



# JAMD

Journal of Agricultural  
Management & Development



E-ISSN: 3141-2297  
Volume 1 Issue 1, April, 2026

ISSN 3141-2297

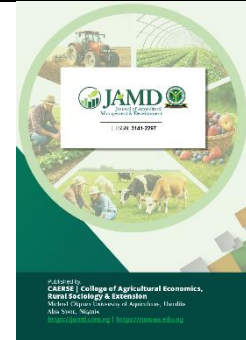


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Published by:  
**CAERSE | College of Agricultural Economics,  
Rural Sociology & Extension**  
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ABIA STATE, NIGERIA  
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**Journal of Agricultural  
Management & Development**  
E-ISSN: 3141-2297  
Volume 1 Issue 1, April, 2026



## Determinants of Market Participation among Smallholder Cassava Farmers in Osioma L.G.A of Abia State, Nigeria

Nse-Nelson, F.A., Oke, U.R., Chinedu-Eze, V.C.A and Nwadike P.C.

### ARTICLE INFO

**Author(s) Affiliation(s):**

Department of Agricultural Economics,  
Michael Okpara University of Agriculture,  
Umudike, Nigeria.

Correspondence:

Email: [nse-nelson.florence@mouau.edu.ng](mailto:nse-nelson.florence@mouau.edu.ng)

Phone: +238035236753

**Keywords:** Cassava farmers, Determinants,  
Market Participation, Marketing.



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Journal homepage: [www.jamd.com.ng](http://www.jamd.com.ng)

### ABSTRACT

The study examined the determinants of market participation among cassava marketers in Osioma L.G.A of Abia State, Nigeria. Specifically, the study examined the socioeconomic characteristics of cassava farmers in the study area; assessed the level of participation in the market by the farmers; examined the cost and return of cassava farmers in the study area; estimated the determinants of net income of cassava farmers in the study area; and identified the constraints involved in market participation of cassava farmers in the study area. A multistage sampling technique was used in selecting 60 respondents for the study. Data for the study were obtained using a well-constructed questionnaire. Data were analyzed with descriptive statistics, market participation index, and multiple regression models. Results showed that most respondents (31.67%) belonged to the 30-39 age group, with a mean age of 46 years old, implying that the farmers are middle-aged marketers. The majority of farmers (68.33%) were females, while only about 31.67% were single. The majority of the farmers (68.33) recorded a participation index range of 0.10-0.24, with a mean value of 0.23, implying they were subsistent marketers. The cassava farmers realized a monthly average total revenue of ₦175,665.65 and incurred an average total marketing cost of ₦153,464.65 while the net profit was ₦22,201.00, implying that cassava marketing in the study area is profitable. Level of market participation, educational level, household size, value of output, and cooperative membership were the positive and significant determinants of the net income while market charges had a negative and significant relationship with the net income of marketers. All farmers encountered constraints such as high transportation costs, price fluctuations, and elevated market charges within the study area. The study recommended that government and governmental organizations should sensitize and motivate cassava farmers to join cooperative societies for collective bargaining and to moderate the high market charges.

## Introduction

Root crops are valuable commodities in Africa, generating income and employment opportunities for farmers operating at the subsistence level (FAOSTAT, 2020). Smallholder farmers generate income through their involvement in cassava tubers marketing at the farm gate, homes, and markets in Nigeria. They also supply the commodity to industries using cassava roots as raw materials for starch, ethanol, and flour production (Otekunrin *et al.*, 2022). Cassava marketing starts at the farm when smallholder farmers harvest and gather cassava from the farm to the market (Eze *et al.*, 2023). Marketing allows the cassava roots to be sold to the customers in good form after being harvested, further sorted, cleared, and processed using different methods. Smallholder farmers expect payment when participating in the market, and the payments are made to cover each stage of the marketing process until the product is delivered to the end user (Egbetokun *et al.*, 2017).

Market participation refers to involvement in any market-related activity that promotes the sale of cassava as the individual household's economic transactions with others in cash or kind or commercialization (Ogundele, 2020). Market participation allows smallholder farmers to sell cassava for higher profit and purchase inputs necessary for efficient production. Reliable market access improves productivity, income, and food security and could reduce poverty and hunger among smallholder farmers. Participation in the market generally provides a greater chance for smallholder farmers to expand the scope of their marketing activities and improve their income level (Zakari *et al.*, 2023). Market participation comes in different ways. It may be on the output side of marketing with sales of farm produce or on the input side regarding accumulated use of purchased inputs (Otekunrin, 2021). Smallholder farmers participate in the output market when they produce large quantities of cassava, allocate marketable commodities, and sell a significant portion, resulting in increased transactions for specialization gains (Otekunrin *et al.*, 2022).

Furthermore, market participation is a prerequisite for enhancing agriculture-based economic growth and increasing the income of smallholder farmers whose scale of operation is subsistent, associated with low income and productivity (Otekunrin, 2021). However, subsistence production cannot improve the income of smallholder farmers without participating in the output market. These emphasized the need for intensification, increased commercialization, and specialization among smallholder cassava farmers. Also, efficient marketing systems are crucial for building these systems, ensuring low transaction costs, minimizing risk, and extending information at the least possible cost (Abu, 2015).

In Nigeria, however, market participation is determined by information cost, market structure, and transaction costs (Eze *et al.*, 2023). Other determinants of markets are inadequate market infrastructure and lack of access to technology and credit facilities. All these factors negatively affect market participation, and limit smallholder farmers' income, making it difficult to enjoy the benefits of market participation (Hussayn *et al.*, 2022). Commercial cassava production is associated with a higher degree of market participation; however, smallholder farmers are resource-poor, facing financial constraints, and have a limited quantity of cassava output which lowers their involvement in the market. Low participation is often exacerbated by pest and disease attacks that reduce the quantity of output produced and the desire to participate in output markets.

Most smallholder cassava farmers in Nigeria including the study area do not have adequate information regarding risk management, resulting in seasonal crop failures and low quantity of output. With low cassava output, the farmers may have insufficient surplus to sell in the market (Egbetokun *et al.*, 2017). Furthermore, smallholder farmers also lack access to processing and storage facilities, implying that they cannot hold their commodity for an extended period after harvest. This often results in forced sales and the inability to store the product when prices are low for sales when the prices are high in the market. (Hussayn *et al.*, 2020). Inadequate processing and storage facilities make it more difficult for smallholder farmers to add value to their products or supply in forms that match market standards. High labor cost is another factor discouraging market participation among smallholder farmers in Nigeria. The net returns are reduced when labor costs are high. This could imply that high labor costs cut significantly into the net profits of smallholder farmers, making market participation less rewarding.

Research has been conducted by scholars in Nigeria to assess the determinants of market participation among smallholder cassava farmers. For example, Egbetokun *et al.*, (2017) examined determinants of market participation among maize farmers in Ogbomoso Zone, Oyo State, Nigeria; Otekunrin *et al.*, (2022) assessed

the determinants of agricultural commercialization and challenges confronting cassava farmers in Oyo State, Nigeria. However, none has been conducted in Osisioma L.G.A of Abia State, highlighting the unique challenges faced by smallholder cassava farmers in accessing the market. Hence, this study tends to bridge the research gap by examining the socioeconomic characteristics of cassava farmers in the study area; assess the level of participation in market by the farmers; examine the cost and return of cassava farmers in the study area; estimate the determinants of net income of cassava farmers in the study area; and identify the constraints involved in market participation of cassava producers in the study area.

The findings of this study will provide smallholder farmers with insights into profitable market operation levels. It will also inform policymakers and government officials in developing evidence-based policies to enhance market participation among smallholder farmers and foster agricultural development. Additionally, the study will contribute to existing literature, serving as a valuable reference for researchers, students, and stakeholders interested in this field. The objectives were to; examine the socioeconomic characteristics of cassava farmers , assess the level of participation in market by the respondents; examine the cost and return of the respondents; estimate the determinants of net income of the cassava marketers ; and identify the constraints involved in market participation of cassava farmers in the study area.

### Methodology

The study was carried out in Osisioma L.G.A of Abia State, Nigeria. Osisioma Local Government Area is one of the existing 17 LGAs in the state with the composition of the towns of Uratta, Okpu-Umuobo, Amaitoli, Aro-Ngwa, Amasa, Oso-Okwa, Umunneise and Okupu-Umuobo. It lies between latitudes 5° 5' 57" and 5° 19' 32"MN and longitudes 7° 15' 49" and 7° 25' 23"E) with a land area covering about 198km<sup>2</sup> and a total population of 321,300 (NPC, 2022). Osisioma Local Government Area has its administrative council headquarter in Osisioma with eight other towns and many communities under the local government area. Multistage sampling technique was used in selecting 60 smallholder cassava farmers for the study. In the first stage, 6 major markets in the study area known for cassava marketing were purposively selected for the study. The markets of interest were: Ekeakpara market, Nkwo Abayi market, Afoule market, Ahia Nwankpa market, Nkwo Okpu Umuobo Market and Ahia Ekenwaobasi Markets. In the second stage, 10 cassava producers were randomly selected from each of the selected marketers from the list obtained confidentially from the market officials, giving a total of 60 respondents for the study.

Data for the study were obtained using well-constructed questionnaire. The data of interest included socio-economic characteristics such as sex, age, level of education, experience, income, access to credit, household size and cooperative membership. Others include purchase cost, transportation cost, storage cost and level of market participation. Objectives (i) and (v) were analyzed using descriptive statistics such as frequency tables, means and percentages. Objective (ii) was realized with market participation index. The market participation index is stated below:

$$MPI_i = \quad \times 100 \tag{1}$$

The respondents were grouped into three levels: Subsistence marketers (value of the sale is less than 25%); Transition marketers (value of sale between 25% - 50%) and commercial marketers (value of sale is greater than 50%).

Objective (iii) was analyzed with market budgetary approach. Cost and returns formula are stated below:

$$\begin{aligned} NR &= TR - TC \\ TC &= TVC + TFC \end{aligned} \tag{2}$$

Where:

NR = Net Returns

TR = Total Revenue

TC = Total Cost

TVC= Total Variable Cost

TFC= Total Fixed Cost

The fourth objective was analyzed using multiple regression model. The determinants of net return were analyzed with multiple regression model. The Ordinary least square (OLS) model used was implicitly stated as follows:

$$Y=f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9) \quad (3)$$

Where;

Y = Net Returns (₦)

X<sub>1</sub> = Level of market participation (%)

X<sub>2</sub> = Age (Years)

X<sub>3</sub> = Education (No of years spent in school)

X<sub>4</sub> = Household size (No of persons)

X<sub>5</sub> = Output (Kg)

X<sub>6</sub> = Transportation cost (Kg)

X<sub>7</sub> = Market charges (Kg)

X<sub>8</sub> = Amount of credit (₦)

X<sub>9</sub> = Cooperative membership (Member=1, otherwise=0)

e = error term.

## Results and Discussion

### *Socioeconomic Characteristics of the Respondents*

Result in Table 1 showed that most respondents (31.67%) belonged to the 30-39 age group, with a mean age of 46 years old, implying that the respondents are middle-aged marketers. This finding is in-line with Osakue *et al.* (2023), who studied analysis of cassava tuber marketing in rural and urban markets in Edo South Agro-Ecological Zone, Edo State, Nigeria and reported that the most of the cassava marketers were within the age range of 41 – 50.

Results also showed that the majority of respondents (68.33%) were females. This finding implies a difference in the gender distribution among cassava marketers in the study area, reflecting broader societal norms and structures regarding gender roles in economic activities. However, the high representation of females in cassava marketing suggests that women are actively engaged in this aspect of agribusiness, potentially contributing significantly to household income and welfare. This finding contradicts with Ogundele (2020), who studied factors influencing output commercialization among small-scale farmers in Nigeria and reported that most of the marketers were males.

Table 1 also showed that the majority (75%) of respondents were married, while only about 25% of them were single. This finding implies that the majority of the male and female respondents in the study area were married. Of course, marriage often brings responsibilities and commitments, which may incentivize marketers to engage more consistently in economic activities like cassava marketing to meet their needs and those of their family members. Being married could promote market participation and income of the respondents through the combined efforts of spouses. This could mean more resources available for investment in the business, leading to potential growth and improved welfare status. This finding aligns with Otekunrin *et al.* (2022) who examined the determinants of agricultural commercialization and challenges confronting cassava farmers in Oyo State, Nigeria, and reported that the majority of the marketers were married.

The majority of respondents (50%) had tertiary education as their highest level of education. In addition to the fact that the majority of the respondents are educated and capable of making wise investment decisions regarding cassava marketing, they might be less vulnerable to exploitation by middlemen and other agents who will not be able to take advantage of them in terms of pricing mechanisms, and contractual agreements. Also, education may have provided the marketers with access to information and resources that are crucial for a successful cassava marketing business. This finding also aligns with Hussayn *et al.* (2020), who examined the effects of agricultural commercialization on poverty status of smallholder cassava farming households in Oyo State, Nigeria and reported that majority of the respondents were educated.

The majority (66.67%) of respondents lived in households with 4-6 people, with an average household size of 6 persons, implying that most of the cassava marketers had a fairly large household size that could assist them. The availability of family labor could potentially lead to increased market participation among the

respondents. Also, increased market participation consequent upon the availability of family labor could reduce the cost of marketing for the marketers and potentially lead to higher incomes for the household, promoting their overall welfare.

Results in Table.1 also showed that the majority of the respondents (78.33%) had marketing experience of 1-9 years, with mean years of marketing of 6 years, suggesting that the respondents possess a high level of expertise and knowledge about the cassava market, and are more likely to be more efficient in their marketing activities including sourcing and distributing cassava roots. Over the space of 6 years, the respondents may have developed networks and relationships with buyers and other market participants which can help in maintaining a steady flow of cassava roots to the market. This finding is in tandem with Otekunrin *et al.* (2022) that most cassava marketers in Oyo State, Nigeria are experienced.

The majority of respondents (75%) did not access credit. This finding may have negatively influenced their level of involvement in cassava marketing. Of course, without credit access, cassava marketers may struggle to scale up their marketing operations, assemble marketable surplus, or cover transportation costs. Lack of access to credit could limit the level of market participation, revenues, and profitability of the respondents in the business.

The majority of respondents (66.67%) do not belong to cooperative societies. By implication, this could restrict networking and mutual support opportunities, both of which are critical for the long-term viability of businesses and their ability to adjust to shifting market conditions. However, cooperative societies often provide members with collective bargaining power, access to financial services, better pricing, and shared knowledge or training. Without these advantages, non-members may face higher costs for inputs, limited access to credit, and weaker market connections, which can hinder their ability to compete effectively and grow their businesses.

#### **Level of Participation in the Market by the Cassava Marketers**

The level of market participation of the marketers is presented in Table 2. The result showed that the majority (68.33) recorded a participation index range of 0.10-0.24, with a mean value of 0.23. This finding implies that the farmers are subsistent marketers. This subsistent level of participation in the market could be associated with limited access to credit and poor market infrastructure among others. By implication, those operating at a subsistent level might not benefit from cost reduction advantages associated with commercial and transition marketers. Also, they cannot compete effectively with larger players in the markets. This finding contradicts with Otekunrin *et al.* (2022), who examined the determinants of agricultural commercialization and challenges confronting cassava farmers in Oyo State, Nigeria, and reported that majority of the respondents were commercial traders.

#### **Cost and Return of Cassava Marketers in the Study Area**

In a month, the respondents recorded an average total variable cost of ₦92,954.15, which is about 60.57% of the total cost. It also showed that the purchase cost of cassava formed the major cost, such that it was 40.99% of the total marketing cost. This is because purchase cost is typically the biggest outlay in marketing, particularly for agricultural products like cassava (Osakue *et al.*, 2023).

Furthermore, the respondents realized a monthly average total revenue of ₦175,665.65 and the total marketing cost was ₦153,464.65 while the net profit was ₦22,201.00, implying that cassava marketing in the study area is profitable. This profit could incentivize the marketers to continue participation in the cassava market, potentially expanding their operations, investing in better technologies, and enhancing efficiency. This finding aligns with Osakue *et al.* (2023) who analyzed cassava tuber marketing in rural and urban markets in Edo South Agro-Ecological Zone, Edo State, Nigeria and reported that cassava marketing was profitable.

More so, the marketing efficiency computation showed that the respondents were only about 14.47% efficient in cassava marketing in the study area. Of course, they are inefficient because their efficiency score is less than 100%. This low efficiency could be due to several factors such as poor infrastructure, high transportation and handling costs, limited access to modern technologies, and inefficient market structures. These factors contribute to higher operational costs and reduced profit margins, preventing the marketers from maximizing returns on their investments.

### Determinants of Net Income of Cassava Farmers in the Study Area

From Table 4 above, the linear functional form was chosen as the lead equation. This was based on statistical and econometric reasons which include the magnitude of the coefficient of multiple determination, the number of significant variables, as well as the significance of F-ratio. The coefficient of multiple determination ( $R^2$ ) was 0.9619 which implies that 96.19% of the variations in the net returns of the respondents were explained by the independent variables included in the model while 3.81% unexplained was due to error factor. The F-ratio of 160.86 was statistically significant at a 1% significant level indicating that the variables included in the estimated regression model were correct and have a line of best fit.

The coefficient of level of market participation was statistically significant and had a positive relationship with the net income of the respondents at 1%. This means that the net income of the respondents tends to increase as the level of participation of the respondents increases. This is because greater market participation typically means selling a larger proportion of cassava output, which directly leads to higher revenue. When marketers expand their operations by selling more cassava, accessing larger markets, or improving their marketing strategies they are likely to achieve better economies of scale, reducing per-unit costs and increasing overall profitability. Otekunrin (2017) stated that market participation allows marketers to sell their products to a wider customer base, potentially fetching higher prices and income for their goods.

The coefficient of education was statistically significant and had a positive relationship with the net income of the respondents at 1%. This means that the net income of the respondents tends to increase as their educational level increases. A positive effect of education on the net income is expected because education promotes critical thinking ability, problem-solving ability, and decision-making skills of the respondents. Equipped with these abilities, they are more likely to make informed business decisions, such as optimizing pricing strategies, managing costs, and identifying profitable opportunities, which can lead to increased net income. This finding is in tandem with Egbetokun *et al.* (2017) who reported that education had a positive influence on the net income of the marketers.

The coefficient of household size was statistically significant and had a positive relationship with the net income of the respondents at 1%. This means that a unit increase in the household size of the respondents results in a corresponding increase in their net income. This could be due to several factors related to the contribution of household members to cassava marketing activities. In larger households, more family members are likely available to assist with various stages of cassava marketing, such as production, processing, transportation, and sales. Family labor can reduce the need for hired labor, thereby lowering operational costs and increasing net income. This finding contradicts with Zakari *et al.* (2023) who studied the drivers of smallholder farmer's market participation in the Sahelian region of Niger and reported that household size had negative effect on the net income of the marketers.

The coefficient of output level was statistically significant and had a positive relationship with the net income of the respondents at 5%. This means that a unit increase in the output of the respondents results in a corresponding increase in their net income. A higher output level means that the respondents are selling more of their products, other things being. This leads to higher net income especially if the cost of marketing does not increase proportionally.

The coefficient of market charges was statistically significant and had a negative relationship with the net income of the respondents at 1%. This means that the net income of the respondents decreases with an increase in the market charges. Market charges represent additional expenses for the marketers. When these costs rise, they cut directly into the marketers' revenue, leaving them with lower net income after covering these charges. In many cases, marketers may not be able to increase prices in response to rising market charges due to price sensitivity or competition in the market. This means that any increase in market charges directly reduces their net earnings, as their revenue remains constant while their costs increase.

The coefficient of cooperative membership was statistically significant and had a positive relationship with the net income of the respondents at 1%. This result aligns with *a priori* expectations, as cooperatives enable marketers to combine their limited resources to navigate challenging situations, sell at better prices, reduce expenses, and boost profitability. Additionally, cooperative members benefit from shared resources, equipment, and services, which lowers their operating costs and enhances their profit margins.

### Constraints Involved in Market Participation of Cassava Marketers

Results in Table 5 showed the constraints involved in the market participation of cassava marketers. All respondents encountered constraints such as high transportation costs, price fluctuations, and elevated market charges within the study area. The high transportation costs are apparent as many marketers travel long distances to sell and are also far from their homes. The increase in transportation expenses, driven by rising fuel prices and poor road conditions, further adds to the marketing costs for respondents, ultimately reducing their profit margins. This study aligns with Otekunrin *et al.* (2022), who reported that high cost of transportation was the major problem of the marketers.

Also, cassava marketing in Nigeria is seasonal since its production depends on rainfall, and producers have limited access to modern farming tools such as irrigation systems and drought-resistant varieties. As a result, cassava prices tend to fluctuate with seasonal changes, and prices often drop unexpectedly during the offseason, negatively affecting profit margins. High market charges are evident in high taxes and fees imposed by market officials, which adds to the total cost of marketing, reducing their net income.

### Conclusion

This study examined the determinants of market participation among cassava farmers in Osisioma L.G.A of Abia State, Nigeria. The findings revealed that most respondents were middle-aged, educated, and had considerable marketing experience. However, they faced significant constraints, including limited access to credit, high transportation costs, price fluctuations, and elevated market charges.

The results showed that the level of market participation, education, household size, output, and cooperative membership had a positive and significant relationship with the net income of the respondents. On the other hand, market charges had a negative and significant relationship with the net income of the respondents. The study's findings have important implications for policymakers, agricultural extension agents, and other stakeholders involved in cassava marketing in Nigeria. To improve the participation of cassava farmers in the market and enhance their net income, it is recommended that:

- Credit facilities should be made available to cassava farmers to enable them to scale up their marketing operations.
- Market infrastructure should be improved to reduce transportation costs and market charges.
- Cooperative membership should be encouraged among cassava farmers to enable them to benefit from shared resources, equipment, and services.

By addressing these constraints and providing support to cassava farmers, it is possible to improve their participation in the market, enhance their net income, and contribute to the overall development of the agricultural sector in Nigeria.

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## Appendix

**Table 1: Socio-economic characteristics of the cassava farmers**

Variables	Frequency	Percentage
<b>Age (years)</b>		
20 – 29	4	6.67
30 – 39	19	31.67
40 – 49	14	23.33
50 – 59	13	21.67
60 – 69	6	10.00
70 – 79	2	3.33
80 – 89	2	3.33
<b>Total</b>	<b>60</b>	<b>100</b>
<b>Mean</b>	<b>46</b>	
<b>Sex</b>		
Male	19	31.67
Female	41	68.33
<b>Total</b>	<b>60</b>	<b>100</b>
<b>Marital status</b>		
Married	45	75.00
Single	15	25.00
<b>Total</b>	<b>60</b>	<b>100</b>
<b>Education</b>		
No formal education	11	18.33
Primary	5	8.33
Secondary	11	18.34
Tertiary	33	55.00
<b>Total</b>	<b>60</b>	<b>100</b>
<b>Mean</b>	<b>12</b>	
<b>Household size</b>		
1-3	3	5.00
4-6	40	66.67
7-10	14	23.33
11-13	3	5.00
<b>Total</b>	<b>60</b>	<b>100</b>
<b>Mean</b>	<b>6</b>	
<b>Marketing experience</b>		
1-9	47	78.33
10-19	10	16.67
20-29	3	5.00
<b>Total</b>	<b>60</b>	<b>100</b>
<b>Mean</b>	<b>6</b>	
<b>Credit access</b>		
Yes	15	25.00
No	45	75.00
<b>Total</b>	<b>60</b>	<b>100</b>
<b>Cooperative membership</b>		
Yes	20	33.33
No	40	66.67
<b>Total</b>	<b>60</b>	<b>100</b>

Source: Field survey, 2024

**Table 2: Level of participation in market by the cassava farmers**

Index	Levels of participation	Frequency	Percentage
0.10-0.24	Subsistence	41	68.33
0.25-0.50	Transition	12	20.00
0.51-1.00	Commercial	7	11.67
Total		60	100
Mean	Subsistent marketers	0.23	

Source: Field Survey, 2024

**Table 3: Monthly cost and return of cassava farmers in the study area**

Variables	Mean Values (₦)	Share (%)
<b>Total Average revenue</b>	<b>175,665.65</b>	
Price per bag	35,133.33	
Quantity (Bags)	5	
<b>Fixed Costs</b>		
Rent	56,100.00	36.56
Depreciation	4,410.50	2.87
<b>Total Fixed Cost</b>	<b>60,510.50</b>	<b>39.43</b>
<b>Variable Costs</b>		
Purchase cost	62,900.81	40.99
Labour cost	9,766.67	6.36
Market charges	6,535.00	4.26
Cost of transportation	11,105.00	7.24
Storage cost	2,646.67	1.72
<b>Total Variable Cost</b>	<b>92,954.15</b>	<b>60.57</b>
<b>Total Marketing Cost (TVC+TFC)</b>	<b>153,464.65</b>	<b>100</b>
<b>Net Profit (TR-TMC)</b>	<b>22,201</b>	
<b>M.E(%) (Net profit/TMC×100)</b>	<b>14.47</b>	

Source: Field survey, 2024: Note: M. E=Marketing Efficiency

**Table 4: Regression estimate of the determinants of net income of cassava farmers**

Variables	(+) Linear	Exponential	Semi log	Double log
<b>Intercept</b>	-93484.52 (-4.63)***	3.65 (19.45)***	378170.60 (3.26)***	4.98 (8.51)***
Level of market participation	130969.6 (11.49)***	0.32 (3.02)***	722216.2 (8.41)***	2.63 (6.07)***
Age	-6.97 (-0.03)	0.03 (1.45)	-49361.18 (-1.00)	0.22 (0.90)
Education	2629.09 (4.63)***	0.02 (5.13)***	11181.06 (0.83)	0.25 (3.65)***
Household size	5741.98 (3.63)***	0.03 (2.08)**	126621.70 (3.23)***	0.51 (2.65)**
Output	8214.53 (2.05)**	0.33 (0.91)	-384017.3 (-4.30)***	-1.26 (-2.80)***
Transport cost	-0.42 (-1.07)	-1.56 (-0.43)	-4804.34 (-0.27)	0.07 (0.82)
Market charges	-1.75 (-4.76)***	-0.01 (-4.07)***	-35287.05 (-2.76)***	-0.27 (-4.19)***
Cooperative membership	2567.42 (2.87)***	-0.03 (-0.59)	-22309.75 (-0.60)	0.06 (0.35)
<b>R<sup>2</sup></b>	<b>0.9619</b>	<b>0.8270</b>	<b>0.8758</b>	<b>0.8338</b>
<b>R<sup>-2</sup></b>	<b>0.9559</b>	<b>0.7998</b>	<b>0.8563</b>	<b>0.8077</b>
<b>F-ratio</b>	<b>160.86***</b>	<b>30.47***</b>	<b>44.95***</b>	<b>31.98***</b>

Source: Field Survey, 2024, Note: Note: values in parentheses () are the respective t-ratio. \*\*\*, \*\*, and \* implies statistical significance at 0.01, 0.05 and 0.1 probability levels respectively.

**Table 5: Constraints involved in market participation of cassava farmers**

Variables	Frequency*	%
Lack of credit/loan	7	11.67
High cost of transportation	60	100
Perishability of the product	32	53.33
Price fluctuation	60	100
High market charges	60	100
High purchase cost	56	93.33
Under-developed market	28	46.67

Source: Field survey, 2024 \*Multiple responses recorded