DETERMINANTS OF FOOD INSECURITY AND COPING STRATEGIES AMONG CASSAVA FARMERS IN ANAMBRA STATE, NIGERIA

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ABSTRACT

The study was conducted in Enugu State with 120 respondents. Primary data were obtained using questionnaires and oral interviews. Percentage responses and logistic model analysis were used to analyze the data. The results indicated that the coping strategies adopted by the respondents included off-farm income, remittances, decreased meal frequency, and food aid. The logistic regression model showed that the coefficients for educational level, membership in organizations, and access to extension services were positive and significant. Furthermore, the constraints to achieving food security were high labour costs, poor access to land, and limited access to credit. It is recommended to enhance farmers' access to educational programs, off-farm income-generating activities, and extension services.

Keywords: Coping strategies, Food insecurity, logit model, Farmers, Nigeria

INTRODUCTION

INTRODUCTION

Cassava is a staple food in Africa, Latin America, and Asia, with Nigeria and Thailand being the top consumers. Cassava and its derivatives are rich in fibre, copper, and magnesium, but low in other nutrients, so it is often eaten with protein and vitamin-rich foods (Nzeakor & Ume, 2021). In 2021, global cassava production was estimated at 308 million tonnes; Africa's total production was about 203 million tonnes (56% of world production), followed by Asia (84 million tonnes) and America (26 million tonnes) (National Root Crops Research Institute [NRCRI], 2022). During the same period, Nigeria was one of the highest producers of cassava in the world, producing over 63 million tonnes, accounting for about 26% of global production (Nzeakor & Ume, 2021).

Cassava (*Manihot esculenta*) production is vital to the economy of Nigeria and is recognized as a 21st-century crop primarily for smallholders. It is produced in 24 of the country's 36 states, predominantly by women farmers. However, this trend is changing as more men are entering the enterprise due to the nation's dwindling economy (Owoseni, Okunlola, & Akinwalere, 2021). Despite the production achievements of the farmers, they are still burdened with food insecurity and other challenges (Olutosin & Otekunrin, 2019).

According to the Food and Agricultural Organization (FAO) (2020), food insecurity refers to the consequences of inadequate consumption of nutritious food, considering the physiological use of food by the body as being within the domain of nutrition and health. FAO (2011) identified three pillars underpinning food security: food availability, food accessibility, and food utilization. The causes of food insecurity include lack of resources (financial and infrastructural), unemployment, natural disasters, irregular rises in global food prices, shifts in global food harvests to biofuel among major food-exporting countries, persistent government neglect of agriculture, particularly in infrastructural facilities, and the impact of climate change on food production (FAO, 2013). These factors result in seasonal changes in food supplies, lack of access to nutritious food at affordable prices, geographical isolation, and lack of motivation or knowledge about a nutritious diet, thus impeding households' ability to maintain nutritional food intakes for healthy body development (Babatunde et al., 2007).

In Nigeria, successive governments have embarked on numerous policies and programs, including Agricultural Development Programmes (ADPs) and Operation Feed the Nation (OFN), to boost farmers' productivity for enhanced food security. Yet, food insecurity, hunger, and poverty continue to multiply at an alarming rate in the country (Abu & Soom, 2017). Farmers, whose income and livelihood depend on agriculture, are particularly affected (Babatunde, Omotosho, & Sholotan, 2007). Rural farmers have designed several mechanisms or strategies for coping with or mitigating the effects of food shortages, especially during the planting season. These strategies include food rationing, skipping meals, migration, depending on assistance from family and friends, selling assets and livestock to buy food, reducing consumption, and eating less preferred meals.

This research aims to investigate food insecurity among farmers in relation to their socioeconomic characteristics for policy formulation and implementation. Specifically, the objectives are to: (i) describe the socioeconomic characteristics of the farmers, (ii) determine the coping strategies adopted by the farmers, (iii) determine the effect of farmers' socioeconomic characteristics on their food insecurity, and (iv) identify the constraints to achieving food security in the study area.

METHODOLOGY

Anambra State lies between latitudes 5°38'N and 6°47'E of the Equator and longitudes 6°36'N and 7°21'E of the Greenwich Meridian. Anambra State shares boundaries with Enugu and Delta States to the east and west, respectively, while it is bordered by Imo State to the south and Kogi State to the north. Awka is the capital of Anambra State. According to the National Population Census, the state has an estimated population of 5.146 million people (NPC, 2016). The state is known for its cassava producers. The off-farm income activities engaged in by the people include bricklaying, auto mechanics, salon services, and trading.

First, twelve Local Government Areas (LGAs) were randomly selected from the seventeen LGAs in the state. Second, ten towns were randomly selected from each LGA, resulting in a total of one hundred and twenty towns. Third, one cassava farmer was selected from each town from the lists provided by the extension agents residing in the towns, bringing the total to one hundred and twenty cassava farmers for detailed study.

The primary data used to analyze the objectives of the study were obtained using well-structured questionnaires and oral interview schedules.

The objectives of the study were addressed using percentage responses and the Logit Regression model.

The logit regression model was used to examine the determinants of food insecurity of the farmers. The model, as given by Kaine and Ume, (2017) is expressed as:

$$P_r(Y = 1/X_i) = in\left(\frac{Y}{1-Y}\right) = a + b_1X_1 + \ldots\ \ldots\ \ldots\ \ldots + b_7X_7 + U \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Where: Y is Food security status of the ith farmer (food secure = 1, food insecure = 0),

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P (Y = 1/*X*) is the Probability of Y (attaining r *I* food security) occurring, given that X has occurred, *a* is constant intercept, b1 - b7 are coefficients of the independent variables to be estimated and X - X are explanatory variables defined as follows: is X_1 = age (years), X_2 = Level of education (years*)*, X_3= farming experience, *(years)*, X_4 = Membership of Organization(member = 1, otherwise; 0), X_5 = Access to extension services (access; 1 and otherwise; 0), $X_{3;}$ farm size(ha) and *U* is error term.

Results and Discussion

Socioeconomic Characteristics of the Farmers

The socioeconomic characteristics of the farmers are presented in Table 1

Table I: Distribution of Respondent According to Socioeconomic Characteristics

Variable	Frequency	Percentage
Age		
20- 40	38	31.7
41 and above	82	68.3
Level of education		
No formal education	35	29.2
Primary	60	50
Secondary	20	16.7
Tertiary	5	4.2
Organization		
Member	20	16.7
Non member	100	83.3
Extension services		
Had contact	40	33.3
Had no contact	80	66.7
Farming experience		
1 – 5	12	10
6 – 10	20	16.7
11 – 15	48	40
16 and above	50	41.7
Farm size		
0.01-1.00	18	15
1.01 – 2.00	30	25
2.01 – 3.00	17	14.2
3.01 – 4.00	40	33.3
4.01 and above	15	12.5

Source; Field Survey;2024.

Table 1 indicates that 31.7% of the respondents were between 20 and 40 years old, while 68.3% were 41 years and above. This suggests that most respondents were youthful, energetic, able-bodied, and active, which could boost household food security through enhanced food production (Ogbonna & Ume, 2022). Additionally, the majority (71.93%) of the respondents had attained various forms of formal education, while 29.17% had no formal education. Educational attainment enhances individuals' access to information, boosting their food security through higher farm outputs (Abu & Soom, 2016).

Moreover, 83.33% of the population studied were members of different cooperative organizations, while only 16.7% were not. According to Babatunde et al. (2007), cooperatives aid in improving their members' farm productivity through the exchange of ideas, training, and access to improved farm inputs at subsidized prices, thereby enhancing the likelihood of being food secure through training and credit access.

Table 1 also explained that only 33.3% of the respondents had contact with extension agents, while the majority (66.7%) had no contact. This indicates poor extension outreach, which implies poor access to improved technologies for high productivity, leading to a higher propensity for food insecurity (Delvaux & Paloma, 2018).

The results of the cassava farmers' years of farming experience emphasized that 41.7% of the respondents had farming experience of 16 years and above, while only 10% had farming experience ranging from 1 to 5 years. The number of years in farming may indicate the practical knowledge acquired on how to overcome inherent farm problems, leading to increased farm productivity and food security (Ogbonna & Ume, 2022).

Table 1 also indicated that the majority (33.3%) of the farmers studied cultivated farm sizes ranging from 3.01 to 4.00 hectares, while the least (12.5%) cultivated above 4.01 hectares. This implies that cassava production in the study area was at a small scale. Farmers' farms in most developing countries are small-sized, fragmented, and scattered, not contiguous land holdings. These pose significant challenges to the much-desired agricultural modernization, mechanization, and commercialization, hence affecting their food security status.

Coping Strategies adopted by the Respondents

Table 2 shows the distribution of respondents according to the coping strategies adopted.

Table 2: Distribution of coping strategies adopted by the household

Strategy	Frequency	Percentage
Reliance on remittance	78	65
Sale of farm assets and land	45	37.5
Decrease in meal frequency	74	61.67
Withdrawal of children from school	38	31.67
Reduction in other expenditure	50	41.67
Off- farm income	96	80
Food aid	65	54.27
Migration	24	20

Source: Field Survey, 2024. * **Multiple responses**

Off-farm income was identified by 80% of the respondents as the most important factor in coping with food insecurity. The importance of off-farm income includes providing an alternative to farmers' farm income, facilitating easy access to land, reducing urban drift, boosting the rural economy through income distribution and diversification (FAO, 2004), bridging agricultural labour seasonality, stabilizing output and income, reducing the availability of family labour for farm work, and enhancing expenditure on farm resources (Kaine & Ume, 2017).

This was followed by reliance on remittances, cited by 65% of respondents. Remittances play a crucial role in the economic growth of a country, poverty reduction, and improving the standard of living for the families and households of migrants (Graaff, Kessler, & Nibbering, 2011). The least cited strategy was migration (20%). Migration is a strategy used by households to allocate their human capital, making migration decisions as a means of risk-sharing or as an investment to gain higher returns in the form of remittances (Babatunde et al., 2007).

Determinants of Food Security Status

The Logit regression model was used to examine factors that determine the food security status of households. The chi-square value was 183.54*** and the log-likelihood function was -744071. Hence, the sigma square was statistically significant, indicating that the model displays a good fit. The coefficient for the age of the farmer was negatively signed, indicating that older farmers were more food insecure than younger ones. According to Graaff et al. (2011), older farmers are often very conservative towards technology adoption, which negatively influences their farm output and predisposes them to food insecurity. However, Ibrahim, Bello, and Ibrahim (2009) found that older farmers have a high propensity for attaining food security, as they are efficient in resource management through years of observation and experimentation, leading to high farm output.

Table 3 The Logit regression result

Variable	Coefficient	Standard Error	t-value	P>|t|
Age of the farmer	- 0.0252305	0.009675	- 2.64*	0.130
Educational level	0.764364	0.234136	3.62***	1.215
Extension services	0.43241	0.13673	3.16***	1.008
Farming experience	0.32870	0.46721	0.70354	0.007
Organization	0.165	0.128	1.345o*	0.028
Farm size	0.43241	0.53673	0.72134	1.008
Sigma	1.297732 ***	0.392639		
Constant	7.197244	2.023820	4.06***	0.051
Log likelihood = -79.407; LR Chi^2 = 187.54***; Pseudo^2 = 0.2352				

Source; Field Survey, 2024

Additionally, the coefficient for the educational level of the farmer had a direct correlation with the dependent variable at the 99% confidence interval. This implies that farmers with formal education are more food secure than their counterparts. The educational level of the farmer enhances their access to information, aiding in making rational decisions on the best strategies to cope with food insecurity (Kaine & Ume, 2017).

The coefficient for membership in organizations was positively signed and significant at the 10% alpha level. Cooperative societies, as remarked by FAO (2020), engage in manpower development by providing training to members and offering farm inputs at subsidized prices and soft loans to enhance farmers' productivity and food security status. In contrast, Ume et al. (2018) reported that many cooperatives have deviated from their primary aim of formation and have become involved in partisan politics.

The coefficient for extension services had a direct association with the dependent variable at the 90% confidence interval. Adequate extension outreach, as remarked by FAO (2020), is capable of enhancing farmers' adoption of innovations to maximize their outputs and food security status. Nevertheless, the reluctance of many extension agents to be diligent in their duties and the bottlenecks to effective and efficient extension services could hinder this potential (Ibrahim et al. 2009).

Table 4 Limiting Factors to Attainment of Food Security

Variable	Freq	Percent
Poor access to land	75	62.5
High cost of labour	72	60
Poor access to credit	86	71.7
Access to Extension services	40	33.3
Access to Extension services	40	33.3

Source: Field Survey, 2024. *Multiple Responses

Most (71.7%) of the respondents reported poor access to credit. This poor access could be related to the high interest rates charged by lending agencies, which hinder the importance of agricultural financing. Fewer farmers can afford the conditions demanded by lending agencies, such as high interest rates and the use of collateral. This predicament could make farmers food insecure (Kaine & Ume, 2017). The least (33.3%) reported poor access to extension services. This could be related to the wide ratio of farmers to extension officers in most developing countries (Ogbonna & Ume, 2022).

CONCLUSION AND RECOMMENDATIONS

The food insecurity of the farmers was positively and significantly influenced by educational level and access to extension services. The factors limiting food security were access to credit, land, and high labour costs. The coping strategies adopted by the respondents included off-farm income, remittances, decreased meal frequency, and food aid. The logistic regression model showed that the coefficients for educational level, membership in organizations, and access to extension services were positive and significant. Furthermore, the constraints to achieving food security were high labour costs, poor access to land, and limited access to credit.

1. There is a need to enhance farmers' access to educational programs such as adult education, seminars, and workshops to boost their production and productivity. Policies aimed at improving farmers' access to education through aggressive awareness campaigns and mass mobilization are needed.
2. Extension agents should be motivated to be responsive to their duties through timely payment of salaries and other fringe benefits. There is also a need to provide extension agents with mobility and other incentives to improve their functions.
3. There is a need to develop labour-saving devices, such as hand-driven ploughs, and disseminate them to farmers through government agencies and Non-Governmental Organizations (NGOs). Exposing farmers to these devices will help minimize production costs.
4. The Land Use Act of 1976 should be revisited to make land available to genuine farmers for cultivation.
5. There is a need to enhance farmers' access to credit through commercial banks at reduced interest rates. Ensuring credit access to farmers through microcredit institutions and other financial institutions is also crucial.
6. Policies aimed at encouraging farmers to form cooperatives or associations should be advocated. Cooperative societies can engage in manpower development, provide training, and offer farm inputs at subsidized prices and soft loans to enhance farmers' productivity and food security status.

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