

LATENT ACTORS IN CASSAVA VALUE ADDITION ACTIVITIES IN OYO STATE, NIGERIA: A GENDER ANALYSIS

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ABSTRACT— The less recognition given to some actors in the cassava value addition processes motivated this research to examine latent actors' involvement in the cassava value addition in Oyo State, Nigeria, with respect to harvesters and transporters. Data elicited from a sample of 176 “latent actors” in cassava value addition across the four agricultural zones using a cross-sectional research design, were analysed using descriptive statistics, weighted average index, and factor analysis. Findings revealed an ageing population of actors with an average age of 41.5 years for harvesters and a mean age of 44.3 years for the transporters that were engaged in cassava value addition. Majority of actors were married, with a significant gender imbalance, particularly in harvesting and transportation where men dominate in the value addition process. Most actors had secondary education. The results also indicated that those actors (in harvesting and transporting) face severe constraints especially in rural areas. Despite these challenges, cassava value addition remains a key source of income for rural households, significantly contributing to food security and employment opportunities. Results from the factor analysis also showed that harvesters' involvement in cassava value addition was influenced by three significant factors which collectively explain over 80% of the variance in their involvement, and each of these factors capturing different aspects of the harvesting, highlights the complexity and diversity of activities undertaken by harvesters. In the case of transporters' involvement, the analysis also identified three significant factors, which explain about 71.5% of the total variance in the data, indicating these factors capture a significant portion of the variability and diversity in transporters' activities in the cassava value addition. Consequent on the results of this study, provision of rural infrastructure is essential, while financial inclusion is another area. Gender-sensitive policies must be introduced to address the existing disparities in access to resources. Strengthening cooperatives and capacity-building programs can also improve access to markets and resources. All these are necessary to create a more resilient and inclusive agri-food sector that will benefit rural communities and the broader agricultural economy.

KEYWORDS: Latent actors, Cassava, Value addition, Factor analysis, Oyo State, Nigeria

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1. INTRODUCTION

Cassava is a vital staple crop in Nigeria, serving as both a crucial food source and economic driver. As the world's largest producer, Nigeria's cassava production increased from 42.5 million tons in 2010 to 66 million tons in 2022 [1]. The crop's significance stems from its adaptability to various agro-ecological zones and year-round cultivation potential [2]. Beyond its role in ensuring food security, cassava supports numerous small and medium enterprises through value addition processes, creating employment opportunities and fostering rural development [3]. The crop can be processed into various products, including flour, starch, and garri, diversifying both diets and income sources for farmers [4]. Globally, cassava production grew from 250 million tons in 2010 to 311.5 million tons in 2022 [1], with Africa accounting for 57% of total production. In Nigeria, Oyo State stands out as a major cassava-producing region, with favorable soil and climatic conditions across its key growing areas: Ibadan/Ibarapa, Iseyin, Ogbomoso, Oyo, and Saki. The crop provides substantial income for smallholder farmers [5].

Gender dynamics play a critical role in agriculture, influencing production, resource access, and value addition, especially in cassava farming in Nigeria. Women are heavily involved in cassava cultivation, performing tasks like planting, weeding, and harvesting, while men often take on physically demanding tasks like land preparation [6], [7]. This division of labour highlights the importance of recognizing both genders' contributions for optimal productivity. Gender also affects access to essential resources like land, with women often facing barriers to land ownership, which hampers their ability to invest in long-term agricultural ventures [8]. In the cassava value chain, men dominate harvesting and transporting activities, including the production of cassava roots and flour, which contribute significantly to household income and food security [4], [9]. Gender-inclusive agricultural practices have been shown to improve crop yields and income, enhancing overall agricultural efficiency [10]. Therefore, policies promoting gender equality in resource access and agricultural services are crucial for improving agricultural outcomes.

Cassava harvesters and transporters are crucial latent actors in the cassava value addition. Although they may not be recognised or directly involved in the production, processing and marketing of cassava value addition but they play vital roles in ensuring the efficient prevention of postharvest loss from the farm to the processing centres and markets. Harvesters and transporters ensure that cassava root is gathered and delivered at optimal time, when the roots are mature and of high quality [11]. Latent actors ensure efficient harvesting and transportation help minimize damage to the cassava roots, reducing post-harvest losses and preserving the quality of the cassava roots and products [12]. Latent actors provide the raw materials for processing and facilitate markets access, enabling cassava producers to reach a wider range of buyers and increasing the cassava value addition [13].

The distinction between women and gender constructs is vital for understanding gender roles. Gender refers to socially constructed differences between men and women, shaped by societal beliefs about femininity and masculinity [14]. Understanding how these roles influence behaviour, attitudes, and power dynamics is essential for addressing gender disparities in agriculture [15]. In cassava farming, addressing gender imbalances can significantly enhance productivity, livelihoods, and economic development.

Several African and Asian countries have demonstrated successful gender-sensitive cassava value addition initiatives. In Ghana, the Women in Agriculture Development Directorate (WIAD) have trained women in value addition techniques, enhancing their income and scale up their involvement [16]. Similarly, Tanzania's Cassava Village value addition Project provides women with value addition equipment and transport access, contributing to poverty reduction and gender equality [17]. In Nigeria, initiatives like the High-Quality Cassava Flour (HQCF) project empower women in the cassava value chain, and improving people's

livelihoods [18], [19]. In other countries such as Thailand, Vietnam, and Cambodia, cassava value addition has driven economic growth, food security, and rural development [19- 22]. These experiences emphasize the need for gender-sensitive policies and value addition linkages to empower women and reduce gender disparities in agriculture. And, if these challenges are properly addressed, cassava value addition can transform the Nigerian agri-food system, foster inclusive economic growth, food security, and improved livelihoods for both men and women.

Given the aforementioned exposition, the study assessed latent actors' (harvesters and transporters) activities in cassava value addition in Oyo State, Nigeria and examined the factors associated with their involvement in cassava value addition in Oyo State, Nigeria.

Significance of the study - This study on latent actor's involvement in cassava value addition in Oyo State, Nigeria examines how addressing latent actor's inequalities could enhance agricultural productivity and rural livelihoods. Understanding latent actor's roles in cassava harvesting and transporting is essential for developing inclusive agricultural practices [7]. The research investigates barriers and opportunities for latent actor's participation to unlock latent actor's-equality policies [10]. The focus on cassava value addition responds to efforts to improve sector competitiveness [23]. By identifying factors affecting latent actor's involvement, the study can guide strategies to empower both men and women in value-adding activities [24]. This research contributes to broader goals of enhancing food security and rural livelihoods in agrarian economies where cassava is crucial for sustenance and income [1].

2. Literature Review

In Nigerian cassava value chains, there is distinct between latent actor's specialization, with men focusing on fresh cassava root production and women specializing in processing and value addition [7], [25]. Men traditionally handle physically demanding tasks such as land preparation, planting, harvesting and transporting, often managing larger plots and operating machinery [26]. They typically lead in decision-making about farming strategies, variety selection, and resource allocation [27], and have greater access to crucial resources like land and credit [8]. Women are primarily responsible for post-harvest activities and value addition, including transforming cassava into products like garri, fufu, and cassava flour through cleaning, peeling, fermenting, and milling processes [18], [27]. They also contribute significantly to labor-intensive tasks such as harvesting and transporting [28], and play vital roles in seed selection and planting, drawing on their knowledge of local varieties [29], [30].

This latent actor's-based division of labour reflects traditional cultural norms but varies based on regional and socio-economic factors. Understanding these dynamics is crucial for promoting gender equality and sustainable development in cassava agriculture. Cassava value addition involves multiple stages to transform perishable raw roots into value-added products. The process begins with harvesting, transporting and pre-processing (cleaning, peeling, washing), which must be done promptly as cassava deteriorates within 3-4 days of harvest [31]. The cleaned roots are grated into mash and pressed to extract starchy liquid containing valuable components [19], [23]. Fermentation follows, reducing cyanogenic compounds while improving flavour and nutritional qualities of products like garri [19], [23]. The product then undergoes drying using sun or mechanical methods to extend shelf life and enable further processing into industrial products [32]. Milling follows to produce fine powders or flours, enhancing final product texture and consistency [23]. Finally, products are packaged for transportation and marketing to various consumers, from local communities to industrial buyers [19]. Recent studies have highlighted significant gender-based among latent actor's roles in cassava value addition across Africa, with particular emphasis on Nigeria. The literature consistently shows a clear gender division in cassava value chain activities, where men primarily handle harvesting while women

dominate supporting harvesting and transportation activities [7], [25].

In Nigeria specifically, research has documented women's crucial role in cassava value addition. Studies show they are predominantly responsible for transforming raw cassava into various products like garri, fufu, and cassava flour, often using traditional processing methods [27], [18]. Women's involvement in these value-addition activities has been found to significantly impact household income and food security. Studies focusing on mechanized operations reveal persistent gender disparities. Men typically control mechanized aspects of cassava harvesting, including operating machine, machines and mechanical up rooters [26]. This gender-based among latent actors access to technology often impacts value addition efficiency and income generation potential among latent actors. Research in Oyo State has particularly highlighted the role of women in labor-intensive value addition activities. Women are found to dominate manual operations such as peeling, washing, and grating, while also managing small-scale processing enterprises [28]. These studies emphasize how traditional gender norms influence task allocation and resource access in the cassava value chain. Recent investigations have also examined the challenges latent actors face in cassava value addition, including limited access to modern harvesting and transportation technology, credit facilities, and market information [8]. Despite these constraints, latent actor's contributions to cassava value addition remain vital for household livelihoods and local food security [30].

2.1 Theoretical Framework

The theoretical framework for analysing latent actors in cassava value addition activities draws primarily on latent actors' analysis frameworks and social capital theory. The Harvard Analytical Framework, developed by the Harvard Institute for International Development [33], provides a systematic approach to understanding labour distribution and decision-making power between men and women in agricultural value chains. This framework examines who does what, who has access to and control over resources, and how these patterns affect value addition activities. The latent actor's analysis in agricultural value addition reveals how social norms and cultural practices influence the division of labour and resource allocation. According to [34], latent actors in Nigerian cassava value addition often face constraints in accessing technology, credit, and markets despite their significant involvement in value addition activities. The framework helps identify these latent actors-based constraints and opportunities within the cassava value addition. Social capital theory complements the latent actor's analysis framework by explaining how social networks and relationships influence economic outcomes. Putnam's conceptualization of social capital, as cited in [35], emphasizes how trust, reciprocity, and social networks facilitate collective action and economic advancement. In the context of cassava value addition, social capital manifests through informal networks, cooperatives, and associations that processors, particularly women, rely on for information, resources, and market access.

The intersection of latent actors and social capital is particularly relevant in understanding how harvesters and transporters navigate constraints in the value chain. Research by [36] demonstrates that actor's participation in social networks and cooperatives enhances their ability to access resources, improve harvesting and transporting techniques, and negotiate better prices for their services. However, traditional latent actor's roles and power dynamics can limit actor's ability to fully leverage social capital for economic advancement.

2.3 Gaps in the literature

The existing literature on latent actors in the cassava value addition reveals gaps that need further exploration, particularly in Oyo State, Nigeria. One key gap is the limited understanding of latent actor's involvement in various stages of cassava value addition. While traditional actors roles in cassava harvesting and transportation have been documented, with men focused on harvesting, transporting and women on supporting activities [7], [25], a more detailed analysis of latent actors-based patterns in the value addition process is needed.

Additionally, the socio-economic, cultural, and institutional factors influencing latent actor's participation in cassava activities remain underexplored [37]. Furthermore, research on the perceived benefits and constraints faced by harvester and transporter actors is lacking [5]. Addressing these gaps will inform unlock latent actors-responsive policies, enhancing the livelihoods and entrepreneurial opportunities for both actors in the cassava value chain in Oyo State.

3. Methodological approach

The study was conducted in Oyo State, located in the South-western region of Nigeria, situated between latitudes 7°31' and 9°12' north of the equator and longitudes 2°47' and 4°23' east of the Meridian. Covering an area of 27,249 km², Oyo State is bordered by Ogun State to the south, Kwara State to the north, the Republic of Benin to the west, and Osun State to the east. The state is home to thirty townships and rural communities, with an estimated population of 7,976,100 in 2022, showing an annual growth rate of 2.3%. Oyo State's economy is predominantly agricultural, with cassava being a major crop grown in the region. The state's tropical climate, characterized by distinct wet and dry seasons, supports the cultivation of cassava, yam, rice, and other crops [38]. Oyo State Agricultural Development Programme (OYSADEP) was established to enhance agricultural productivity and improve the living standards of farmers. The state's population is mainly of Yoruba descent, with a strong cultural heritage rooted in kinship ties and the extended family system [39].

3.1 Sampling methods, Sample size and Data collection

This study employed a cross-sectional research design, which involves collecting primary data directly from research subjects. A validated structured interview schedule designed according to the research objectives was used to elicit information from the "latent actors" (harvesters and transporters) in the cassava value addition process. A four-stage sampling procedure was used to select respondents. In the first stage, two Local Government Areas (LGAs) from each of the four Agricultural Development Programme (ADP) zones (totalling eight LGAs) in the state were purposively selected based on the highest concentration actors involved in cassava value addition. Simple random sampling was used in the second stage to select 2 (two) cells from each of the selected LGAs, making a total of 16 (sixteen) cells. Then, in the third stage, 30% of villages in each cell were randomly selected, while in the fourth stage, 50% of actors of interest were proportionately selected across the study area based on their varying population sizes in each of the selected villages. Summarily, a sample of 180 actors were chosen, but responses from 176 actors, comprising of 87 harvesters and 89 transporters were sufficiently used for the final analyses.

3.2 Data analytical approach

The study applied descriptive statistics (frequency distribution, percentages, and mean values) to explore the dataset. Also, Weighted Average Index (WAI) was also used to rank the severity of the constraints facing latent actors' involvement in cassava value addition. Furthermore, inferential statistics such as Factor analysis was used to examine the factors influencing latent actor's involvement in cassava value addition in the study area.

4. Results and Discussion of Findings

4.1 Socio-economic characteristics of the Latent Actors in the Cassava Value Addition

The socio-economic characteristics of latent actors involved in cassava value addition in Oyo State, Nigeria are shown in Table 1, and the result revealed distinct trends across actor's perspective. Based on the results, harvesters are generally middle-aged, with a mean age of approximately 42 years, and with the prevalence of male individuals (74.7%) who are mostly (81.6%) married. The results also showed that majority (49.4%) of the harvesters had at least post-primary (secondary) level of education, with an average years spent in school

estimated as 9 years. Most of the sampled harvesters practice Christianity and are into farming as primary occupation, which account for 52.9% and 69% respectively; while the estimated average household size among the harvesters were approximately 5 persons. In agreement with [40- 47], the implication of these results is that harvesters are fairly aged individuals and this may limit their work efficiency. Then, with limited years of education, harvesters may find it difficult to deal with current technological changes in agriculture to add current value; harvesters also had a fairly large household size which could be helpful as family labour on their farmlands.

For transporters, the results indicated that transporters are older individuals are more prevalent in transporting (mean age 44.3), suggesting the role may demand experience over physical endurance, and with male individual account for (78.6%) who are mostly (84.3%) married. The findings also indicated that majority (29.2%) of the transporters had at least post-primary (secondary) level of education, with an average years spent in school approximately estimated as 10 years. Most of the transporters practice Islam and are into farming as primary occupation, which account for 53.9% and 50.6% correspondingly; while the estimated average household size among the transporter were approximately 6 persons. With a trend also observed in a study by [40- 48], the implication of these results is that transporters were married individuals emphasizes the role of family support in these activities. Married individuals likely leverage family labor, indicating that cassava value addition may benefit from household-based labor strategies.

Table 1: Socio-economic characteristics of the Actors involved in Cassava Value Addition

Characteristic	Harvesting (n=87)		Transporting (n=89)	
Age Distribution	≤30:	24.1%	≤30:	12.4%
	31-40:	28.8%	31-40:	26.9%
	41-50:	18.4%	41-50:	28.1%
	>50:	28.7%	>50:	32.6%
	Mean:	41.5	Mean:	44.3
	SD:	12.8	SD:	10.0
Gender Distribution	Male:	74.7%	Male:	78.6%
	Female:	25.3%	Female:	21.4%
Marital Status	Married:	81.6%	Married:	84.3%
	Single:	13.8%	Single:	4.5%
Years Spent in School	None:	13.8%	None:	11.2%
	≤6:	24.1%	1-6:	14.6%
	7-12:	49.4%	7-12:	56.2%
	13-18:	12.6%	13-18:	18.0%
	Mean (8.85)		Mean (9.62)	
Religion	Christianity:	52.9%	Christianity:	46.1%
	Islam:	46.0%	Islam:	53.9%
Primary Occupation	Farming:	69.0%	Transporting:	50.6%
	Trading:	21.8%	Farming:	42.7%
Secondary Occupation	Farming:	47.1%	Transporting:	46.1%
	Harvesting:	33.3%	Farming:	37.1%
Household Size	≤3:	23.0%	≤3:	9.0%
	4-6:	62.1%	4-6:	68.5%
	7-9:	13.8%	7-9:	24.4%

	Mean: 4.7	Mean: 5.5
	SD: 1.9	SD: 1.7

Note: SD – Standard deviation

Source: Field survey, 2024

4.2 Level of harvester Involvement in the Cassava Value Addition

Level of involvement in the cassava harvesting activities

Table 2 highlights harvester's involvement in the cassava value addition process, which reveals distinct labor divisions. Cutting stems emerges as the most value added activity, with both genders highly involved, that is, male (59) and female (17) in the "Always Involved" category. This task's critical role aligns with [50]. Cutting tubers and uprooting tubers value added show higher male participation, possibly due to the physical demands or traditional gender roles [26]. Sorting and aggregating display a more balanced value added involvement, especially among women, suggesting less physically demanding tasks favour gender equity. Packing and grading rank lower value added, with grading showing more value added among male, potentially linked to quality assessment specialization. No one reported being "Never involved," indicating universal engagement. Despite the dominance of male gender in value added tasks, female participation in value added like sorting and cutting stems challenges gender norms, underscoring the need for gender-sensitive agricultural policies to enhance equity and value added productivity [51].

Table 2: Level of involvement in the cassava harvesting activities

Harvesting Value added	Always Involved (3)		Sometimes Involved (2)		Rarely Involved (1)		Never Involved (0)		Weight	WAI	Rank
	Female	Male	Female	Male	Female	Male	Female	Male			
Cutting stems	17	59	4	6	0	0	1	0	248	2.8	1 st
Cutting of tubers' stems	8	51	6	10	6	4	2	0	219	2.5	2 nd
Uprooting of tubers	14	19	6	24	1	16	1	6	176	2.0	3 rd
Sorting	12	14	8	34	1	15	1	2	178	2.0	3 rd
Aggregating	8	23	9	23	3	15	2	4	175	2.0	3 rd
Packing	11	52	5	10	4	3	2	0	166	1.9	6 th
Grading	14	7	4	30	4	25	0	3	160	1.8	7 th

Figures in parentheses, at the headings are weights of scale

WAI = Weighted Average Index

Source: Data analysis, 2024

4.3 Level of involvement in the cassava transporting activities

Table 3 explores the value added in the cassava transportation aspect, and this also reveals distinct labour involvement in different activities. Loading cassava roots and products is the most value added activity (WAI of 2.4) with both genders added value, particularly males (114) and females (30). This aligns with [52], highlighting the importance of efficient agricultural logistics value added. Offloading follows with a WAI of 1.8, showing a similar gender distribution but lower value added. Carriage by car/bus (WAI 1.5) reflects a preference for motorized transport, with higher value added among male actors, possibly due to vehicle ownership norms [53]. Traditional transport methods like motorcycles and bicycles rank lower in value added, indicating a shift towards modern methods. Overall, higher value added among male is noted, consistent with

[54], but significant female value added, especially in loading and motorized transport, suggests growing gender equality in the transportation process. Therefore, the findings emphasize the need for gender-sensitive transportation policies in cassava value addition [55].

Table 3: Level of involvement in the cassava transporting activities

Cassava transporting value added	Always (3)		Often (2)		Rarely (1)		Never (0)		Weight	WAI	Rank
	Female	Male	Female	Male	Female	Male	Female	Male			
Loading of cassava roots, garri, lafun and fufu	10	38	9	24	0	7	0	1	217	2.4	1 st
Off-loading cassava roots, garri, lafun and fufu	6	26	1	24	2	10	10	10	157	1.8	2 nd
Carriage with Car / Bus	10	22	3	10	3	8	4	29	133	1.5	3 rd
Carriage with tri-cycle	14	5	3	7	3	10	0	47	90	1.1	4 th
Carriage with motor cycle	2	4	1	8	15	18	2	39	69	0.8	5 th
Carriage with head	1	3	2	4	7	27	10	35	58	0.6	6 th
Carriage with bicycle	2	4	2	7	5	2	11	56	43	0.5	7 th

Figures in parentheses, at the headings are weights of scale

WAI = Weighted Average Index

Source: Data analysis, 2024

4.4 Factors Associated with Harvesters' Involvement in Cassava Value Addition

The data in Tables 4a and 4b jointly present the results of a factor analysis conducted to evaluate the major factors contributing to the involvement of harvesters in the cassava value addition process. Given the results, the analysis retained 3 factors (Factor 1, Factor 2 and Factor 3), and these are jointly significant as it suggests that these three factors account for the majority of the variability in the data (the variation in the harvesters' involvement in the cassava value addition).

From Table 4a, the first factor (Eigenvalue = 2.8662) explains the most variance (approximately 41%) among the factors, followed by the second factor (Eigenvalue = 1.7302, approximately 25%) and the third factor (Eigenvalue = 1.0512, approximately 15%). The cumulative proportion for the three factors is 80.68%, indicating that these three factors together account for a substantial portion of the variability in harvesters' involvement in cassava value addition. The LR test result ($\chi^2 = 286.09$, $\text{Prob} > \chi^2 = 0.0000$) also indicates that the factors identified are statistically significant and that the model fits the data well.

As earlier indicated, the analysis retained 3 factors, and in Table 4b revealing the factor loadings and unique variances, the results showed that Factor 1 is mostly defined by activities such as "Packing" (0.8776), "Aggregating" (0.7327), "Sorting" (0.7316), "Uprooting tubers" (-0.7046) and "Cutting tuber off stems" (-0.5554), suggesting that these activities relate closely to initial harvesting activities. The loading value with positive sign means that such activity has a direct association with factor 1, while loading value with negative sign is an indication that such activity is inversely associated with factor 1.

Also, factor 2 is strongly associated with Grading (0.7204), "Cutting tubers off stems" (-0.6690), "Uprooting tubers" (-0.5691), and Sorting (0.5251), indicating it represents the processes involved in preparing cassava for market or further processing. The positive loadings suggest that as these activities increase, this factor also increases. Then, factor 3 is made up of activities such as "Cutting stems" (0.5920), "Grading" (-0.5440), "Aggregating" (0.5279), and these have significant loadings, suggesting that this factor is related to the organization and management of harvested cassava.

Overall, the factor analysis reveals that harvesters' involvement in cassava value addition can be categorized into three significant factors that collectively explain over 80% of the variance. Each factor captures different aspects of the harvesting and value addition process, highlighting the complexity and diversity of activities undertaken by harvesters. This revelation could be useful for improving practices in the cassava value addition and developing interventions targeted at enhancing productivity and efficiency in cassava production and cassava value addition.

Table 4a: Factors Analysis - Harvesters' Involvement in Cassava Value Addition

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	2.86620	1.13597	0.4095	0.4095
Factor 2	1.73024	0.67903	0.2472	0.6566
Factor 3	1.05121	0.33089	0.1502	0.8068
Factor 4	0.72032	0.46604	0.1029	0.9097
Factor 5	0.25428	0.03132	0.0363	0.9460
Factor 6	0.22296	0.06817	0.0319	0.9779
Factor 7	0.15479	-	0.0221	1.0000

Retained factors = 3; Number of observation = 87

LR test: independent vs. saturated: $\chi^2(21) = 286.09$; Prob> $\chi^2 = 0.0000$

Source: Data analysis, 2024

Table 4b: Factors Loadings - Harvesters' Involvement in Cassava Value Addition

Variable	Factor 1	Factor 2	Factor 3	Uniqueness
Cutting stems	-0.4284	0.2518	0.5920	0.4026
Uprooting tubers	-0.7046	0.5691	0.1021	0.1692
Cutting tubers off stems	-0.5554	0.6690	0.1351	0.2256
Aggregating	0.7327	0.2273	0.5279	0.1329
Packing	0.8776	0.2213	0.2671	0.1095
Sorting	0.7316	0.5251	-0.1615	0.1629

Grading	0.1882	0.7204	-0.5440	0.1496
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Source: Data analysis, 2024

4.5 Factors Associated with Transporters' Involvement in Cassava Value Addition

The data in Tables 5a and 5b jointly present the results of a factor analysis conducted to evaluate the major factors contributing to the involvement of transporters in the cassava value addition process. Given the results, the analysis also retained 3 factors (Factor 1, Factor 2 and Factor 3), and these are jointly significant, suggesting that these three factors account for most of the variability in transporters' involvement in the cassava value addition.

In Table 5a, the first factor (Factor 1) has the highest eigenvalue of 2.2844, explaining 32.63% of the total variance. Factor 2 has an eigenvalue of 1.6360, explaining an additional 23.37%, while Factor 3 has an eigenvalue of 1.0841, explaining 15.49% of the variance. Together, the three retained factors explain 71.49% of the total variance in the data, indicating they capture a significant portion of the variability in transporters' activities. Meanwhile, the LR test result ($\chi^2 = 157.47$, $\text{Prob} > \chi^2 = 0.0000$) shows that the factors identified are statistically significant, meaning the factor analysis model fits the data well.

As mentioned earlier, the analysis also retained 3 factors, and in Table 5b showing the factor loadings and unique variances, the results revealed that Factor 1 is strongly associated with "Carriage with head" (0.8663), "Carriage with bicycle" (0.8773) and "Carriage with bus" (0.5388), indicating that it primarily represents traditional, low-tech modes of transporting cassava. The loadings are high and positive, showing that these variables contribute strongly to Factor 1. The findings also revealed that second factor (Factor 2) is strongly linked with "Off-loading cassava products" (0.7346), "Loading cassava products" (0.6565) and "Carriage with bus" (-0.5571) as well as "Carriage with motor-cycle" (0.5547). The positive loading for off-loading and loading activities and carriage with motorcycle suggest that as involvement in these activities increases, Factor 2 increases, while the negative loading for carriage with bus suggests that transport by bus is inversely related to this factor, perhaps due to the current economic instability in the country. More so, Factor 3 includes only "carriage with tri-cycle" (0.7747) which is significant in this factor. The positive loading for tricycle indicates this mode of transportation is a major contributor to this factor.

Conclusively, the factor analysis for transporters' involvement in cassava value addition identified three significant factors, explaining about 71.5% of the total variance in the data for transporter as an actor in the cassava value addition. These factors highlight different modes of transport and activities: Factor 1 relates to manual or low-tech transport methods like carrying by head or bicycle, while Factor 2 captures the use of motorized transport, particularly motorcycles and buses, but shows an inverse relationship for bus transportation mode. Equally, Factor 3 is associated with the use of tricycle. All these provides a baseline into the diverse methods used by transporters in the study area in the cassava value chain, which could help improve the efficiency and productivity of cassava transportation in the value addition path.

Table 5a: Factors Analysis - Transporters' Involvement in Cassava Value Addition

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	2.28435	0.64835	0.3263	0.3263

Factor 2	1.63600	0.55192	0.2337	0.5600
Factor 3	1.08408	0.35444	0.1549	0.7149
Factor 4	0.72963	0.14852	0.1042	0.8192
Factor 5	0.58111	0.08285	0.0830	0.9022
Factor 6	0.49827	0.31170	0.0712	0.9733
Factor 7	0.18656	-	0.0267	1.0000

Retained factors = 3; Number of observation = 89

LR test: independent vs. saturated: $\chi^2 (21) = 157.47$; Prob> $\chi^2 = 0.0000$

Source: Data analysis, 2024

Table 5b: Factors Loadings - Transporters' Involvement in Cassava Value Addition

Variable	Factor 1	Factor 2	Factor 3	Uniqueness
Loading of cassava products	0.2313	0.6565	-0.3550	0.3895
Carriage with head	0.8663	0.0684	-0.3160	0.1451
Carriage with bicycle	0.8773	0.0813	-0.1926	0.1867
Carriage with motor-cycle	0.3846	0.5547	0.4428	0.3483
Carriage with tri-cycle	0.3752	0.1899	0.7747	0.2230
Carriage with bus	0.5388	-0.5571	0.0129	0.3991
Off-loading cassava products	-0.3632	0.7346	-0.1568	0.3039

Source: Data analysis, 2024

5. Conclusion and Recommendations

5.1 Conclusion

The latent actors in cassava value addition activities in Oyo State, Nigeria, involve diverse actors' value added to the flow of cassava from farms to markets. Despite this, challenges such as labour shortages in harvesting and transportation as well as limited financial access for marketing, constrain the full potential of the sector. Although cassava offers significant income and employment opportunities, especially for rural communities, barriers like high value-added costs, gender disparities, and inadequate infrastructure must be addressed to ensure inclusive growth and sustainability. The predominance of small-scale actors in harvesting and transporting underscores that cassava remains a smallholder activity. Policy interventions focusing on latent actors-friendly equipment access, financial inclusion, and addressing latent actors imbalances are critical for scaling the sector and improving efficiency.

The study also emphasizes the importance of collective action. Cooperatives and social networks play a vital role in improving access to resources and markets. However, more formalized structures, particularly in harvesting and transporting, are necessary to meet the growing demand for cassava products.

5.2 Recommendations

Improving the cassava value addition activities in Oyo State, Nigeria, requires targeted interventions in key areas. First, enhancing rural infrastructure is essential to reduce transportation costs. Poor roads and fuel scarcity increase the cost of moving cassava from farms to processing centers and markets. Investment in road networks and ensuring a stable fuel supply would improve efficiency and market access. Financial inclusion is another priority. Cassava harvesters and transporters need tailored financial services, such as loans with flexible repayment terms. Establishing microfinance institutions and cooperative credit schemes in rural areas can improve access to capital, enabling latent actors to scale their businesses. Gender-sensitive policies must be introduced to address the existing disparities in access to resources. Women should be supported with training programs and gender-friendly technologies that enhance their participation in cassava harvesting and transporting. The full enactment of the Value-Added Act would further promote gender equity and growth in the cassava sector.

Promoting mechanization is critical to reducing labour costs and improving productivity. Introducing affordable mechanized solutions for harvesting and transportation would ease the physical burden on latent actors, boosting overall efficiency. Strengthening cooperatives and capacity-building programs can also improve access to markets and resources. Training in entrepreneurship, financial management, and technical skills would help actors scale their operations and improve business acumen, making the sector more competitive. Lastly, implementing price stabilization measures and enhancing market access can protect cassava value addition actors from market volatility and supply chain disruptions. Improved market information systems and storage facilities would increase resilience, ensuring more stable incomes for producers year-round. All these are necessary to create a more resilient, inclusive, and profitable cassava value addition sector, that will benefit Oyo State's rural communities and the broader agricultural economy.

6. References

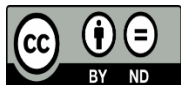
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