FOOD SECURITY STATUS AND COPING STRATEGIES ADOPTED BY FARM HOUSEHOLDS DURING THE COVID-19 PANDEMIC IN NIGER STATE, NIGERIA

Alhassan, A. M.*, Olorunsanya, E. O., & Baba, K. C.
[1]Department of Agricultural Economics and Extension Services,
Faculty of Agriculture,
Ibrahim Badamasi Babangida University, Lapai, Niger State, Nigeria

ABSTRACT
This study examined the determinants of household food-security status and the coping strategies adopted by farm households during the COVID-19 pandemic in Niger State, Nigeria. A multistage random sampling technique was used to select 300 farm households from the state's three agricultural zones. Data were collected using a structured questionnaire and analysed using descriptive statistics and binary logistic regression. The results showed that the age of the household head, household size, farm size, and farm income were associated with household food-security status. Farm size had a positive and statistically significant effect on the likelihood of being food secure, while age and household size were negatively associated with food-security status. Farm income showed a negative and statistically significant association at the 10% level, indicating that higher reported farm income was associated with lower odds of being food secure in the estimated model. Findings on coping strategies showed that households predominantly relied on consumption-based responses. Eating less expensive food (mean = 2.71), reducing consumption rations (mean = 2.66), and allowing children to eat first (mean = 2.55) were the most widely adopted strategies. Additional strategies included small-scale production, meal skipping, buying food on credit, backyard livestock production, and borrowing money to purchase food. In contrast, mortgaging or selling domestic assets, eating wild fruits, eating once a day, selling labour power, and collecting leftover food at social functions were less frequently adopted. The study recommends improved access to productive agricultural resources, livelihood diversification, agricultural credit and extension services, and strengthened social-protection programmes to enhance household resilience to future shocks.

Keywords: Food security determinants, coping strategies, COVID-19, logistic regression, Likert scale, farm households

INTRODUCTION

Household food security depends on an interacting set of demographic, economic, and institutional factors, and understanding these determinants is essential for designing effective interventions, especially during shocks (Aidoo *et al.,* 2013; Asogwa & Umeh, 2012). Recent evidence from Nigerian farming households shows that education, credit access, farm size, agricultural output, and participation in safety-net programmes can significantly shape household food-security outcomes (Ogunniyi *et al.,* 2021). Beyond identifying what drives food insecurity, understanding how households respond once it occurs is equally important, since the coping strategies a household adopts reveal both the depth of the shock it faces and its underlying resilience (Woldeamanuel, 2015; Tabe-Ojong *et al.,* 2022).

Understanding household responses to food insecurity is equally important because households do not passively experience food shortages; they adopt different strategies to maintain consumption and protect their livelihoods. These responses may include changing the type and quantity of food consumed, borrowing money or food, purchasing food on credit, reducing meal frequency or portion sizes, drawing on savings, selling assets, increasing labour supply, and relying on social or institutional support. Recent evidence from South-East Nigeria shows that households experiencing food insecurity frequently resort to less-preferred or less-expensive foods, food purchases on credit, borrowed money, reduced meal portions, fewer meals, and restrictions on adult food consumption. The study also found a significant relationship between food insecurity and the intensity of coping strategies, showing that coping behaviour is an important indicator of the severity of household food insecurity (Iheme *et al.,* 2026).

The COVID-19 pandemic supplied a large-scale test of this relationship. Lockdown and movement restrictions in Nigeria disrupted farm households' incomes and their access to input and output markets, sharply raising the risk of food insecurity (Endashaw *et al.,* 2020). A study of 480 rural farming households across three South-West Nigerian states found that the pandemic's lockdown and price shocks measurably worsened households' food security status, with household income, size, and the household head's education and gender significantly shaping outcomes (Omotayo *et al.,* 2022). At the national level, a telephone survey of over a thousand Nigerian households showed that income losses pushed households toward more severe food insecurity and less diverse diets, while households' wealth endowments, social capital, and access to safety nets moderated how severely they were affected; livestock ownership in particular cushioned households against falling into deeper food insecurity (Balana *et al.,* 2023).

Where households did become food insecure, the literature shows they drew on a fairly consistent repertoire of coping responses: informal social support, drawing on savings, borrowing, selling assets and livestock, increasing labour supply, cutting food and non-food consumption, and turning to formal or informal safety nets (Balana *et al.,* 2023). Evidence from outside Nigeria reinforces this pattern. In Burkina Faso, a survey of 503 small-trader households found that asset endowment and access to basic social services were the main pillars of household resilience, reducing the likelihood that a household would need to resort to coping strategies at all, and that a household's economic status, proxied by farm size, livestock ownership, and access to extension services, shaped which strategy it chose (Sawadogo & Ouoba, 2023). More recently, a large cross-sectional study of 1,244 households in South-East Nigeria used the Household Food Insecurity Access Scale alongside the CARE/World Food Programme Coping Strategy Index and found that the intensity of coping strategies rose in step with the severity of food insecurity experienced, from reliance on less preferred or cheaper foods through to more disruptive responses (Iheme *et al.,* 2026).

Together, these studies confirm that coping strategies differ markedly in severity and sustainability, from relatively benign dietary adjustments to more damaging responses such as asset depletion, and that their relative prevalence within a population is itself informative about how deeply food insecurity has taken hold (Farzana *et al.,* 2017; Ume *et al.,* 2018).

Within Nigeria, Niger State offers a useful setting for this question because it is a major food-producing area in the North Central zone whose farm households combine crop and livestock production with off-farm income sources, yet remain vulnerable to price and market shocks. Existing evidence from the wider North Central zone, however, is fragmented. A recent multi-state study covering 812 respondents across Benue, Kogi, Kwara, Nasarawa, Niger, and Plateau States and the Federal Capital Territory found that the sex, marital status, and education of the household head, along with farm size and farming experience, significantly influenced food security status, but the study addressed determinants only and did not examine how food-insecure households actually responded (Ogunfolaju *et al.,* 2026). Similarly, state-level work on Niger State farming households has tended to focus narrowly on livelihood diversification or on food security determinants in isolation, without linking either to a systematic account of coping behaviour during the pandemic period (Idumah *et al.,* 2023).

This study addresses an important gap in the literature on household food security during the COVID-19 pandemic in Niger State. Few studies have jointly examined the socioeconomic and farm-level factors influencing household food security status and the coping strategies adopted by food-insecure farm households within the same study population. Such an integrated analysis is important because it provides insight into how household characteristics and production-related factors shape food security outcomes and influence the coping responses adopted by affected households. Understanding this relationship is essential for designing and targeting interventions that address both the underlying determinants of food insecurity and the strategies households employ to cope with food-related shocks.

Specifically, the study sought to:

1. determine the socioeconomic and farm-level factors influencing food security status among farm households in Niger State during the COVID-19 pandemic; and
2. assess the coping strategies adopted by food-insecure farm households and determine their relative prevalence in the study area.

Literature Review

Household Food Security and Its Determinants

Household food security is influenced by demographic, economic, productive, and institutional factors and is commonly understood through the dimensions of food availability, access, utilization, and stability. At the household level, food access is particularly important because households obtain food through own production, market purchases, transfers, and other livelihood resources; hence, food-security outcomes depend not only on food availability but also on purchasing power and access to productive and institutional resources (Aidoo *et al.,* 2013; Asogwa & Umeh, 2012). Demographic characteristics, including household size, age, gender, marital status, and education of the household head, also shape food-security status by influencing food requirements, labour availability, access to employment, information, credit, and agricultural resources. Evidence from Nigerian farming households confirms that these socioeconomic characteristics significantly influence household food-security outcomes (Omotayo *et al.,* 2022; Ogunfolaju *et al.,* 2026).

Economic and agricultural resources play important roles in determining household food security. Income, savings, access to credit, and productive assets enhance households' ability to obtain food and withstand temporary economic shocks, while limited financial resources can accelerate food insecurity during periods of disruption. Evidence from Nigeria shows that income losses during COVID-19 increased food insecurity and reduced dietary diversity, whereas wealth, social protection, and livestock ownership helped cushion households against these effects (Balana *et al.,* 2023). For farming households, farm size, livestock ownership, farming experience, access to inputs, and extension services can influence both food production and income generation. In particular, livestock serves as a source of food, income, and emergency wealth, while farm size and farming experience contribute to household production capacity. Evidence from North-Central Nigeria further indicates that farm size, farming experience, and household characteristics significantly influence household food-security status (Ogunfolaju *et al.,* 2026).

These relationships became particularly important during COVID-19. The pandemic affected household food security not only through direct health effects but also through mobility restrictions, job losses, market disruptions, rising food prices, and reduced access to agricultural inputs. Amare *et al.* (2021) found that COVID-19 exposure and lockdown measures increased food insecurity among Nigerian households, partly through reductions in labour-market participation. Omotayo *et al.* (2022) similarly reported adverse food-security effects among rural farming households in South-West Nigeria.

COVID-19, Food Security, and Coping Strategies in Nigeria

The COVID-19 pandemic generated an unprecedented livelihood shock for many Nigerian households. Measures introduced to contain the spread of the virus restricted movement and economic activity, disrupted agricultural and food markets, and reduced opportunities for wage employment and petty trading. For farming households, these disruptions could affect access to inputs, labour, transport, markets, and consumers at the same time. Amare *et al.* (2021), using panel data from Nigeria, found that COVID-19 exposure and lockdown measures increased food insecurity. The study showed that reductions in labour-market participation were an important mechanism through which the pandemic affected food access. However, the effects were not uniform across households, indicating that pre-existing socioeconomic conditions influenced the extent to which households could absorb the shock.

Balana *et al.* (2023) similarly found that income losses were associated with increased food insecurity and reduced dietary diversity. Their findings also demonstrated the protective role of household wealth, livestock ownership, social capital, and safety-net access. These findings matter because they show that the consequences of COVID-19 depended not only on exposure to the shock but also on the resources households had before and during the pandemic. Evidence from farming households provides further insight into these effects. Omotayo *et al.* (2022), using data from 480 rural farming households in three South-Western Nigerian states, found that lockdown and price-related shocks adversely affected food-security outcomes. Household income, size, education, and household head characteristics were among the factors associated with differences in food security.

COVID-19 also affected household coping behaviour. Okidim *et al.* (2021) found that rural households in Enugu State adopted several strategies to cope with food insecurity during the pandemic, including consuming less-preferred foods, reducing food consumption, skipping meals, borrowing, and seeking additional income. Mukaila *et al.* (2024) similarly examined rural farming households in Enugu State and found substantial food insecurity during the COVID-19 period.

These studies establish that COVID-19 affected both food-security status and household coping behaviour in Nigeria. However, their findings also demonstrate the importance of geographical context. Household livelihood systems and access to agricultural resources, markets, credit, social networks, and alternative employment differ substantially across Nigerian states. Consequently, evidence from South-West and South-East Nigeria cannot automatically be assumed to describe the experience of farm households in Niger State.

Theoretical Framework

Household Coping Strategy Theory

The Household Coping Strategy perspective provides a theoretical explanation of how households respond when their normal access to food or income is disrupted. Corbett (1988) argues that households confronted with food shortages do not immediately adopt the most costly coping mechanisms. Instead, they generally attempt to protect consumption by using resources that are relatively accessible and reversible. As the severity or duration of the crisis increases, households may progressively adopt more costly strategies that can undermine future livelihood capacity.

This perspective implies a hierarchy of coping responses. At relatively low levels of stress, households may change food preferences, purchase cheaper foods, reduce portion sizes, or modify meal patterns. As the shock becomes more severe, households may borrow money or food, seek additional employment, reduce expenditure on essential non-food items, or depend on social networks. Under more severe or prolonged conditions, households may sell livestock, productive equipment, or other assets. The movement toward increasingly erosive strategies reflects declining capacity to absorb the shock through less costly means.

Maxwell *et al.* (2008) provide an empirical basis for this perspective by demonstrating that coping behaviours can be used to assess the severity of food insecurity. The frequency with which households employ particular strategies indicates the pressure under which households are operating. Thus, coping behaviour can be understood as both a response to food insecurity and an indicator of the intensity of household vulnerability.

The theory is relevant to the present study because it explains why food-insecure farm households in Niger State may adopt different strategies. Households facing similar external conditions may not respond identically because the severity of their food-access constraints and the resources available to them differ. The theory therefore supports the study's second objective of assessing the coping strategies adopted by food-insecure households and determining their relative prevalence.

METHODOLOGY

The study was conducted in Niger State, Nigeria, with farm households serving as the target population. A multistage random sampling technique was used to select respondents. In the first stage, the three agricultural zones in the state were included, and two Local Government Areas (LGAs) were randomly selected from each zone, resulting in six LGAs. In the second stage, two villages were randomly selected from each selected LGA, resulting in 12 villages. Simple random sampling was used at both stages to give eligible LGAs and villages equal opportunities for selection.

In the final stage, 25 farm households were randomly selected from each selected village, resulting in a total sample of 300 households (3 zones × 2 LGAs × 2 villages × 25 households). Thus, 100 households were selected from each agricultural zone, 50 from each selected LGA, and 25 from each selected village. The household head served as the sampling unit and respondent. This multistage procedure ensured adequate geographical representation across the three agricultural zones and provided a systematic, replicable approach to obtaining the final sample of 300 respondents.

Distribution by Agricultural Zone

Agricultural zone	LGAs selected	Villages selected	Households per village	Total households
Zone 1	2	4	25	100
Zone 2	2	4	25	100
Zone 3	2	4	25	100
Total	**6**	**12**	**25**	**300**

Source: Field survey, 2025.

Following Adeniyi and Ojo (2013), a binary logistic regression model was used to examine the determinants of household food security status, with food security status (1 = food secure, 0 = food insecure) as the dependent variable, specified as:

The binary logistic regression model was specified as:

$$Ln(1 - PiPi) = \beta 0 + \beta 1X1i + \beta 2X2i + \beta 3X3i + \beta 4X4i + \beta 5X5i + \beta 6X6i + \beta 7X7i + \beta 8X8i + \beta 9X9i$$

Where:

$Pi = P\ (FS_i = 1 \mid X_i) = e^{Zi} / 1 + e^{Zi}$

and

$$Zi = \beta 0 + \beta 1X1i + \beta 2X2i + \beta 3X3i + \beta 4X4i + \beta 5X5i + \beta 6X6i + \beta 7X7i + \beta 8X8i + \beta 9X9i$$

where Pi is the probability that the i-th household is food secure; FSi is household food-security status (1 = food secure, 0 = food insecure); β0 is the intercept; and β1,…,β9 are the coefficients to be estimated.

The explanatory variables are defined as follows: X1 = age of household head (years); X2 = education (years); X3 = household size (adult equivalent); X4 = cooperative membership (1 = member, 0 = non-member); X5 = access to credit (1 = access, 0 = no access); X6 = farm size (hectares); X7 = farming experience (years); X8 = gender (1 = male, 0 = female); and X9 = farm income (₦).

The coping strategies adopted by households were assessed using a 4-point Likert-type rating scale developed by Rensis Likert in 1932, and widely used for attitude and behaviour-frequency measurement (Uzoagulu, 2011). Respondents rated the frequency of adoption of each of thirteen coping strategies, and a weighted mean score was computed for each; strategies with a mean score of 2.0 or above were considered widely adopted, following the study's cut-off convention.

RESULTS AND DISCUSSION

Socio-economic and farm institutional characteristics of the farm household.

Table 1 shows that male-headed households constituted the majority (84.67%) of the sample. This may imply that males were likely responsible for the household's needs and well-being and were responsible for providing food for the household. This finding agrees with the findings of Ojediran *et al* (2021) and Ojokoh *et al* (2022) in their studies on the effects of COVID-19 lockdown on agricultural livelihoods and food security, where male respondents dominated farm household surveys due to their primary role in farm decision-making and household headship in rural areas.

Table 1: Table 1: Distribution of respondents by their socioeconomic characteristics

Characteristics	Category	Frequency (n=300)	Percentage	Mean
Sex	Male	254	84.67	
	Female	46	15.33	
Age	≤30	23	7.67	
	31-40	176	58.67	**39**
	41-50	85	28.33	
	51-60	14	4.67	
	>60	2	0.66	
Educational level	No formal education	51	17.00	
	Primary education	40	13.33	
	Arabic education	8	2.67	
	Secondary education	129	43.00	
	Tertiary education	72	24.00	
Marital status	Single	78	26.00	
	Married	207	69.00	
	Widowed	10	3.33	
	Separated/divorced	5	2.67	
Household size	≤3	6	2.00	
	4-8	118	39.33	**10**
	>8	176	58.67	
Farming Experience				
	≤ 10	117	39.00	
	11 – 20	136	45.33	**15**
	21 – 30	43	14.33	
	> 30	4	1.34	
Farm size				
	≤ 5	263	87.67	
	6 – 10	35	11.67	**3**
	> 10	2	0.66	

Source: Field survey, 2025

The age analysis shows that the mean age of farm households was 39 years. Age is an important socio-economic characteristic, as it determines the effectiveness and competence of labour availability for production (Idumah *et al.,* 2023). This result suggests that more farm households in the study area are economically active. The result of the study is in agreement with the result of Lawal *et al*, (2023), who posited that farming households in Niger State have a mean age of 46 years, but in contrast to the findings of Aboaba (2020), who reported that the mean age of farming households in Ogun State was 54 years. This contrast may be because the studies focused on different states.

Furthermore, analysis of the educational background of the sampled farming households shows that the majority (about 83%) have at least one form of education. The relatively high proportion of educated farm households in the study area likely enhanced households' capacity to access information, diversify livelihoods and adopt coping strategies during the COVID-19 lockdown, which may partly explain the moderate effects observed on livelihood and food security status compared to less educated farming households. The result is in line with the findings of Ibukun & Adebayo (2021), who found that households with lower educational levels are particularly vulnerable to food insecurity during the pandemic.

In the analysis of marital status, the results show that the majority (69.00%) of respondents in the study area are married. The predominance of married respondents in the study area may have enhanced household resilience during the COVID-19 lockdown through increased labour availability, share income sources and a stronger social support system, though larger household sizes associated with marriage may also have increased food consumption pressure. This finding aligns with a study by Mukaila et *al*. (2024), who asserted that marital status and household structure significantly shape food security conditions among farming households in Nigeria. Table 1 also shows that a typical household size of farming households in the study area is 10 persons. The moderate household size observed among respondents in the study area implies the availability of family labour that could support farming activities during the COVID-19 lockdown. The result is in line with Idumah *et al.* (2023), who also observed an average household size in COVID-19 lockdown research conducted in Niger State.

Table 1 reveals that an average farming household in the study area has 15 years of farming experience. This indicates that the respondents have the capacity to manage farm activities and adopt effective coping strategies during the COVID-19 lockdown, which may have moderated the impact of the pandemic on both livelihood and food security outcomes. Furthermore, analysis of farm size shows that an average farming household in the study area has a farm size of 3 hectares. Farm size is essential to expanding farm production. This is because, through an efficient production system, farmers with larger landholdings are expected to have higher output, which can help during the COVID-19 lockdown, as more food might be available for household consumption; hence, farm households might be saved from food insecurity during the lockdown.

Determinants of Food Security Status

Table 1 presents the logistic regression results for the determinants of food security status among farm households in the study area. Four variables were statistically significant: age, household size, farm size and farm income. Table 2 presents the logistic regression estimates of the socioeconomic and farm-level factors influencing household food-security status. The likelihood-ratio chi-square statistic of 42.87 ($p<0.001$) indicates that the explanatory variables jointly explain variation in household food-security status.

The pseudo-R2 of 0.3222 further suggests that the variables included in the model provide meaningful explanatory power. This finding is consistent with recent Nigerian studies showing that household food security is jointly influenced by demographic, agricultural, economic, and institutional characteristics rather than by a single factor (Adebayo *et al.,* 2025; Ogunfolaju *et al.,* 2026).

Table 2: Logistic Regression Results on the Determinants of Food Security Status

Variable	Coefficient (β)	Std. Error	Odds Ratio	P-value
Age	-0.049*	0.027	0.952	0.090
Education	0.109	0.162	1.115	0.502
Household size (adult equivalent)	-0.086*	0.051	0.918	0.093
Membership of association	0.105	0.083	1.111	0.205
Access to credit	-0.424	0.312	0.654	0.173
Farm size	0.547**	0.268	1.728	0.041
Farming experience	0.003	0.025	1.003	0.895
Gender	0.064	0.362	1.066	0.859
Farm income	-0.296*	0.173	0.744	0.081
Constant	0.807	1.683	2.242	0.631
LR χ^2 (9)	42.87			0.0000
Pseudo R^2	0.3222			
Log likelihood	193.58377			

Source: Field survey, 2025. **Note:** Dependent variable: food-security status (1 = food secure; 0 = food insecure). ** and * indicate statistical significance at the 5% and 10% levels, respectively. Odds ratios are calculated as eβ.

Farm size had a positive and statistically significant effect on household food-security status at the 5% level. The coefficient of 0.547 and odds ratio of 1.728 indicate that a one-hectare increase in farm size was associated with approximately a 72.8% increase in the odds of being food secure, holding other factors constant. Larger farms may provide households with greater production capacity, more food from their own production, and opportunities to generate farm income. This result is strongly supported by recent evidence from Nigeria. A study of rice-farming households in the Kano River Irrigation Project found farm size to be a positive determinant of food security, while a recent study of smallholder farmers in North-Central Nigeria similarly reported that farmers with larger landholdings were more likely to be food secure (Ogunfolaju *et al.,* 2026).

Age of the household head had a negative and statistically significant relationship with food-security status at the 10% level. Its odds ratio of 0.952 implies that a one-year increase in the age of the household head was associated with approximately a 4.8% reduction in the odds of being food secure, ceteris paribus. This may reflect declining physical labour capacity, reduced participation in income-generating activities, or lower ability to adjust production and livelihood strategies among older household heads. A recent study of Nigerian farmers similarly reported a negative coefficient for farmers' age, although the effect was not statistically significant in that particular sample (Ogunfolaju *et al.,* 2026).

Household size was negatively associated with food-security status and statistically significant at the 10% level. Its odds ratio of 0.918 indicates that a one-unit increase in household size was associated with approximately an 8.2% reduction in the odds of being food secure, holding other factors constant. Larger households generally have greater food requirements and may experience stronger pressure on available income and productive resources, particularly where household resources do not increase proportionately with the number of members. This finding is consistent with recent evidence from Nigerian rice farmers, where household size was negatively associated with food security, and with research among cassava farmers in Oyo State, which found household size significantly associated with food insecurity (Wudil *et al.,* 2023; Babarinde *et al.,* 2024).

Farm income recorded a negative coefficient (−0.296) and was statistically significant at the 10% level, with an odds ratio of 0.744. This indicates that a one-unit increase in farm income was associated with a 25.6% reduction in the odds of being food secure, ceteris paribus. The negative direction is contrary to the conventional expectation that higher income improves households' capacity to purchase food and withstand economic shocks. Previous studies have generally reported a positive relationship between household income and food security (Balana *et al.,* 2023; Babarinde *et al.,* 2024).

Access to credit had a negative coefficient (-0.424) and an odds ratio of 0.654, but the relationship was not statistically significant (p=0.173). The coefficient suggests that households with access to credit had lower estimated odds of being food secure in the sample, but the absence of statistical significance means that no reliable conclusion can be drawn about the independent effect of credit access on food-security status. The negative direction may partly reflect the possibility that households experiencing greater financial pressure were more likely to seek or obtain credit. This interpretation is important because recent Nigerian research has produced mixed evidence on credit and food security. While a 2023 study of rice-producing households found that credit access positively influenced food security, other research has identified credit constraints as a factor associated with greater food insecurity (Wudil *et al.,* 2023; Babarinde *et al.,* 2024; Balana *et al.,* 2023).

Education had a positive but statistically insignificant relationship with food-security status (OR = 1.115; p = 0.502). Although the result suggests that additional years of education were associated with higher odds of being food secure, the estimated effect was not statistically different from zero in this study. This contrasts with recent evidence from North-Central Nigeria, where the household head's education significantly influenced food-security status, with more educated farmers more likely to be food secure (Ogunfolaju *et al.,* 2026). The difference may reflect variations in study location, sample characteristics, agricultural systems, or the relative importance of education compared with farm-based resources in Niger State.

Membership in an association had a positive but statistically insignificant effect on food-security status (OR = 1.111; p = 0.205). The positive coefficient suggests that association membership may provide access to social networks, information, collective action, and potentially agricultural or financial services, but the evidence in this study is insufficient to establish a statistically significant effect. Recent research among Nigerian farming households similarly recognizes cooperative and institutional linkages as potentially important livelihood resources, although their effects may depend on the specific services and benefits accessible through membership (Wudil *et al.,* 2023; Babarinde *et al.,* 2024; Balana *et al.,* 2023).

Farming experience had a positive but statistically insignificant relationship with food-security status (OR = 1.003; p = 0.895). The odds ratio indicates that an additional year of farming experience was associated with only a very small increase in the odds of being food secure. Although the effect was not significant in this study, recent evidence from North-Central Nigeria found farming experience to be a significant determinant of food-security status, with more experienced farmers more likely to be food secure (Ogunfolaju *et al.,* 2026). The difference may indicate that farming experience alone is insufficient to improve food security unless it is accompanied by adequate land, capital, technology, inputs, and market opportunities.

Finally, gender had a positive but statistically insignificant relationship with food-security status (OR = 1.066; p = 0.859). Thus, male-headed households had slightly higher estimated odds of being food secure than female-headed households, but the difference was not statistically significant. This result differs from recent evidence from North-Central Nigeria, where household head sex significantly influenced food-security status, with male-headed households more likely to be food secure (Ogunfolaju *et al.,* 2026). The difference may reflect the specific socioeconomic and agricultural characteristics of the households sampled in Niger State.

Coping Strategies Adopted by Farm Households

Table 3 presents the Likert-scale ranking of coping strategies adopted by farm households to mitigate the effect of the COVID-19 pandemic on their food security. Eating less expensive food (mean = 2.71) was ranked first among the thirteen strategies identified, indicating that households predominantly substituted preferred foods with cheaper alternatives to stretch limited resources. This finding is consistent with Declaro-Ruedas (2019) and Mukaila *et al.* (2020), who similarly found consuming less expensive food to be the leading coping strategy, often associated with lower household income and larger household sizes requiring greater quantities of food.

Table 3: Coping Strategies Adopted by Farm Households during the COVID-19 Pandemic

Coping strategy	Always (freq.)	Occasionally (freq.)	Never (freq.)	Weighted score	Likert mean	Rank
Eating less expensive food	214	84	2	812	2.71	1st
Reducing rations of consumption	225	48	27	798	2.66	2nd
Allowing children to eat first	183	99	18	765	2.55	3rd
Engaging in additional small-scale production activities	135	109	56	679	2.26	4th
Skipping meal within a day	144	78	78	666	2.22	5th
Buying food on credit	135	94	71	664	2.21	6th
Backyard livestock production	94	123	83	611	2.04	7th
Borrowing money to buy food	99	102	99	600	2.00	8th
Mortgaging and sales of domestic assets	51	72	177	474	1.58	9th
Eating wild fruits	30	99	171	459	1.53	10th
Eating once a day	42	63	195	447	1.49	11th
Selling labour power	36	69	195	441	1.46	12th
Picking up left-over food at social functions	39	27	234	405	1.35	13th

Source: Field survey, 2025.

Reducing consumption rations (mean = 2.66) was the second most widely adopted strategy, reflecting households' efforts to manage available food by reducing portion sizes, consistent with Mukaila *et al.* (2020). Allowing children to eat first (mean = 2.55) ranked third, reflecting a deliberate household strategy of protecting children from the effects of food scarcity by prioritizing their consumption.

Engaging in additional small-scale production activities, such as backyard poultry production and garri processing (mean = 2.26), and skipping a meal within a day (mean = 2.22), were also commonly adopted; the latter was typically practised by adult household members, particularly household heads, who forfeited meals to preserve food for other household members. Buying food on credit (mean = 2.21) and borrowing money to buy food (mean = 2.00) were also common, reflecting reliance on informal credit arrangements to sustain household food access, albeit often at a premium.

In contrast, mortgaging or selling domestic assets (mean = 1.58), eating wild fruits (mean = 1.53), eating once a day (mean = 1.49), selling labour power (mean = 1.46), and picking up left-over food at social functions (mean = 1.35) were not widely practiced, each recording a mean score below the 2.0 cut-off used to distinguish widely adopted strategies. This suggests that, while a minority of severely affected households resorted to these asset-depleting or socially degrading strategies, most farm households in the study area managed food insecurity primarily through dietary adjustment rather than asset erosion, an encouraging indication of relatively sustainable coping behaviour during the pandemic.

CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

Conclusion

This study examined the determinants of household food-security status and the coping strategies adopted by farm households in Niger State during the COVID-19 pandemic. The logistic regression results indicate that age of the household head, household size, farm size, and farm income were associated with food-security status, although the direction and statistical significance of the individual effects varied across the explanatory variables. Farm size had a positive and statistically significant association with the odds of being food secure, suggesting that households with larger farms were better positioned to maintain food security during the period of economic disruption. Age and household size were negatively associated with food-security status, indicating greater vulnerability among older household heads and households with larger consumption requirements.

The estimated coefficient for farm income was negative and statistically significant at the 10% level, with an odds ratio of 0.744. Thus, if the reported coefficient is confirmed by the original statistical output, higher farm income was associated with lower odds of being food secure in the estimated model. This finding differs from the expected positive relationship between income and food security and should therefore be interpreted cautiously. It may reflect the measurement and timing of farm income, differences in production and consumption patterns, or other household characteristics not captured in the model. The finding should be regarded as an empirical association rather than evidence that increases in farm income cause food insecurity.

The coping-strategy results further show that farm households responded to food insecurity predominantly through dietary and consumption-based adjustments. Eating less expensive food, reducing consumption rations, and allowing children to eat first were the three most frequently reported strategies. Additional small-scale production, meal skipping, purchasing food on credit, backyard livestock production, and borrowing money to purchase food were also used to varying degrees. In contrast, mortgaging or selling domestic assets, eating wild fruits, eating once a day, selling labour power, and collecting leftover food at social functions were less frequently reported. The results suggest that households generally tried to preserve productive assets while adjusting food consumption and relying on informal financial or livelihood mechanisms to manage the effects of the pandemic.

Limitations of the Study

The findings should be interpreted in light of several limitations. First, the study employed cross-sectional, self-reported data collected after the COVID-19 lockdown period. Consequently, respondents were required to recall aspects of their household food-security experiences and coping behaviour during the pandemic, which may have introduced recall bias. The study therefore captures households' reported experiences rather than continuously observed changes in food security and coping behaviour before, during, and after the lockdown.

Second, the study was conducted among a relatively small sample of 300 farm households in Niger State. Although the multistage sampling procedure provided coverage across the selected agricultural zones, the findings should not automatically be generalized to all farming households in Nigeria or even to all rural households in North-Central Nigeria. Differences in agricultural systems, market access, livelihood opportunities, institutional support, and exposure to shocks may produce different food-security and coping outcomes in other locations.

Third, the logistic regression model included a relatively parsimonious set of nine explanatory variables. While these variables capture important demographic, socioeconomic, and farm characteristics, the model did not include several potentially important determinants of household food-security status. In particular, the model did not incorporate information on pre-pandemic income and wealth, household asset holdings, the severity of COVID-19-related shocks, other concurrent shocks, and access to informal safety nets and social networks. Omitting these factors means some relevant sources of heterogeneity may remain unobserved, and the estimated relationships should not be interpreted as causal effects.

Finally, because the data are cross-sectional and lack detailed pre-pandemic information, the study cannot establish with certainty how much household food-security status changed as a direct consequence of COVID-19. Rather, the results provide evidence on the reported food-security status and coping responses of the sampled farm households during the pandemic period. Future studies would benefit from longitudinal or panel data that follow the same households before, during, and after major shocks.

Recommendations

Based on the findings, the following recommendations are proposed:

1. Agricultural and social-protection programmes should pay particular attention to older household heads and larger households because the results indicate that these characteristics were associated with greater vulnerability to food insecurity. Support could include targeted food assistance, cash transfers, livelihood support, and programmes that reduce the cost of accessing agricultural inputs.

2. The positive association between farm size and food security suggests the importance of improving farm households' access to productive land and other agricultural resources. Policies should facilitate secure access to cultivable land while also improving farmers' access to improved inputs, extension services, irrigation where feasible, and agricultural markets.
3. Interventions should promote diversified income-generating opportunities rather than relying exclusively on crop production. Access to affordable agricultural credit, storage facilities, value-addition opportunities, market information, and off-farm employment can help households manage income fluctuations during future economic shocks.
4. Agricultural-extension and social-protection programmes should encourage coping mechanisms that protect rather than undermine household productive capacity. Small-scale livestock production, diversified food production, home gardens, savings mechanisms, and community-based support systems may help households maintain food access without selling productive assets.
5. The relatively high use of cheaper foods, reduced food portions, meal skipping, and food credit suggests that many households experienced substantial pressure on food access. Government and relevant development organisations should strengthen shock-responsive social-protection mechanisms that can be rapidly deployed during pandemics, price increases, market disruptions, and other livelihood shocks.
6. Future studies should collect panel data covering the pre-shock, shock, and post-shock periods and include information on household wealth, pre-pandemic income, asset ownership, informal safety nets, social networks, and exposure to different types of shocks. Such data would provide a stronger basis for distinguishing temporary coping responses from longer-term changes in household resilience and food security.

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