EFFECT OF AGRICULTURAL COOPERATIVES ON CASSAVA VALUE ADDITION AMONG FARMERS IN EDO STATE, NIGERIA

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Abstract

This study investigated the impact of agricultural cooperatives on cassava value addition among smallholder farmers in Edo State, Nigeria. A descriptive cross-sectional survey design was employed to collect data from a stratified random sample of 400 farmers—200 cooperative members and 200 non-members—using a structured questionnaire. Data were comparatively analysed using descriptive statistics. Analyses of demographics of the respondents revealed that 55% of them were aged 45 or younger, with a slight majority (53.3%) being female. Findings on comparative cassava production volume revealed that 43.9% of cooperative members produced between 6 and 10 tons of cassava annually compared to only 26.7% of non-members. In processing activities, 57% of cooperative members engaged in garri production, 51.7% in fufu, and 42.2% in starch manufacturing, significantly exceeding the 26.7%, 20.2%, and 11.7% reported by non-members in the food categories, respectively. Despite the advantages associated with cooperative membership, farmers faced persistent challenges such as inadequate rural infrastructure, high input costs, and limited access to modern processing equipment. These findings underscored the critical role of cooperative membership in enhancing production scale and value-added activities. It is recommended that targeted policy interventions are needed to address infrastructural and operational constraints in the cassava value chain.

Keywords: Cooperative membership, Smallholder farmers, Cassava value addition, Edo State, Nigeria

Introduction

Cassava (*Manihot esculenta Crantz*) is a vital staple crop and a significant economic resource for millions of smallholder farmers in Nigeria, the world's largest producer. In 2021, Nigeria produced at least

approximately 63 million metric tons of cassava, representing one-fifth of the world production (Saliu, 2024). The versatility of cassava is evident in its wide range of uses, from traditional food products like garri, fufu, and cassava flour to industrial applications such as starch and bioethanol (Agbarevo & Okeke, 2015). This adaptability presents substantial opportunities for enhancing rural incomes and achieving food security. Despite Nigeria's high cassava production, many farmers continue to sell raw cassava, thereby missing substantial opportunities for value addition and improved income generation (Jacob, Adam & Fausat, 2023).

Agricultural cooperatives have emerged as a promising mechanism to bridge this gap by pooling resources, facilitating access to credit, and providing technical training and modern processing technologies (Jacob et al., 2023; Onugu, Obasanya, & Nwosu, 2024)). Through cooperative membership, farmers can share the risks associated with agricultural production and processing while benefiting from economies of scale and enhanced bargaining power in local and regional markets. These advantages theoretically lead to improved production efficiency and diversification in cassava processing activities (Alufohai, Ekunwe & Mogbolu, 2018).

Nonetheless, the impact of cooperative membership on cassava value addition remains underexplored, particularly in localized contexts such as Edo State, Nigeria (Alufohai et al., 2018). While existing literature underscores the role of cooperatives in agricultural development (Adegoke & Agbasi, 2022; Budi, Fonteh, & Manu, 2021; Christian, Obi, Zantsi, Mdoda, & Jiba, 2024; Onugu et al., 2024), empirical studies that specifically address, holistically, how cooperative membership influences processing practices, production scale, and income generation in the cassava value chain are limited. This research is intended to fill this gap by conducting a comparative analysis of cooperative and non-cooperative farmers in cassava production and processing, focusing on their roles in the cassava value chain. The objective of this study is to comparatively anlayse the impact of agricultural cooperatives on cassava value addition among farmers in Edo State, Nigeria with specific focus on scale of cassava production, cassava processing value addition and challenges faced by cooperative and non-cooperative farmers in adding value to cassava in the study area.

Agricultural Cooperative Membership and Cassava Production in Nigeria

Agricultural cooperatives are member-owned organizations that enable smallholder farmers to pool resources, share risks, and access inputs, credit, and markets (Onugu et al., 2024). Recent studies have demonstrated that cooperative membership significantly enhances farmers' production revenue and household income (Zhang & Huang, 2023). Cassava value addition

involves transforming raw cassava into higher-value products such as garri, fufu, starch, and cassava flour (Udoro, Anyasi & Jideani, 2021; Darko-Koomson, Aidoo & Abdoulaye, 2020). This process extends shelf life, enhances marketability, and increases profitability, thereby reducing post-harvest losses and supporting rural industrial growth (World Bank, 2023).

Cooperative farmers are farmers are members of cooperative societies who actively engage in cooperatives to benefit from shared resources, technical training, and enhanced market access. Their collective participation facilitates investment in modern processing equipment and innovative value-addition techniques, leading to higher incomes and overall sector development (Geffersa, 2024).

Empirical investigations have consistently shown that cooperative membership positively influences agricultural outcomes. For example, Akerele (2016) demonstrated that cooperative credit schemes significantly enhanced cassava production by enabling farmers to access essential inputs such as fertilizers and improved cassava stems. In a similar vein, Okafor and Umebali (2019) compared economic outcomes between cooperative and non-cooperative cassava farmers, finding that cooperative members achieved higher incomes, better savings, and improved access to processing equipment.

Other studies, such as those by Kampli and Katti (2023) and Ma et al. (2023), have expanded the scope to qualitative and meta-analytical approaches, respectively, revealing that while cooperative membership generally yields positive effects on productivity and technical efficiency, the magnitude of these benefits can vary regionally. Research conducted in various contexts—from Nigeria to Brazil and Ethiopia (e.g., Neves et al., 2021; Adegoke & Agbasi, 2022; Guyalo & Ifa, 2023)—has further highlighted that cooperatives contribute to food security and rural development by enhancing access to markets and modern technologies.

Notwithstanding the foregoing, several empirical studies have also pointed to persistent challenges. Issues such as inadequate rural infrastructure, high input costs, and limited access to modern processing equipment have been noted as barriers that restrict the full potential of cooperative activities (Muoghalu et al., 2021). Furthermore, the literature suggests that while cooperatives can facilitate diversification in cassava processing, the extent of such diversification remains uneven, often influenced by factors like member engagement, governance efficiency, and external economic conditions.

In summary, the empirical literature indicates that agricultural cooperatives generally enhance production efficiency, increase income levels, and foster greater diversification in value-added activities. However, these benefits are tempered by systemic challenges, including infrastructural

deficiencies, high operational costs, and variable levels of cooperative engagement. The findings from these studies collectively point to the potential of cooperatives to transform cassava value chains, albeit within a context that requires substantial policy and infrastructural support.

Although existing studies have documented the positive effects of cooperative membership on agricultural productivity and income generation, there remains a notable gap in research specifically addressing the role of cooperatives in cassava value addition within Edo State, Nigeria. Most empirical studies have either focused on other regions or have generalised the findings across different crops and cooperative models. This gap underscores the need for a localized, detailed analysis that considers the unique challenges and opportunities in Edo State's cassava value chain, thereby providing tailored insights for policy interventions and cooperative development.

Theoretical Framework

Two key theories underpin this study including Collective Action Theory and Value chain theory. Collective Action Theory, proposed by E. Ostrom in his seminar work, examines how individuals collaborate to achieve shared objectives, particularly in contexts where solitary efforts are insufficient (Ostrom, 1990). In agriculture, this theory is exemplified by farmers forming cooperatives to pool resources, access markets, and share investment costs, thereby enhancing their collective bargaining power and reducing individual risks.

The Value Chain Theory, introduced by Porter in 1985, analyses how businesses create value through a series of linked activities. It divides operations into primary activities (e.g., logistics, production, marketing) and support activities (e.g., procurement, technology, HR), helping firms optimize efficiency and competitiveness (Porter, 1990).

Research Methodology

A descriptive cross-sectional survey design was employed to compare cooperative and non-cooperative cassava farmers. This approach enabled the systematic collection and analysis of data on production volume, processing practices, income levels, and perceived challenges.

The study was conducted in Edo State, Nigeria—a predominantly agrarian region with favourable climatic conditions for cassava cultivation. The population consisted of 400 cassava farmers, with equal representation from cooperative members (identified via cooperative membership records) and non-members (identified through local agricultural offices).

A stratified random sampling technique was applied to ensure adequate representation of farmers involved in different levels of value-addition

activities. Data were collected using a structured questionnaire that gathered detailed information on demographic characteristics, production scales, specific processing activities, income from value-added products, and the challenges encountered. The questionnaire was pre-tested in Delta State, yielding a Cronbach's alpha of 0.85, which indicates strong internal consistency.

Data analysis was conducted using descriptive statistics (frequencies, percentages, means) and comparative analyses. Special attention was given to measuring differences in processing activities (garri, fufu, starch, cassava flour) and annual production volumes between the two groups. Further, qualitative responses on challenges were thematically analysed to complement the quantitative findings.

The demographic characteristics of cassava farmers in Edo State, as detailed in your table, provide a snapshot of the age, gender, educational background, and farming experience of the respondents.

Age Distribution: The age distribution shows a youthful demographic with 55.3% of the farmers aged 45 years or younger. This younger age profile aligns with research suggesting that younger farmers are often more receptive to adopting innovative farming practices and technologies (Donkor et al., 2018).

Gender Distribution: Gender representation is fairly balanced with a slight majority of female respondents at 53.3%. This is indicative of significant female participation in cassava farming, a trend supported by findings from Udemezue et al. (2023), who noted substantial contributions by women in agricultural value chains.

Educational Background: The cassava farmers in Edo State exhibit a high literacy rate, with only 17.5% lacking formal education. Notably, 41% have completed primary education, and 41.5% have at least a secondary school education. This substantial educational attainment is likely to positively influence their farming practices and decision-making processes. The role of education in agricultural productivity is well-documented, with higher education levels often associated with better adoption of modern agricultural techniques (Agada et al., 2018).

Farming Experience: Farming experience varies, with 28.2% of the respondents having more than 10 years of experience, which could imply a deeper understanding and potentially more skilful management of farming activities. The distribution suggests a blend of relatively new and more

seasoned farmers, which could affect the overall adoption of new technologies and farming practices

Table 1: Demographic characteristics of the respondents.

Variable	Value	Frequence	Percentage	Cummulative percentage
Age	18-25	85	21.3	21.3
	26-35	70	17.5	38.8
	36-45	66	16.5	55.3
	46-55	87	21.7	77.0
	56 and above	92	23.0	100.0
Sex	Female	213	53.3	-
	Male	187	46.8	-
Formal education	None	70	17.5	-
	Primary	164	41.0	-
	Secondary	80	20.0	-
	Tertiary	86	21.5	-
Farming Experience	Less than 1 year	104	26.0	26.0
	1-5 years	89	22.3	48.3
	6-10 years	94	23.5	71.8
	More than 10 years	113	28.2	100.0

Source: Field Survey, 2025

Production Scale and Cooperative Membership

Among cooperative members, 43.9% produced between 6 and 10 tons of cassava annually, compared to only 26.7% of non-members. This indicates that cooperative members generally engage in larger-scale production. As shown in Table 2, cooperative members produced more cassava overall, which can be attributed to better access to resources, credit, and technical assistance. This finding supports the results of Okafor and Umebali (2019), who noted that cooperative membership significantly enhances access to financial support, enabling farmers to scale up production. Similarly, Ekwere (2016) highlighted that cooperative members in Anambra State were able to secure higher production outputs due to collective access to resources and technology.

Table 2: Annual Cassava Production Scale

Production Scale (Tons)	Cooperative Members (%)	Non-Members (%)
0-5	28.1	45.5
6-10	43.9	26.7
11-15	18.3	15.8
16+	9.7	12.0

Source: Field Survey, 2025

Value-Addition Activities

Table 3 shows that cooperative members engage in a wider range of value-added cassava products compared to non-members. 57% of cooperative members processed cassava into garri, 51.7% processed cassava into fufu, and 42.2% processed cassava into starch, compared to 26.7%, 20.2%, and 11.7% of non-members, respectively. These results underscore the role of cooperatives in facilitating diversification within the cassava value chain. These findings align with those of Akerele (2016), who found that cooperatives enable smallholder farmers to engage in value-added processing by providing access to modern processing equipment and training Which might not be unconnected to a better access to resources in line with the position of Okafor & Umebali (2019). Additionally, the increased engagement in multiple processing activities suggests that cooperative membership facilitates a more diversified income base, a key advantage for farmers in a fluctuating agricultural market.

Table 3: Cassava Value-Addition Activities

Processing Activity	Cooperative Members (%)	Non-Members (%)
Garri	57.0	26.7
Fufu	51.7	20.2
Starch	42.2	11.7
Cassava Flour	39.7	14.3

Source: Field Survey, 2025

Challenges Faced by Farmers

Despite the benefits of cooperative membership, both cooperative and non-cooperative farmers faced significant challenges. Table 4 highlights the most commonly reported issues, with inadequate rural infrastructure (60%), high input costs (55%), and limited access to modern processing equipment (48%) being the top constraints. These results reflect the findings of Muoghalu & Akanwa (2021), who noted that infrastructural deficiencies, particularly in rural areas, continue to constrain agricultural productivity. Similar challenges were highlighted by Ogunniyi et al. (2021), who pointed

out that high input costs and inadequate processing facilities hamper the growth potential of farmers.

Table 4: Challenges Faced by Farmers

Challenge	Cooperative Members (%)	Non-Members (%)
Inadequate Rural Infrastructure	60.0	58.0
High Input Costs	55.0	58.5
Limited Access to Processing Equipment	48.0	45.2
Market Instability	42.3	40.0
Lack of Training	35.0	34.7

Source: Field Survey, 2025

Conclusion and Recommendations

This study demonstrates that agricultural cooperatives play a significant role in enhancing cassava production and value addition among smallholder farmers in Edo State, Nigeria. Cooperative members exhibited higher production levels and a broader engagement in value-added activities, such as the processing of garri, fufu, starch, and cassava flour than their non-cooperative counterparts. While agricultural cooperatives play a critical role in improving the scale of production and enhancing value-addition activities, their impact is still constrained by broader systemic challenges including inadequate rural infrastructure, high input costs, limited access to modern processing equipment, and market volatility limit cassava production and value addition by both cooperative and non-cooperative farmers.

Based on the study findings, the following recommendations are made: Improve Rural Infrastructure: Given that both cooperative and non-cooperative farmers reported inadequate rural infrastructure, investments in road networks and electricity supply are crucial to enhance transportation and processing efficiency.

Reduce Input Costs: High input costs were a significant challenge for both groups. Introducing subsidies or low-interest loans for essential inputs like fertilizers and improved processing equipment would reduce financial burdens and improve production capacity.

Enhance Access to Modern Processing Equipment: With many of the farmers reporting limited access to modern processing equipment, providing affordable processing tools or facilitating equipment leasing programs would enable greater engagement in value-added activities and increase farmers' income.

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