

## ANALYSIS OF FOOD SECURITY STATUS OF COOPERATIVE AND NON-COOPERATIVE CASSAVA FARMING HOUSEHOLD: EVIDENCE FROM THE NIGER DELTA REGION, NIGERIA.

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### ABSTRACT

*The study investigated the food security status of cooperative and non-cooperative cassava farmers in the Niger Delta Region of Nigeria. The results revealed that 66.7% of the cooperative farming households were food secure, while 33.3% were food insecure. Also, 54.4% of the non-cooperative farming households were food insecure, while 45.6% were food secure. Farmers in cooperative societies were more food secured (mean equals 45687.9; SD = 102.8) than non-cooperative farmers (mean equals 1,4030.4; SD = 155.6). The mean difference of 31657.456 observed was statistically significant at 5% ( $t_{(178)} = 2.904$ ). Cassava production among cooperative farmers had a higher gross margin and recorded a greater percentage (93.57%) of farmers with profit as compared to 6.43% observed among the non-cooperative farmers. Similarly, the benefit-cost ratios for both categories of farmers were far more significant than 1, indicating that cassava farming was economically viable for both the cooperative (5.24) and non-cooperative (4.49) farmers. The study, therefore, recommended that more awareness should be created on the need for farmers to join cooperative societies to pull their resources together for more significant economies of scale to achieve food security. This will also enable them to have access to farm inputs and loan facilities from the Government and commercial banks. It would also encourage people to remain in rural communities while taking cassava production as their principal occupation.*

**Keywords:** Food security, Cooperative, Non-Cooperative, Cassava Farming Households, Niger Delta

### INTRODUCTION

Cassava (*Manihot esculenta*) farming is one of the livelihood activities of people in the Niger Delta region of Nigeria. Food and Safety Network (2014) attributes it to the fact that cassava (*Manihot esculenta*) happened to be the third most significant source of calories in the tropics after rice and maize. Its processed products contain an essential proportion of carbohydrate (mainly starch) and minerals (Guira, 2013) while it is cultivated both as food (for humans and animals) and as industrial raw material (Food and Agricultural Organization, F.A.O., 2012). With the low cost of production and improved varieties, cassava has a high potential to reduce poverty among the smallholder farm households in the Niger Delta

region, Nigeria, and contribute immensely to the country's Gross Domestic Product (G.D.P.) (Osun, Ogundipe and Bolariwa, 2014). The outcome has led to the internal demand for cassava products in the country. It has also generated billions of incomes both for families and Government as well as contributes a lot for food security at several levels during the food shortage period in some regions (Diacounba, 2008 and F.A.O., 2012). This continuous high demand for cassava could guarantee price stability and improved household income among smallholder cassava farmers (Cassava Action Plan, 2012).

However, despite the high demand for cassava and its products, studies have shown that the yield and the profit accruing to cassava farming among cooperative and non-cooperative farmers in Nigeria remained abysmally low (IITA, 2011; Ogunlege, Adeyemo, Bamire and Kehinde, 2017). The abysmal performance negates the vision of Nigeria to have physical and economic access to food continuously (Rahji and Fakayode, 2009). The concept of food security, therefore, ensures that all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preference for active and healthy life (Mohammed, 2003). The food security concept implies that for food security to exist at the national, regional, and local levels, it must be available, accessible, and adequately utilized. Food availability means that there enough, safe, and nutritious food is either domestically produced or imported from the international market. However, food availability does not ensure food accessibility. For food to be accessible, individuals or families must have sufficient purchasing power or ability to acquire quality food at all times while utilization demands sufficient quality and quantity of food intake (Omonona, Lawal and Oyinlana, 2007). These elements of availability, accessibility, and utilization in a broader context, embrace the supply, demand, and adequacy of food at all times (Omonona and Agoi, 2007). At this juncture, the concept of cooperative comes in to be able to access funds by the farmers for more massive cassava production; otherwise, it would result in food insecurity.

According to Mohammed (2003), food insecurity exists when there is physical unavailability of food, lack of social and economic access to adequate food, and inadequate food utilization. By this, food-

insecure households are households whose food intake falls below their minimum caloric (energy) requirements and those who exhibit physical symptoms caused by energy and nutrient deficiencies resulting from inadequate diets. Available evidence indicates that on almost every indicator such as deficit in calorie intake, export earnings, per capita income, and food imports, Nigerian exhibits a high level of insecurity (Akpan, 2009). The statement is supported by (Ojo and Adebajo, 2012), who confirm that Nigeria is one of the food-deficit countries in sub-Sahara Africa while Maziya-Dixton., Akinyele, Oguntona, Nokoe, Sanusi, and Harris (2004) assert that over forty percent of the household across all agro-ecological zones in Nigeria face the problem of severe food insecurity. Similarly, the United States Agency for International Development (USAID, 2000) identifies a range of important issues that lead to the food insecurity of households and individuals in developing countries. According to USAID (2000), the socio-economic characteristics and resources of an individual household are identified as essential factors influencing the food security status of households (USAID, 2000). Therefore, food security is determined by various factors such as income, education, age, availability of infrastructure, availability of extension services, government policies on trade, agricultural land area under cultivation, and a social safety net (Rose, Michalak, Pannunzio, Nicolas, Rambaldi and Butterworth, 2000; Mano and Urassa, 2003; Makombe, Mamara, Hagos, Awulachew, Ayana, Bossio, 2011). The Niger-Delta region has experienced series of unrest that has adversely affected the economy of the area resulting in unemployment and poverty rate in the post-conflict Niger-Delta (Ministry of Niger-Delta, 2011; Akpaeti and Umoh, 2012). This level of unemployment and poverty has made the majority of the agrarian communities who are resource-poor to look for financial freedom to escape the vicious circle of poverty due to frequent crises. To escape from poverty, apart from fishing that is an everyday livelihood in the riverine, some now engage in cassava (Obamuji, 2008; Akpaeti and Umoh, 2013). Food insecurity ranks topmost among the development problems facing Nigeria (Babatunde, Omotesho, and Sholotan, 2007). This is why attention has been focused on the means of eliminating food insecurity and hunger. Hence, the Millennium Development Goal (M.D.G.) agenda now Sustainable Development Goal (S.D.G.) to eradicate extreme hunger and poverty, becomes one of the goals of nations as an effort to reduce/eradicate food insecurity/crises. In the wake of this new push, the MDG/SDG was launched, bringing together the international communities to work together to achieve the set goals (Migotto, Davis, Carrietto and Kathleen, 2005), which is yet to be achieved. The bringing of communities to work together to achieve this set goal (S.D.G.) of food security cannot

be effective if the farmers do not come together to form cooperatives to complement government efforts. The Government have committed to spend up to 10% of the budget on Agriculture under the Comprehensive African Agricultural Development Programme (CAADP) agreement (Action Aid, 2014) and introduced the Nigeria Cassava Growers Association (NCGA), which is currently embarking on producing additional two million tons of cassava for industrial use (SUN NEWS, 2018). Several pieces of evidence have suggested that the majority of the world's food-insecure live and work in rural areas (Internal Fund for Agricultural Development, 2001). The evidence is an indication that reducing rural food insecurity is very important in reducing overall food insecurity. Pulling of resources in the form of cooperatives to produce more and diversified products where surplus can be marketed, thereby generating income to improve quality of life through improved diet and nutritious investment in productivity activity by farmers in this agrarian communities is key to poverty alleviation and food security. This may also serve as a means of collateral for credit to purchase input and other supplies to enhance agricultural and non-agricultural enterprises (F.A.O., 2016). Also, empirical information on the relationship between food security status of cooperative and non-cooperative as its affect agricultural production is scarced. Most information on this issue is, at best mere assertions. The import of the subject matter on individuals, households, organizations, regions, and the state may not be apparent to the stakeholders in the absence of empirically established and tested information. It is against this backdrop that this study seeks to assess the food security status among cooperative and non-cooperative cassava farming households in the Niger Delta Region of Nigeria. The study shall consider the following specific objectives, which are to (i) Ascertain the food security status of cooperative and non-cooperative in the study area, (ii) Determine the gross margin and cost-benefit ratio of cooperative and non-cooperative respondents in the study area.

## 2. RESEARCH METHODOLOGY

### 2.1 Area of Study

This study was carried out in the Niger Delta Region of Nigeria that is made up of nine states. Akwa Ibom State was selected to represent the region as a state that produces cassava predominantly. In the state, Etinan Agricultural Zone was selected for the data collection. The Agricultural Zone is made up of four (4) Local Government Areas, which includes: Nsit Ibom, NsitUbium, NsitAtai, and Etinan, which is the Headquarters. The area lies in a tropical rain forest belt and has two distinct seasons- the rainy and dry seasons. The vegetation is evergreen and has large deposits of mineral resources such as clay, glass,

sand, and sharp sand. Agricultural resources include; palm produce, cassava, and yam.

## 2.2 Sampling Procedures and Sample Size

The multi-stage sampling method was adopted in selecting the respondents for this study. The first stage was the selection of Akwa Ibom State from the Niger Delta Region; then we had the purposive selection of three (3) of the four (4) Local Government Area (L.G.A) in Etinan Agricultural zone that is known for their involvement in cooperative using the bureau of cooperative. The four (4) Local Government Area that made up Etinan Agricultural Zone were: Nsit Ibom, Nsit Ubium, Nsit Atai, and Etinan Local Government Area while the three (3) selected Local Government Areas were: Nsit Ibom, Nsit Ubium, and Etinan Local Government Area. The second stage was the selection of villages for in-depth study. Four (4) groups of villages were chosen from the three selected L.G.A.s to give twelve (12) villages. The first six (6) groups of villages were known cassava cooperative villages from the bureau of cooperative which are: Ikot Nan Nsit and Oboetuk in Nsit Ibom

L.G.A., Edem Idim Okpot and Ikot Edibon in Nsit Ubium L.G.A.; Ikot Ebiyak and Ikot Ebo in Etinan L.G.A. While the second group was a random selection of six (6) non-cassava cooperative Villages which were: Afaha Offiong and Edebom one in Nsit Ibom L.G.A, Ikot Imoh and Ekpene Ukim in Nsit Ubium L.G.A., Ikot Ibok/Ikot Nte and Etinan in Etinan L.G.A. The third stage was the random selection of fifteen (15) cassava farmers in each of the Twelve (12) villages. These gave a total sample size of One Hundred and Eighty (180) respondents.

## 2.3 Analytical Technique

The food security status of the respondents was analyzed using ratio analysis (food security index). The dependent variable of this study was the food security status of cooperative and non-cooperative cassava farming households in the Zone. The ratio analysis that was used is the food security index. This was used to categorize the sampled households into food secure and food insecure if it attains at least two-thirds of the average food expenditure of the sample household. Otherwise, the household was considered food insecure.

$$F1 = \frac{\text{Per capita food expenditure for the } i\text{th household}}{2/3 \text{ means per capita food expenditure of all household}}$$

Where F1 = Food security index

When:

$F1 \leq 1$  the household is considered food insecure

$F1 \geq 1$ , the household is considered food secure.

The gross margin and cost-benefit ratio of the respondents in cooperative and non-cooperative were analyzed using this formula:

Gross Margin Analysis was expressed as:

$$GM_{C,NC} = TR - TVC$$

Where GM = Gross Margin

T.R. =  $\sum PQ$

$\sum$  = Summation

PQ = Price of cassava sold x quantity of cassava sold

TR = Total Revenue

TVC = Total Variable Cost.

$GM_{C,NC}$

Where  $C$  = Cassava Cooperative and  $NC$  = Non-cassava Cooperative

While

Cost Benefit Ratio (B/C) = Total Benefit / Total Cost

## 3.0 RESULTS AND DISCUSSION

### 3.1: Food Security Status of Cooperative and Non-Cooperative Farmers.

Farming households in the study area are profiled into food secured and food insecure groups based on their per capita food expenditure. The food security status is defined as two-third of the mean per capita food expenditure of the total households studied and is determined using the food security index (Omonona and Agoi, 2007)b. The food security status shown in Table 3.1 reveals that households whose per capita food expenditure fall below

₦23,925 for cooperative farmers and ₦9,354 for non-cooperative farmers are designated food insecure while households whose per capita food expenditure equal or is more significant than ₦23, 925 for cooperative farmers and ₦9, 354 for non-cooperative farmers are tagged food secured. It is observed that 66.7% of the cooperative farming households are food secured, while 33.3% are food insecure. 54.4% of the non-cooperative farming households are food insecure, while 45.6% are food secured. In other words, based on the headcount ratio, 67% have their per capita food expenditure equal or above ₦23, 925,

while 33% have their per capita food expenditure below ₦23,925 among the cooperative farmers. 46% have their per capita food expenditure equals or above ₦9,354, while 54% had their per capita food expenditure below ₦9,354 among the non-cooperative farmers. This result supports previous works on food security in Akwa Ibom State by Achibong (2015), which opines that most farming households in Akwa Ibom State are food secured and that the cooperative farmers are more secured than the non-cooperative farmers. T-test analysis of the

difference between the food security status of cooperative and non-cooperative cassava farming household carried out indicates that there is a significant difference in food security status between cooperative and non-cooperative cassava farming household since the calculated t-value (2.90) is greater than the critical t-value (1.9) at 0.05 level of significance. This result confirms that the food security status of farmers in the study area is a critical issue and must be taken seriously.

**Table 3.1: Food Security Status in the Study Area**

Food security status	Cooperative farmers		Total	Non-cooperative farmers		Total
	Food Secured	Food Insecure		Food secured	Food Insecure	
2/3 Mean per capita food expenditure	₦23,925			₦9,354		
Percentage of households	66.7	33.3	<b>100</b>	45.6	54.4	<b>100</b>
Number of households	60	30	<b>90</b>	41	49	<b>90</b>
Headcount ratio (H)	0.67	0.33		0.46	0.54	

**Source:** Computed from Field Survey, 2018.

$t_{cal} = 2.904$ ;  $t_{tab} = 1.9$

### 3.2: Costs and Benefits of Cassava Farmers in the Study Area

Findings in Table 3.2 reveal that cost of fertilizer constituted the highest variable cost representing 74.04%, 42.67%, and 71.63% respectively for cooperative, non-cooperative, and the pooled farmers. This is followed by the cost of hired labor, which constituted 8.90%, 16.58%, and 9.49%, respectively, for the three categories of farmers. The cost of water is found to be the least variable cost constituting 0.66%, 0.43%, and 0.64% for cooperative, non-cooperative, and the pooled farmers. This is followed by the cost of transportation, representing 1.08%, 8.16%, and 1.63% of the total variable cost for cooperative, non-cooperative, and pooled farmers. The Table also shows that the total variable cost of ₦17,428,800 is obtained by the cooperative. ₦1,453,480 for non-cooperative and ₦18,882,280 for the pooled farmers in the study area. Total returns of ₦91,325,245, ₦6,529,900, and ₦97,855,145 are earned by the cooperative, non-cooperative, and the pooled farmers, respectively, within the farming season of 2017. This gives an average return of ₦1,014,724 per cooperative farmer, ₦72,554 per non-cooperative farmer, and ₦543,639 per pooled farmers, respectively. This result reveals a high relative increase in income of the cooperative farmers far beyond that of the non-cooperative farmers and even the pooled farmers.

The gross margin for Cooperative, Non-cooperative, and the pooled farmers are ₦73,896,445, ₦5,076,420, and ₦97,855,145, respectively, while

the benefit-cost ratio for the three categories of farmers is 5.24, 4.49, and 5.18 respectively. This implies that cassava production among cooperative farmers has a higher gross margin and contributes a more significant percentage (93.57%) to the farm profit as opposed to only 6.43% of the non-cooperative except for pooled farmers' contribution of 100%, which the combination of both cooperative and non-cooperative farmers. Similarly, the undiscounted benefit-cost ratios for both categories and even the pooled of farmers are far greater than one (1), indicating that cassava farming is economically viable for both the cooperative (5.24), non-cooperative (4.49), and pooled (5.18) farmers. However, the higher benefit-cost ratio value observed among the cooperatives implies that cassava production by cooperative farmers are more efficient and contributed more to the growth of both the farmers and the society at large. This also guarantees more income to the cooperative farmers leading to an increase in their purchasing power, hence making them more food secure.

Results from the independent t-test conducted on the gross margin of the cooperative cassava farmers and non-cooperative farmers reveal that there is a statistically significant difference in the gross margin of cooperative farmers from that of the non-cooperative farmers since the t calculated of 13.3 is greater than the tabulated t which is equal to 1.97;  $t_{(178)}$  at 5% level of significance. This finding corroborates the findings of Ogunleye, Adeyemo, Bamire, and Kehinde (2017), which reports that members of government-assisted farmers' associations have better access to credit compared to

their counterparts who are not members of government-assisted farmers' associations. They also report that average yield and farm revenue are higher among cassava farmers that are members of

government-assisted farmers' associations and significantly different from those who are non-members.

**Table 3.2: Costs and Benefits of Cassava Farmers in the Study Area**

Variable Cost Items	Cooperative Farmers		Non-cooperative Farmers		Pooled	
	Cost (₦)	(%)	Cost (₦)	(%)	Cost (₦)	(%)
Land preparation	557,500	3.20	112,500	7.74	670,000	3.55
Hired Labour	1,551,000	8.90	241,000	16.58	1,792,000	9.49
Planting Material	567,100	3.25	95,730	6.59	662,830	3.51
Family labour	551,900	3.17	38,750	2.66	590,650	3.13
Water	114,600	0.66	6,250	0.429	120,850	0.64
Fertilizer/Manure	12,905,000	74.04	620,250	42.67	13,525,250	71.63
Insecticide/Pesticides	419,700	2.41	72,100	4.95	491,800	2.60
Transportation	188,500	1.08	118,600	8.2	307,100	1.63
Contingences	573,500	3.29	148,300	10.20	721,800	3.82
<b>Total Variable Cost (TVC)</b>	<b>17,428,800</b>	<b>100.0</b>	<b>1,453,480</b>	<b>100.0</b>	<b>18,882,280</b>	<b>100.0</b>
<b>Total Revenue (TR)</b>	<b>91,325,245</b>		<b>6,529,900</b>		<b>97,855,145</b>	
<b>Gross margin (TR -TVC)</b>	<b>73,896,445</b>		<b>5,076,420</b>		<b>78,972,865</b>	
<b>%Contribution of Gross Margin</b>	<b>93.57</b>		<b>6.43</b>		<b>100</b>	
<b>Benefit-Cost ratio (Undiscounted)</b>	<b>5.24</b>		<b>4.49</b>		<b>5.18</b>	

Source: Computed from Field Survey, 2018.

$t_{cal} = 13.3$ ;  $t_{tab} = 1.97$

## CONCLUSION AND RECOMMENDATIONS

The study investigated the food security status of cooperative and non-cooperative cassava farmers in the Niger Delta Region of Nigeria. The results reveal that for cooperative farming households, 66.7% are food secured, while 33.3.8% are food insecure. For non-cooperative farming households, 54.4% are food insecure, while 45.6% are food secure. These results imply that farmers in cooperative societies are more food secured (mean equals 45,687.9; SD = 102.8) than non-cooperative farmers (mean equals 14,030.4; SD = 155.6). The mean difference of 31, 657.456 observed is statistically significant at 5% ( $P < 0.05$ ). Cassava production among cooperative farmers has a higher gross margin and contributed a greater percentage (93.57%) to the farm profit as opposed to only 6.43% and 81.41% contributions observed in the non-cooperative and pooled farmers, respectively.

Similarly, the undiscounted benefit-cost ratios for both categories of farmers are far greater than one (1), indicating that cassava farming is economically viable for both the cooperative (5.24) and non-cooperative (4.49) and pooled (5.38) farmers. However, the higher benefit-cost ratio value observed among the cooperatives implies that cassava production by cooperative farmers are more efficient and contributed more to the growth of both the farmers and the society at large. This also guarantees more income to the cooperative farmers leading to an increase in their purchasing power,

hence making them more food secure. It is therefore recommended that advocacy and awareness should be created on the need for farmers to join cooperative societies to pull their resources together for more significant economies of scale to achieve food security. This will also enable them to have access to farm inputs and loan facilities from the Government and commercial banks because of their large size.

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