



EVALUATION OF COSTS AND RETURNS OF CASSAVA PRODUCTION IN EMOHUA LOCAL GOVERNMENT AREA, RIVERS STATE

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Abstract

This study Evaluates the costs and returns of cassava production in Emohua Local Government Area of Rivers state, Nigeria. Despite Nigeria's status as the largest producer globally, limited studies have assessed its economic performance in specific areas such as Emohua Local Government Area (LGA), Rivers State. This study examined the socio-economic characteristics of cassava farmers, production costs, profitability, and constraints. A total of 104 farmers were selected using a multi-stage sampling procedure, and data were collected through structured questionnaires and interview scheduled. Analytical tools employed included descriptive statistics, costs and returns analysis and gross margin analysis. Results showed that cassava farmers were mostly male (73.1%), middle-aged, moderately educated, and experienced, with an average of 12-4 years in cassava farming. The average farm size was 3.08 hectares and mean household size 6 persons. Labour was identified as the largest cost component, making cassava production highly labor-intensive. Profitability analysis showed an average gross margin of ₦178,073.20 per hectare and a benefit–cost ratio of 2.03, indicating economic viability, though profitability varied across farmers. The enterprise was found to be profitable, with a total revenue of ₦27, 643,000, total cost of ₦9,123,387 and a total Gross Margin of ₦18,519,613 production cycle. Major challenges included high labour and input costs, pest and disease pressure, poor access to credit, weak extension services, and post-harvest losses. The study concludes that cassava farming in Emohua LGA is profitable but constrained, and recommends credit access, subsidized inputs, extension support, construction of infrastructure.

Keywords: costs, returns, cassava, cassava production.

1.0 Introduction

Agriculture remains the backbone of Nigeria's rural economy, contributing substantially to food security, employment generation, and income for millions of Nigerians. One of the most economically and nutritionally significant crops in the Nigerian agricultural sector is cassava (*Manihot esculenta*), which has become a vital staple for both rural and urban households. The crop plays a dual role: it serves as a food security buffer for millions and also as a source of household income, particularly among smallholder farmers. Despite its potential, there has been limited evaluation of cost and returns of cassava production across specific local contexts such as Emohua Local Government Area (LGA) in Rivers State. Nigeria holds the position of the world's largest producer of cassava, accounting for an estimated 59.19 million metric tonnes annually, according to the Food and Agriculture Organization (FAO, 2021). Cassava is cultivated



in nearly all states of the federation due to its adaptability to various soil types and climatic conditions, its tolerance to drought, and its ability to produce reasonable yields even under minimal input. Its diverse derivative products ranging from garri and fufu to flour and starch further underscore its importance. In many rural communities, cassava serves not just as a food crop but also as an economic buffer in times of financial strain (FAO, 2021).

Emohua LGA in Rivers State is one of the agrarian communities where cassava production is practiced extensively by rural farming households. The area is blessed with favorable agro-ecological conditions such as fertile land, adequate rainfall, and a conducive climate, all of which support cassava cultivation. A large proportion of the population in Emohua engages in cassava farming either as a primary or supplementary livelihood activity. However, despite the scale of cassava cultivation in this area, there is limited empirical data on its economic performance. Specifically, the cost structure, revenue potential, profitability, and key production constraints faced by farmers.

Traditionally, cassava farming in Emohua is carried out on small plots using basic tools such as hoes and cutlasses. Mechanization is almost non-existent, and many farmers continue to rely on traditional methods for land preparation, planting, weeding, and harvesting. These low-input, labor-intensive systems, while culturally entrenched, are often associated with low yields and inefficiencies that undermine profitability. The average farm size remains small, typically less than two hectares, and farmers rarely adopt improved technologies or high-yielding varieties due to financial constraints, lack of extension services, or inadequate awareness.

Another major concern is the cost of production. While cassava is generally regarded as a low-input crop, farmers still incur significant costs related to land clearing, planting materials, labor, weeding, and harvesting. Labor costs, in particular, form a major part of total production costs, especially in the absence of family labor or community-based work groups. Fertilizers and herbicides, though often used sparingly due to cost, also contribute to the total production expenditure. An understanding of these cost elements is essential for estimating the profitability of cassava production and guiding investment decisions, especially for government programs and development agencies that aim to boost agricultural productivity (FAO, 2021).

Profitability remains a central concern for farmers in Emohua. Although cassava has a ready market and strong consumer demand for its products such as garri and fufu, the margin between production cost and revenue is often slim. This is partly due to unstable market prices, lack of price control mechanisms, and the perishable nature of cassava roots, which compels farmers to sell quickly often at suboptimal prices. Furthermore, because farmers have little or no access to storage or preservation technologies, post-harvest losses are high, further reducing potential earnings.

In addition, socio-economic characteristics of cassava farmers such as age, education level, household size, gender, access to credit, and land tenure status have significant implications for production outcomes. Older farmers, for instance, may lack the physical strength for intensive labor or may be more risk-averse in adopting new practices. Limited education also hampers record-keeping, financial planning, and the adoption of modern production methods. Women, although actively involved in cassava farming and processing, often face gender-based constraints such as limited access to land, credit, and decision-making power, all of which limit their productivity and economic returns (FAO, 2021).



Infrastructure deficits pose another critical challenge. Inadequate feeder roads and poor rural transportation networks result in high transport costs and market inaccessibility, which collectively lower net revenue. The absence of reliable rural infrastructure also affects access to agricultural extension services, which are vital for disseminating best practices in planting, pest control, and soil fertility management. Where extension agents are available, their coverage is often inadequate, with one agent serving hundreds of farmers across several communities. This reduces the effectiveness of the services and leaves most farmers to rely on indigenous knowledge or peer learning.

Climate-related factors have also started impacting cassava farming in Emohua. Although cassava is considered drought-tolerant, erratic rainfall patterns and occasional flooding can delay planting or destroy fields. These environmental uncertainties add a layer of risk that must be factored into any comprehensive economic analysis. Soil fertility decline due to continuous cropping and lack of soil amendments also contributes to declining yields, thereby affecting the economic viability of cassava cultivation over time (FAO, 2021).

It is evident from the foregoing that while cassava has the potential to uplift rural economies, particularly in Emohua LGA, a deeper understanding of its economic dimensions is essential. This includes not only the physical output but the actual cost structure, net profits, and the socio-economic and environmental factors that influence farming performance. Previous studies on cassava in Nigeria have largely focused on production volumes, improved varieties, and post-harvest processing. However, very few have provided localized economic assessments that can inform specific policy or extension strategies targeted at smallholder cassava farmers in rural areas like Emohua (FAO, 2021).

Given these challenges and opportunities, this study aims to undertake a detailed economic evaluation of cassava production in Emohua Local Government Area, Rivers State. It will assess the socio-economic characteristics of cassava farmers, estimate production costs and returns, evaluate profitability, and identify key constraints affecting cassava farming in the area. The outcome of the study is expected to provide evidence-based insights that can guide agricultural policy interventions, extension service design, and support systems to enhance cassava production and farmer livelihoods in Emohua and similar contexts across the country.

2.0 Methodology

The study was conducted in Emohua Local Government Area (LGA) of Rivers State, Nigeria located between latitude 4°51'N and 5°08'N and longitude 6°33'E and 6°57'E, Emohua LGA is one of the 23 LGAs in Rivers State. The LGA shares boundaries with Ikwerre LGA to the north, Ahoada East LGA to the west, Asari-Toru LGA to the south, and Obio/Akpor LGA to the east., known for its agrarian economy and significant cassava production activities. The area experiences a tropical monsoon climate with annual rainfall averaging between 2,300mm to 2,700mm, with peak precipitation occurring between June and September. The area is characterized by fertile soil and a favorable climate, which supports the cultivation of various crops, including cassava, yam, maize, and vegetables. The predominant languages spoken in the area are Ikwerre (a dialect of Igbo) and English, Farming is the predominant occupation of the people, with cassava serving as a major staple and cash crop in the region Eze, C. O., Okoro, C. U., & Obasi, N. D. (2019).



3.0 Sampling Methods and Size

A multiple stage sampling procedure was employed to select respondents. In the first stage, eight communities in emohua LGA were purposively selected due to its large volume of cassava farmers in the study area. Secondly, a purposive sampling technique was used to select 13 cassava farmers per community, making a total of 104 farmers from eight major cassava-producing communities.

Data were collected using structured questionnaires and interview schedules. Interviews were conducted for respondents who had difficulty reading and writing.

3.1 Method of Data Analysis

The collected data were analyzed using combination of descriptive and inferential statistical tools.

3.2 Model Specifications

$$TC = TVC + TFC$$

$$GM = TR - TVC$$

$$NI = TR - TC$$

$$\pi = TR - TC$$

Where:

TVC = Total Variable Cost (₦)

TC = Total Cost (₦)

TR = Total Revenue (₦)

GM = Gross Margin (₦)

NI = Net Income (₦)

π = profit

Gross margin = total revenue – total variable cost

$$Gm = TR - TVC$$

Where;

GM= Gross Margin

TR= Total Revenue

TVC= Total Variable Cost



4.0 Results and Discussion

The analysis revealed that a majority of the cassava farmers in the study area were male (73.1%), while females constituted only 26.9%. The highest age category was between 44–56 years, accounting for 37.5% of the respondents, followed by those aged 31–43 (33.7%). The least represented age group was 18–30 years (9.6%). This shows that cassava farming in Emohua is predominantly undertaken by individuals in their middle-age, who are likely to possess experience and resilience. Most farmers were married (74.0%), followed by widowed (21.2%) and single (4.8%), reflecting strong household engagement in cassava production.

Educationally, the majority of farmers had primary (43.3%) and secondary (36.5%) education, with 14.4% having no formal education and only 5.8% attaining tertiary level. This reflects a moderately literate population, which is relevant for the uptake of improved agricultural technologies. Household size was relatively large, with 42.3% having 7 to 9 members, followed by 38.5% with 4 to 6 members, and 9.6% each with 1 to 3 members and 10 or more. This suggests a high potential for family labor contribution in cassava farming.

Regarding farming experience, 49.0% of respondents had between 11 to 15 years of cassava farming, 24.0% had 6 to 10 years, and 22.1% had 16 to 20 years. This indicates that the farming population is largely experienced, a factor that enhances production efficiency and risk management. Farm size analysis showed that nearly half (49.0%) of the farmers cultivated between 1 to 3 hectares of cassava, while 34.6% had 4 to 6 hectares. Only 3.8% operated between 7 to 9 hectares, and 12.5% cultivated less than 1 hectare.

Monthly income distribution revealed that 46.2% of the respondents earned between ₦50,000 and ₦100,000, while 38.5% earned less than ₦50,000. Only 15.4% earned between ₦100,000 and ₦200,000 monthly. The average monthly income was ₦67,307.69, indicating that cassava farming serves as a modest source of livelihood for many in the area.

Table 4: Socio-Economic Characteristics of Respondents (N = 104)

Characteristic	Category	Frequency	Percentage (%)	Mean ($\bar{x}$)
Sex	Male	76	73.1	46
	Female	28	26.9	
Age (years)	18 – 30	10	9.6	
	31 – 43	35	33.7	
	44 – 56	39	37.5	
	57 – 69	20	19.2	
Marital Status	Single	5	4.8	
	Married	77	74.0	



	Widowed	22	21.2	
Educational Level	No formal education	15	14.4	
	Primary	45	43.3	
	Secondary	38	36.5	
	Tertiary	6	5.8	
Household Size	1 – 3	10	9.6	6.46
	4 – 6	40	38.5	
	7 – 9	44	42.3	
	10 and above	10	9.6	
Farming Experience	1 – 5 years	5	4.8	12.42
	6 – 10 years	25	24.0	
	11 – 15 years	51	49.0	
	16 – 20 years	23	22.1	
Farm Size (hectares)	Less than 1	13	12.5	3.08
	1 – 3	51	49.0	
	4 – 6	36	34.6	
	7 – 9	4	3.8	
Monthly Income (₦)	Below ₦50,000	40	38.5	₦67,307.69
	₦50,000 – ₦100,000	48	46.2	
	₦100,000 – ₦200,000	16	15.4	

Source: Field Survey, 2025

The result shows that the majority of cassava farmers in Emohua LGA were male (73.1%), suggesting a male-dominant participation in cassava farming in the study area. This aligns with Iheke and Igbelina



(2016) who reported that men constitute the majority in root crop farming in Southern Nigeria due to the physical labor involved.

The mean age of 46 years indicates that most farmers are in their economically active years, with 71.2% falling between the ages of 31 and 56. This age range suggests they have both the energy and experience for effective farm management, supporting Nwaiwu et al. (2020) who noted that farmers aged 31 to 50 years are more likely to adopt modern practices and manage production risks efficiently.

Marital status analysis showed that 74.0% were married, reflecting stable household structures that may support family labor availability. This finding is consistent with Oteh and Nwachukwu (2018) who found a high percentage of married cassava farmers in Abia State.

Education-wise, 43.3% had primary education and 36.5% had secondary education, which implies a moderately literate farming population. According to Okoye et al. (2016), education enhances farmers' access to and adoption of agricultural innovations, making them more responsive to extension services.

The average household size was 6.4 with over 80% of respondents having more than 4 household members. This supports Nwaru et al. (2017) who observed that large household sizes contribute to farm labor availability, especially in smallholder settings.

On farming experience, a majority (49.0%) had 11 to 15 years of cassava production experience, with a mean of 12 years. This suggests high familiarity with local agronomic conditions and seasonal variations. Similar trends were observed by Eze et al. (2021) in Cross River State.

The mean farm size of 3.08 hectares shows that respondents are mostly small- to medium-scale farmers, in line with national averages reported by Nwosu et al. (2019) for cassava producers in Southeastern Nigeria.

Finally, income distribution showed that 46.2% earned ₦50,000 and ₦100,000 monthly, while the average income was ₦67,307.69, indicating a modest but sustainable income stream, comparable to cassava profitability trends observed by Olubanjo et al. (2022).

EVALUATION OF COST AND RETURNS OF CASSAVA PRODUCTION

The analysis focuses on production costs, revenue, gross margin, net income, and profitability of cassava farming per hectare in the study area.

Table 1: Costs and Returns Analysis of Cassava Production

Costs & Returns	Items	Price (₦)	Quantity(kg)	Amount(₦)
Returns	Sales of Cassava	18,465	1,497	27,643,000
Variable Cost	Land lease (per/Ha)	1,560,000		780,000
	Land Clearing	1,500,000		
	Cassava Stem	1,110,100		



Fertilizers	987,654	
Labour	2,000,000	
Transportation	1,000,000	
Herbicides & Pesticides	1,235,578	
Miscellaneous	1,290,055	
Total Revenue		27,643,000
Total variable Cost (TVC)		10,683,387
Profit (Revenue-TC)		16,959,613

Source: field survey, 2025.

Table 4.1 shows The total variable cost (TVC) incurred by cassava farmers was ₦9,123,387 and the cost of land lease per hectare is 1,560,000. This represents expenses on variable inputs such as planting materials, labor, fertilizers, herbicides, transportation, and other operational costs. Variable costs accounted for the largest proportion of the total production cost, indicating that cassava production in Emohua LGA is input-intensive. This finding agrees with previous studies which reported that variable costs dominate cassava production expenses in Nigeria (Adebayo et al., 2019).

The total variable cost (TVC) of cassava production was ₦10,683,387, obtained as the sum of total variable and fixed costs. This reflects the overall financial commitment required for cassava farming in the study area.

The total revenue (TR) generated from cassava production in Emohua LGA was ₦36,766,387, derived from the sale of harvested cassava roots.

The gross margin (GM), calculated as the difference between total revenue and total variable cost, amounted to ₦18,519,613. The positive and high gross margin indicates that cassava production in the study area is capable of covering all variable costs and still generating substantial returns. This suggests efficient utilization of variable inputs and confirms the economic viability of cassava farming in Emohua LGA.

The findings of this study reveal that cassava production in Emohua LGA is a profitable agricultural enterprise. The dominance of variable costs over fixed costs suggests that farmers' profitability largely depends on efficient management of inputs such as labor and agrochemicals. Similar observations have been reported in other cassava production studies across Nigeria, where effective cost control significantly improved farm returns (Nweke et al., 2002; Ezedinma et al., 2007).



The high gross margin and net income recorded in this study indicate that cassava farming provides a viable source of income for farmers in the area. This supports earlier findings that cassava production contributes significantly to rural household income and livelihood sustainability in Nigeria (FAO, 2021). The substantial profit realized further underscores the potential of cassava production to enhance food security and economic well-being in Rivers State.

GROSS MARGIN ANALYSIS OF CASSAVA FARMERS

The gross margin analysis was conducted to evaluate the profitability of cassava production in Emohua Local Government Area. Results reveal that the mean gross margin per hectare was ₦178,073.20, indicating a substantial level of profitability among cassava farmers. The minimum gross margin recorded was ₦40,543.00, while the maximum was ₦367,043.00, showing wide variability in profit margins, possibly due to differences in scale, input costs, and yield performance. The median gross margin of ₦147,395.50 suggests that at least half of the farmers earned a margin above this value.

The standard deviation of ₦95,523.57 indicates notable dispersion around the mean, which implies that farmers' profitability levels are not uniform. This may reflect heterogeneity in farm management practices, access to inputs, and market channels. The total gross margin generated by all 104 cassava farmers surveyed was ₦18,519,613.00.

Table 4: Gross Margin Analysis of Cassava Farmers in Emohua LGA

Item	Amount (₦)
Total Revenue (TR)	13,821,500
Variable Costs (VC)	4,561,693.5
Gross Margin (GM)	9,259,807
Benefit–Cost Ratio (BCR)	2.03

Source: Field Survey, 2025

The results from the gross margin analysis demonstrate that cassava production is a profitable venture for smallholder farmers in Emohua LGA. The positive mean gross margin of ₦178,073.20 per hectare is consistent with previous findings by Ogunyinka and Ajibefun (2016) and Okoye et al. (2020), who reported that cassava farmers in South-South Nigeria earn positive returns, despite rising input costs. The profitability observed here suggests that the enterprise can support household incomes and contribute to rural livelihoods.

The large standard deviation and range in gross margins (₦40,543.00 to ₦367,043.00) point to significant disparities in farm performance. Factors such as timely planting, access to quality planting materials, fertilizer use, pest control practices, and output prices may have influenced the variability. Ani et al. (2021) noted that yield variability and inconsistent input supply are major determinants of income differentials among cassava producers in Rivers and Bayelsa States.



Moreover, the median margin being below the mean indicates that a portion of the respondents earned relatively lower returns, possibly due to inefficient resource use or lower access to extension services. This observation is corroborated by Nnadi et al. (2018), who found that technical inefficiencies were common among cassava producers without formal training or institutional support.

The positive total gross margin of ₦9,259,807 million confirms that cassava farming is economically viable at the aggregate level. However, to reduce variability and improve returns, it is necessary to enhance farmers' access to improved technologies, market information, and cost-effective inputs. Targeted policies that subsidize fertilizer and stem supply, coupled with agricultural training, could boost overall profitability and make cassava production more sustainable in the region.

PERCEIVED CONSTRAINTS TO CASSAVA PRODUCTION

The results from the analysis revealed the major constraints perceived by cassava farmers in Emohua Local Government Area. Respondents reported agreement with several production-related constraints. The highest-rated constraint was high cost of production with a mean score of 4.04, followed closely by high labor cost (4.01), high transportation cost (4.00), and disease and pest infestation (3.97). These suggest that economic and biological pressures are significant barriers to cassava productivity in the region.

Moderate agreement was recorded for limited access to credit (3.77), poor extension services (3.77). These reflect institutional and infrastructural shortcomings. Meanwhile limited access to modern facilities (3.46) were interpreted as neutral to agree, indicating mixed perceptions on the severity of these constraints among the farming population.

Table 4: Constraints Faced by Cassava Farmers in Emohua LGA (n = 104)

Constraint	SA (%)	A (%)	D (%)	SD (%)	Mean
High cost of production	50 (48.1)	40 (38.5)	10 (9.6)	4 (3.8)	4.04
High labor cost	48 (46.2)	42 (40.4)	10 (9.6)	4 (3.8)	4.01
High transportation cost	47 (45.2)	41 (39.4)	12 (11.5)	4 (3.8)	4.00
Diseases and pests' infestation	45 (43.3)	40 (38.5)	15 (14.4)	4 (3.8)	3.97
Limited access to credit	39 (37.5)	38 (36.5)	23 (22.1)	4 (3.8)	3.77
Poor extension services	39 (37.5)	38 (36.5)	23 (22.1)	4 (3.8)	3.77
Limited access to modern facilities	31 (29.8)	40 (38.5)	29 (27.9)	4 (3.8)	3.46



Source: Field Survey, 2025

The analysis clearly indicates that cassava production in Emohua LGA is constrained by both cost-related and infrastructural issues. The high cost of production was perceived as the most critical barrier, aligning with findings by Okoye et al. (2016) and Lawal et al. (2018), who emphasized that fluctuating input prices and high labor expenses are common in root and tuber production systems across southern Nigeria.

The substantial concern over high labor and transportation costs reflects the challenges in rural mobility and labor shortages, especially during peak seasons. Ehirim et al. (2020) observed similar patterns in Delta State, noting that poor rural road infrastructure inflates farm-to-market transport costs, reducing farmers' net margins.

Access to finance also emerged as a moderate constraint. With a mean of 3.77, the data suggest that many cassava farmers struggle to access formal credit systems, likely due to lack of collateral or high interest rates. This echoes the work of Ugwuja and Chukwu (2021), who found that over 60% of cassava farmers in the Niger Delta relied on personal savings or informal loans, which limited their capacity to scale up.

The moderate rating of poor extension services and limited access to modern facilities indicates a knowledge and technology gap. This is concerning, as Ogunleye and Adeyemi (2019) reported that access to technical guidance and mechanization significantly improves cassava productivity. In the absence of reliable agricultural advisory services, farmers are left to rely on traditional methods, which may not always be efficient or sustainable.

Diseases and pest pressure, rated at 3.97, also plays a significant role in limiting output, particularly with the rising incidence of cassava mosaic virus and mealybugs. Ayoade and Adebayo (2017) stressed that biological stressors continue to reduce cassava yields in regions with weak plant health systems.

In summary, the major constraints affecting cassava producers in the study area stem from economic costs, infrastructural bottlenecks, institutional limitations, and environmental stressors. These findings are vital for policymakers and extension agencies aiming to promote cassava production and farmer resilience in the Niger Delta.

5.0 Conclusions

The study concludes that cassava production in Emohua Local Government Area is a viable and profitable agricultural enterprise. It contributes significantly to household income, food security, and rural livelihoods. However, its economic potential is constrained by high production costs, inadequate infrastructure, poor access to credit and extension services.

The results confirm that the profitability of cassava production is strongly influenced by socio-economic characteristics, cost structure, and institutional support systems. Addressing these constraints is vital to improving productivity, enhancing income levels of farmers, and sustaining cassava's role as both a food security crop and an economic driver in Emohua and beyond.



6.0 Recommendations

- i. Access to credit: Financial institutions should design farmer-friendly credit schemes with low interest rates and flexible repayment options to enable farmers to expand production and adopt improved technologies.
- ii. Input subsidy and distribution: Subsidized farm inputs such as fertilizers, herbicides, and improved cassava stem cuttings should be made readily available to farmers to reduce production costs and increase yields.
- iii. Strengthening extension services: Agricultural extension systems should be revitalized to provide farmers with training on improved agronomic practices, pest and disease management, and post-harvest technologies.
- iv. Infrastructure development: Investment in rural road networks and transportation systems is necessary to reduce high transport costs and improve access to both input and output markets.

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