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ECONOMIC ANALYSIS OF CASSAVA PRODUCTION IN OTUKPO LOCAL GOVERNMENT AREA OF BENUE STATE, NIGERIA

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Abstract:

Cassava is a vital staple crop and a major source of income for rural farmers in Nigeria. This study Analyzes the Economics of Cassava Production in Otukpo Local Government Area of Benue State, Nigeria. The research aimed to describe the socioeconomic characteristics of cassava farmers, estimated the profitability of cassava production, determined the factors influencing production, and identified constraints faced by farmers in the study area.A structured questionnaire was used to collect data from cassava farmers, and descriptive statistics, gross margin, and regression were employed for data analysis. The findings revealed that most cassava farmers in the study area are middle-aged with mean age of 40years, with all respondents having one form of formal education or the other, also (48.3%) had 3-5 household size of persons, and majority (63.3%) had 1-5years of farming experience,80.8% respondents cultivate 0.5 hectares of farm size, 56.3% are male and 67.5%married, 62.5% had contact with extension agents, 99.2% took farming as primary occupations, 60.0% hadaccess to loan, 57.5% got their source of land from family and used personal savings (85.%).The average revenue from cassava production was ₦294,889 leading to an averagegross margin (GM) of ₦198,310 when average variable cost was subtracted from average revenue. The Return per Naira Invested (RNI), calculated as GM/TC, was 2.1, indicating that for every naira invested in cassava production, farmers earned ₦2.10. The multiple regression analysis demonstrated exceptional explanatory power with an R-squared value of 0.9938 and an adjusted R-squared of 0.9931, indicating that the selected variables explain nearly all variation in cassava profitability. From the findings of this study, the following recommendations were drawn, high cost of farm inputs affects profitability, the government should help implement subsidy programs that make these inputs more affordable and accessible to farmers.

Keywords:

Cassava, Production, Profitability, Constraints

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INTRODUCTION

Cassava (*Manihot esculenta*), a major staple crop in Nigeria and across many tropical regions, plays a pivotal role in food security, poverty alleviation, and income generation. Known for its resilience and adaptability, cassava thrives in diverse agro-ecological zones and remains a primary source of carbohydrates for millions of people in Africa, Asia, and Latin America (Chima & Rahman, 2017). Nigeria is the world's leading producer of cassava, accounting for approximately 20% of global output. The crop is essential in the Nigerian diet, being processed into various local products such as garri, fufu, tapioca, and starch. Cassava also supports rural livelihoods and serves as raw material for livestock feed and industrial applications, including bioethanol and pharmaceuticals (Omotayo & Oladejo, 2016; Ani et al., 2019).

In Benue State, Nigeria's "Food Basket of the Nation," agriculture dominates the local economy, and cassava cultivation remains a key activity. Otukpo Local Government Area (LGA), located in the southern part of the state, has favorable agro-climatic conditions, including loamy soil, tropical climate, and reliable rainfall, which make it ideal for cassava production (Tokula et al., 2020). Agriculture employs over 70% of Otukpo's population, with smallholder farmers cultivating cassava alongside other crops like yam, maize, and rice. The crop contributes significantly to household nutrition and income, serving both subsistence and commercial purposes. Over the years, improved varieties and agronomic practices have enabled farmers to increase yields and enhance profitability (Oyekola et al., 2021).

Despite its importance, cassava production in Otukpo is constrained by a number of socio-economic and structural challenges. These include limited access to credit facilities, inadequate land tenure security, poor rural infrastructure, and inefficient market systems. Most smallholder farmers in Otukpo rely on traditional farming techniques and are often unable to acquire quality inputs due to financial constraints. Furthermore, land acquisition is predominantly based on inheritance and communal ownership, restricting farm expansion and discouraging long-term investment (Yuguda et al., 2020). Market access is also hampered by poor transportation infrastructure and the influence of middlemen, resulting in lower farm-gate prices and reduced incentives for farmers (Onyemma et al., 2019).

Between 2010 and 2023, global cassava production increased by 29%, reaching 310 million metric tons, while Nigeria's output rose by 58% during the same period—from 40 million metric tons in 2010 to 63 million metric tons in 2023 (FAO, 2022; NBS, 2021). Despite this national growth, small-scale cassava farmers in Otukpo continue to face difficulties in

expanding production and improving profitability. This situation is exacerbated by weak access to agricultural credit, high input costs, and inefficient extension service delivery, all of which limit productivity.

In light of these challenges, it is pertinent to examine the economic viability of cassava farming in Otukpo and assess the socio-economic factors influencing production. This study, therefore, seeks to describe the socio-economic characteristics of cassava farmers, determine the profitability of cassava farming, identify key socio-economic drivers of output, and examine the major constraints affecting farmers in the area. The findings are expected to inform policy actions and agricultural interventions aimed at improving cassava productivity, profitability, and sustainable livelihoods in Otukpo and similar agrarian communities across Nigeria.

METHODOLOGY

Study Area

The study was conducted in Otukpo Local Government Area of Benue State, Nigeria—a prominent cassava-producing region in the country's Middle Belt. Geographically situated between latitudes 7°12'N and longitude 8°08'E, Otukpo has a rural population of approximately 384,600 (Tokula et al., 2020). The region experiences a tropical climate with annual rainfall ranging from 1,200 mm to 1,500 mm and temperatures between 25°C and 32°C, conditions that are ideal for cassava cultivation (Ani et al., 2019). The area features savannah vegetation and predominantly loamy soils which are well-suited for root crops. The Idoma ethnic group constitutes the majority of the population, and traditional land tenure systems prevail, where land is acquired through inheritance or communal arrangements (Ajayi et al., 2016). Farming is largely small-scale, with increasing adoption of improved agricultural practices.

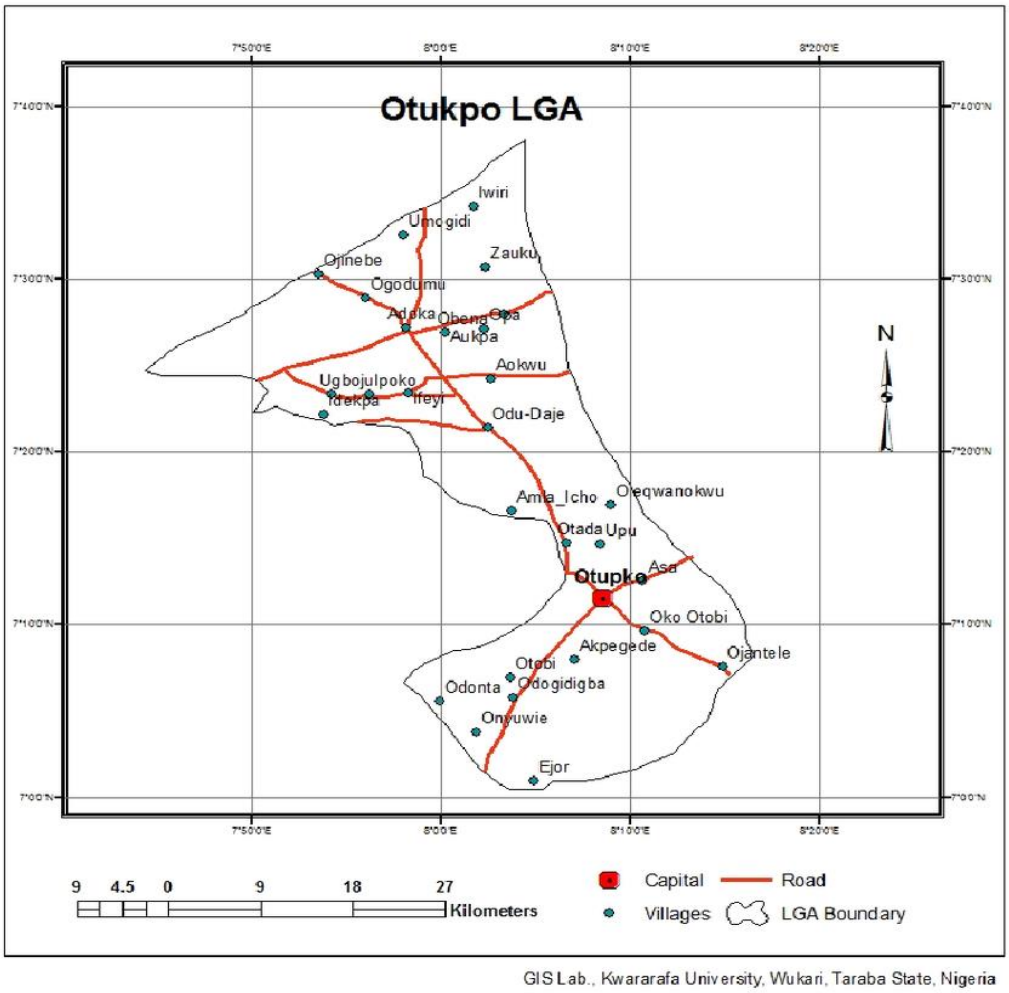


Figure 3: Map of Otukpo LGA Showing the Study Area. Source: GIS Lab Kwararafa University, Taraba State, Nigeria

Data Sources and Collection Methods

Primary data were collected through the administration of structured questionnaires to cassava farmers. The instrument gathered information on socio-economic characteristics, production inputs and outputs, revenue, and constraints associated with cassava farming in the study area.

Sampling Procedure

A multi-stage sampling technique was used to select respondents. In the first stage, five wards were randomly selected from the 13 existing political wards in Otukpo LGA. In the second stage, two villages were chosen from each of the five wards. Finally, in the third

stage, 12 cassava farmers were randomly selected from each of the 10 villages, yielding a total sample size of 120 respondents. The sampling distribution is presented below:

Analytical Techniques

A combination of analytical methods was employed to achieve the study objectives:

- **Descriptive Statistics**
- **Profitability Analysis**
    - **Gross Margin (GM)** = Total Revenue (TR) – Total Variable Cost (TVC)
    - **Net Farm Income (NFI)** = Total Revenue (TR) – Total Cost (TC), where TC = TVC + Total Fixed Cost (TFC)
- **Multiple Regression Analysis** using the following model:

$$Y=\beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5+\beta_6X_6+\beta_7X_7+\beta_8X_8+\beta_9X_9+\beta_{10}X_{10}+\beta_{11}X_{11}+\varepsilon$$

Where:

Y= Output (Kg)
X_1 = Land clearing cost (₦)
X_2 = Stem cost (₦)
X_3 = Transportation cost (₦)
X_4 = Age (years)
X_5 = Farming experience (years)
X_6 = Source of capital (₦)
X_7 = Ridging cost (₦)
X_8 = Fertilizer cost (₦)
X_9 = Herbicide cost (₦)
X_{10} = Gender (binary)
X_{11} = Total revenue (₦)
ε = error term
β_0 = constant
β_1 -β_{10}= Regression coefficients

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

The study revealed key socio-economic characteristics influencing productionshown in Table 1. The majority of farmers were middle-aged (mean age: 39.8 years), with 56.7% between 31–40 years old, indicating a productive workforce. Males dominated (56.3%), and most were married (67.5%), relying on family labor (average household size: 3–5 persons). Education levels were relatively high, with 70% having secondary education, though only 2.5% attained tertiary education. Land access primarily came through family inheritance (57.5%), while farming experience was limited, with 63.3% having just 1–5 years in cassava cultivation. Notably, 99.2% depended on cassava farming as their primary occupation, yet most (85%) relied on personal savings rather than formal credit (4.2%), and only 62.5% had contact with extension services, highlighting gaps in institutional support.

These findings underscore systemic challenges in Otukpo's cassava sector. The reliance on personal savings and inherited land, coupled with limited access to credit and extension services, constrains productivity and technological adoption. The predominance of smallholder farmers with moderate experience suggests a need for targeted interventions, such as expanded rural credit programs, enhanced extension outreach, and land tenure reforms to improve scalability.

Table 1: Socio-Economic Characteristics of Cassava Farmers

Variables	Frequency	Percentage
Age		
25- 30	05	4.2
31-40	68	56.7
41-50	43	35.8
51-60	04	3.3
Household Size		
1-2	08	6.7
3-5	58	48.3
6-8	45	37.5
9 -14	09	7.5
Years of Experience in production		
1-5	76	63.3
6-10	40	33.3
11-15	03	2.5
16-20	01	0.8
Farm Size devoted to cassava production. (ha)		

0.2	13	10.8
0.5	97	80.8
1	10	8.3
Sex		
Male	67	56.3
Female	53	43.7
Marital Status		
Single	29	24.2
Married	81	67.5
Divorced	01	0.8
Widowed	09	7.5
Contact with Extension Agents		
Having contact	75	62.5
No contact	48	37.5
Level of Education		
Primary school	33	27.5
Secondary school	84	70.0
Tertiary	03	2.5
Primary Occupation		
Farming	119	99.2
Civil service	01	0.8
Access to Credit/ loan		
Access	72	60.0
No Access	48	40.0
Source of Land		
Family	69	57.5
Hired	51	42.5
Source of Capital		
Personal Savings	102	85.0

Agric./Commercial Banks	05	4.2
Cooperatives/Thrift	07	5.8
Family & Friends	06	5.0

Source: Field Survey, 2025

Factors Affecting Cassava Farmers

The results of the factors affecting cassava farmers in the area showed, Farm size (X_1) had a positive and significant ($p< 0.05$) effect on the yield of cassava. The bigger the size of a farm, the more the yield of cassava that will be produced in the study area. Farming experience (X_2) had a positive and strong significant ($p< 0.01$) effect on the yield of cassava. The more experienced the farmer, the higher the yield of cassava produced.Fertilizer use (X_3) had a negative and significant ($p< 0.05$) effect on the yield of cassava. This implies that increased expenditure on fertilizer does not necessarily increase cassava yield in the study area, possibly due to improper application methods. Transportation cost (X_4) had a negative significant ($p< 0.05$) influence on cassava farmers' yield. Higher transportation costs reduce the profitability of cassava farming.Gender (X_5) had a positive and significant ($p< 0.05$) effect on the output of cassava from the result. Male farmers had higher yields compared to female farmers, possibly due to greater access to resources. The estimated R-squared shows that the independent variables explain 99% of variations in the total output of cassava.

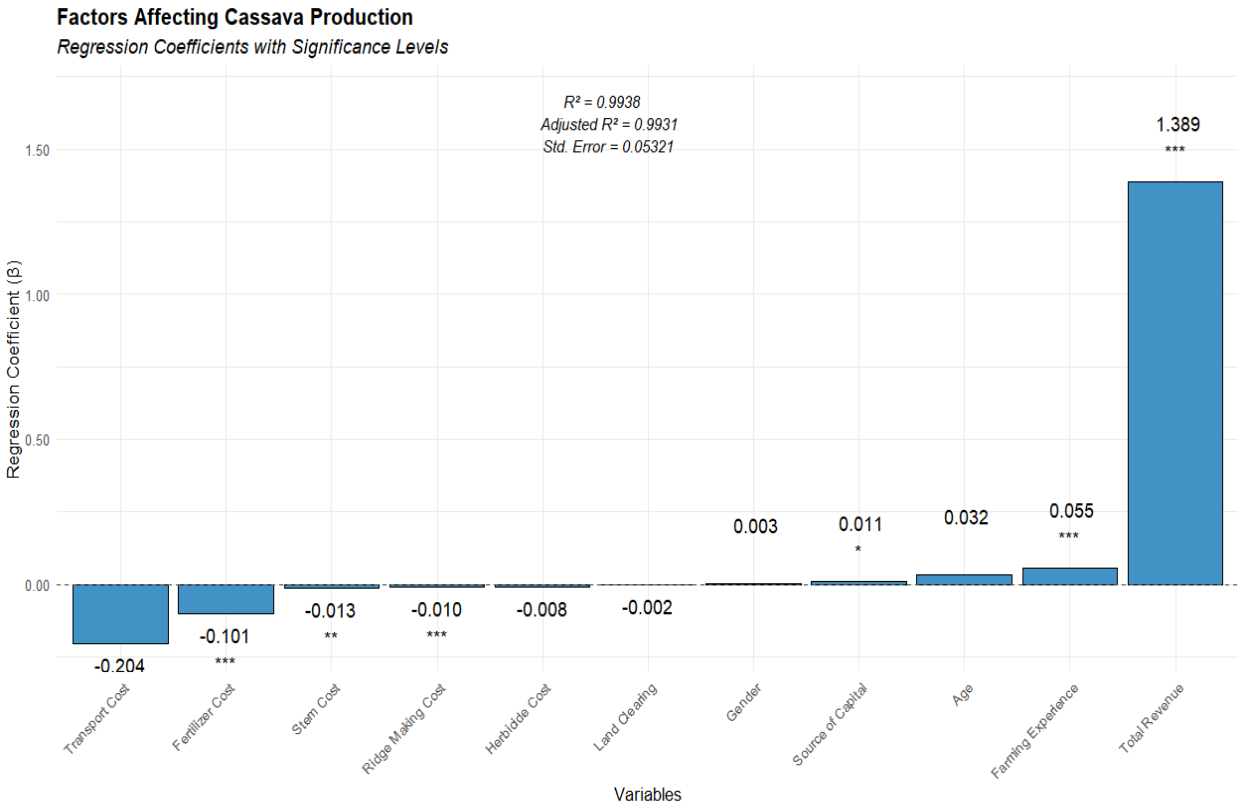
Table 2. Multiple Regression Results for Factors Affecting Cassava Production

Variable	Coefficient (β)	Std. Error	t-value	p-value
(Intercept)	-2.184307	0.210115	-10.396	< 2e-16***
Land Clearing	-0.001597	0.003067	-0.521	0.60361
Stem Cost	-0.013200	0.005225	-2.526	0.01301**
Ridge making Cost	-0.010347	0.003811	-2.715	0.00774***
Fertilizer Cost	-0.101458	0.013617	-7.451	2.62e-11***
Herbicide Cost	-0.008140	0.005862	-1.389	0.16783
Transport Cost	-0.203890	0.030990	-6.579	1.85e-09***
Age	0.032084	0.040160	0.799	0.42614
Farming Experience(years)	0.054945	0.011651	4.716	7.37e-06***
Source of Capital	0.011356	0.006766	1.678	0.09622

Variable	Coefficient (β)	Std. Error	t-value	p-value
Gender	0.002728	0.012204	0.224	0.82353
TotalRevenue	1.389199	0.026474	52.474	< 2e-16***
R Square	0.9938			
Adjusted R Square	0.9931			
Std. Error of the Estimate	0.05321			

Source: Field Survey, 2025

Key: ***Significant at 1% **Significant at 5% *Significant at 10%



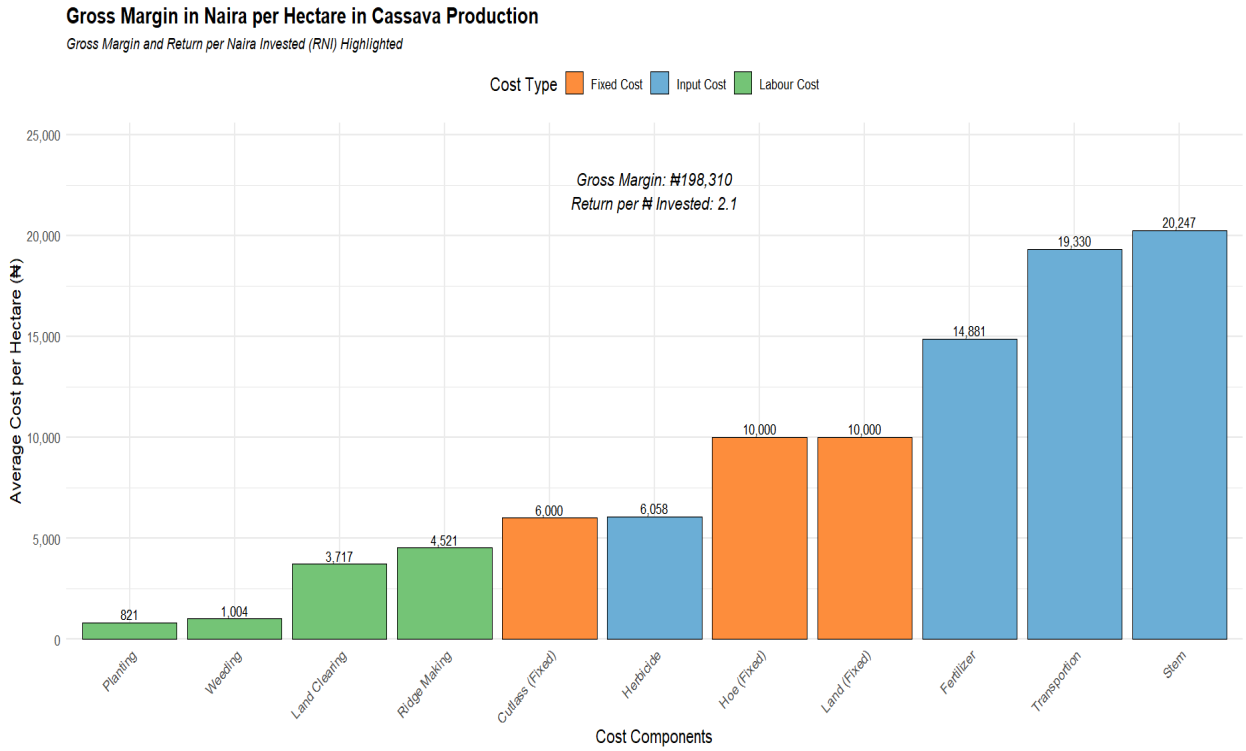
Profitability of Cassava Production

Table 3 shows the result of profitability of cassava production. The result shows that the total variable cost per hectare by cassava farmers was ₦96,579.00 and the total revenue was ₦294,889.00, Thus, the gross margin obtained was ₦198,310.00 per hectare. It can therefore be concluded that cassava production in Otukpo Local Government Area of Benue State is profitable. This result is in agreement with the result reported by Ogunniyi and Omonona (2019) in their study of cassava production in Kwara State, Nigeria.

Table 3: Gross Margin in Naira per Hectare for Cassava Production

Variable cost	**Cost (₦)**	**Average (₦)**
Input Costs		
Stem	2,429,700	20,247
Fertilizer	1,785,700	14,881
Herbicide	727,000	6,058
Transportion	2,319,550	19,330
Labour - Hired & Family (man/days)		
Land clearing	446,000	3,717
Ridge making	542,500	4,521
Planting	98,500	821
Weeding	120,500	1,004
Fixed Cost		
Land	1,200,000	10,000
Cutlass	720,000	6000
Hoe	1,200,000	10,000
Total Cost (TC)	**11,589,450**	**96,579**
Total Revenue (TR)	**35,386,700**	**294,889**
Gross Margin (GM = TR - TVC)	35386700 – 11589450 **= 23,797,250**	294889 – 96,579 **= 198,310**
Return per Naira Invested (RNI = GM/TC)	RNI = GM/TC 23797250 /11589450 **= 2.1**	RNI = 2.1

Source: Field Survey, 2025



Constraints Associated with Cassava Production in the Study Area

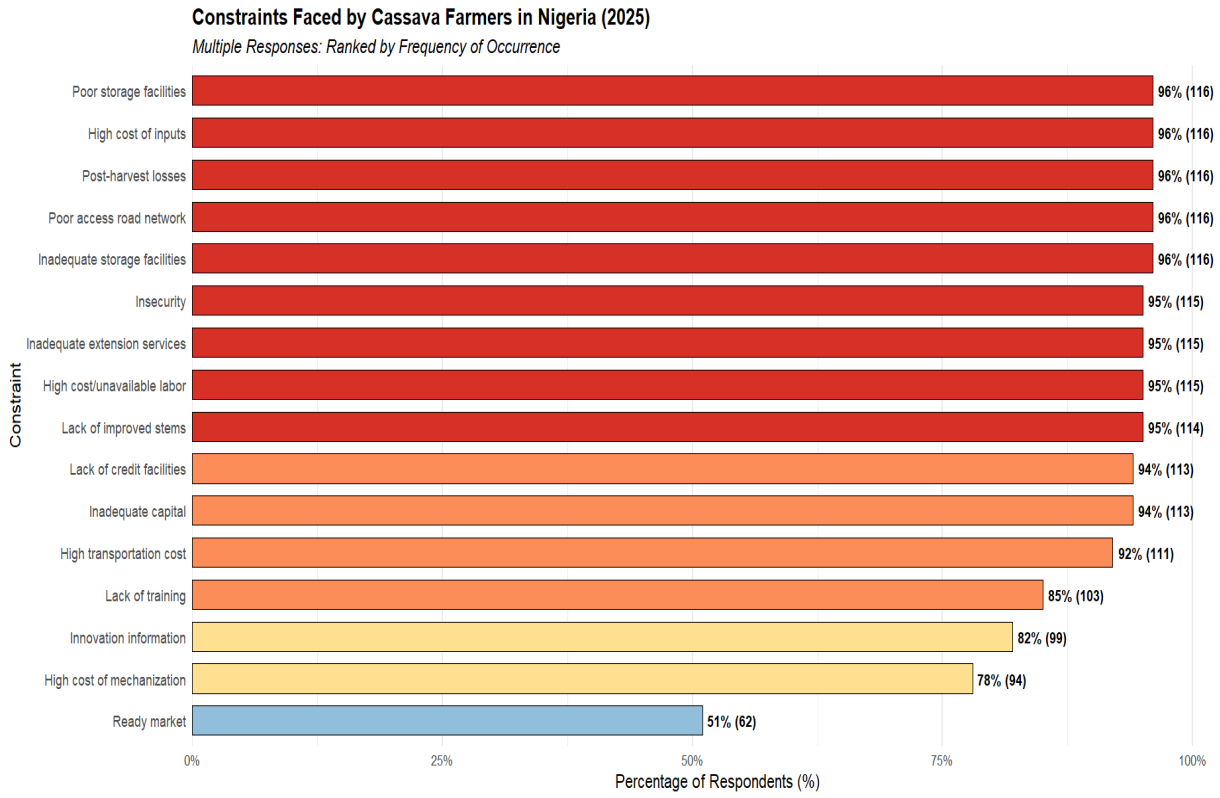
Table 3 presents constraints faced by cassame farmers in the study area in order of ranking. High cost of inputs, Poor storage facilities, Inadequate extension services, and High transportation costs were the severe constraints faced by farmers in cassava production in the study area. The result obtained is similar to that of FAO (2022) who reported that majority of cassava farmers in sub-Saharan Africa face similar challenges. Insufficient labor and Poor road infrastructure were ranked lowest among the constraints faced by farmers.

Table 3: Constraints Faced by Cassava Farmers

Constraints	Frequency*	%	Rank
Poor storage facilities	116	96	1st
High cost of inputs	116	96	1st
Post-harvest losses	116	96	1st
Poor access road network	116	96	1st
Inadequate storage facilities	116	96	1st
Insecurity	115	95	2nd

Inadequate extension services	115	95	2nd
High cost/unavailable labor	115	95	2nd
Lack of improved stems	114	95	3rd
Lack of credit facilities	113	94	4th
Inadequate capital	113	94	4th
High transportation cost	111	92	5th
Lack of training	103	85	6th
Innovation information	99	82	7th
High cost of mechanization	94	78	8th
Ready market	62	51	9th
Multiple Response *			

Source: Author's compilation



Conclusion

Based on the findings of the study, it can be concluded that although cassava production is profitable, farmers can still have the potential to increase their overall efficiency to maximize yield and profit in Otukpo local government area of Benue State Nigeria. Farm size, farming

experience, fertilizer use, transport costs and gender as factors affecting them in producing cassava. Constraints that are top on the list are high input costs, poor storage facilities and inadequate extension services affecting the production of cassava.

Recommendation

Based on the findings of the study, policy recommendations are that:

- Government should subsidize the cost of farm inputs to make them more affordable to farmers
- Storage facilities should be provided to reduce post-harvest losses
- More extension workers should be employed to educate farmers on improved production techniques
- Road infrastructure should be improved to reduce transportation costs

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