation of the Poverty Line and Poverty Status

The Foster, Greer, and Thorbecke [4] weighted poverty index was used in the measurement of poverty status of the households. FGT measures the respondents poverty incidence, gap and severity each of the indices puts different weights on the degree to which a household or individual falls below the food security line;

$$P_{\alpha} = \frac{1}{N} \sum_{i=1}^Q \left(\frac{Z - Y_i}{Z} \right)^{\alpha}$$

Where;

a= the parameter that measures the prevalence, gap and severity of poverty respectively with number 0, 1 and 2 representing the poverty incidence, gap and severity respectively.

N = total number of household

Q = number of f poor households

Z = poverty line or threshold: it's the 2/3 of the Monthly Average Household Expenditure (MAHE)

Relationship between Food Security and Poverty Status of Rural Households

The logit regression model was used to measure the relationship between food security and poverty status of the households. This model is state as follow;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + u_i$$

B₁ – B_n = Logistic regression coefficients

X₁ = Age (years)

X₂ = Level of Education (Number of years spent in school)

X₃ = Household(Number of persons)

X₄ = Farmer's Association (Yes = 1, 0 otherwise)

X₅ = Access to Credit (Yes =1. 0 Otherwise)

X₆ = Farm Size (Hectares)

X₇ = Poverty Status (Poor = 1, 0 otherwise)

3.0 Results and Discussions

Table 2: Distribution of sampled households by members characteristics, n=120

Age group	Frequency	Percentage
Below 30 years	8	6.7
31-40 years	38	31.7
41-50 years	74	61.7
Sex		
Female	53	44.2
Male	67	55.8
Marital status		
Divorced	13	10.8
Married	82	68.3
Single	25	20.8
Widowed	4	3.3
Separated	9	7.5
Level of Education		
Higher National Diploma	35	29.2
National Certificate Examination	19	15.8
Ordinary National Diploma	20	16.7
Secondary Education	46	38.3
Religion		
Christian	49	40.8
Muslim	28	23.3
Others	14	11.7
Tradition	29	24.2
Family size		
1-3	4	3.3
3-6	88	73.3
7-9	25	20.8
10-12	3	2.5
Primary occupation		
Farmer	40	33.3
Others	10	8.3
Teacher	30	25.0
Trader	40	33.3
TOTAL	120	100.0

Source: Sample survey, 2024.

Household Characteristics

Table 2 presents the socio-economic characteristics of household heads among the sampled rural farming households. The variables examined include age, gender, level of education, marital status, religion, and primary occupation. These characteristics are important because they influence household livelihood strategies

and the ability of households to ensure food security. The results show that the largest proportion of household heads falls within the 41–50 years age group (61.7%), while only 6.7% of respondents are 30 years or younger. This indicates that most respondents are within their economically active years, a stage of life generally associated with greater labour productivity and involvement in income-generating activities that can enhance household welfare and food security. Studies have noted that individuals in their active working age tend to be more productive and better able to engage in livelihood activities that improve household food availability (Omonona and Agoi, 2007, ; FAO, 2018).

The gender distribution further shows that 55.8% of the households are headed by males, reflecting the traditional structure of many Nigerian households where men commonly assume the role of household heads. This pattern is consistent with findings from previous studies which observed that male-headed households dominate rural communities in Nigeria due to prevailing cultural and social norms (Olayemi, 2012). Regarding marital status, the majority of the respondents (68.3%) are married. Marriage often contributes to household stability and provides additional labour for farming and other livelihood activities, which may improve the household's economic capacity and food access (Amaza et al., 2006). The findings also reveal that all respondents (100%) have received some form of formal education, with many having attained secondary school education. Despite this, literacy levels remain relatively low among some household heads, which may limit their ability to fully utilize agricultural extension services and modern farming information. Limited access to relevant information and agricultural innovations can negatively affect productivity, income generation, and ultimately household food security. According to Usman et al. (2021), households with higher educational attainment are generally better positioned to access information and adopt improved practices that enhance their living standards. Household size is another important factor affecting food security. The study indicates that 73.3% of households consist of between three and six members, suggesting moderately large family sizes. While larger households may provide additional labour for farming activities, they may also increase household consumption demands. Under current economic conditions in Nigeria, especially with rising food prices and inflation, larger family sizes may place additional pressure on household food resources (FAO, 2020).

Finally, the results indicate that agriculture is not the primary occupation for about 60% of the household heads. This suggests that many households engage in other income-generating activities in addition to farming. Diversification of livelihood sources is common in rural areas and is often adopted as a strategy

to reduce income risk and improve household resilience to food insecurity (Barrett et al., 2001).

Table 3: Distribution of sample rural farm households by access to social amenities and living conditions, n=120

Type of residential building	Frequency	Percentage
Block house	39	32.5
Brick house	49	40.8
Mud house	32	26.7
Toilet facility		
Water closet	39	32.5
Pit toilet	48	40.0
Bush	33	27.5
Total	120	100.0

Source: Sample survey, 2024.

Household Living Conditions and Access to Basic Amenities

The standard of housing and the availability of basic social amenities play an important role in determining the level of poverty and the overall welfare of a household. Adequate living conditions, together with access to services such as sanitation and safe housing, contribute significantly to improved health and quality of life for rural families (World Bank, 2018). In view of this, the present study assessed these important indicators among the sampled rural farming households, as presented in Table 3. The information contained in Table 3 shows that a considerable proportion of the rural farming households in the study area live in houses constructed with bricks, accounting for about 40.8 percent of the respondents. Housing materials such as bricks are often associated with relatively better living standards in rural communities (FAO, 2017). The results also reveal that most of the houses are equipped with toilet facilities. This suggests that many households have access to improved sanitation systems, thereby reducing the practice of open defecation in nearby bushes. Access to proper sanitation is essential because poor waste disposal practices can expose communities to serious environmental and health risks, including the spread of infectious diseases (UNICEF and WHO, 2019).

Table 4: Poverty indices by household characteristics

Socio-economic Variable	Category	Per Capita Expenditure (₦)	Poverty Incidence (Po)	Poverty Depth (Pi)	Poverty Severity (P ₂)
Age Group	Below 30 years	6,800.99	0.4650	0.2814	0.3182
	31–40 years	14,667.53	0.1904	0.1026	0.1259
	41–50 years	11,369.91	0.2391	0.1368	0.1400
Sex	Male	11,898.81	0.2845	0.1713	0.1821
	Female	11,357.77	0.2139	0.1184	0.1069
Marital Status	Single	10,944.44	0.1569	0.0712	0.0378
	Married	11,714.43	0.2665	0.1621	0.1618
	Divorced	10,822.50	0.0981	0.0415	0.0096
	Widowed	12,044.93	0.2529	0.1430	0.1287
	Separated	11,611.48	0.2151	0.1202	0.1290
Education	Secondary	4,920.37	0.5900	0.4016	0.3590
	OND	9,600.81	0.3409	0.2217	0.2076
	NCE	9,004.88	0.3146	0.1963	0.1695
	HND	13,477.79	0.1598	0.0937	0.1048
Family Size	1–3	21,766.67	0.1019	0.0436	0.0211
	3–6	12,962.63	0.1825	0.0961	0.0929
	7–9	5,275.82	0.5603	0.4218	0.3872
	10–12	13,350.00	0.0017	0.0004	0.0000
Type of Building	Block house	11,196.29	0.2561	0.1510	0.1499
	Brick house	21,327.60	0.0000	0.0000	0.0000
	Mud house	10,201.00	0.3284	0.2145	0.1959
	Water closet	15,321.05	0.1432	0.0814	0.0837
Toilet Type	Pit latrine	12,455.59	0.2374	0.1461	0.1475
	Bush	7,928.58	0.3518	0.2317	0.1914

Source: Field survey 2024**Level of rural farm household poverty**

As explained earlier in the methodology section, the poverty status of the sampled rural farming households was determined using their per capita monthly expenditure. This measure included both food and non-food spending as well as the estimated value of farm products consumed by the household. The total expenditure per person was then compared with a poverty threshold of ₦7,000 per person per month, which is approximately ₦150 per person per day. Household expenditure is widely used in poverty studies because it provides a reliable indicator of the welfare level of households, particularly in rural

areas where income is often irregular or difficult to measure (Deaton and Zaidi, 2002). Table 5 presents the per capita expenditure levels and Foster-Greer-Thorbecke (FGT) poverty indices for the sampled rural farming households, together with variations across different socioeconomic groups. The FGT index is commonly applied in poverty analysis to measure not only the incidence of poverty but also its depth and severity among populations (Foster, Greer, and Thorbecke, 1984). The Cost of Calorie (CoC) approach was used to determine the poverty line for the respondents. The method estimates the minimum expenditure required for an individual or household to meet the recommended daily calorie intake necessary for healthy living. Based on the established poverty line, the Foster-Greer-Thorbecke (FGT) indices were applied to measure poverty incidence (Po), poverty depth (Pi), and poverty severity (P₂) among the respondents. Poverty Status by Age Group: The analysis revealed that respondents below 30 years experienced the highest level of poverty among all age groups. They recorded a poverty incidence of 0.4650, indicating that about 46.5% of respondents within this category were poor. Their poverty depth (0.2814) and poverty severity (0.3182) further showed that many poor youths were substantially below the poverty line and suffered severe deprivation. Their low per capita expenditure of ₦6,800.99 suggests that their income was insufficient to meet the minimum calorie requirement determined by the Cost of Calorie method. Respondents aged 31–40 years recorded the lowest poverty incidence (0.1904), poverty depth (0.1026), and poverty severity (0.1259), alongside the highest per capita expenditure of ₦14,667.53. This implies that individuals within this economically active age bracket were better able to afford the minimum calorie requirement and maintain improved welfare conditions. Respondents aged 41–50 years recorded moderate poverty conditions, with poverty incidence of 0.2391 and poverty severity of 0.1400, indicating that poverty existed within the category but was less severe than among younger respondents.

Poverty Status by Sex

Male respondents recorded higher poverty incidence (0.2845), poverty depth (0.1713), and poverty severity (0.1821) than female respondents. This indicates that a larger proportion of male respondents were unable to attain the expenditure level required to meet minimum calorie needs. Female respondents recorded lower poverty indices with poverty severity of 0.1069, suggesting relatively better welfare conditions. Although male respondents had slightly higher per capita expenditure, the greater poverty severity among them reflects unequal distribution of income and higher financial responsibilities.

Poverty Status by Marital Status

Married respondents experienced the highest poverty incidence (0.2665), poverty depth (0.1621), and poverty severity (0.1618) among the marital groups. This implies that married households were more vulnerable to poverty due to large household responsibilities and higher consumption demands, which reduced their ability to meet calorie requirements. Widowed respondents also recorded relatively high poverty indices, reflecting the economic difficulties associated with loss of household support. Single respondents recorded lower poverty severity (0.0378), while divorced respondents had the least poverty incidence (0.0981) and severity (0.0096). This suggests that respondents with fewer household burdens were better able to maintain consumption above the poverty line.

Poverty Status by Educational Level

Education significantly influenced poverty status among respondents. Those with only secondary education recorded the highest poverty incidence (0.5900), poverty depth (0.4016), and poverty severity (0.3590). This implies that approximately 59% of respondents within this category could not afford the minimum expenditure necessary to meet recommended calorie intake. Their very low per capita expenditure of ₦4,920.37 further confirms poor welfare conditions. Respondents with OND and NCE qualifications also experienced relatively high poverty levels, though less severe than respondents with only secondary education. In contrast, respondents with HND qualifications recorded lower poverty incidence (0.1598), poverty depth (0.0937), and poverty severity (0.1048). Their higher per capita expenditure indicates that higher education improved earning opportunities and enabled households to satisfy minimum calorie requirements more effectively.

Poverty Status by Family Size

Family size had a strong influence on poverty status. Households with family sizes of 7–9 persons recorded the highest poverty incidence (0.5603), poverty depth (0.4218), and poverty severity (0.3872). Their low per capita expenditure of ₦5,275.82 indicates that available household resources were insufficient to provide the recommended calorie intake for all members. Households with smaller family sizes of 1–3 persons recorded the lowest poverty severity (0.0211) and the highest per capita expenditure of ₦21,766.67. This suggests that smaller households experienced less economic pressure and were more capable of maintaining adequate food consumption. The almost zero poverty recorded among households with 10–12 members may have resulted from multiple income earners or a limited number of sampled respondents within the category.

Poverty Status by Type of Building

Housing condition also reflected the poverty status of respondents. Respondents living in mud houses recorded high poverty incidence (0.3284), poverty depth (0.2145), and poverty severity (0.1959). Their lower per capita expenditure indicates poor economic conditions and inability to meet the calorie-based poverty threshold. Respondents occupying block houses experienced moderate poverty levels, while those living in brick houses recorded no poverty. Their high per capita expenditure of ₦21,327.60 suggests stronger economic capacity and better welfare conditions.

Poverty Status by Toilet Type

Respondents using bush disposal methods experienced the highest poverty incidence (0.3518), poverty depth (0.2317), and poverty severity (0.1914). This indicates poor welfare conditions and inadequate household resources. Households using pit latrines also experienced moderate poverty conditions. Conversely, respondents with water closet facilities recorded the lowest poverty indices and relatively high per capita expenditure, indicating better living standards and improved economic wellbeing.

The FGT analysis based on the Cost of Calorie method revealed that poverty was more severe among younger respondents, individuals with low educational attainment, large households, residents of poor housing structures, and households with inadequate sanitation facilities. The analysis further showed that higher education, smaller household size, improved housing quality, and better sanitary conditions contributed significantly to improved welfare and reduction in poverty. The findings therefore suggest the need for policies aimed at improving educational opportunities, employment generation, household welfare, and access to decent living conditions in order to reduce poverty among respondents.

Table 5: Logit Regression Analysis of Relationship between Food Security and Poverty Status of Rural Households

Variables	Co-efficient	t-value	Marginal effect
Constant	0.347	0.234	0.121
Age	-0.303	-0.020	-0.106
Educational status	-0.799*	-1.847	-0.280
Household size	0.504	0.048	0.177
Farmers association	-0.411	-1.362	-0.144
Access to credit	0.495	0.237	0.173
Farm size	0.217**	2.409	0.761
Poverty status	-0.258**	-2.161	-0.907

Source: field survey, 2024.

***, ** and * denotes the associated coefficients is significant at 1%, 5% and 10% levels

Relationship between Food Security and Poverty Level of Rural Families

The logit regression result examined the relationship between food security and poverty level among rural families. The coefficients indicate whether each variable increased or reduced the likelihood of households being food secure, while the marginal effects show the extent of the influence of each factor on food security status. The t-values were used to determine the statistical significance of the explanatory variables. The constant term had a coefficient of 0.347 with a marginal effect of 0.121. Although it was not statistically significant, the positive sign suggests that, in the absence of the explanatory variables, rural households had a slight tendency toward food security. Age recorded a negative coefficient of -0.303 and a marginal effect of -0.106. This implies that an increase in the age of household heads reduced the probability of being food secure by 10.6%. The negative relationship may indicate that older farmers often face declining physical strength and reduced capacity for productive agricultural activities. However, the variable was not statistically significant, meaning age did not strongly determine food security among the rural families studied. Educational status had a negative coefficient of -0.799 and was statistically significant at the 10% level. The marginal effect of -0.280 shows that a rise in educational status reduced the likelihood of food insecurity by 28.0%. This finding suggests that educated household heads are more capable of adopting improved farming practices, managing resources efficiently, and accessing information that can improve household welfare and food availability. Household size showed a positive coefficient of 0.504 with a marginal effect of 0.177. This indicates that larger household sizes increased the probability of food insecurity by 17.7%. Large families may place additional pressure on household income and food consumption requirements, thereby reducing the ability of the household to maintain adequate food supply. Nevertheless, the variable was not statistically significant. Membership in farmers' associations had a negative coefficient of -0.411 and a marginal effect of -0.144. This implies that belonging to a farmers' association reduced the likelihood of food insecurity by 14.4%. Farmers' associations often provide members with access to extension services, agricultural information, improved inputs, and cooperative support, all of which can contribute to better food production and welfare. However, the variable was not statistically significant. Access to credit had a positive coefficient of 0.495 and a marginal effect of 0.173. This suggests that households with access to credit were more likely to improve their food security status by 17.3%. Access to financial resources can enable rural families to purchase farm inputs, invest in agricultural production, and meet household consumption needs. Despite the positive relationship, the variable did not significantly influence food security statistically. Farm size had a positive coefficient of 0.217 and was statistically significant at the 5% level. The marginal effect of 0.761 indicates

that an increase in farm size increased the likelihood of food security by 76.1%. This result implies that households with larger farm holdings were able to produce more food and generate higher income, thereby improving their food security condition. Poverty status had a negative coefficient of -0.258 and was statistically significant at the 5% level. The marginal effect of -0.907 reveals that poverty reduced the probability of food security by 90.7%. This indicates that poor households faced severe limitations in accessing sufficient food, productive resources, healthcare, and other necessities required for a stable livelihood. Poverty therefore emerged as a major factor contributing to food insecurity among rural families. Overall, the logit regression analysis revealed that educational status, farm size, and poverty status were the major determinants of food security among rural households. Education and larger farm size improved the chances of households being food secure, while poverty significantly reduced food security. The findings suggest that policies aimed at reducing rural poverty, improving educational opportunities, and increasing access to farmland would greatly enhance food security among rural families.

Table 5 Behaviours adopted by the households

Coping behaviours adopted by the households	Yes	No
Rely on less preferred/ less expensive	95.1	4.9
Reduce number of meals eaten in a day	80.5	19.5
Purchase food on credit	92.0	8.0
Limit portion size at meal times	57.9	39.1
Borrow food or rely on help from relative / friend	55.0	45.0

Source: Field Survey, 2024

Behaviours for Coping Implemented by the Households

Table 5 presents the various coping mechanisms adopted by households when they experience food shortages. Based on the Coping Strategy Index (CSI), the findings reveal that many households in the study area rely on several adjustment strategies to manage periods of food insecurity. The most commonly used strategy is the consumption of less preferred and cheaper foods, reported by about 95.1% of the households. This is followed by purchasing food on credit (92.0%), skipping meals during the day (80.5%), reducing portion sizes at mealtimes (57.9%), and borrowing food or seeking assistance from relatives and friends (55.0%). Such responses are typical survival strategies adopted by households when food availability or purchasing power is limited. These findings are consistent with the study by Sambo et al., 2020 which reported that rural households in Kaduna State manage food shortages by reducing both the number of meals eaten per day and the quantity of food consumed (Sambo et al., 2020). Similar observations were made by Akanji et al., who found that women farmers in the Ogbomoso Agricultural Zone of Oyo State frequently depend on different coping strategies to deal with limited food access and seasonal food shortages (Akanji et

al., 2019,). These coping behaviours highlight the vulnerability of rural households and the need for policies aimed at strengthening food security and improving household resilience

5.0 Conclusions

Most of the respondents in the study were relatively young men who were responsible for large households. The analysis further revealed that factors such as the level of education of the household head, the size of the farm, and the household's poverty status played important roles in determining the food security condition of rural families. When faced with food shortages, the strategies most commonly adopted by respondents included consuming cheaper or less preferred foods, reducing the number of meals eaten each day, and obtaining food on credit.

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Declaration of conflict of interest

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