



Determinants of Food Security Status among Cocoyam Farmers in Ogun State, South Western Nigeria

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Abstract

Food insecurity is endemic in Nigeria. Therefore, this study was carried out to determine factors affecting food security status among cocoyam farmers in Ogun State, Southwest Nigeria. A multi-stage sampling technique was employed to obtain data from 241 respondents, United State Department of Agriculture (USDA) household food security module was used to categorise the farmers into four and Ordered Logistic (OLOGIT) regression was used to investigate those factors that determine the Food Security (FS) status of the respondents. The socio-economic characteristics of the farmers revealed that there are more male (96.27%) in cocoyam production. Majority (90.04%) of them are married, with mean age 47 and farming experience 18 years, The mean household size, farm size and farm income are; 6, 0.72Ha, and ₦303,642 per year respectively while 86.31% belong to various cooperative societies. The OLOGIT regression results revealed that farmers access to credit, membership of cooperative society, education, extension contact, and non-farms income increased the farmers' FS status, while increase family size decreased their FS status. The study concluded that 97.93% of the cocoyam farmers are food insecure. It was recommended that cocoyam farmers should belong to cooperative society for regular access to credit and other incentives, the non-literate farmers should enrol in adult education classes to enable them acquire knowledge on modern technologies, and more extension officers should be employed.

Introduction

Poverty, food insecurity and hunger are among the main challenges facing governments of many nations of the world especially the Sub-Saharan Africa (SSA) and Nigeria since her independence (Otekunrin *et al.*, 2020). Nigeria, like some other developing countries is principally an agrarian nation who still face food insecurity crisis (Baquedano *et al.*, 2020). This situation arises as the level of food production is yet to meet the nutritional and energy demand of her inhabitants. Okoye, *et al.* (2008) reported that there is worsening food insecurity in Nigeria, even

with massive food importation as evidenced by rising food import bill. Adewuyi, (2012) opined that food security is a condition in which all people at all times can acquire safe, nutritionally adequate and personally acceptable foods in a manner that maintains human dignity, while food insecurity is a situation where there is inadequate food to meet the nutritional demand of people.

In Nigeria, despite the high percentage of people working in agriculture, the output cannot successfully feed the population, this made food insecurity to be getting worse in Nigeria, where about 48%, of the Nigerian population suffer from extreme poverty (Otekunrin *et al.*, 2019).

Food and Agriculture Organisation (FAO) (2018) recorded that Africa is the most food insecure region in the world with high proportion

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of food-insecure people, with an estimated regional average of 20.4% of the undernourished population in 2017 compared to other regions of the World, where Latin America and the Caribbean 6.1 %, Central America 6.2 %, South America 5.0 %, North America and Europe 2.5 %. Generally, 15.1 % of West African population are food insecure. FAO (2012) and Asogwa, *et al.* (2017) reported that one out of every four persons in the Sub-Saharan Africa (SSA), lack adequate food for a healthy and active life. As evidenced above, Nigeria as one of the countries in SSA that is unable to attain self-reliance and resilience in food production as this could result from its inability to have proper investment in agricultural production due to lack of harmonization, insecurity, high cost of inputs and economic recession (Ajibade *et al.*, 2019 and Adedokun, 2021).

Agbelemoge (2013) opined that one of the practical means of solving hunger problems and malnutrition in a developing country like Nigeria is by way of increasing production and consumption of local staples of high energy content such as cocoyam. Cocoyam constitutes one of the main staple food for the people in the South-West Nigeria prior to the advent of the high yielding varieties of maize and cassava. It is also among the world's six most important root and tuber crops (FAO, 2012).

In Nigeria, it is usually consumed in various forms such as cocoyam flour, mixed with water yam to prepare *ikokore*, *ebiripo*, porridge, pounded, mixed with cowpea, sliced and fried as cocoyam chips commonly hawked in streets. Cocoyam ranks third in importance after cassava and yam among the root and tuber crops that are cultivated and consumed in rural areas in Nigeria (Ajijola *et al.*, 2003). The nutritional and chemical compositions as reported by FAO (2006) shows that cocoyam if fully exploited would enhance the food security of people living in the tropics due to its easy agronomic trait as it can survive or thrive well in a newly opened land even under the shade unlike other crops like cassava, potato and yam. Nutritionally, cocoyam is richer in carbohydrates with nutritional value than potato, and superior to cassava and yam in the possession of higher

protein, mineral and vitamin contents as well as being easily digestible starch (Abdulrahman, *et al.*, 2015).

However, in Nigeria, consumption of cocoyam is not favoured in urban homes due to *poor* information about its nutritive values and profit arising from its production, this has impeded general acceptability and extensive production of the crop by wealthy farmers (Okoye *et al.*, 2007). Recently as the population pressure on land continues to increase, the importance of cocoyam in ensuring household food security need to be given adequate recognition. And with various crises in the country ranging from Boko Haram, insurgency of Fulani herdsmen and kidnaping, which causes increase in prices of staple food such as rice, maize and cassava, consumption of some crops that have been neglected such as cocoyam. Cocoyam is nutritionally superior to major competitor roots and tubers like cassava and yam, in terms of digestibility, contents of crude protein and essential minerals, such as Ca, Mg and P. (Alabi *et al.* 2019).

Therefore, there is urgent need to invest in crops like cocoyam that can easily adapt to wide range of soil conditions in the tropics, with low level of initial capital, widely accepted, and can be prepared in different forms to meet the taste of different people.

This study therefore, tried to: investigate the socio-economic characteristics of cocoyam farmers investigate the level of food security status of the respondents, and determine those factors that are responsible for the level of food security among cocoyam farmers in Ogun State.

Materials and Methods

Study area

This study was carried out in Ogun State. It is located in Southwest Nigeria, and covers 16,762 square kilometres. It borders Lagos State to the South, Oyo and Osun States to the North, Ondo State to the east and the Republic of Benin to the west. It lies between latitude 6⁰N and 8⁰N and longitudes 2⁰ E and 5⁰ E with temperature range of 27⁰C to 32⁰C. The 2006 national population census showed that Ogun State has 3,751,140 inhabitants

(2006 National Population Census)

The climate and good vegetation of the state is favourable to cultivation of various cash and food crops as well as livestock rearing. The climate is also conducive for business and industrial growth. The southern part is covered with evergreen forest vegetation and soil most suitable for the cultivation of cash and food crops like oil palm, rice, kola- nut, cocoa, cotton, cassava, cocoyam and vegetables. It is divided into four agricultural development (ADP) zones. Viz, Ijebu-Ode, Ikenne, Ilaro and Abeokuta. Five Local Government Areas (Ado-odo, Ijebu north, Odeda, Ikenne and Sagamu.) noted for cocoyam farming were purposively chosen across the four ADP agricultural zones in the state.

Sampling procedure

Primary data were collected with the aid of well-structured questionnaires administered on the farmers. A multi-stage technique was employed to select respondents. In the first stage, five Local Government Areas prominent in cocoyam production were purposively selected across the four (4) agricultural development Programme (ADP) zones in the state. In the second stage 50 cocoyam farmers were randomly selected from each Local Government Area with the assistance of field extension officers, this gave a total number of 250 questionnaires, but 241 questionnaires that gave valid information after cleaning from the respondents were subjected to analytical techniques.

Analytical technique

United State Department of Agriculture (USDA) 2000 food security scale was used to determine the food security status of the respondents and categorised them into four. Descriptive analysis was used on the socio economic characteristics of the farmers. Such as Means, Frequencies, Tables and Percentages. Ordered logistic regression was used to identify those factors that can likely influence food security status of the respondents. The assumption is that condition expected from category 2 is higher or better than category 1, and category 3 is better than category 2. Thus these four categories are naturally

ordered $4 > 3 > 2 > 1$. Because of this interrelation between categories, estimation of those factors that affect food security is based on the ordered logistic regression model, in which the mean score is supposed to be a linear function of dependent variables and an aggregate of cut point or limit (Greene, 2005).

As stated by Greene (2005), the model for ordered logit is specified as:

$$Y^* = b_i X_i + \varepsilon_i$$

Where Y^* is a latent variable that can take on four values corresponding to the levels of food security among cocoyam producers, b_i are the parameters to be estimated, X_i represents a set of socio-demographic covariates, and ε_i is a random error.

The explicit form is:

$$\Pr(y_i=j) = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11}X_{11} + b_{12}X_{12} + b_{13}X_{13} + b_{14}X_{14} + \varepsilon_i$$

where:

$\Pr(y_j = i)$ is the probability of cocoyam farmers food security level or category (1, 2, 3 and 4).

$y_i = 0, 1, 2$ and 3

- (1) Food insecure with severe hunger
- (2) Food insecure with moderate hunger
- (3) Food insecure without hunger
- (4) Food Secure

X_s are the independent variables

Variables:

X_1 = Farming experience (years)

X_2 = Access to credit (Yes =1; No = 0)

X_3 = Member of cooperative society (Yes=1;No=0)

X_4 = Level of education (years)

X_5 = Family size (Number 1, 2,...,)

X_6 = Age of farmer (Years)

X_7 = Sex (Male = 1, Female = 0)

X_8 = Extension visits per year (Number 1, 2,...,)

X_9 = Marketing (Ready market for cocoyam = 1, otherwise = 0)

X_{10} = Marital status (Married = 1, otherwise = 0)

X_{11} = Farm size (Ha)

X_{12} = Farm Income (Naira)

X_{13} = Other farms income (Naira)

X_{14} = Non-farm income (Naira)

X_{15} = Remittances (Naira)

b_0 is the intercept

b_1 - b_{15} are the parameters to be estimated.

ε_i is the error term.

Results and Discussions

Socioeconomic characteristics of the respondents

The results of Table 1 revealed that 47.3% of the cocoyam farmers in Ogun state were within 41-50years with a mean of 47years. The implication of this result is that most of the cocoyam farmers were still active and this may have a positive influence on their production and improve their food security status. This result supports the findings of Amusa *et al.* (2011) who reported that majority of sampled cocoyam farmers in Ekiti State were within 41-60years.

Majority (96.27%) of the cocoyam farmers in Ogun State were male. The implication of this result is that male dominated cocoyam production in the study area. This can be attributed to the fact that cocoyam farming like every other crop production is tedious and requires a lot of strength which most female might not be able to provide. This result is in line with the findings of Amusa *et al.* (2011) who reported that male dominated cocoyam enterprise in their respective study areas. Most (90.04%) of the cocoyam farmers were married. This may have a positive influence on their production and food security status, because marital status prompt commitment to business to enable them to cater for family needs. This result conforms to the findings of Ayanlere *et al.* (2017).

The result revealed further that the mean household size and the mean farming experience were 6 members and 18 years respectively. This result supports the findings of Amusa *et al.* (2011) This implies that majority of the cocoyam farmers

have enough family that are used for labour and the have experience about cocoyam production, this may have a positive influence on their household food security. The finding showed that 50.62% of the cocoyam farmers did not have access to credit. This may limit their volume of investment on cocoyam, and consequently leading to food insecurity. Larger proportions (86.31 %) of the farmers were members of cooperative society, this is expected to give them room for easy access to credit, also be a means to purchase farm inputs on credit and at reduced cost.

Frequency of level of food security status of cocoyam farmers in Ogun State.

The result of Table 2 showed that, few (2.07%) of the cocoyam farming households were food secured, 2.49% were marginally food insecure, 51.87% were low food insecure category while 43.57% were severely food insecure. The results indicated that 95.44% of cocoyam farmers were food insecure. The implication of this result is that despite the fact that the bulk of food produce comes from the rural areas, majority of the farming households were food insecure. The result supports the findings of Obayelu (2012) who reported that 16%, 36%, 28% and 21% of the households in North-Central Nigeria were food secure, food insecure without hunger, food secure with moderate hunger and food insecure with severe hunger respectively.

Determinants of food security status of the respondents

The results of Table 3 on those factors that determined the food security status using Ordered Logit regression shows that food security status of households is directly related to access to credit, membership of cooperative, level of education, extension visit, income from cocoyam farm and non-farm income. Access to credit facilities may enhance increase in production leading to increase in income, this will enable the farmers to have enough income to cater for their family food requirement. This result corroborates the findings of Aboaba *et al.* (2020) who reported significant and positive relationship between access to credit facilities and household food security status.

Table 1: Socioeconomic characteristics of cocoyam farmers

Variable	Freq.	Percentage	Mean/ SD.
Age			
≤30	13	5.39	(47±5.02)
31-40	44	18.26	
41-50	114	47.30	
>50	70	29.05	
Total	241	100.00	
Sex			
Female	9	3.73	
Male	232	96.27	
Total	241	100.00	
Marital status			
Single	15	6.22	
Married	217	90.04	
Widowed	9	3.73	
Total	241	100.00	
Household size			
≤3	8	3.32	(6±2.01)
4-6	143	59.34	
>6	90	37.35	
Total	241	100.00	
Farming experience			
≤10	45	18.67	(18±3.11)
11-20	127	52.70	
>20	69	28.63	
Total	241	100.00	
Access to credit			
Non access	122	50.62	
Access	119	49.38	
Total	241	100.00	
Membership of cooperative			
Non-member	33	13.69	
Member	208	86.31	
Total	241	100.00	

Source: Feld Survey, 2022

Table 2: Frequency of level of Food Security Status of Cocoyam Farmers in Ogun State

Food security category	Freq.	Percentage
Food secured	5	2.07
Food insecure without hunger	6	2.49
Food insecure with moderate hunger	125	51.87
Food insecure with severe hunger	105	43.57
Total	241	100.00

Source: Field Survey, 2022.

Table 3: Ordered logit estimates of determinants of food security

Variable	Coef.	Std. Error	P>z	Marginal effect
Experience	-0.024	0.033	0.470	2.98e-06
Access to credit	0.472**	0.402	0.024	-0.000589***
Member of Cooperative	0.951*	0.516	0.065	-0.0002732**
Education	0.060**	0.062	0.033	-7.51e-04***
Family size	-1.981***	0.319	0.000	-0.0002462**
Age	0.024	0.024	0.309	-3.02e-06
Sex	0.915	1.000	0.360	-0.0001797
Extension contact	0.254***	1.124	0.005	-0.000315***
Marketing	0.397	0.946	0.724	-0.0000587
Marital status	-0.059	0.772	0.950	7.22e-06
Farm size	0.235	0.515	0.761	0.0000292
Farm income	5.47e-06*	4.10e-06	0.083	6.80e-10 *
Other farm income	3.02e-06	1.11e-06	0.462	-3.75e-10
Non-farm income	2.92e-06**	1.11e-06	0.046	1.38e-07*
Remittances	-1.82e-06	5.13e-06	0.723	2.26e-10
/cut1	-9.718			
/cut2	-6.779			
/cut3	-0.832			
Diagnostic test				
Wald chi ²	71.95			
Prob > chi ²	0.000			
Pseudo R ²	0.509			
Log pseudo likelihood	-103.004			

Source: Feld Survey, 2022. ***, ** and *, Significant at $p < 0.01$, $p < 0.05$ and $p < 0.1$ respectively

Cocoyam farmers who are members of cooperative society are more likely to have access to loan to increase their production, they are also more likely to enjoy higher economies of scale thereby resulting to extra income which can be used to purchase food items for their household members. Highly educated cocoyam farming households are more likely to be more food secure. This is because educated farmers source income from none farming activities. This is in line with the findings of Echebiri *et al.* (2017) who reported direct relationship between household food

security status and education. The extension agents are likely to introduce high yielding and early matured cocoyam varieties to the farmers which will increase their productivity and invariably improve their food security status. Farmers that have larger farm will be more food secure due to increase in output and income.

The food security status of cocoyam farmers that derived additional income from non-farm sources is likely to be better off compared with those that derived their livelihood solely from cocoyam production. This is because diversifying livelihood

source guaranteed the households stable income during lean periods of cocoyam production. This result supports Echebiri *et al.* (2017) that reported a direct correlation between food security and income diversification. Also increase in family size reduces the food security status of the households. The larger the size of household the lower the per capita food consumption thereby negatively influencing household food security status. This finding supports that of Obayelu *et al.* (2013) and Aboaba *et al.* (2020) who reported that larger family size negatively influence household food security status.

Conclusion and Recommendations

Cocoyam is a crop that has great potential to generate employment and improve food security, therefore this study attempt to investigate the food security status of cocoyam farmers and factors that are responsible for their level of food security. The study found out that majority (97.93%) of the cocoyam farmers in the study area are food insecure. Poor access to credit, low level of education, insufficient extension visit, and large family size are the likely causes of low food level of security among cocoyam farmers in the study area. This study therefore recommended that cocoyam farmers should belong to cooperative societies to give them easy access to credit. Adult education classes should be established in the state, there is need for enlightenment campaign on the need to embark on family planning, Government should employ more extension, officers to facilitate up-to-date information on how to improve farmers' productivity and income leading to improvement of food security.

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