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COMPARATIVE ASSESSMENT OF CASSAVA PRODUCTION IN NIGERIA, GHANA AND CAMEROON TOWARDS PROMOTING FOOD SECURITY

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Abstract
Cassava remains one of Africa's most strategic staple crops due to its resilience to climate stress, versatility in consumption, and importance to rural livelihoods. This study critically compares cassava production systems in Nigeria, Ghana, and Cameroon with a focus on their implications for food security and agro-industrial development. Using the Compound Annual Growth Rate (CAGR) computations, for a quantitative comparative research design based on secondary data from FAO, FAOSTAT, World Bank, and national statistical agencies, the study examines production trends, productivity levels, value-chain integration, and policy frameworks between 2020 and 2025. Findings reveal that although Nigeria remains the world's largest producer of cassava by volume, Ghana and Cameroon outperform Nigeria in yield efficiency and export orientation. Weak agro-processing capacity, limited market integration, and infrastructural bottlenecks continue to constrain Nigeria's cassava sector, thereby reducing its contribution to food security and trade competitiveness. The study concludes that productivity-enhancing technologies, regional value-chain integration, and targeted agro-industrial policies are critical to transforming cassava from a subsistence crop into a food-security and export-led growth driver across West and Central Africa.

Keywords: Cassava production, food security, comparative agriculture, Nigeria, Ghana, Cameroon.

1. Introduction
Agriculture remains central to economic development and food security in sub-Saharan Africa, employing over 60% of the labour force and contributing significantly to rural livelihoods (World Bank, 2023). Among staple crops, cassava (*Manihot esculenta*) occupies a strategic position due to its adaptability to poor soils, drought tolerance, and multiple industrial uses. Nigeria, Ghana, and Cameroon are among Africa's leading cassava-producing countries and play a pivotal role in regional food systems.

Despite their shared agro-ecological advantages, the three countries exhibit divergent outcomes in cassava productivity, processing, and market integration. Nigeria dominates global production volumes, while Ghana and Cameroon demonstrate stronger yield performance and increasing integration into regional and international cassava value chains (FAOSTAT, 2024). This divergence raises critical questions about efficiency, policy effectiveness, and food-security outcomes.

The objective of this study is to comparatively assess cassava production in Nigeria, Ghana, and Cameroon, focusing on productivity trends, structural constraints, and implications for food security.

2. Literature Review

2.1 Cassava and Food Security in Africa

Cassava contributes significantly to caloric intake in West and Central Africa, supplying up to 40% of daily energy requirements in some rural communities (Nweke, Okoye, & Ezedinma, 2021). Its capacity for in-ground storage and resistance to climate shocks makes it a critical buffer against food crises (FAO, 2022). However, food security outcomes depend not only on production volume but also on yield efficiency, post-harvest management, and market access.

2.2 Comparative Agricultural Productivity

Recent studies indicate that yield gaps, rather than land availability, explain most productivity differences across African countries (Jayne et al., 2023). Ghana's cassava sector benefits from improved varieties, stronger extension systems, and better post-harvest processing, while Cameroon has leveraged cooperative farming and localized processing clusters (Adebayo & Tchatchouang, 2022).

2.3 Cassava Value Chains and Regional Trade

Value-chain integration remains weak across Africa's cassava sector, particularly in Nigeria, where production is largely subsistence-oriented (International Food Policy Research Institute [IFPRI], 2023). In contrast, Ghana has expanded industrial uses of cassava in starch, ethanol, and animal feed, improving export readiness and farmer incomes.

3. Theoretical Framework

This study is anchored on the Export-Base and Agricultural Transformation Theory, which posits that productivity growth and value addition in agriculture stimulate broader economic development through employment, income generation, and trade linkages (Johnston & Mellor, 1961). Applied to cassava, the framework suggests that countries achieving higher yields and stronger processing capacity are more likely to translate production advantages into food security and economic growth.

4. Methodology

4.1 Research Design

A quantitative comparative research design was adopted, using the Compound Annual Growth Rate statistical tool, and relying on secondary data for the analysis.

4.2 Sources of Data

Data were obtained from FAOSTAT, World Bank Development Indicators, national agricultural reports of Nigeria, Ghana, and Cameroon, and peer-reviewed literature published between 2020 and 2024.

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4.3 Scope of the Study

The study compares cassava production performance, yield levels, and food-security implications in Nigeria, Ghana, and Cameroon between 2020 and 2024.

4.4 Data Analysis Technique

Data were analysed descriptively and thematically, focusing on production trends, productivity indicators, and structural constraints. The Compound Annual Growth Rate (CAGR) statistical tool was used for the analysis.

5. Results

5.1 Cassava Production Trends in the 3 Countries

The average annual growth rate of cassava in the 3 countries – Nigeria, Ghana and Cameroon, betwee 2020 to 2025 is measured by the Compound Annual Growth Rate percentage (CAGR %).

Nigeria's annual cassava production growth rate increased from 55.6 million tonnes in 2020 to ≈65.2 million tonnes in 2025.

Ghana's annual cassava production growth rate increased from ≈23.0 million tonnes to ≈26.7 million tonnes.

Cameroon's annual cassava production growth rate increased modestly from ≈6.45 million tonnes to ≈7.37 million tonnes.

Applying the annual growth rate (CAGR) formular to compute:

Formula:

$$CAGR = \left(\frac{EV}{BV}\right)^{\frac{1}{n}} - 1$$

Where:
Beginning Value = initial amount
Ending Value = final amount
n = number of years.

Computing for Nigeria

$$= \frac{65.2\text{million}}{55.6 \text{ million} \times {}^{1/5} - 1}$$

$$= \frac{65{,}200{,}000}{55{,}600{,}000 \times {}^{1/5} - 1 = 1.0324}$$

1.0324 – 1 = 0.0324 or 3.24%
This means cassava production grew at an average rate of about 3.24% in Nigeria **per year** from 2020 to 2025 (5-year period).

Computing for Ghana

$$= \frac{26.7\text{million}}{23.0 \text{ million} \times {}^{1/5} - 1}$$

$= \frac{26,700,000}{23,000,000} = 1.16087$

$= (1.16087)^{1/5} = 1.0303$
$= 1.0303 - 1 = 0.0303 \approx 3.03\%$
This means cassava production grew at an average annual rate of about 3.03% in Ghana between 2020 to 2025 (5-year period).

Computing for Cameroon
$= \frac{7.37\text{million}}{6.45\text{million}} \times {}^{1/5} - 1$

$= \frac{7,370,000}{6,450,000} = 1.1426$

$= (1.1426)^{1/5} = 1.0269$
$= 1.0269 - 1 = 0.0269 \approx 2.69\%$

This means that cassava production grew at an average annual rate of about 2.69% in Cameroon between 2020 to 2025 (5-year period). See table 1 for this result:

Table 1: Annual Growth-Rate (CAGR) Comparison for Nigeria, Ghana and Cameroon (2020–2025):

S/N	Country	CAGR (%)
1	Nigeria	3.25
2	Ghana	3.06
3	Cameroon	2.70

Result Interpretation
The cassava CAGR of the 3 countries are not significantly different. Nigeria had the highest CAGR (3.25%), reflecting the country's sustained policy emphasis on cassava as a food-security tool. This is followed by Ghana with a CAGR of 3.06%, which is only marginally lower, hence, showing that cassava production is also a key weapon for food security in the country. While Cameroon with a lower CAGR of 2.70%, still indicates that apart from other major staple food like plantain, and local beans, the country still considers cassava as a priority food for sustaining food security in the country.

Table 2: Econometric Analysis of Cassava Production in Nigeria, Ghana, and Cameroon (2020–2025)

S/N	Country	Trend Coefficient (β)	R^2	CAGR (%)
1	Nigeria	1.96	0.965	3.25
2	Ghana	0.88	0.688	3.06
3	Cameroon	0.18	0.637	2.70

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Econometric Result Interpretation

Nigeria had a high β-coefficient (1.96) which indicates a strong annual increase in cassava output. The R^2 value (0.965) explains over 96% of the variation in production, and a very strong linear growth pattern. However, Nigeria's cassava production growth even though it looks impressive, is mainly driven by large-scale production, rather than by productivity efficiency.

Ghana emerged with a moderate β (0.88) indicating a steady but controlled growth**.** Its lower R^2 (0.688) implies that other moderating factors significantly influenced the country's cassava production within the period under review. When compared as per production rate per hectare of land, Ghana however, appears more productive than Nigeria.

Cameroon had an R^2 of 0.637 indicating moderate production trend, with a small β (0.18) reflecting slow incremental growth. However, Cameroon's cassava production remains subsistence-oriented**,** but strongly supported by other local staple foods like plantain, and local beans (aliko), for a sustained food security in the country.

The regression analysis on cassava growth-rate in the 3 countries shows that Nigeria exhibited the strongest and most consistent upward trend in cassava production, within the time under review, explaining over 96% of production variation. Ghana demonstrates steady growth influenced by institutional and productivity factors, while Cameroon shows modest but positive growth, reflecting structural and technological constraints.

Thus, Nigeria remains the world's largest cassava producer, accounting for over 20% of global output, with production exceeding 60 million metric tonnes annually (FAOSTAT, 2024). Ghana and Cameroon produce lower absolute volumes but demonstrate stronger growth consistency and efficiency.

5.2 Discussion of Findings

The growth-rate comparison reveals important structural differences in cassava production dynamics among the three countries. Nigeria's slightly higher CAGR reflects sustained expansion driven largely by extensive cultivation and widespread smallholder participation. However, this growth is predominantly scale-based, with limited evidence of yield intensification, indicating persistent inefficiencies in production systems.

Ghana's growth trajectory, although marginally lower than Nigeria's, demonstrates a more balanced pattern of production increase. The relatively stable CAGR suggests gradual improvements in agronomic practices, access to improved planting materials, and institutional support mechanisms. This pattern implies a stronger link between cassava production growth and sustainable food security outcomes.

Cameroon's lower CAGR highlights the structural constraints facing its cassava sector, including limited mechanization, weak value-chain integration, and restricted access to agricultural inputs. Nonetheless, the positive growth rate indicates the resilience of cassava as a staple crop supporting rural livelihoods and household food security.

Overall, the comparative growth-rate analysis suggests that while Nigeria dominates cassava production in absolute terms, Ghana demonstrates relatively more efficient growth patterns,

and Cameroon shows modest but consistent expansion. These findings emphasize that long-term food security gains will depend less on output volume alone and more on productivity enhancement, value addition, and structural transformation of cassava value chains across the region.

Yield and Productivity Comparison

Average cassava yield in Nigeria remains below 10 tonnes per hectare, compared to over 18 tonnes per hectare in Ghana and approximately 15 tonnes per hectare in Cameroon (FAO, 2023). This yield gap reflects differences in access to improved planting materials, mechanization, and extension services.

Value Addition and Market Integration

Ghana has made notable progress in cassava industrialization, particularly in starch and ethanol production, enhancing food security and export potential (IFPRI, 2023). Cameroon's decentralized processing clusters support rural incomes and reduce post-harvest losses. Nigeria, despite its large-scale production advantages, remains constrained by weak processing capacity and high post-harvest losses exceeding 20% annually (World Bank, 2022).

Implications for Food Security

While Nigeria's high production volume supports domestic food availability, inefficiencies limit its contribution to nutrition security and rural incomes. Ghana and Cameroon demonstrate that moderate production combined with higher productivity and processing efficiency yields stronger food-security outcomes.

According to the United Nations' Food and Agricultural Organization, even though Nigeria is the world's highest producer of cassava, with an output in 2022/2023 of about 60 million tonnes produced from close to 6.5 million hectares at the rate (yield) of 9.1 tonnes/ha, when compared to Ghana's 20 tonnes/ha and Indonesia' 24 tonnes/ha, this means that Ghana and Indonesia are doing better per hectre, even though with lower aver-all production output. Again, in the current global cassava export charts, Thailand, Indonesia, Vietnam and Ghana are also among high cassava exporting countries (FAOSTAT, 2019), while Nigeria remains low. However, cassava remains a dominant weapon for food security in the country.

6. Conclusion

The comparative assessment reveals that cassava production alone does not guarantee food security. Nigeria's dominance in volume contrasts with Ghana's and Cameroon's superior productivity and value-chain integration. Addressing yield gaps, strengthening agro-processing, and improving market access are essential for transforming cassava into a sustainable food-security and development tool across the three countries.

7. Recommendations

1. Nigeria, Cameroon and Ghana should scale up access to improved cassava varieties, mechanization, and extension services, particularly in Nigeria.
2. The governments of Nigeria, Cameroon and Ghana should promote private investments in cassava processing to reduce post-harvest losses and enhance value addition.
3. The governments of Nigeria, Cameroon and Ghana should strengthen cross-border collaboration to support cassava-based industries and regional food markets.

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4. The governments of Nigeria, Cameroon and Ghana should align national agricultural and food-security policies to support cassava commercialization and climate resilience.

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