The Bangladesh Journal of Agricultural Economics, 41(1): 1-16, 2020

FOOD SECURITY AND POVERTY STATUS OF CASSAVA PROCESSORS IN AWKA NORTH LOCAL GOVERNMENT AREA OF ANAMBRA STATE OF NIGERIA

Osuafor Ogonna Olive[1*]
Obianefo Chukwujekwu Aloysius[2]
Dike Angel Beauty[1]

ABSTRACT

Cassava is one of Nigeria's most important root cash crops and plays a key role in food security and poverty alleviation in rural areas. The study assessed the food security and poverty status of cassava processors in Awka North Local Government Area of Anambra State, Nigeria. Data were collected with a well-structured questionnaire from a cross section of 490 randomly selected cassava processors in 2019. Data were analyzed with descriptive statistics, mean threshold from 5 point Likert scale, logistic regression, food security index, and Foster Greer Thorbecke (FGT) poverty status model. The study reveals that the majority (60.8%) of processors is female, it equally summarized that the average age, level of education, processing experience, household size, contact with agricultural officers, enterprise size, monthly income, and monthly expenditure were 45 years, 11 years, 16 years, 9 people, 4 times, 67.36 tons, 126.5204286 USD and 91.91425714 USD at ₦350 per dollar respectively. The average cassava processing output was 26.02 tons/month and the processor's food security line was 61.28 USD, while the poverty line was 84.45 USD. The study equally observed that the food security index was 1.5 with the majority (89.59%) of the processors being food secure. Also, the poverty incidence, depth and severity were 0.098, 0.055, and 0.03 respectively, while the poorest processors spent 71.5% of their income on food consumption. Furthermore, the determinants of food security were sex, age, farm size, household size, contact with agricultural officer, and cooperative membership.

Keywords: Food security, poverty, cassava processor, Nigeria

[1]Department of Agricultural Economics and Extension, Nnamdi Azikiwe University, Awka, Nigeria.
[2] Anambra State IFAD assisted Value Chain Development Programme, Awka, Nigeria.

*[*]Correspondence: Osuafor Ogonna Olive, Department of Agricultural Economics and Extension, Nnamdi Azikiwe University, Awka, Nigeria *oo.osuafor@unizik.edu.ng*

I. INTRODUCTION

Poverty is universal occurrence that affects nations and people differently and afflicts people in various depths and levels at different times and different phases of existence, this have reached an alarming proportion in the developing countries, poverty is said to exist when an individual is not able to cater adequately for his or her basic needs like food, shelter and clothing, unable to meet their social and economic obligations, lack income generating activities, skills, assets and has limited access to social and economic infrastructure such as education among others (Omoniyi, 2013). By way of definition, poverty is complex, multifaceted and multidimensional which manifest in the economic, social, political, environmental and every aspect of human existence, this situation has persisted and several interventions have failed to yield significant improvement in Nigeria's Human Development Index even in periods of economic growth (Danaan, 2018). Pearson (2015) noted that poverty has a multiplier effects and linkages such that lack of access to resources can affect health status, life expectancy, education, security and relationships. Thus, efforts are being intensified globally through reforms, interventions and sustainable development goals to tackle poverty and improve living standards. Most articles declared Nigeria as the poverty capital in the world, one of the root cause of poverty is unemployment (lack of income generating activities) and Nigeria recorded an unemployment rate of 55.4% as at third quarter of 2018 (NBS, 2019, Obianefo *et al.*, 2019). The recent publication on Nigerian living standard survey by Nigerian Bureau of Statistics (NBS, 2020) reveals that worrisomely; household per capita income is 32.72 USD per month, it equally stated that about 40% of Nigerians are living in extreme poverty.

Poverty is capable of leading to a reduced access to social and economic infrastructure which in turn leads to food security challenges (Adisa and Adesanmi, 2017). Food security is a situation where all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life (Clover, 2003). When this demanded food does not sufficiently match its quantity and quality experiences, food insecurity is said to exist (Olayinka 2017). This research tend to adopt cassava processing as a way of creating an income generating activities to make money available to the processing households for the purchase of foods and meeting other basic needs.

Cassava is a popular food crop grown in West Africa. It is a native of South America where it is referred to as *Manihot*, but it is commonly grown throughout the tropics, where it is known for its starchy, tuberous roots. It occupies a unique position in the world's food economy, especially due to the fact that it survives where other crops fail. Cassava production in Nigeria reached the highest level with an estimated value of 59 million tons and accounted for 20.4% world share since 2017 (Olutosin A.O. and Sawicka, 2019), making her the highest cassava producer in the world, Nigeria's

production is three times more than Brazil's production capacity and almost double the production capacity of Thailand and Indonesia (Onyenwoke and Simonyan, 2014). By providing food continuously under conditions that cause other crops to fail, cassava has often played a crucial role in alleviating poverty. Its drought tolerance, resilience on marginal agricultural land and the ability to be stored in the ground for up to three years makes it an important food security crop for small holder farmers (FAO, 2000; Sayre *et al*., 2011). The importance of cassava cannot be overemphasized because it is an important component in the diet of over one billion people around the world as food for human consumption. Cassava is principally grown by rural farmers who depend on seasonal rainfall. As a most important local staple and cash crop, cassava availability throughout the year could support the attainment of food security for the rural households in the cassava growing areas (Saediman *et al*., 2016).

In Nigeria, Cassava is grown by almost every household and serves more as a major source of income especially for the increasing rural dwellers. Osuji (2019) noted that cassava has been considered as one of the preemptive famine reserve crops in areas where rainfall is unpredictable, which gives it an advantage over yam and other root and tuber crops in the country. Cassava is also identified as a promising crop for international trade, as demand for cassava derivatives doubled over the last two decades (Esiobu, 2019). Food security is exacerbated by the wide disparity between the nation's food production and her every growing population. Aside rice and yam, cassava is preferred by the resource-poor farmers in Awka North Local Government area of Anambra State, Nigeria, due to its easy adaptability and survival in the area. Adepoju *et al*. (2019) stated that cassava as a food crop, fits well into the farming systems and smallholder processing in Nigeria because it is available all year round, thus providing household food security.

Plummeting food security continues to be a major public challenge in Nigeria. Therefore, achieving food security in any country is typically an insurance against hunger and malnutrition, both of which hinders economic development (Davies, 2009). As a result of this, Nigeria has made several attempts to address the issue of increased food production in both quantity and quality thereby solving the problem of food insecurity. Some of these attempts have amounted into several programs and projects aimed at boosting agricultural production. Despite successive strategies and programs implemented as related to food insecurity, these issues are still a problem (Orefi, 2012). Rural households are the most affected in spite of their contribution to the feeding of the rest of the population (Kuku-Shittu, 2013). Farming households face a high risk of food insecurity due to poverty, income inadequacies, limited access to resources, under-employment, and several barriers to self-sufficiency, which has posed many challenges to rural households, as well as processing household. However, cassava and its products can be a powerful tool to eradicate food insecurity in Nigeria. Cash income from cassava proves to be more egalitarian than any other staple crops because cassava's low cash input and investment cost

(Muhammed-Lawal *et al*., 2012). The small holder farmers who formed the bulk of cassava processors are faced with a number of constraints that limit their productivity which includes; lack of improved varieties and cultural practices, storage problems, increasing input-cost, land scarcity, inadequate technical know-how among cassava growing farmers and processors. Traditionally, cassava is processed before consumption, cassava processing is a means of reducing the toxic cyanogenic glucosides present in fresh cassava tubers. It equally act as a preservation technique and to yield products that have different characteristics (Abiodun *et al*., 2014).

Cassava processing is a value chain process that helps to improve the quality and self-life of its products. Cassava is processed in Nigeria in the form of cassava flour, cassava chips, Garri (Eba), Akpu (Fufu), Abacha, among others (Agricdemy, 2018). Many of these cassava processing activities are majorly handled by smallholder/small scale processors. Thus, the problem of this study is to accelerate the scale of operation on labour, availability of land and machineries, among others. It is against this background raised that the study attempts to access the food security and poverty status of cassava processors in Awka North local government area of Anambra State and its role to fight against hunger with the aim of finding the solutions to the following research questions: What are the socioeconomic characteristics of cassava processor in the study area? What is the level of cassava processing and forms of cassava utilized in the study area? What are the food security and poverty status of cassava processors in Awka North? What are the determinants of food security status and the constraint affecting cassava processors in the study area?

The need for this study on food security and poverty status of cassava processors cannot be overemphasized at this very time Nigeria has been pronounced the poverty capital of the world. Many scholars have in the past provided empirical evidence on poverty status in Nigeria and on State bases. The study by Canback Global Income Distribution Database (C.GIDD, 2012) revealed that per capita income by individual household in a month in Anambra State was USD134.58 equaling ₦21,129.58 at ₦157 per dollar exchange rate in 2012 (Macrotrends, 2020). A look at time value of money on inflation rate of 12.22% in 2012 assumed that the poverty line in Anambra State was 151.84 USD per month in the year 2012. Worrisomely, the Nigerian Bureau of Statistics (NBS) in 2019 worked on Nigerian living standard survey (NLSS) and was reported in April, 2020 which reveals that household per capita income is 32.72 USD per month. When compared with the 2012 C.GIDD result, it was clear that per capita income dropped by 78%. NBS (2020) also asserts that the current poverty depth in Nigeria 12.85%, while the severity is 5.63%. This finding justifies the need for this study as it will afford researchers the opportunity to investigate policy performance in the study area. Therefore, the study specifically looked at the following objectives: i. to describe the socioeconomic characteristics of cassava processors in the study area; ii. to identify the level of processing and utilization by cassava processors; iii. to ascertain the food security and poverty status

of cassava processors; iv. to examine the factors influencing the food security status of cassava processors; and v. to identify the challenges faced by cassava processors.

Based on the objectives the following null hypotheses were tested:
Ho_1: The socioeconomic characteristics of the cassava processors do not significantly affect their food security status; Ho_2: There is no significant difference between the mean output of food secure and food insecure cassava processors.

II. MATERIALS AND METHODS

The study adopted a descriptive survey design approach. The study was carried out in Awka North Local Government Area (LGA) of Anambra State, Nigeria. The LGA headquarters is at Achalla and lies in the latitude of 6.33^{o}E and longitude 7.00^{o}N. The estimated population of the LGA in the last census was 112,192 (NPC, 2006). The communities in Awka North LGA are Awba Ofemili, Amunuke, Isuaniocha, Amansea, Ebenebe, Uzum, Ugbene, Achala, Mgbakwu and Ugbenu. Farming is their major occupation and their major crops are cassava, rice, maize and yam.

The multi-stage random sampling technique was adopted to select cassava processors used for the study. In the first stage, six communities (Achalla, Isuaniocha, Mgbakwu, Amansea, Amanuke and Uzum) were purposively selected where 5 villages were randomly selected from each community, making it a total of thirty villages. Sixteen cassava processors were randomly sampled from twenty-nine villages, while twenty-six cassava processors were randomly sampled from the five villages from Isuaniocha community due to the dominance of cassava processors. This brought the sample size to 490 respondents. A well-structured questionnaire and facial interview were the research instrument validated by a lecturer from the department of Agricultural Economics & Extension and Crop Science & Horticulture from Nnamdi Azikiwe University.

Data Analysis
In analyzing the data, descriptive statistics, mean threshold from 5-point Likert scale, food security index, Foster Greer Thorbecke (FGT) 1984 poverty index, Logistic regression model, and Z-test were the tools employed to achieve the objectives.

The mean is calculated as:

$$\bar{X} = \sum_{i=1}^{n} \frac{FX}{N}$$

Where $\bar{X}$ = mean, X = variables under investigation, N = population, F = frequency of occurrence.
The mean threshold from 5 point Likert scale is defined by:

$$\bar{x} = \frac{SA + A + SWA + D + SD}{5} = 3.0$$

Where SA = 5 (strongly agree); A = 4 (agree); SWA = 3 (somewhat agree); D = 2 (disagree); SD = 1 (strongly disagree)

The food security index is estimated as;

$$FI = \frac{MFCE}{2/3(PCFCE)}$$

Where FI = food security index; MFCE = mean food consumption expenditure; PCFCE = per capita food consumption expenditure; 2/3 = the ratio of the severity of PCFCE.

Foster Greer Thorbecke (FGT-1984) poverty index was used to estimate the poverty status of the processors defined as:

$$P \propto = \frac{1}{N}\sum_{i=1}^{m}\left(\frac{z - Yi}{z}\right)^{\propto}$$

Where N = total population (Number); m = total number processors below the poverty line (Number), z = poverty line (2/3 of the average per capita expenditure or income of processors (Naira); Yi = per capita income of processors below the poverty line; α = poverty aversion parameter that takes the values 0, 1, 2 (Number), When α = 0; the poverty incidence is defined by:

$$FGT_0 = \frac{1}{N}\sum_{i=1}^{m}\left(\frac{z - Yi}{z}\right)^{0}$$

Where: FGT_0 = m/N. It is worthy of note that poverty incidence is equally known as poverty head count.

When α = 1, it shows the poverty depth/gap is defined by;

$$FGT_1 = \frac{1}{N}\sum_{i=1}^{m}\left(\frac{z-Yi}{z}\right)^{1} = \frac{m}{N}\left(1 - \frac{Yi}{z}\right)$$

Also, the poverty severity is defined by;

$$FGT_2 = \frac{1}{N}\sum_{i=1}^{m}\left(\frac{z-Yi}{z}\right)^{2} = \frac{m}{N}\left(1 - \frac{2Yi}{z} - \frac{Yi^2}{z^2}\right)$$

The poverty depth considers the distance separating the poor from the poverty line, while severity measures the distribution expenditure among the poor.

To indentify the factor affecting poverty, logistic regression model is used as:

$$P = E\left(Y_i = \frac{i}{X_{ij}}\right) = \frac{1}{1+e^{-zi}} \; equation\ 1 = \frac{1}{1+e^{-(\propto+\varepsilon jBjxi+\varepsilon j)}} \; equation\ 2$$

Where zi = the food security index obtained in objective three. Household with food security index of less than 1 was considered food insecure while those with food security index greater or equal to 1 was considered food secure.

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}) + e$$

Where:
Y = probability of household been food secure ($Y_i = 1$ when zi $\geq$ 1; Yi = 0 when zi < 1); X_1 = Sex (male 1, female 2) ; X_2 = Age (years); X_3 = processing experience (years); X_4 = level of education (years spent in formal learning); X_5 = Marital Status (single = 1, married = 2, otherwise = 3); X_6 = Enterprise size (tons); X_7 = Monthly income (Naira); X_8 = Household size (Number); X_9 = contact with ministry of agriculture (Number); X_{10} = Cooperative membership (Yes = 1, No = 0) and e = error term.

III. RESULTS AND DISCUSSION

Socioeconomic Characteristics of Cassava Processors in the Study Area

The socioeconomic characteristics of cassava processors in Awka North Local Government Area are summarized in Table 1. The Table shows that the majority (60.8%) of them is female, with a greater proportion (44.7%) of the processors married and are member of agricultural cooperative (56.9%), this implies that cassava processing in the area is female dominated. Being a member of agricultural cooperative will help the processors to enjoy many advantages like principles of bulk purchase among others. The study equally summarized that the cassava processor's average age, level of education, processing experience, household size, contact with agricultural extension officers, enterprise size, monthly income, and monthly expenditure are 45 years (44.75), 11 years (10.90), 16 years (16.23), 9 people (8.91), 4 times (4.35), 67.36 tons, 126.52 USD, and 91.91 USD respectively. This implies that the cassava processors are in their active farm age. At this age the processors can still adopt new innovative technology in cassava processing industry known that the processors averagely attended secondary school, meaning that they are fairly literate and are well positioned to adopt new technology in the industry. It is also worthy to note that the large household size will provide cheap family labour which will help to reduce the cost incurred on labour in the industry.

Table 1: Socio-economic characteristics of cassava processors (n = 490)

Sn.	Variable	Frequency	Percentage	Mean
1	**Sex**			
	Male	192	39.2	
	Female	298	60.8	
2	**Marital status**			
	Single	171	34.9	
	Married	219	44.7	
	Otherwise	100	20.4	
3	**Level of Education**			
	Primary	118	24.1	
	Secondary	199	40.6	10.90
	Tertiary	173	35.3	
4	**Experience**			
	0-5	58	11.8	
	6-10	54	11.0	
	11-15	135	27.6	16.23
	16-20	93	19.0	
	21 and above	150	30.6	
5	**Age**			
	0-25 years	118	24.1	
	26-45 years	199	40.6	44.75
	46-65years	173	35.3	
6	**Household size**			
	0 - 5 person	89	18.2	
	6 - 10 person	210	42.9	8.91
	11 - 15 person	177	36.1	
	16 and above	14	2.9	
7	**Contact with agric. officers**			
	0 - 3 times	122	24.9	4.35
	4 - 6 times	348	71.0	
	7 and above	20	4.1	
8	**Enterprise size** (tons/day)			
	0 - 10 tons	31	6.3	
	11 - 20 tons	37	7.6	67.36
	21 - 40 tons	76	15.5	
	41 and above	346	70.6	
9	**Income (USD)**			
	0 - 20,000	43	8.8	
	20,001 - 30,000	68	13.9	
	30,001 - 40,000	91	18.6	
	40,001 and above	288	58.8	126.52
10	**Expenditure (USD)**			
	0 - 20,000	40	8.2	
	20,001 - 30,000	162	33.1	91.91
	30,001 - 40,0001	196	40.0	
	40,001 and above	92	18.8	
	Cooperative membership			
	No	279	56.9	
	Yes	211	43.1	

Level of Cassava Processing and Utilization by Cassava Processors

The level of cassava processed and forms of utilization is presented in Table 2. It shows that the greater proportion (35.9%) of the cassava processors processed a minimum of 30.1 tons and above per month, while the remaining 33.7%, 23.5% and 6.9% processed 20.1 – 30 tons, 10.1 – 20 tons, and ≤ 10 tons respectively. The mean processing output was equally found to be 26.02 tons. Also, the Table 2 shows that the cassava tubers are processed into six products which are Fufu, Garri, Tapioca, Chips, Starch and Animal feed. None of the processor is in ethanol production. This could be attributed to the level of sophistication required in its process. The finding is in line with the report of Agricdemy (2018); Adepoju *et al.* (2019) who found that Garri and Fufu are the highest cassava processing activities in Nigeria and Oyo state respectively; also processing of ethanol was not recorded for any cassava processor.

Table 2: Level of Cassava Processing. (n = 490)

Output (tons)		**Frequency**	**Percentage (%)**	**Mean**
≤ 10 tons		34	6.9	
10.1 - 20 tons		115	23.5	26.02
20.1 - 30 tons		165	33.7	
30.1 and above		176	35.9	
Product utilization	**Yes**	**No**		
Fufu	490	0	100.0	-
Garri	490	0	100.0	-
Tapioca (wet abacha)	464	26	94.7	5.3
Chips	424	66	86.5	13.5
Starch	351	139	71.6	28.4
Animal feed	351	139	71.6	28.4
Ethanol	0	490	0	100.0

Food Security Status of Cassava Processor

The food security status of the cassava processing household is presented in Table 3. The Table shows that the Total Food Consumption Expenditure (TFCE) among the processing household was 45,038.00 USD; mean Food Consumption Expenditure (MFCE) was 91.91 USD; and 2/3 per capita food consumption expenditure (PCFCE) which is the food security line was 61.28 USD. The food security index (FI) was found to be 1.5, implying that the majority (89.59%) of the respondents is food secure, while only 10.41% of the cassava processors are food insecure. This showed that the majority of cassava processors had access to enough food for their households. The finding is in agreement with Saediman *et al.*, 2016 research which reported that a great majority of cassava growing households (96.1%) were classified as food secure. Also, it matches the report of Saediman *et al*. (2019) stated that households having the status of Food Secure accounted for 81.2% and households having Food Insecure status accounted for 18.8%.

Table 3: Food security status of cassava processing household

Items Per Month	Value (USD)
Total food consumption expenditure (TFCE)	45,038.00
Mean food consumption expenditure (MFCE)	91.91
2/3 per capita food consumption expenditure (PCFCE)	61.28
Food security index (FI)	1.5
Food secure	439 (89.59%)
Food insecure	51 (10.41%)
Observation	490
Mean household size	9 person (8.91)

Poverty Status of Cassava Processing Household

The poverty status of the cassava processors in the study area using the indicators such as poverty incidence (P_0), poverty depth (P_1) and poverty severity (P_2) is presented in Table 4. The table reveals that the poverty incidence was 0.098, this implies that 9.8% of the cassava processor were classified poor in the study area. The poverty depth was 0.055, implying that the amount an individual cassava processor falls short of the poverty line was represented by 5.5%; In other words, an additional 5.5% of the total consumption expenditure is required to close the poverty gap. Also, the study showed that the poverty severity was 0.03, which implies that the poorest of the poor cassava processors who needs help in the distribution of standard of living indicators (health care, clean water, income generating activities, among others) was represented by 3.0%. When compared with per capita expenditure, it was gathered that the poorest cassava processor spent 71.5% of their monthly income on food consumption expenditure. The study also showed that the poverty line 84.45 USD which is an indication that the expenditure of a cassava processor below this value was poor. The finding on poverty incidence and the poverty line is in contrast with the study of Osuji (2019) who reported a poverty incidence and poverty line index for cassava farmers as 0.25 and 178.50 USD respectively; although the index of poverty severity (0.03) are in agreement.

Table 4: Poverty status of cassava processors

Poverty indices	Index	Percentage
Poverty incidence (P_0)	0.098	9.8
Poverty Gap/depth (P_1)	0.055	5.5
Poverty Severity (P_2)	0.03	3.04
Poverty line (USD)	84.45	
2/3 per capita income of poor household (USD)	37.11	
Percentage of income spent on consumption		71.5

Factors Influencing Food Security Status of Cassava Processors

The logistic result of the factors influencing the food security status of the cassava processors is presented in Table 5. The result shows that the Pseudo R^2 was 0.5191,

indicating that the independent variable explained 51.91% of the variation in the probability of being food secure or not. The livelihood Chi^2 of 26.03 is significant at 1% probability level. This showed that the explanatory variable had a significant effect on the likelihood of being food secure or not. The coefficient of sex, age, farm size, household size, extension contact, and cooperative membership are the significant socioeconomic variables affecting food security. This agrees with the study of Saediman *et al.* (2019) identified sex, farm size, family size and access to credit as factors affecting food security.

The marginal effect of sex (0.26169) was positive and significant at the 5% level of probability level. This implies that an increase in the number of male cassava processors by one will increase the probability of being food secure by 0.26169 units. This could be linked to the physical strength of male processors which aid processing of agricultural products. The marginal effect of age (0.01882) was positive and significant at the 10% level of probability level. This implies that an increase in the age of cassava processor by one unit, will increase the probability of being food secure by 0.01882 units. Age is linked with experience, thus, as the processors grow older, their skills are better off in the enterprise. The marginal effect of enterprise size (0.0344) was negative and significant at the 10% level of probability level. This implies that an increase in the enterprise size of the cassava processors by one unit is likely to reduce the probability of being food secure by 0.0344. The marginal effect of household size (0.0356) was negative and significant at the 5% level of probability level. This implies that an increase in the number of household members of processors by one unit is likely to reduce the probability of being food secure by 0.0356. This could be that as the number of household members grew, more of their product will be consumed with little to sell for money to purchase other necessary food items. Large household size will consume more and reduce the profit margin of the cassava processors.

The marginal effect of contact with agricultural officers (0.1717) was positive and significant at the 5% level of probability level. This implies that an increase in the number of contacts with agricultural officers by one unit will increase the probability of being food secure by 0.1717 units. Frequency of visit by staff of the ministry of agriculture to the processors will help to improve their processing skills for optimum production. The marginal effect of cooperative membership (0.0126) was negative and significant at the 5% level of probability level. This implies that an increase in the number of cassava processors that are not members of a cooperative by one unit is likely to reduce the probability of being food secure by 0.0126 units. Organizing the processors into association will help them to achieve the principles of bulk purchase, scale up production, and increase their profit margin.

Table 5: Logistic regression analysis result on factors influencing food security status of cassava processors

Food security index	Coefficient	Marginal effect	Z
_cons	-2.249		-0.73
Sex (X_1)	3.816	0.261	2.38**
Age (X_2)	0.274	0.018	1.89*
Experience (X_3)	-0.177	-0.012	-1.37
Education (X4)	0.194	0.013	1.32
Marital Status (X_5)	-0.111	-0.007	-0.23
Enterprise size (X_6)	-0.502	-0.034	-1.77*
Income (X_7)	-0.001	-3.950	-1.22
Household size (X_8)	-0.519	-0.035	-2.55**
Contact with agricultural officers (X_9)	2.503	0.171	2.21**
Cooperative (X_{10})	-0.183	-0.012	-2.29**
Diagnostic tools			
Log likelihood	-12.054		
Pseudo R^2	0.519		
LR chi^2	26.030		
Prob. > chi^2	0.003		
Observation	490		

Significant at 10%, (**) Significant at 5%, (***) Significant at 1%.

Challenges Faced by Cassava Processors

The challenges facing cassava processors are presented in Table 6 using the mean threshold from 5-point Likert scale. The processors' responses were captured on the scale of 1 to 5. The mean threshold greater than or equal to 3.0 were agreed to be the major challenges facing cassava processors in the study area, while the mean threshold of less than 3.0 were not part of the challenges facing cassava processors. Based on the 8 items, 6 have a mean threshold of 3.0. Thus, the challenges were the high cost of labour, inadequate finance, high cost of input, over dependence on traditional technology, poor extension contact and bad road network.

Variable such as sex, age, enterprise size, household size, contact with agricultural officers, and cooperative membership were the socioeconomic variables affecting food security in the area. Thus, the null hypothesis was rejected based on those significant variables as mentioned. (Table 7)

Table 6: Challenges faced by cassava processors in the study area

SN.	Variables	Mean	Std. dev.	Decision
1	High cost of labour	3.4	0.504	Agree
2	Inadequate finance	3.68	0.606	Agree
3	Poor access to credit	2.78	1.213	Disagree
4	Low government presence to subsidize inputs	2.26	1.059	Disagree
5	High cost of input	3.53	0.863	Agree
6	Over dependence on traditional technology	3.06	0.669	Agree
7	Poor contact with agricultural staff	3.16	1.081	Agree
8	Bad road network	3.82	0.447	Agree
9	Cluster mean	3.21	0.810	Agree

The significant difference in the output of food secure and insecure cassava processors was tested with the z-test. The mean output for food secure processors was 33,916.57kg and that of food insecure processors was 17,135.82kg. The z calculated value of 29.73*** significant at the 1% level of probability is an indication that the null hypothesis two was rejected.

Table 7. Difference in output of food secure and insecure cassava processors

Items	Food secure (kg)	Food insecure (kg)
Mean	33916.57	17135.82
Known Variance	52814025	10117209
Observations	439	51
Hypothesized Mean Difference	0	
Z	29.73	
z Critical one-tail	1.64	

IV. CONCLUSION

The study has analyzed the food security and poverty status of cassava processors in Awka North Local Government Area of Anambra State, Nigeria. The results shows that cassava processors were majorly (60.8%) female in the study area which is consistent with many researcher's view that women are more involved in the cassava value chain. Thus, it becomes necessary to find out if the processors engaged in the enterprise are food secure? And if yes, what percentage of the processors are, especially now that there is need for gender mainstreaming at the global agricultural sector. With rising issues of rural poverty especially in this time of Convid-19 pandemic, the need to ascertain the poverty line and severity among cassava processors considering the dominance of women in the sub-sector cannot be overemphasized as this will help policy makers to come up with an informed decision. The study reveals that as high as 89.59% of the processors are food secure with food security index of 1.5. The poverty line (84.45 USD) as reported by the study is favorable when compared to what is attainable in most rural areas at this present time. It is worthy to note that the study reported a severity of 0.03 (3.0%),

and further investigation shows that the processor within this value spends 71.5% of their income on food consumption. Thus, there is need for policymakers to help in the distribution of standard of living indicators (health care, clean water, income generating activities, among other things). It is important to bring to the public notice that some of the challenges facing cassava processors in the area were; high cost of labour, inadequate finance, high cost of input, over dependence on traditional technology, poor extension contact and bad road network, among others which sure affects their food security status and poverty line. Therefore, it becomes necessary to make the following policy recommendations:

I. Since the enterprise is women dominated, male processors should be sensitized on the need to invest in cassava value chain, seen that men influx will improve their food security status as identified by its gender determinant.
II. Seen that none of the processors ventured into ethanol production, there is need to train them and also make available the equipment needs for ethanol extraction in the area.
III. The processors should be organized into a formidable group (cooperatives) since this was identified as a positive and significant determinant of food security status in the area.
IV. Financial institutions should be encouraged to give credit to agro-processors that will help them to up-scale ad solve the challenges of inadequate capital.
V. Processors should be innovative and ready to adopt modern processing methods to reduce dependence on local/traditional processing methods, as this will help to improve their output per day.

REFERENCES

Abiodun, O.A., Akinoso R. and Oluoti O.J. (2014). Changes in functional and pasting properties of trifoliate yam flour during storage. *Journal of Applied Science and Environmental Management*, 18(2): 337–340.

Adepoju, A.A., Oladeebo, J.O. and Toromade, A.S. (2019). Analysis of occupational hazards and poverty profile among cassava processors in Oyo State, Nigeria. *Asian Journal of Advances in Agricultural Research*, 9(1): 1-13.

Adisa, T. and Adesanmi, A. (2017). North East lost $9.6bn infrastructure to Boko Haram Nigerian Tribune 26 January 2017, p2.

Agricdemy. (2018). Cassava processing in Nigeria. Accessed 3 June 2020 from https://agricdemy.com/post/cassava-processing-nigeria

C.GIDD (Canback Global Income Distribution Database). Canback angel. Archived from original on 11 March 2012. Retrieved 6 May 2020 from www.google.com/m?q=cranback+global+income+distribution+database&client=ms opera-mobile&channel=new&espv=1.

Clover, J. (2003). Food Security in Sub-saharan Africa, *African Security Review*, 12(1).

Danaan V.V. (2018). Analysing Poverty in Nigeria through Theoretical Lenses. Journal of Sustainable Development, 11(1): 20-31.

Davies A.E. (2009). Food security initiatives in Nigeria Prospect and challenges. *Journal of sustainable development in Africa*, 11(1): 186-202.

Esiobu, N.S. (2019). Understanding the allocative efficiency of cassava farms in Imo State, Nigeria. *International Journal of Innovation and Sustainable Development*, 10(19): 82-93.

FAO. (2000). Crops and Drops. Land and Water Division of the Food and Agricultural Organization, FAO, Rome, Italy.

Food and Agricultural Organization. (2005). Food and Organization of the United Nation. FAOSTAT, Statistical Database. FAO, Rome, Italy.

Food and Agriculture Organization. (2013). Statistics Database- FAOSTAT, http: faostat. Foa.org/: 2013.

Foster Greer J.J. and Erik Thorbecke 1984. A class of decomposable poverty measures. *Econometrica*, 3(52): 761–766. https://doi.org/102307/1913475.

Gross, R. S. and Keilmann, A.A. (1991). *Community nutrition and approach, in encyclopedia of human nutrition.* In M. Salder, J.J. Strain & B. Caballerp (Eds), Academic press Ltd, London. 433-441.

Kuku-Shihu, O.A., Mathcassen, W., Myles, A. and Akaem, L.A. (2013.) Comprehensive food security and vulnerability analysis. Retrieved online March 14, 2020, from https://www.africaportal.org/publications/comprehensive-food-security-and-vulnerability-analysis-nigeria-2/

Macrotrends. (2020). Nigeria inflation rate: 1960 – 2020. Retrieved 6 May 2020 from https://www.macrotrends.net/countries/NGA/nigeria/inflation-rate-cpi.

Muhammad-Lawal A., Salau, S.A. and Ajaji, S.A. (2012). Economics of improved and local varieties of Cassava among farmers in Oyo State Nigeria. *Ethiopian journal of environmental Studies and management (EJESM)*, 2, 189-194.

N.P.C. (2006). List of Nigerian population by States. Retrieved online March 14, 2020, from https://en.wikipedia.org/wiki/List_of_Nigerian_states_by_population.

NBS (Nigerian Bureau of Statistics). (2020). Revealed: 82.9m Nigerians are poor – NBS. Emmanuel Elebeke. Retrieved 5 May 2020 from https://www.vanguardngr.com/2020/05/revealed-82-9m-nigerains-are-poor-nbs/

NBS. (2019). Key indicator: Q3 2018 Unemployment/Underemployment. National Bureau of Statistics. https://www.nigerianstat.gov.ng/. Accessed July 13, 2019. [Nigeria].

Obianefo, C.A., Meludu T.N. and Onah O.G. (2019). Agribusiness Development on Pro-vitamin A Cassava Recipes among Female Youth in IFAD Value Chain Development Programme in Southeast Nigeria. *International Journal of Science and Research*. 8(9): 1148-1153.

Olayinka, O.F. (2017). The Right to Food in Nigeria: What is the Impact of University Education on Food Security in Falaye, FV & Adegbile, JA (eds), *Issues in Curriculum and Language Education*, (Ibadan University Press, Ibadan, Nigeria, 2017(1), pp: 411-429.

Olutosin A.O. and Sawicka B. (2019). Cassava, a 21st Century Staple Crop: How can Nigeria Harness Its Enormous Trade Potentials? *Acta Agriculturae Slovenica*. 3(8): 194-202. https://doi.org 10.31080/ASAG.2019.03.0586

Omoniyi, V.A. (2013). Policy implementation and rural poverty reduction in Nigeria: An analysis of the National Poverty Eradication Programme (NAPEP) in Ado-Odo Ota local government area, Ogun State. *1st Annual International Interdisciplinary Conference, AIIC*. 2013, pp: 24-26.

Onyenwoke, C.A. and Simonyan, K. J. (2014). Cassava post-harvest processing and storage in Nigeria: A review. *African Journal of Agricultural Research*. 9(53): 3853-3863. https://doi.org/10.5897/AJAR2013.8261

Orefi, A. (2012). Food Security in Nigeria and South Africa: Policies and challenges. *Journal of Human Ecology*, 38(1): 31-35.

Osuji, M.N. (2019). Determinants of poverty status of cassava-based farmers in Imo State, Nigeria. *Advances in Research,* 20(1): 1-8.

Pearson, T. (2015). Poverty: The Other Risk Factor for Diabetes and Its Complications. *AADE in Practice*, 3(2), 8-10. https://doi.org/10.1177/2325160315572597

Saediman, H., Aisa, S., Zani, M., Limi, M.A. and Yusria, W.O. (2019). Food security status of households in a cassava-growing village in Southeast Sulawesi, Indonesia. *Journal of Agricultural Extension,* 23(1): 199-209.

Saediman, H., Rosmawaty, M.A.L., Arimbawa, P. and Indarsyih, Y. (2016). Cassava consumption and food security status among cassava growing households in Southeast Sulawesi. *Pakistan Journal of Nutrition,* 15(12): 1008-1016.

Sayre R., Beeching J.R., Edgar B.C., Egesi C., and Claude F. *et al*. (2011). The Bio-Cassava Plus Program: Bio-fortification of Cassava for Sub-Saharan Africa. *Annu. Rev. Plant Biol*. 62:251–72. https://doi.org/0.1146/annurev-arplant-042110-103751.