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Agrarian Households' Vulnerability To Food Insecurity In Ogun State, Nigeria

Folasade Oluremi AMINU

Department of Agricultural Technology, School of Technology, Yaba College of Technology, Epe Campus, P.M.B. 2011, Yaba, Lagos State, NIGERIA

https://orcid.org/0000-0003-2926-6024

Corresponding Author: folaafe02@gmail.com

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ABSTRACT

The study examined the vulnerability of agrarian households to food insecurity in Ogun State, Nigeria. One hundred and twenty (120) agrarian households were chosen using a multistage sampling procedure. Data were gathered using a focus group discussion and a pre-tested questionnaire. Descriptive statistics, coping strategy index (CSI) and ordered logit regression were employed for data analysis. Results revealed that agrarian households, which had a mean age of 52 years, a mean household size of 7 persons, mean farm size of 1.5 ha, and a mean monthly income of ₦49, 508.3 ($60.66) respectively, were predominately male (60.8%). Findings from the CSI revealed that 62.5% of the agrarian households were mildly vulnerable to food insecurity. The result of the ordered logit regression analysis showed that age, household size, farm size, off-farm income, number of dependence, days of incapacitation and numbers of coping strategies adopted were the significant determinants of agrarian households' vulnerability to food insecurity (VFI). Consuming low-quality and less expensive food products, sending children under the age of 18 to work to help with household needs as well as skipping meals, among other measures, were effective coping mechanisms adopted to combat VFI shocks. The study concluded that agrarian households were at risk of food insecurity, and as a result, there was a need for special consideration in the form of significant food support and access to production inputs that would increase their productive capacity, boost their income, and assist them in escaping this vulnerability in the study area.

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INTRODUCTION

Any esculent substance with nutritional elements that, when ingested, sustains life, produces vitality, and enhances bodily growth, preservation, and health is referred to as food. Food security, according to the 1996 World Food Summit, is described as "a situation where all people at all times have physical, social, and economic access to

adequate, safe, and nutritious food to satisfy their dietary requirements and food preferences for an active and healthy life." There are four key components to this definition: availability, stability, accessibility, and usage. On the other hand, Food insecurity is the inconsistent access to nutritionally adequate and safe food (FAO, 2006; Mendy *et al.,* 2020). Food insecurity is defined by the United States Department of Agriculture in 2018, as "a situation in which steady access to sufficient food is restricted by paucity of fund and other required resources". Food insecurity remains a global challenge and reducing it continues to be a major public policy (FAO, IFAD, UNICEF, WFP and WHO. 2019).

The number of malnourished individuals increased on a global scale. According to FAO (2020), between 720 and 811 million people in the world faced hunger in 2020, there were about 14 million more people in Latin America and the Caribbean, nearly 57 million more people in Asia, and 46 million more people in Africa who experienced famine than in 2019. Conflict, climate variability and extremes, economic slowdowns and downturns; and the COVID-19 pandemic were the major drivers slowing down progress in food security, particularly where inequality is high (FAO, 2020).

In Nigeria, about 19.4 million people faced food crisis between June and August 2022. According to FAO (2022) report, the food crisis, which had higher impact in 21 states and the FCT, also effected 416,000 internally displayed people (IDPs). Insecurity, particularly insurgency in the North-east and North-central states, high inflation and food prices that may be related to economic downturn, job losses and reduction in household income due to the long-term effects of COVID-19 pandemic, displacement resulting from conflict and armed banditry, and armed insurgency were all identified as factors that contributed to the hunger crisis. Due to the aforementioned reasons as well as the careless use of cattle to graze farmers' crops, the poor-resource farmers are frequently the worst affected. Consequently, many farmers have abandoned farming for off-farming activities because of the fear of losing their crops to Fulani herdsmen (Johnson and Awoseyila, 2020).

The word "vulnerability" describes a person's propensity to decline or remain below a predetermined baseline in a specific period of time. The term "vulnerability to food insecurity" (VFI) refers to circumstances that make families more vulnerable to the shock of food insecurity (Ojo et al., 2019; Mendy et al., 2020). Vulnerability to food insecurity (VFI) refers to conditions which increase the susceptibility of households to the shock of food insecurity (Ojo et al., 2019; Mendy et al., 2020). Risks or shocks are events that threaten household's food access, availability, utilization and stability (Mendy, 2019). Agrarian communities typically have a high frequency of food insecurity and interrelated vulnerability. Agrarian families continue to experience difficult economic conditions, which lower their standard of living and threaten their ability to eat. They are more vulnerable to malnutrition, low quality foods and sometimes complete lack of food (Matemilola and Elegbede, 2017). While many

researchers have studied food security and insecurity in developing countries, investigation into agrarian household's vulnerability to food insecurity has not been done in-depth in the study area. Hence, this study seeks to analyse agrarian households' VIF as well as coping mechanisms adopted to combat food shortage in the study area. In particular, the study described the socioeconomic traits of agrarian households in the study area; assessed the degree of households' VIF; examined the factors influencing households' VIF; and identified the coping mechanisms used by the households against food shortage.

Theoretical Framework

Concept of vulnerability

In literature, vulnerability is distinctly defined by various disciplines. The disaster management literature relates vulnerability with natural threat Alwang, 2001; Sileshi *et al.,* 2019), while the social risk management literature, food security and poverty literature define vulnerability in terms of an adverse future effect on welfare (Mansuri and Healy, 2001; Calvo and Dercon, 2005; Holzmann and Jørgensen 2011). Others associate vulnerability with level of risks and ability to respond and recover. In view of the above, vulnerability can be said to, not only measure levels of risk in terms of economic, physical or social aspects alone, but also depict the capacity to cope with different threats and shocks (Proag 2014; Sileshi *et al.,* 2019). Vulnerability analysis is advantageous in that, it does not center on the present status alone but also farsighted, that is, ex-ante. Vulnerability also concentrates on set of risks as well as the coping strategies that households can adopt to mitigate the likelihood of being food insecure (Bogale, 2012; Mutabazi *et al.,* 2015; Ozughalu, 2016). In this study, vulnerability is examined in terms of food dearth related shocks and adaptation mechanisms adopted to overcome such shocks.

VFI measures

There are three major approaches to measuring VFI, namely, Vulnerability as low Expected Utility (VEU), Vulnerability as Expected Poverty (VEP) and Vulnerability as Uninsured Exposure to Risk (VER) (Naudé *et al.,* 2009; Deressa *et al.,* 2009). VEP evaluates the likelihood that a series of shocks will push household well-being below the threshold in the near future, and VER assesses the degree to which a series of shocks results in welfare loss as a result of the absence of efficient risk management tools. VEU focuses on the change in utility obtained from an equivalent satisfied level of consumption, while VEP assesses the probability that a series of shocks will do so in the near future. These approaches have been used by several researchers in literature. Ligon and Schechter (2003); Hoddinott and Quisumbing (2003) used VEU approach, Bogale (2012); Ojo *et al.,* (2019); Sileshi *et al.,* (2019) adopted the VEP approach, Hoogeveen *et al.,* (2004), Oni and Yusuf, (2008) applied VER. This study adopts the VEP approach to analyse households' VFI because it can be evaluated using cross-sectional data, unlike VEU and VER which require extensive panel data.

Several studies have analysed food insecurity as well as VIF using different analytical tools. Hussaini et al., (2016) analysed the determinants of food insecurity among farming households in Katsina State, North-western Nigeria using cross-sectional survey, coping strategy index and ordered logit regression approach. Results revealed that majority (73%) of the households were food insecure. The main coping mechanisms used by the food insecure families included choosing the less appealing meal, buying food on credit, and consuming less food overall. The total quantity of cereal saved, number of income sources, access to credit and dependency ratio were significant factors influencing food insecurity. Ojo et al. (2019) examined the factors influencing food insecurity among rural households in Ekiti State, Nigeria, using the VEP, CSI, and ordered logit regression approach. They discovered that 35.33% of households were moderately vulnerable in the study area, while 33.33% and 31.33% of households were mildly and severely vulnerable. The main coping mechanisms used by the families included borrowing food, eating seed stock, begging for food, and reducing meals. According to the regression analysis, household vulnerability to food insecurity was negatively influenced by education level, farm income, and off-farm employment, while positively influenced by age of the household head, the number of dependents, non-food expenditures, and the number of coping strategies.

However, there is a dearth of information on households' vulnerability to food insecurity in the study area. Hence this study was undertaken to examine the agrarian households' vulnerability to food insecurity in the study area.

MATERIALS and METHODS

Study Area

The research was conducted in Ogun State, Nigeria. The state was created on February 3, 1976. Abeokuta is its headquarters. Republic of Benin borders it on the west, Lagos State and the Atlantic Ocean on the south, Ondo State on the east, and Oyo and Osun States on the north. Ogun State, which has a population of 3,751,140 as of the 2006 census, is situated at on longitude 3^0 35^1 00^{11}E and latitude 7^0 00^1 00^{11}N. It has a roughly 16,980.55 square kilometer land area. Cassava, yam, cocoyam, plantains, maize, and vegetables are some of the major food crops produced in the study area, while cocoa is the main perennial crop. The research area's native vegetation is rainforest.

Sampling Procedure and Data Collection

120 respondents were selected for the research using a multistage sampling technique. The first step entailed choosing Abeokuta Agricultural Zone for the project out of the state's four Agricultural Zones. In the second step, two Local

Government Areas were purposefully chosen from the zone due to the areas' predominance of agricultural activities. In the third step, a random sampling technique was used to choose two communities from each of the LGAs. In the fourth step, 30 households were randomly chosen from each of the chosen communities, giving the research a total of 120 agrarian households. A pre-tested questionnaire and focus group discussions were used to gather information on the socioeconomic and vulnerability traits of the chosen households.

Analytical Techniques

Information on the socioeconomic characteristics of the households and adaptation mechanisms used in the research area was described using descriptive statistics, such as means, frequencies, percentages, and mean. VIF was assessed using the CARE International/World Food Programme (WFP) Household Coping Strategy Index (CSI) (Maxwell *et al.,* 2003). The index was calculated by multiplying the frequency and severity of using a set of eleven coping strategies against food shortage related shocks. The higher the score the higher the probability of a household being vulnerable to food insecurity.

Ordered Logit Regression Model

The ordered logistic regression model was used to assess the factors determining vulnerability of the agrarian households to food insecurity. According to Grilli and Rampichini (2014), an ordered logit model is a regression model for an ordinal response variable. As a result, the ordered logit model for an ordinal response Yi with Q categories is described by a collection of Q-1 equations in which the cumulative probabilities, $gQi = \Pr(Yi \leq yQ/xi)$, are connected to a linear predictor $\beta'xi = \beta0 + \beta1x1i + \beta2x2i + \cdots$ through the logit function:

βi (1)

The parameters αQ are cutoffs that are listed in increasing sequence from "1" to "Q-1" ($\alpha1 < \alpha2 < ... < \alpha Q\text{-}1$).

Ordinal reaction Yi is the dependent variable that depicts the three levels of VIF; Yi= 0; mildly vulnerable, Yi = 1; moderately vulnerable and Yi= 2; severely vulnerable households. αQ = the intercept term, βi vector of parameter to be estimated, Xi's are the independent variables which include: X_1 = Sex of household head (male=1, 0 otherwise); X_2 = (years); X_3 = Education (years); X_4 = Marital status (married=1, otherwise=0); X_5 = Household size (number of persons); X6 = Farm size (ha); X_7 = Income (₦); X_8 = Food expenditures (₦); X_9 = Non-food expenses (₦); X_{10} = Extension contacts (dummy), X_{11} = Off-farm employment (dummy); X_{12} =Credit access (dummy); X_{13} = membership of cooperative association (dummy); X_{14} = Size of dependents (number of persons); X_{15} = Days spent incapacitated by illness (days); X_{16} = Adaptation mechanisms (number)

A four-point Likert-type measure was used to determine the adaptation mechanisms households used to mitigate VIF effects. Strongly agree = 4, agree = 3, disagree = 2, and strongly disagree = 1 are the response choices and values given. The result of adding these numbers and dividing by 4 was 2.5, which was taken as the mean. Strategies were considered "effective" if their mean scores were higher than or equal to 2.5, while ineffective if their mean scores were less than 2.5.

Module of the Statistical Package for Social Sciences (SPSS-IBM) software, version 21 was used to analyse the descriptive statistics and The STATA version 11 computer program was used for the ordered logit regression model.

RESULTS and DISCUSSION

The information on the respondents' socioeconomic characteristics is presented in Table 1. According to the results, more than half (60.8%) of the households were headed by male. As a result, it can be inferred that the households were predominately male. The average age of about 52 years is an indication that respondents were growing older and might find it challenging to handle the demands of farming. Due to their reduced strength and decreased participation in income-generating activities, older farmers may also be more susceptible to food insecurity. Similar findings were found for rural households in Ondo State by Johnson and Awoseyila (2020). Just 16.7% of respondents lacked formal education. This suggests that the respondents were educated and may be familiar with technological advancements in farming operations. About two-third of the household heads were married. The average household size was 7 persons. Accordingly, it can be inferred that the respondents have large households, which may provide a supply of family labor. Large household size could also predispose the respondents to being vulnerable to food insecurity as they are responsible for feeding many mouths. This result agrees with the findings of Mendy (2019) that some large sized households can easily become vulnerable to food insecurity. Less than 1 hectare of farmland was farmed by the majority (65%) of respondents Despite the respondents' extensive farming expertise and average farm size of 1.15 ha, the respondents' small-scale farming operations make them particularly susceptible to food insecurity. This confirms Johnson and Awoseyila's results that small-scale farms operations will exacerbate food insecurity.

Table 2's findings show that less than half (48.3%) of the respondents had monthly income of ₦40000. Given that the bulk of respondents were elderly small-scale farmers, the mean monthly income of ₦49508.3 is not shocking. The results also show that 56.7% of respondents spent less than ₦10000 per month on non-food expenses, while more than half spent between ₦20100 and ₦40000 on food monthly.

Table 1. Selected socio-economic characteristics of the respondents (n = 120)

Variable	Frequency	Percentage (%)	Mean
Sex			
Female	47	39.2	
Male	73	60.8	
Age (years)			
≤40	19	15.8	51.82 (±11.683)
41-50	29	24.2	
51-60	46	38.3	
> 60	26	21.7	
Educational Qualification			
No Formal Education	20	16.7	
Primary Education	33	27.5	
Secondary Education	39	32.5	
Adult/Vocational	10	8.3	
Tertiary Education	18	15.0	
Marital Status			
Single	11	9.2	
Married	94	78.3	
Divorced	1	0.8	
Widowed	14	11.7	
Household Size (No)			
1-5	40	33.3	7 (±2.522)
6-10	75	62.5	
>10	5	4.2	
Farm size (ha)			
<1	78	65.0	1.15 (±0.014)
1.1-3	36	30.0	
>3	6	5.0	
Farming Experience			
<10	22	18.3	21.86 (±10.343)
11-30	79	65.9	
>30	19	15.8	
Other Occupation			
Farming only	73	60.8	
Trading	32	26.7	
Artisan	15	12.5	
Extension Contact			
Yes	30	25.0	
No	90	75.0	

Source: Field survey, 2022

This implies that the respondents are low-income earners who could easily be susceptible to food insecurity. This is not unexpected because the study area is an agrarian community, usually characterized by low income.

Table 2. Distribution of respondents by income and expenses (n = 120)

Variable	Frequency	Percentage (%)	Mean
Monthly Income			
≤40000	58	48.3	49508.3 (±257.1)
41000-60000	41	34.2	
>60000	21	17.5	
Monthly Feeding Expenses			
≤20000	12	10.0	35200 (±107.7)
20100-40000	85	70.8	
>40000	23	19.2	
Non-Food Expenses			
≤10000	68	56.7	14308.3 (±147.4)
10100-20000	40	33.3	
>20000	12	10.0	

Source: Field survey, 2022

Measure of Food Insecurity in Households

Results in Table 3 show how the sampled households responded to various sets of questions, revealing how vulnerable they were to food insecurity. The result shows that, in "often" response category, majority (53.3%) of the respondents or any member of their household had skipped meal in the previous three months due to a lack of funds to purchase food. Also 73.3% had had times they were hungry but did not eat due to paucity of fund to purchase food in the past 3 months. In the "sometimes" response category, 55% of the respondents expressed concern that they would run out of food before they had enough money to buy more, 91.7% said they could not afford a balanced diet, 90.8% could not feed their children balanced diet because of lack of money and 52.5% could not purchase enough food due to lack of money, while 72.4% said they had never skipped a meal because they did not have enough money to buy food. This finding suggests that food insecurity was a major concern for agrarian households in the study area. The mean score values revealed that "household could not eat balanced mean ranked first among the measures of food insecurity while "have any members of your household including yourself ever gone a day without eating due to a lack of funds to purchase food" ranked last.

Table 3. Households' vulnerability to food insecurity

Vulnerability parameters	Responses				
	Often	Sometimes	Never	Mean	Rank
In the past three months, have you or any other family members ever skipped meals due to a shortage of funds to purchase food?	64 (53.3)	48 (40.0)	8 (6.7)	1.87	7th
Have any members of your household—including yourself—ever gone a day without eating due to a lack of funds to purchase food?	8 (6.7)	23 (19.2)	89 (74.2)	1.40	8th
Have any members of your household ever eaten less than they otherwise would have required to?	52 (43.3)	54 (45.0)	14 (11.7)	1.98	4th
"I was concerned that we would run out of food before we had enough money to purchase more." What was the frequency?	43 (35.8)	66 (55.0)	11 (9.2)	1.97	5th
We could not afford to eat balanced meals" what was the frequency?	6 (5.0)	104 (91.7)	6 (5.0)	2.66	1st
"Due to a shortage of funds, we were unable to provide the kids with a nutritious diet what was the frequency?	5 (4.2)	109 (90.8)	6 (5.0)	1.99	2nd
Did the household not have money to buy enough food?	51 (42.5)	63 (52.5)	6 (5.0)	1.99	2nd
Have you ever in the past three months been starving but refrained from eating because you lacked the funds to purchase food??	88 (73.3)	27 (22.5)	5 (4.2)	1.89	6th

Source: Field Survey Data, 2022

Distribution of Households to Vulnerability Status

Results in Table 4 show that, a larger proportion (45.8%) of the respondents experienced mild vulnerability, 37.5% were moderately vulnerable and 16.7% were severely vulnerable to food insecurity. Following Ojo *et al.,* (2019), households with an index between 0-0.4 are vulnerable but are still able to manage, while those with an index between 0.41-0.46 need urgent but temporary external help to recover from shocks, and those with an index between 0.47 and 0.80 are at emergency and perilous levels of vulnerability to food insecurity to which special government attention is required. This result is consistent with those of Ayoade and Adetunbi (2013), who found that 65% of farming households in south-western Nigeria experienced food insecurity. Hussaini *et al.,* (2016) observed that high level of food insecurity among farming households is quite alarming despite the fact that the bulk of agricultural

production activities take place in these areas. Similar result was also reported by Sileshi *et al.,* (2019) and Mandy (2020).

Table 4. Distribution of households into vulnerability status

Vulnerability Category	Vulnerability index	Frequency	Percentage
Mildly vulnerable	0.1-0.4	55	45.8
Moderately vulnerable	0.41-0.46	45	37.5
Severely vulnerable	0.47-0.80	20	16.7
Total		120	100

Source: Field Survey Data, 2022

Determinants of Households' Vulnerability to Food Insecurity (VFI)

The findings of the ordered logit regression model shown in Table 5 details the factors that influence how vulnerable households are to food insecurity in the study area. With a log likelihood of -119.739, the overall model is strongly significant ($p < 0.01$) and suggests a reasonable fit for the data. The predicted cut-off point (μ) satisfy the conditions that $\mu1 < \mu2 < \mu3$. This implies that these categories are ranked in an ordered way (Hussaini et al., 2016; Ojo et al., 2019).). The findings of the marginal effects show that the major determinants of VFI in the study area were age of the household head, household size, farm size, off-farm income, number of dependents, days of incapacitation, and numbers of adaptation mechanisms used.

At 5% alpha levels, the age of the household head showed a significant positive relationship with VFI in the severely vulnerable group. This suggests that as a household gets older in the study area, the likelihood that it will experience severe food insecurity rises.

This is not unexpected as aged farmers are often less economically productive due to reduced strength This finding agrees with findings of Ojo et al. (2019) that elderly household heads are likely to have less labour power and are therefore more susceptible to the woes of economic downturn. The marginal effect of household size was positive and statistically significant at 5% for both mildly and severely vulnerable categories. This suggests that a further rise in the number of household members will result in a 13.5% rise in the likelihood of moderately vulnerable households and a 10.7% rise in severely vulnerable households in the study area. This result concurs with the findings of Johnson and Awoseyila (2020) that the probability of households falling into food insecurity increases with household size in Ondo State. Farm size of mildly vulnerable households was found to decrease VFI as it had inverse significant relationship at 5% alpha levels. This suggests that a rise in farmland cultivated will reduce the probability of the households being mildly VFI. This result agrees with the submission of Sileshi *et al.,* (2019) that farm size is directly associated with the ability of a household to produce enough farm produce for consumption and sale. The result further reveals that the marginal effects of off-

farm income for the moderately and severely vulnerable households was negative and significant at 1% and 5% respectively.

Table 5. Determinants of household's vulnerability to food insecurity

Variables	Coefficients	Marginal Effects		
		MILV	MOV	SEV
Sex	0.359	-0.794	0.016	0.063 (0.071)
	(0.036)	(0.088)	(0.018)	
Age	-0.405**	-0.091	0.019	0.072**
	(0.277)	(0.172)	(0.036)	(0.136)
Education	-0.067	0.014	-0.003	-0.012 (0.034)
	(0.019)	(0.042)	(0.008)	
Household size	0.602*	0.135**	0.028	0.107**
	(0.487)	(0.144)	(0.032)	(0.114)
Farm size	0.610	-0.137**	0.028	0.108
	(0.481)	(0.106)	(0.024)	(0.084)
Income	-0.278 (0.496)	0.062	-0.012	-0.494
		(0.111)	(0.023)	(0.088)
Food expenses	-0.115 (0.587)	0.834	-0.007	-0.029
		(0.131)	(0.027)	(0.104)
Non-food expenses	-0.208 (0.037)	0.046	-0.010	-0.037
		(0.081)	(0.168)	(0.064)
Extension contact	0.649	-0.145	0.030	0.116
	(0.451)	(0.097)	(0.023)	(0.078)
Off-farm income	-0.163** (0.394)	-0.036	-0.007***	-0.029**
		(0.083)	(0.017)	(0.660)
Credit access	-0.336 (0.284)	0.075	-0.015	-0.060
		(0.091)	(0.020)	(0.077)
Cooperative membership	-0.056 (0.285)	0.012	-0.003	-0.010**
		(0.109)	(0.022)	(0.087)
Dependents	0.041**	0.012**	0.914**	0.562**
	(0.244)	(0.533)	(0.001)	(0.505)
Days of incapacitation	0.502	-0.112**	0.023***	0.089**
	(0.239)	(0.051)	(0.013)	(0.042)
Coping strategies used	0.337***	0.022	0.181**	0.176**
	(0.276)	(0.154)	(0.071)	(0.101)
Cut 1	-3.008687			
Cut 2	-1.746969			
No of observation	120			
Log likelihood	-119.739			
LR Chi2 (14)	16.14			
Pseudo R2	0.6311			

MILV (Mildly vulnerable); MOV (Moderately vulnerable), SEV (Severely vulnerable) ***, **, * =significant at 1%, 5%, 10% Figures in parenthesis are standard error. Source: Computed from Field Survey, 2022.

This implies that the likelihood of VFI of the moderately and severely households decrease with earning income from off-farm activities. The quantity of income received by the respondents will rise as a result of additional revenue sources. This

result is in consonance with the findings of Hussaini *et al.,* (2016); Ojo *et al.,* (2019) that off-farm income increases total income, access to food and household welfare. Furthermore, cooperative association membership was negative and significant for the severely vulnerable group at 1% alpha levels. This suggests that households whose heads belong to cooperative associations are less likely to be severely VIF. This is because cooperative association helps households bridge the seasonality gaps associated with farming. This result is in tandem with the findings of Johnson and Awoseyila (2020) that cooperative membership of households helps mitigate the shocks of food insecurity.

Additionally, at the 5% level with VFI, the parameter estimate of the size of dependents was statistically significant and positive for all categories of agrarian households. This suggests that families with more dependents are more prone to experience food insecurity. This result supports the findings of Akukwe (2020) that larger number of dependents put pressure on household resources thereby increasing the tendency of being vulnerable to food insecurity. The likelihood of being mildly vulnerable decreases as the number of days of incapacitation rises, while the likelihood of being moderately and severely vulnerable rises. This is because the marginal effect of mildly vulnerable households was significate at 5% and negatively related with VFI while those of moderately and severely households were significant at 1% and 5% respectively, and positively related with VFI. Johnson and Awoseyila (2020) opines that sickness exposes farmers to risk leading to low productivity, low income and increased vulnerability to food insecurity. In the same vein, for the moderately and severely vulnerable households, the number of coping mechanism used was positive and significant at 5%, respectively. This suggests that the propensity to be moderately and severely VIF increases as the number of coping mechanism used increases. This result is in conformity with the submission of Ojo et al., (2019) that adoption of coping strategies increases as household needs increases.

Coping Mechanisms Employed Against Food Shortage

The findings of the coping mechanisms used by agrarian households to lessen the impact of VFI are shown in Table 6. Using the cut-off point of 2.5 as a guide, the result shows that consumption of low-quality and inexpensive food items ($\bar{x} = 3.4$), sending children under 18 to work to help with household needs ($\bar{x} = 3.4$), reducing adults' food consumption to secure the need ($\bar{x} = 3.4$), selling some food items to fund the purchase of other food items ($\bar{x} = 3.3$), consuming less food during meals ($\bar{x} = 3.1$), reducing essential non-food expenditure such as education, health, etc. ($\bar{x} = 3.0$), skipping meals ($\bar{x} = 2.9$), consuming seed stock set aside for planting the following season ($\bar{x} = 2.8$), reducing household's expenses to the barest minimum to buy food ($\bar{x} = 2.6$) and borrowing from family, friends, and neighbors ($\bar{x} = 2.5$) were the effective adaptation strategies adopted by the respondents against VFI shocks.

This result implies that the agrarian households adopted more than one coping strategies to combat VFI in the study area. Similar results were reported by Johnson and Awoseyila (2020); Mendy et al., (2020). Also, Agada and Igboke (2014) observed that the prominent coping strategies adopted by ethnic groups in north central Nigeria to lessen the effect of food insecurity were reliance on less preferred food and limiting food portions at meal times rather than on skipping of meal by eating once a day.

Table 6. Adaptation mechanisms employed against food shortage in the study area

Adaptation mechanisms	Mean	Std. dev.
Skipping meals	2.9	0.99
consumption of inexpensive, low-quality food (switch to less-preferred foods)	3.4	0.78
Borrow from relatives, friends and neighbors	2.5	1.10
Buy food on credit	2.2	1.21
Sell some food items to fund the purchase of other food items	3.3	1.07
Consume less food within the meals	3.1	0.79
Lower adult dietary intake to meet needs	3.4	0.85
Reduce household's expenses to the barest minimum to buy food	2.6	3.73
Send some family members to join other families or homes for dinner.	1.9	1.06
Gather wild foods and fruits, go hunting, or gather immature crops	1.6	0.01
Consumed seed stock reserved for planting the following season	2.8	0.97
Reduced essential non-food expenditure such as education, health, etc.	3.0	1.04
Spent savings	1.7	0.10
Sell household items or goods such as jewelry, furniture, phones, TV sets, etc. to buy food	2.1	1.02
Sell productive assets or means of transport such as cars, lands, sewing machines, hair dryer, or other equipment to buy food	1.7	0.97
Adult members of the household engaged in socially degrading or temporary jobs due to lack of food	1.4	1.16
Changed accommodation location or type in order to save for food	1.3	0.67
Withdrew children from school	1.8	1.00
Change children's school	1.8	0.84
Send children under 18 years to work in order to help with household needs	3.4	0.78

Source: Field Survey Data, 2022

CONCLUSION

The study concluded that agrarian households were vulnerable to food insecurity in the study area. While majority were mildly vulnerable, others were either moderately or severely vulnerable. The study established that age, household size, farm size, off-farm income, number of dependence, days of incapacitation and numbers of coping mechanisms adopted were the significant determinants of VFI. Also, a combination of coping mechanisms: consuming low-quality and less expensive food products, sending children under the age of 18 to work to help with

household needs as well as skipping meals, among other measures, were effective coping mechanisms adopted to combat VFI shocks. Hence, there is need for special consideration in the form of significant food support and access to production inputs that would increase their productive capacity, boost their income, and assist them in escaping this vulnerability. Also, the household heads should be sensitized on the need to plan their families in order to discourage large family size and dependents using the various family planning programs available in government hospitals in the study area.

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