



## **DETERMINANTS OF FOOD INSECURITY AMONG YAM- FARMING HOUSEHOLDS IN WUKARI LOCAL GOVERNMENT AREA OF TARABA STATE, NIGERIA**

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### **ABSTRACT**

This Study examined the determinants of food insecurity incidence among yam farming households in Wukari Local Government Area of Taraba State, Nigeria. Multistage sampling technique was used to arrive at the sampling of 220 respondents in the study area. Data were collected using structured questionnaire and analyzed using descriptive statistics, Foster Greer and Thorbeck (FGT) and probit regression. The results showed that 66.4% of the respondents were male with a mean age of 49years, 51.8% of the respondents had a household size of 1-5 persons, 38.2% of the respondents acquired secondary education. The monthly expenditure for household consumption was used to establish food security line. A mean per capita monthly consumption expenditure of ₦13,100.6 with food insecurity line of ₦8,733.6 was used to classify the households, survey found 54.5% of the respondents to be food insecure. It further revealed a food insecurity incidence of 72.5%, food insecurity depth of 9.2% and food insecurity of 18.3%. The probit regression analysis showed that the coefficients of farming experience ( $X_1$ ), farm size ( $X_4$ ), educational status ( $X_5$ ) and age ( $X_6$ ) were significantly influenced on food insecurity. Coping strategies adopted showed that Withdrawal of children from school ranked 1<sup>st</sup> with a mean score of (3.75), harvesting immature food crop was ranked 2<sup>nd</sup> with mean score of (3.57), Selling durable assets ranked 3<sup>rd</sup> with a mean score of (3.40), Eating once a day is ranked 4<sup>th</sup> with a mean score of (3.31). It was concluded that majority of the respondents were found to be food insecure and various coping strategies were adopted to reduce food insecurity incidence. Farmers should be encouraged by providing incentives such as grants, loan, improved seeds, machineries and pesticides.

**Keywords:** Determinants, Food, Insecurity, Yam, Farming and Households

### **INTRODUCTION**

Food insecurity remains a critical challenge in Nigeria, affecting both urban and rural populations across different states, including Taraba State. Despite being an agriculturally rich country, approximately 25% of the Nigerian population is food insecure (FAO, 2020). In Taraba State, the incidence of food insecurity is particularly pronounced due to factors such as conflict, economic instability, and climatic changes affecting agricultural productivity (Smith, 2020). Yam farming is a cornerstone of agriculture in Taraba State, where a significant proportion of households depend on yam cultivation for subsistence and economic purposes (Akintunde *et al.*, 2022). These households play a vital role in the agricultural landscape, contributing not only to local food supplies but also to regional markets. However, the vulnerability of these households to food insecurity is high, given the fluctuating market prices for yam and the impact of climate variability on yam yields (Yadav *et al.*, 2021). The concept of food insecurity incidence encompasses various dimensions including availability, access, utilization, and stability of food resources (Berry *et al.*, 2015). Food security, conversely, is achieved when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2020). The dynamics of food security involve complex interactions between socio-economic factors, agricultural productivity, policy frameworks, and environmental factors (Mburu, 2016). There is a crucial link between the characteristics of yam farming households and the



incidence of food insecurity. Factors such as household size, access to agricultural inputs, land ownership, and the adoption of modern farming techniques have been shown to influence food security outcomes among these households (Johnson *et al.*, 2016). Understanding these linkages is essential for developing targeted interventions to enhance food security in yam farming communities.

The determinants of food insecurity among these households are multifaceted. Factors such as inadequate access to agricultural inputs, limited land ownership, poor access to markets, and the impacts of climate change significantly influence food security outcomes (Kumar *et al.*, 2019; Platt, *et al.*, 2021). While these factors are recognized at the national level, localized studies in regions like Wukari are scant, underscoring a critical gap in targeted data and specific interventions needed to address these issues effectively. This study seeks to fill the gap by specifically identifying and analyzing the determinants of food insecurity among yam farming households in Wukari. It aims to provide a detailed local perspective that can inform both local and national policies. By understanding the unique challenges and needs of these households, the study will contribute to the broader discourse on improving agricultural policies and food security strategies in Nigeria (Smith and Glauber, 2020). The broad objective of the study was to examine the determinants of food insecurity among yam farming households in the study area. The specific objectives were to;

- i. describe the socio-economic characteristics of the respondents in the study area,
- ii. examine food insecurity status among respondents in the study area,
- iii. analyze the factors affecting food security status among respondents in the study area and
- iv. identify coping strategies adopted towards food insecurity among the respondents in the study area.

## **MATERIALS AND METHODS**

### **The Study Area**

The study was conducted in Wukari local government area of Taraba state. Wukari has a total land area of 4,308km<sup>2</sup> and population of 241,546 at the 2006 census and an estimated population of 343,904.15 projected from population with a growth rate of 2.1%. The Donga River flows through the area and the Benue River forms a boundary with Nasarawa State to the Northeast. Wukari local government area is the largest producer of yam in Taraba state. It comprises of ten (10) wards namely, Avyi, Akwana, Bantaji, Chonku, Hospital, Jibu, Kente, Puje, Rafinkada and Tsokundi. The major occupation is farming, teaching, trading of predominant crops grown in the area such as yam, rice, sorghum, cowpea, groundnut, millet. The local government is predominantly rural and is social-politically made-up of ethnic groups such as Jukun, Tiv, Hausa, Igbo, Yoruba etc.

### **Sampling Techniques**

The data for this study was collected using primary data only. The data was obtained using a well-structured questionnaire administered among the respondents. Farmers were randomly selected from each ward ranking a total of two hundred and twenty (220) respondents in the study area.

### **Method of Data Analysis**

Descriptive statistics such as frequency, percentage, Mean and standard deviation was used to describe the socioeconomic characteristics of the respondents (Objectives i) and coping strategies adopted towards food insecurity among the respondents in the study (objective iv).

Foster Greer and Thorbecke was used to examine food insecurity status among respondents (Objective ii). The Foster, Greer, and Thorbecke (FGT) weighted food security index used for the food security analysis, to determine the incidence, depth and severity of food insecurity among the respondents.

The FGT index is given by the formula

$$P_{\alpha} = \frac{1}{N} \sum_{i=0}^q \left[ \frac{Z - Y_i}{Z} \right]_{\alpha} \quad (1)$$

Where;

P = Food insecurity index

Z = the food security line,

Y<sub>i</sub> = is the per capita expenditure in increasing order for all households;



$q$  = is the number of food insecure people

$N$  = the population of size, and

$\alpha$  = is the food insecurity aversion parameter that takes values of zero, one or two.

when  $\alpha=0$ ,  $P\alpha$  measures the proportion of people in the population whose per capita expenditure on food and non-food items fall below the food insecurity line (food insecurity incidence). When  $\alpha=1$ ,  $P\alpha$  measures the depth of poverty, how deep below the food insecurity line is the averagely poor (food insecurity depth).

When  $\alpha=2$ ,  $P\alpha$  measures how farther the core poor are from the food insecurity line compared to the averagely poor (the severity of food insecurity).

Probit Regression was used to analyze the factors affecting food security status among respondents (Objective iii). Probit regression model is specified implicitly as; -

$$Y = \sum \beta_x + \varepsilon_i \quad \dots (2)$$

Where,

$Y$  = Food security status (1, for food secure households; 0, for food insecure households)

$X_1$ - $X_7$  = Vector of explanatory variables (predictors)

$\beta_1$  -  $\beta_2$  = Coefficients

$\beta_0$  = Constant

$\varepsilon_i$  = Error term

Probit Model is specified implicit as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon_i \quad \dots (3)$$

#### **Probit Regression Model is Specified Explicitly as:**

$X_1$  = Farming experience (years)

$X_2$  = Marital status (Single = 0 and Married = 1)

$X_3$  = Sex (Male = 1 and Female = 0)

$X_4$  = Farm size (hectares)

$X_5$  = Educational status (years spent in school)

$X_6$  = Age (years)

$X_7$  = Household size (Number of persons)

## **RESULTS AND DISCUSSION**

### **Socio-Economic Characteristics of Yam Farming Households**

This examines the socio-economic characteristics of yam farming households in the study area, covering aspects such as sex, age, marital status, household size, education, cooperative membership, extension contact, farming experience, labor source, capital source, and occupation. The study revealed that 66.4% of respondents were male, while 33.6% were female, indicating that men are more actively involved in farming activities. This finding is consistent with Agyo, and Ornan (2021), who reported that most rural household heads are male. In terms of age, 55.5% of respondents were between 41-60 years, with 27.3% in the 21-40 years category with a mean age of 49 years. This suggests that the majority of the household heads are within their productive years and capable of engaging in various economic activities. Marital status results showed that 68.2% of respondents were married, while 10.9% were divorced, 7.3% separated, 7.3% single, and 6.4% widowed. The high percentage of married respondents suggests a greater likelihood of family labor availability. This is consistent with Omotesho *et al.* (2015), who found that married household heads are more likely to have better food security due to labor support from family members. Household size data revealed that 51.8% had 1-5 members, and 42.7% had 6-10 members. This is in line with Babatunde *et al.* (2007), who observed that larger household sizes often correlate with higher food insecurity. In terms of education, 7.3% of respondents had no formal education, 9.1% had primary education, 38.2% had secondary education, and 37.3% had tertiary education. This high level of education could enhance technology adoption and farm productivity, as noted by (Fanifosi and Amao, 2016).



Cooperative membership data showed that 54.4% of respondents were not part of any cooperative society, while 45.5% were members. This indicates a lack of awareness of the benefits of cooperatives, which aligns with Hussain (2016), who found that cooperative membership is associated with lower food insecurity levels. Contact with extension agents showed that 57.3% of respondents had interacted with extension agents, while 42.7% had no contact. Among those who had contact, 34.5% had met with agents once, and 9% had more than five contacts. This suggests limited access to extension services, which could affect the adoption of modern agricultural practices. Regarding the source of capital, 71.8% of respondents relied on personal savings, while 16.4% accessed funds from agricultural or commercial banks, and 10% used cooperative societies. The heavy reliance on personal savings could be due to high interest rates and the unreliability of other sources, leading to limited financial resources for expanding farm operations.

Occupational data revealed that 67.3% of respondents were farmers, 14.5% were civil servants, and 17.3% were traders. This shows that farming is the primary occupation in the study area. As for farming experience, 36.4% of respondents had 11-20 years of experience, 31.8% had 1-10 years, and 24.5% had 21-30 years with a mean of 17.68 years, indicating a relatively experienced farming population. Farm size analysis showed that 91.8% of respondents operated on 1-5 plots, 7.3% on 6-10 plots, and 0.9% on 11-15 plots. This small farm size is likely due to limited capital, as most farmers relied on personal savings. Finally, land acquisition data revealed that 68.2% of respondents used family land, 21.8% hired land, and 8.2% received land as gifts. The predominant use of family land further emphasizes the financial constraints faced by yam farmers in the study area.



**Table 1: Socioeconomic Characteristics of Yam Farming Households**

Socioeconomic	Frequency	Percentage	Mean
<b>Sex</b>			
Female	74	33.6	
Male	146	66.4	
<b>Age</b>			
21-40	60	27.3	
41-60	122	55.5	
61-80	38	17.3	49
<b>Marital Statues</b>			
Divorce	24	10.9	
Married	150	68.2	
Separate	16	7.3	
Single	16	7.3	
Widowed	14	6.4	
<b>Households Size</b>			
1-5	114	51.8	
6-10	94	42.7	
11-15	16	5.5	6
<b>Educational Status</b>			
No formal education	16	7.3	
Others	18	8.2	
Primary	20	9.1	
Secondary	84	38.2	
Tertiary	82	37.3	
<b>Cooperative Membership</b>			
Yes	120	54.5	
No	100	45.5	
<b>Contact with Extension Agents</b>			
No	94	42.7	
Yes	126	57.3	
<b>Number of Contact(Monthly)</b>			
0	94	42.7	
1	76	34.5	
2	20	9.1	
3	24	10.9	
4	4	1.8	
5	2	9	9
<b>Source of Capital</b>			
Agricultural/ Commercial bank	36	16.4	
Corporative/Thrift society	22	10.0	
Friends/Relative	4	1.8	
Personal savings	158	71.8	
<b>Major Occupation</b>			
Civil Service	32	14.5	
Farming	148	67.3	
Others	2	0.9	
Trading	38	17.3	
<b>Farming Experience</b>			
1-10	70	31.8	
11-20	80	36.4	
21-30	54	24.5	
31 and above	16	7.3	17
<b>Farm Size</b>			
1-5	202	91.8	
6-10	16	7.3	
11-15	2	0.9	2





#### Land Acquisition

Gift	18	8.2
Hired/Rent	48	21.8
Others	4	1.8
Own/Family	150	68.2
<b>Total</b>	<b>220</b>	<b>100.0</b>

Source: Author's compilation

#### Food Insecurity Status of Yam Farming Households

The result showed food insecurity status of the respondents in the study area. The monthly expenditure for household consumption was used to establish food security line. A mean per capita monthly consumption expenditure of ₦13,100.6 with food insecurity line of ₦8,733.6 was used to classify the households, survey found 45.5% of the respondents to be food secure. This implied that the households were unable to meet their expected food expenditure while 54.5% to be food insecure. This implies that reasonable proportion of people were food secure (Olayiwola *et al.*, 2017).

**Table 2:** Food Security Status of the Respondents

Food Security Status	Frequency	Percentage (%)
Food security	100	45.5
Food insecurity	120	54.5
<b>Total</b>	<b>220</b>	<b>100.0</b>
The Mean per capita household food expenditure (MPCHHFE) of ₦13,100.6 while the Food Insecurity line (2/3 of MPCHHFE) shows to be ₦8,733.6		

Source: Author's compilation

#### Distribution of Respondents based on Food Insecurity Incidence, Food Insecurity Depth and Food Insecurity Severity

##### Food Insecurity Incidence

The result revealed that farming households whose per capita income or food consumption is below predetermining subsistence level recommended daily food income. At the farming household level, Table below showed the incidence of food insecurity among food insecure farming households. The incidences of food insecurity as indicated by 72.5% for food insecure farming households. This implies that 72.5% of food farming households was not able to meet their recommended daily food income. The result shows that there is higher food insecurity incidence among farming households in the study area, which agreed with the study by (Moses, 2017).

##### Food Insecurity Depth

The food insecurity gap index provides an estimate of the average gap between the expenditure of the households and the food insecurity line. The food insecurity depth (gap) among the food insecure farming household was presented in the table below. The result showed that 9.2% of food insecure farming households are below the recommended daily calorie requirement or are below food insecurity line in the study area (Jabo *et al.*, 2014).

##### Food Insecurity Severity

The food insecurity squared gap index is often described as a measure of the severity of food insecurity among the food insecure households. Food insecurity gap is the distance separating the poor from the food insecurity line. The squared food insecurity gap of the food insecure farming households was presented in the table below. The result showed that 18.3% of the severity of food insecure indices was food insecure farming households. This means that 18.3% of the food insecure farming households were most food insecure in the study area, the study agreed with that of (Moses, 2017).



**Table 3: Food Insecurity Index of the Respondents**

Food Insecurity Index	Frequency	Percentage (%)
Food Insecurity Incidence	87	72.5
Food Insecurity Depth	11	9.2
Food Insecurity Severity	22	18.3
<b>Total</b>	<b>120</b>	<b>100.0</b>

Source: Author's compilation

### Factors Affecting Food Security Status of Yam Farming Households

The result in the table 4 below showed the Probit estimates of factors affecting food security status among yam farming household in the study area. The Pseudo R-square of 0.8278 showed that all the explanatory variables included in the model were able to explain 82.78% of the variation in food security status of the household. The percentage of right predictions obtained 82.78% shows that the predicted outcome has maximum probability. The statistically significant likelihood ratio chi-square at 1% level shows that the model as a whole is statistically significant as compared to models with no prediction, that is, the explanatory variables have a significant effect individually and jointly on the choice. Seven variables were found to significantly affect the food security status of the household; these include farming experience, marital status, gender, farm size, educational status, age and household. All these significant variables had positive coefficients except marital status, gender, and household size. Farming experience has a coefficient of 0.5170423 positive and significant at 5% implied that an increase in household farming experience increase food security of the household. Farm size has a positive significant impact of food security status of household at 1%. The coefficient is 1.766525 units which showed that 1% increase in farm size result in 1.766525 standard deviation increase in the predicted probit index of household farm size. In other ward, 1% increase in farm size increase the probability of a household being food secure. This suggests that increasing the farm size of farm households in the study area is capable of improving their food security situation. This is corroborated by findings that large farm size may be proxy for access to credit and other input that are likely to increase agricultural productivity. Educational status has a coefficient of 1.105494 positive and significant at 1% implied that increase in level of education increases food security of the household. Age has a coefficient of -2.766011 negative and significant at 1% which implied that increase in age of the household decline food security of the households. The negative significant effects of the age of household heads decrease the probability of households being food secure. This result agreed with the findings of Agboola (2004) who reported that increase in age decreases food security,

**Table 4: Factors Affecting Food Security Status among the Respondents**

Variables	Coefficient	Standard error	P> z/
Farming Experience (X <sub>1</sub> )	.5170423	.2244697	0.021**
Marital Status (X <sub>2</sub> )	-1.371441	1.034005	0.185
Gender (X <sub>3</sub> )	2.108407	1.467489	0.151
Farm Size (X <sub>4</sub> )	1.766525	.4745544	0.000***
Educational Status (X <sub>5</sub> )	1.105494	.3648093	0.002***
Age (X <sub>6</sub> )	-2.766011	1.022307	0.007***
Household Size (X <sub>7</sub> )	-.6693668	1.214472	0.582
Constant	-8.178238	2.255234	0.000***
Pro > chi2			0.0000***
Pseudo R <sup>2</sup>	0.8278		

Source: Author's compilation

\* sig at 10%, \*\* sig. at 5% and \*\*\* sig. at 1%

### Coping Strategies Adopted by the Respondent in the Study Area

FAO (2013) define coping strategies as what people are willing to embark on for sustainability were they are food insecure. The result showed the coping strategies employed by the respondents towards food insecurity based on ranking in order of most preferred coping strategies.



The study by Olayiwola *et al.* (2013) observed that respondents adopted several strategies to cope with food insecurity such as; reliance on less preferred food, limiting food portion at meal time, eating once a day, letting children eat first, buying food on credit, buying less expensive food, eating wild fruits, picking of leftover food at social function, consuming seed reserve, selling durable assets, harvesting immature food crops, selling livestock to buy food, migrating to search for job and withdrawal of children from school. The frequency of use of various coping strategies ranked Withdrawal of children from school 1<sup>st</sup> with a mean score of (3.75). Harvesting immature food crop ranked 2<sup>nd</sup> with mean score of (3.57). Selling durable assets ranked 3<sup>rd</sup> with a mean score of (3.40), Eating once a day ranked 4<sup>th</sup> with a mean score of (3.31), Selling livestock to buy food ranked 5<sup>th</sup> with mean score of (3.25), Consuming seed reserved ranked 6<sup>th</sup> with mean score of (3.19), Buying food on credits ranked 7<sup>th</sup> with a mean score of (3.06).

**Table 5:** Coping Strategies Adopted by Yam Farming Households

Coping strategies	Mean	Rank
Withdrawal of children from school	3.75	1
Harvesting immature food crops	3.57	2
Selling durable assets	3.40	3
Eating once a day	3.31	4
Selling livestock to buy food	3.25	5
Consuming seed reserve	3.19	6
Buying food on credit	3.06	7
Migrating to search for job	2.95	8
Picking of leftover food at social function	2.89	9
Limiting food portion at meal time	2.35	10
Buying less expensive food	2.27	11
Letting children eat first	2.11	12
Eating wild fruits	1.88	13
Reliance on less preferred food	1.68	14

Source: Author's compilation

## CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, it could be concluded that the households in the study area were food insecure. The mean per capital expenditure was ₦13,100.6 per day, putting these households at extreme risk of food insecurity. Furthermore, there was a high incidence of food insecurity among the households in which age, education, households' size and various coping strategies were adopted to reduce food insecurity incidence. Base on the findings, the following recommendations were made;

- Practical farming experience through mentorship programs and extension services should be provided to farmers. This could include partnerships with experienced farmers, agricultural training programs, and field-based learning opportunities.
- Land use act be reviewed to increase land holding and access to land by the farmers
- Promote agricultural education programs that target both formal education and adult literacy in rural areas.
- Create programs and policies that encourage younger generations to engage in farming, either through incentives for young farmers or training programs tailored to their interests and technological aptitude.

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