Determinants of Food Insecurity and Household Coping Strategies among Cassava Farmers in Oyo State, Nigeria

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Abstract

This study examined the factors influencing food insecurity and household coping strategies among cassava farmers in Afijio Local Government Area, Oyo State, Nigeria. A multistage sampling procedure was employed to collect data from one hundred and twenty cassava farmers by the use of a well-structured questionnaire. Data collected was analyzed using descriptive statistics, food security and coping strategy index, and logit regression model. The results showed average values of 43 years for age, 13 years for farming experience, 4 members per household, and 5 ha for farm size. The mean farm income was ₦866,825 and the non-farm income was ₦39,433. About 60.00% of the respondents were food insecure. Regression results reveal that educational level is significant and negatively influence food insecurity at 1%. Household size has a direct relationship with food insecurity and significant at 1%. In addition, age of the farmers, sex, and farm income also influenced household food insecurity in the study area. The study recommends that farmers should be enlightened on the benefit of education and therefore encouraged to enroll in school to improve their knowledge. Birth control policy should also be made to regulate the number of households members.

Keywords: Coping Strategies, Food Insecurity, Cassava Farmers, Afijio LGA, Food Price Volatility, Southwestern Nigeria.

Introduction

Agricultural development is one of the most powerful tools to end extreme poverty, boost shared prosperity and feed a projected 9.7 billion people by 2050. Growth in the agriculture sector is two to four times more effective in raising incomes among the poorest compared to other sectors. Analyses in 2016 found that 65 percent of poor working adults made a living through agriculture. Agriculture is also crucial to economic growth: in 2018, it accounted for 4 percent of global gross domestic product (GDP) and in some developing countries, it can account for more than 25% of GDP. But agriculture-driven growth, poverty reduction, and food security are at risk: climate change could cut crop yields, especially in the world's most food-insecure regions. Agriculture, forestry and land use change are

responsible for about 25 percent of greenhouse gas emissions. Mitigation in the agriculture sector is part of the solution to climate change (World Bank, 2020).

Food security refers to a situation whereby individuals have access at all times to quality and sufficient food resources to maintain a healthy and active life (Onunka *et al.,* 2018). On the other hand, food insecurity exists when there is constrained physical and economic access to secure sufficient quantities of nutritionally adequate food to allow individuals to sustain an active and healthy lifestyle. Food insecurity comes with unpleasant conditions with consequences detrimental to human health, well-being, and productivity (Ifeoma and Agwu, 2014). Consequently, when faced with food insecurity, households devise strategies to minimize the impact of food insecurity and as well as to stabilize their food access. Generally, households employ different coping strategies in the early stages of food insecurity, which however vary based on cultural and geographical differences as well as their social and economic resource endowment (Onunka *et al.,* 2018). It is described as "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways". Those individuals whose food intake decreases below their minimum calorie requirements are coming under the food insecure category, as well as the person who is physically not fit, or have some disease due to the lack of food and hunger or unbalance diet. It was described as a situation when people do not have adequate physical, social or economic access to the sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (Nafees *et al.,* 2021).

Also, according to Adegoroye *et al.* (2021b), food insecurity especially during the hunger season among rural households in Nigeria, has been a persistent issue. While most rural households enjoy food security during the harvest season due to their own crop production, inadequate processing and storage facilities, coupled with other urgent needs, often lead them to sell their surplus at low prices. As a result, these households frequently depend on market purchases, lacking sufficient food to sustain them throughout the year. This dependency creates fluctuations in food availability, exacerbating food insecurity.

The endemic rise and volatility of food prices in Nigeria, rooted in the mid-1980s adoption of the IMF/World Bank's Structural Adjustment Program (SAP), have led to significant food insecurity among households. This economic shift, driven by the need to address fiscal deficits and the impacts of the oil market crash, has left the country heavily reliant on oil and imports, rendering it vulnerable to external shocks. As a result, households are increasingly forced to adopt various coping strategies to manage the effects of food insecurity, which may include reducing food consumption, shifting to less nutritious alternatives, or engaging in informal economic activities. However, the sustainability and effectiveness of these coping mechanisms remain questionable, raising concerns about long-term food security and economic stability in Nigeria. This study seeks to explore the dynamics of food price volatility, household coping strategies, and their implications for

food security in the context of Nigeria's economic vulnerabilities (Shittu, Obayelo & Salman, 2014).

Conflict is the main reason for the current surge in the number of people facing acute food insecurity [FSIN, 2021]. Although this casual effect is zone-specific, they show the common feature of producing food system disruption (Martin-Shields, 2019). This situation, directly and indirectly, compromises people and households' food access and availability, severely impacting their food security (FAO (2016); United Nations Security Council, 2018). However, as Maxwell *et al.,* (2017) have argued, despite such a well-documented nexus between conflicts and hunger, there is a gap of information on the choices and behavior of people and households when they face a shortage of food in these situations. Following Christiaensen and Boisvert study (as quoted by Sassi 2021), food security is a managed process. Households are not passive agents but respond to the risks or shocks they face to reduce their vulnerability to these adverse events.

The overall aim of the study was to find out the factors influencing food insecurity and household coping strategies among cassava farmers in Oyo State, Nigeria. Meanwhile, the specific objectives include the following;

i. To describe the socio-economic characteristics of the farming households in Afijio local government.
ii. To identify the food security status across households in the study area.
iii. To identify the livelihood and food consumption coping strategies.
iv. To examine factors influencing household coping strategies.
v. To examine the factors that determines households' food security in the study area.
vi. To identify the constraints affecting the achievement of food security in the study area.

Meanwhile, the theory of commodity price stabilization rule assumes linear demand and supplies schedules; the instantaneous reaction of supply and demand to changes in market prices, additive stochastic disturbances and price stabilization at the mean of the prices which would have prevailed in an unsterilized market, agricultural sector inclusive. In the analysis by Waugh, he was of the opinion that when instability is due to a shift in supply, consumers preferred such price instability. On the other hand, in Fiyinfoluwa's analysis, producers prefer price instability if it is a result of a shift in demand. Massell showed that, by integrating the analysis of Waugh and Oi, if compensation is permitted, the society will gain from stabilization, regardless of the cause of instability (supply of demand variability). Compensation is a great necessity before an improvement in welfare can be observed (Fiyinfoluwa and Ireen 2020). The approach of the Waugh-Oi-Massell model is a partial equilibrium analysis that evaluates the benefits of price stabilization by examining changes in producer and consumer surplus. One of the strengths of the theory is that it can be used for policy recommendation particularly with countries with an unstable but moderate rate of inflation. Also, the agricultural sector can benefit from this theory.

In previous work reviewed, Chinweoke, Uchua, and Chinasa (2020) investigated the food insecurity coping strategies adopted by households in Taraba State during conflict. Primary data for this study were collected from 450 randomly selected households. The data for the study were analyzed using descriptive and inferential statistics. Food insecurity coping strategies index was used in capturing the food security status/levels of the households. Comparing the coping strategies index (CSI) of households in conflict and non-conflict areas of the state, Chisquare result showed a significant difference between the food security levels of the two groups. Households in conflict areas significantly ($p \leq 0.01$) used more food insecurity coping strategies and erosive coping strategies like begging for food than their counterpart. Also, Mustapha Mukhtar (2019) investigated on Food Insecurity and Coping Strategies among Rural Households in Niger State, Nigeria. The research adopted a sample size of 104 rural household heads from three Local Government Areas drawn from three agricultural zones of the State. Food insecurity index was used to determine the food insecurity status of the rural households, while universal coping strategy index was used to determine the different strategies adopted by the rural households faced with problem of food insecurity. The result revealed that a relative high percentage of the rural households were food secure while a lower percentage were food insecure.

Methodology
Study Area
This study was carried out in Afijio Local Government Area of Oyo state. It is an area located in Oyo state, Southwest Nigeria. It covers a total area of 722 km^2 and a population of 152,193 as of the 2006 census. It shares boundaries with Ibadan, the Oyo state capital. It lies between latitudes 7.72N and 3.8658E in the southwest region of Nigeria. Geographically, the local government is entirely within the tropics. Afijio is subdivided into 10 wards: Ilora 1, Ilora 11, Ilora 111, Fiditi 1, Fiditi 11, Aawe 1, Aawe 11, Akinmoorin / Jobele, Iware and Imini. Town under Afijio Local Government: 1. Aawe 2. Akinmoorin 3. Fiditi 4. Ilora 5. Jobele 6. Iware 7. Imini 8. Orelope. Its headquarters are in the town of Jobele. It is predominantly a homogenous society and population of Yoruba-speaking people of the southwest zone of Nigeria. The entire local government area is generally peaceful. In the Nigerian context, the local government area can be said to be both semi-urban and rural councils. It has the necessary social amenities to facilitate smooth economic development. The indigenes of Afijio Local Government are mostly farmers blessed with vast agricultural products such as Maize, Yam, Cassava, Groundnut Fruit, Cocoa, oil palm, Kolanut, Coffee, Orange, and poultry farming both on, large-scale and subsistence levels. There is easy transportation of farm products from the farm and goods from other parts of the country.

Population of the Study

All the farmers cultivating cassava in Afijio local government area, Oyo State, Nigeria.

Sampling Technique and Sample Size

A multistage sampling technique was used for the study. The first stage was the random selection of three wards out of a total number of ten wards in the Local government. In the second stage, two villages were randomly selected from the three wards to make six villages. For the third and final stage, twenty farmers were randomly selected to make a total of 120 cassava farmers which constitute the ideal sample size.

Source of Data and Method of Data Collection

Primary data was used and collected through the use of a well-structured questionnaire and interview schedule.

Data Analysis

Data analysis was done using descriptive statistics such as mean, frequency, and percentage to describe the socio-economic characteristics of the farmers and identify the constraints affecting the achievement of food security.

Food Security Index

This index was used to estimate the food security status across households as used also by Sassi (2021).

$$FSI = \frac{2/3 \text{ of food expenditure}}{\text{Mean per capital income}}$$

Coping Strategy Index

This was used to identify the coping strategies for food insecurity, for food insecure households in the study area. This allows for a better understanding of the likely areas where the Government or stakeholders can come in. In identifying the coping strategies by the farming households, a coping strategy index (CSI) was developed by ranking. The first stage is the listing of all the coping strategies. This was done by first collecting information on coping strategies from the food insecure respondents. This was used to examine factors influencing household coping strategies identify the strategies adopted to mitigate food insecurity.

Coping Strategy Index = Severity of coping strategy + Frequency of use of coping strategy

Logit Regression Model

This assesses the factors that determine households' food insecurity in the study area. This tool was also used by Babatunde *et al.,* (2018) to identify the determinants of households' food consumption expenditure.

$\text{logit } (P((Y=1) = \ln (P (Y = 1) / 1 - P (Y = 1)) = b_0 + b_1x_1 + b_2x_2 + \ldots + b_px_{p} + e$

Where;

bo is the intercept, b1, b2... bp are the coefficients of the independent variables and Y= 1 for food insecure and 0 otherwise

X_1 = Age   *X_2 = Gender*

X_3 =Household size   *X_4 = Marital status*

X_5 = Religion   *X_6 = Educational level*

X_7 = Major occupation   *X_8 = Secondary occupation*

X_9 = Farm size   *X_{10} = farm experience*

X_{11} = Other crops   *X_{12} = Farm income*

X_{13} = Non-farm income   *X_{14} = Total income*

X_{15} = Membership In group   *e- error term*

Results and Discussion

A.   Household Food Security Status

Table 1 shows the food security status of the respondents. The result reveals that 60.00% of the respondents are food insecure with a mean of 30632 while 40.00% of them are food secure having 11079 as mean. This percentage shows that few above average could not meet up with the food needed, while just about 40% could meet the food needed for their

development. This suffices to say that many of the farmers did not cultivate enough land and did not have enough income to meet the food needs of their household members. It could also deduce that the household head could either not procure the food required or didn't have other means to cope with shortage of food that should be consumed to satisfy their food requirements for proper development. This corroborates with Kassy *et al.,* 2021 research findings that around 60% of the farming households were experiencing food insecurity.

Table 1: Food Security Status

Variables	Frequency	Mean	Percentage
Food insecurity	72	30632.73	60.00
Food security	48	11079.22	40.00
Total	**120**		**100.00**

Source: Field Survey 2022.

B.   Respondents Food Expenditure Pattern

Table 2 shows the percentage of income spent by respondents on the different varieties of food. The farmers spent 29.90% of their income on cereal foods like rice, maize, etc.; 16.45% of their income was spent on animal products like eggs, meat, etc.; 6.20% of the income is was spent on beverages like drinks, tea, etc., while only about 1.97% is was spent on fruits. Impliedly, the respondents spent more income on cereals and less on fruits to gain energy to do more work rather than vital living.

Table 2: Percentage of income spent by respondents on the different varieties of food

Variable	Mean (N)	Std. Dev. (N)	Percentage
Cereals	18,700	17,105.63	29.90
Grains	8,966.67	6,071.83	14.34
Tuber	4,870.90	4,281.353	7.79
Other foods	8,429.17	3,947.819	13.48
Vegetables	6,165.86	2,535.978	9.86
Fruits	1,235.02	1,814.254	1.97
Animal products	10,285.87	6,304.982	16.45
Beverages	3,877.93	2,972.043	6.20
Total	**62531.41**	**27194.65**	**100.00**

Source: Field Survey 2022.

C.   Coping strategies adopted to cushion household food insecurity

Table 3 shows the distribution of respondents based on the adopted coping strategies. Accordingly, 52.5% of respondents cope with food insecurity by relying on consumption of less expensive commodities while 47.50% of them claimed to never to experience such. Close to this, are farmers who skip meals in order to cope with the incident. This accounted

for about 45% of them. Although none of them claim to do this on a daily basis, however, 55.00% of this category of people attest they do not experience it .

Purchasing food on credit is what 35% of the respondents had to do to cope with food insecurity. A few number (8.5%) of them had to sell off farm implements/assets so as to cope with food insecurity insurgence in the study area. None of these households did this on a daily basis though, most of them however did that on not more than once in a week. This result shows that a great number of respondents in the study area are coping by different strategies most especially by relying on less expensive commodities and meal skipping. Meanwhile, a few of them depend on charity, send household members to eat elsewhere and just a few sell off farm implements/assets to cope. Similarly, this is in line with what Adegoroye *et al.,* 2021 find that crop farming households rely more on less expensive commodities and that relatively they purchase food on credit to cope.

Table 3: Coping strategies frequency table

Coping strategy (in the previous 30 days)	Relative frequency					
	Freq (%)	Daily	3-6 days/week	1-2 days per week	Not more than once/ week	Never happened
		Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)
Rely on less expensive commodities.	63(52.50)	5(4.17)	10(8.33)	21(17.50)	27(22.50)	37(47.50)
Purchase food on credit	42(35.00)	0(0.00)	3(2.50)	12(10.00)	39(22.50)	75(65.00)
Skip meals	54(45.00)	0(0.00)	4(3.33)	11(9.17)	39(32.50)	66(55.00)
Reduction in the number of meals taken	51(42.50)	8(6.67)	5(4.17)	17(14.17)	21(17.50)	69(57.50)
Buy only the necessities	43(35.83)	13(10.83)	10(8.33)	9(7.50)	11(9.17)	77(64.17)
Borrow food from friends or relatives.	18(15.00)	1(0.83)	0(0.00)	3(2.50)	14(11.67)	102(85.00)
Send household member to eat elsewhere	15(12.50)	0(0.00)	0(0.00)	3(2.50)	12(10.00)	105(87.50)
Sell off farm implement/assets	10(8.50)	0 (0.00)	1(0.83)	3(2.50)	6(5.00)	110(91.50)
Eat less preferred food	35(29.17)	2(1.67)	6(5.00)	11(9.17)	16(13.33)	85(70.83)
Consume immature crop	19(15.83)	0(0.00)	2(1.67)	6(5.00)	11(9.17)	101(84.17)
Exchange one type of food for another	19(15.83)	0(0.00)	3(2.50)	4(3.33)	12(10.00)	101(84.17)
Depend on charity	15(12.50)	0(0.00)	2(1.67)	4(3.33)	9(7.50)	105(87.50)
Worked for payment in kind	27(22.50)	0(0.00)	2(1.67)	9(7.50)	16(13.33)	93(77.50)
Borrow money for food	20(16.67)	0(0.00)	1(0.83)	4 (3.33)	9(7.50)	105(87.50)
Restrict consumption of adults in order for children to eat	32(26.67)	0(0.00)	0(0.00)	11(9.17)	15(12.50)	100(83.33)
Household migration out of the area	19(15.83)	5(4.17)	4(3.33)	5(4.17)	5(4.17)	101(84.17)

Figures in parenthesis are the percentages

Source: Field survey, 2022.

D. Factors influencing coping strategies adopted by farmers

Table 4 shows the factors that determines the coping strategies adopted by the farmers. From the result, about 14.08 percent of the explained variation coping strategy of

respondents is captured by the estimated independent variables specified in the model, while the remaining 85.92 percent of the unexplained variation in the role of the listed factor on the coping strategy of respondents may be due to certain variable of interest not specified in the model but resident in error term. In the analysis, only one (1) out of six (6) estimated variables in the model was statistically significant at a 1% level of significance.

The years spent in school is significant and has a negative relationship with the coping strategy of the respondents. In other words, a unit increase in the number of years spent in school as coping strategy will lead to a 71.19% decrease in the household food insecurity. This insinuates that years of schooling by the farmers plays a crucial role in addressing the food insecurity situation of the farmers at the household level. Furthermore, an educated household head is in a position to comprehend novel information effectively and efficiently utilize available resources to ensure and enhance their food security status. This corroborates with Onunka *et al.,* 2018 study where the number of years spent in school negatively affects the farmers' coping strategy.

Table 4: Factors influencing coping strategies adopted by the farmers.

CSI	Coefficient	Std. Err.	t
Age	-0.0603	0.1037	-0.58
Sex	1.2795	3.2327	0.40
Household size	1.0665	0.7072	1.51
Marital status	-0.5444	0.7780	-0.70
Years in school	-0.7119***	0.2262	-3.15
Secondary occupation	0.6148	0.5518	1.11
Constant	16.3469	5.9126	2.76

N.B: *** Significant Level at 1%   Prob> F = 0.0078; R- squared = 0.1408; Adj R- squared = 0.0952; Root MSE = 12.667
Source: Field Survey 2022.

E.   Determinants of household food insecurity

Table 5 shows the result of the determinants of household food insecurity. From the result, it was revealed that just three out of the eight estimated variables in the model are statistically significant at 5 and 10% levels of significance. Household size has a significant positive relationship with food insecurity while the number of years spent in school, and farm income variables have a significant negative influence on food insecurity. The household size was positive and highly significant at a 1% level. This implies that an increase in household size by a unit will bring about a corresponding increase in the probability of food being insecure by 1.44. This can be as a result of a very large household size which comes with a lot of responsibilities to attend to.

Years spent in school is significant at a 5% level of significant and has a negative relationship with the food insecurity. In other words, a unit increase in the number of years spent in school will lead to a 0.119 decrease in the probability of households being food insecure.

This indicates that, the more years spent in school by the farmer, the less likely they experience food insecurity This insinuates that years spent in school play a crucial role in addressing the food insecurity situation of the households. This corroborates with what Onunka *et al.,* (2018) study where the number of years spent in school enhanced the food security of the respondents.

Farm income was negative and significant at a 1% level of significance. This implies that as the individual farm income increases by 1 naira, the food insecurity status will reduce. This is not unexpected, as a household's farm income is considered an essential factor in determining household access to food. Hence, a high farm income level is expected to boost household food availability and access to sufficient quantity and good quality food. This is in line with Ahmed. *et al.,* (2017) where a negative relationship exists between farm income and food insecurity.

Table 5: Determinants of household food insecurity

Food insecurity	Coefficient	Std. Err.	z	dy/dx	Z
Age	-0.0347	0.0286	-1.21	-0.0771	-1.20
Sex	0.8257	0.7030	1.17	0.1953	1.14
Household size	1.4415***	0.3039	4.74	0.3204	4.62
Marital status	-0.0341	0.1766	-0.19	-0.0758	-0.19
Years in school	-0.1194**	0.0576	-2.07	-0.2655	-2.04
Secondary occupation	0.0885	0.3700	0.02	0.197	0.24
Farm income	-1.10e-06***	4.40e-07	-2.50	-2.44e-07	-2.69
Non-farm income	-2.40e-06	3.75e-06	-0.64	-5.34e-07	-0.64
Constant	-2.3794	1.4433	-1.65		

N.B: *** Significant Level at 1%; ** Significant Level at 5%

Source: Field Survey 2022.

F.   Constraints to food security

Table 6 shows the challenges faced by respondents on food security in the study area. Accordingly, it was revealed that 93.33% of the farmers faced the issue of Fulani herdsmen invasion, 92.50% of them are challenged with high input cost, 86.67% were impeded by unavailable farmland and seasonal agricultural produce changes. While 85.83% of the farmers had no access to necessary/ required farm implement, 83.33% of them suffered from shortfall in staple food and adverse change climate effect. About 41.67% of the farmers suffered from unavailability of food and 36.67% of them are constrained by access to credit facilities. Impliedly, a great number of the respondents are largely affected by the high cost of input and Fulani herdsmen invasion and some faced the challenge of inaccessibility to specific farm implements, and farmland unavailability among others. While just a few of them are constrained by the unavailability of food and access to credit facilities.

Table 6: Constraints to Food Security

Food challenges faced (In the last 30 days)	Freq.	Percentage
Unavailability of food	50	41.60
Increase in food price	104	86.67
Pest and diseases infestation on food produced/purchased	98	81.67
Shortfall in staple food (rice, beans etc.)	100	83.33
Access to credit facilities	44	36.67
Unavailability of farmland for cultivation	104	86.67
High cost of input (seed, fertilizer)	111	92.50
Changes in seasonal agricultural produce	104	86.67
Change climate adverse effect	100	83.33
Inability to sustain food provision	95	79.17
No access to food supplies	99	82.50
No access to specific farm implement	103	85.83
Invasion of Fulani or thief on farmland	112	93.33
Unavailability of labour to production activities	97	80.83

Source: Field Survey 2022.

Conclusion

It can be concluded that there are certain important determinants of food insecurity and household coping strategies among cassava farmers in the study area.

Also, the coping strategy index that is significant to cassava farmers in the study area is educational years, and among the food insecurity indices examined, household size, educational years, and farm income are found to be significant in the study area, although at different levels. Also, regarding the constraints, that almost all the respondents were challenged, thus increasing the chances of food insecurity.

In order for households to meet their needs, they had to adopt a number of coping strategies. Strategies adopted by the households included rely on less expensive commodities, purchase food on credit, skip meals, reduction in the number of meals taken, buy only the necessities borrow food from friends or relatives, send household member to eat elsewhere, sell off farm implement/assets, eat less preferred food, consume immature crop, exchange one type of food for another, depend on charity, worked for payment in kind, borrow money for food, restrict consumption of adults in order for children to eat, rely on less expensive commodities, purchase food on credit, skip meals reduction in the number of meals taken, buy only the necessities, borrow food from friends or relatives, send household member to eat elsewhere, sell off farm implement/assets, eat less preferred food, consume immature crop, exchange one type of food for another, depend on charity, worked for payment in kind, borrow money for food, restrict consumption of adults in order for children to eat, household migration out of the area Household migration out of the area.

Recommendation

Based on the findings of the study, the following recommendations were arrived at:

- The youths should be encouraged to go to school. This is because the more educated they are, the less likely they are food insecure, thus, sidelining coping strategies.
- The government should intensify efforts to educate farmers about the need and usefulness of birth control which will enhance food security as there will be less household demand and therefore farmers can acquire the capacity to purchase needed food varieties that will enhance their security.
- Birth control policy should be made to regulate the number of households. A decrease in the number of households will most likely decrease the level of food insecurity.
- Price control policy should be made so as to make cassava produce more valuable that people want to pay high for it. This would decrease the level of food insecurity as farmers would have enough to cater for their needs, food most especially.

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