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Determinants of Women Participation in Cassava Production in Imo State, Nigeria

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ABSTRACT

The study ascertained the determinants of women's participation in cassava production in Imo State, Nigeria. Primary data was collected from 104 women cassava farmers using a multi-stage sampling procedure. The instrument used for data collection was interview schedule. Descriptive statistics and ordinary least square regression analysis were the major analytical tools employed for the study. The result of the analysis showed that most participants are middle-aged (31–50 years), married, and head large households, highlighting their central role in household sustenance and income generation. Majority of them possess secondary education, which may enhance their adoption of improved practices. Women predominantly farm small plots (1–2 hectares). Annual earnings are small with most earning between ₦101,000–₦200,000, indicating limited economic empowerment. Farmers prefer high-yielding cassava varieties, though early maturity and income potential are also valued. These findings underscore the need for interventions targeting land access, improved varieties, and market opportunities. Ordinary least squares regression analysis revealed that 82.17% of the variability in women's participation in cassava production in Imo State is explained by key socio-economic factors. Age and household size showed significant negative effects, indicating that older women and those from larger households are less likely to participate. In contrast, marital status, education, farmers' association membership, and access to credit all had positive and significant impacts. Regarding income control, only 22.22% of women had full control over cassava sales revenue, while the majority (77.78%) shared decision-making, highlighting both collaborative and independent financial roles within households. Policy interventions aimed at improving access to education, credit, and cooperative membership, as well as promoting gender-equitable decision-making, are essential for enhancing women's participation and autonomy in the cassava production.

Keywords: Women, Cassava, Participation, Income generation

Introduction

Cassava (Manihot esculenta Crantz) is the most popular and widely cultivated crop in Nigeria in terms of area planted and total number of farmers involved in its cultivation. It is a major staple crop in Nigeria. Nigeria produces over 54 million metric tons (MT) of cassava per annum making her the highest cassava producer in the world, with smallholder farmers contributing approximately 95% of total production (FAO, 2020). In Imo State,

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Nigeria, cassava production is a critical component of their farming system, providing livelihoods for a significant portion of the rural community populace, especially women.

Among these farmers, women are central to the production, processing, marketing, and use of cassava, which significantly boosts household income and food security (Nweke, 2016). This is particularly true in southeastern states like Imo, where cassava has long been known as the "mother of all crops" because it is essential to women's livelihoods and household sustenance (Teeken *et al.* 2021).

However, the potential for local cassava varieties to raise the economic status of women farmers is limited because they frequently have low yields, are susceptible to pests and diseases attack and require a lot of labor. With increased yields, disease resistance, and early maturity period, the introduction of new, improved cassava varieties has shown strong potential in addressing these issues in recent years (Oluwatosin *et al.*, 2021).

Research on gender-inclusive cassava breeding has shown that incorporating women's preferences, such as cooking quality and ease of processing, into varietal development can greatly increase adoption rates and economic results (Madu *et al.*, 2024). Despite these developments, there is little empirical data on how these new varieties affect women's income generation and their involvement in cassava value chains in the study area. Gender differences still exist in terms of participation, decision-making authority, and resource access throughout the cassava value chain. In the chain, women are frequently assigned to less lucrative positions like marketing and processing, while males are in charge of higher-value tasks like large-scale production and automated processing (Olaomo, 2021).

By aligning breeding goals with the unique requirements and preferences of both male and female farmers, the introduction of newly improved cassava varieties presents a chance to alleviate these gender disparities. The importance of women in agriculture and the ability for improved cassava varieties to increase their economic empowerment serve as the foundation for this study's justification. Despite making up a significant share of Nigeria's agricultural workforce, women frequently encounter structural obstacles such as restricted access to loans, land, and agricultural inputs (Ajayi & Ogunyinka, 2019).These limitations impede their ability to generate income and be productive, which increases poverty and gender inequity cycles.

Women's livelihoods may improve as a result of the adoption of new cassava varieties that are intended to solve some of these issues. For example, higher-yielding improved varieties might increase the amount of cassava available for sale thereby increasing revenue. Shorter maturation periods can also reduce the amount of time and work needed for cultivation, creating opportunity for women to spend more time in their homes or engage in other sources of revenue (Ezedinma *et al.*, 2020).

Designing focused interventions that support gender equity and sustainable agricultural development requires an understanding of the unique effects of these varieties on women's income and involvement in cassava value chains.

The need to address the gender-specific obstacles women encounter when adopting and benefiting from agricultural innovation further justifies the study. Despite the widespread recognition of the advantages of improved cassava varieties, cultural, societal, and economic problems frequently prevent women from accessing these technologies (Adenle *et al*., 2017).
For instance, women might not have the money to buy improved cassava stems or the authority to decide which household resources to devote to their adoption. Additionally, women may not be able to fully benefit from increased yields due to the labor-intensive nature of cassava processing, which is primarily done by women.

This study offers important insights into how

agricultural innovations might be adapted to fit the demands of women farmers by looking at the elements that influence women's adoption of new cassava varieties and the ensuing effects on their income and participation.

The purpose of this study is to evaluate how newly released cassava varieties affect women's involvement in the cassava value chain and their ability to generate income in Imo State. This study aims to support sustainable agricultural methods that support equal economic opportunity for men and women by concentrating on an area where cassava significantly improves rural livelihoods.

Objectives of the study

The objectives of the study are to:

1. assess the factors that influenced farmer's decision to adopt the newly released cassava varieties
2. analyze the influence of access to land, credit, and other socio-economic variables on women's participation in the cultivation of newly released cassava varieties.
3. assess the extent of women control on income generated within the household on cassava production.

Methodology

The study was carried out in Imo State, Nigeria. A multi-stage sampling technique that involves random and purposive procedure were used for the study. In the first stage, two agricultural zones Okigwe and Owerri were selected due to their popularity in cassava production. Also one LGA from each zone was selected namely: Ngorkpoala for Owerri zone and Ehime Mbano for Okigwe zone. In the second stage, four communities each from a local government were selected making a total of eight (8) communities for the study. In the last stage, thirteen (13) farmers were selected from each community using simple random sampling techniques and this gave a total sample size of 104 respondents. Data was collected using structured questionnaires. Data collected for the research was analyzed using statistical tools such as, percentages, mean scores and Ordinary least square regression Analysis.

The regression model was specified implicitly as follows:

$$Y \text{ is } f(X_1, X_2, X_3, X_4, X_5, X_6, X_7) + e \quad \text{.....(1)}$$

Where:

Y is Participation of women in cassava Production

X_1 is Age (years)

X_2 is Marital status (dummy variable; 1is married, 0 is otherwise)

X_3 is Household size (No)

X_4 is Educational level (years)

X_5 is Membership of farmers Association (dummy variable; 1is member, 0 is non member)

X_6 is Access to Credit (dummy variable; 1 is access, 0 is no access)

X_7 is Farming size (dummy variable; 1 is full time, 0 is part-time)

e is error term

The model used was the linear form because of the presence of many dummy variables in the model. It is only when satisfactory results are not obtained from this model that other forms will be tried out, following Ukoha, (2000).

Result and Discussion

The result on Table 1 shows that the majority (40.04%) of women fall within the 41–50 age group, followed by those aged 31–40 (32.32%) and 51–60 (25.25%). This indicates that middle-aged women dominate cassava-related activities, likely due to their experience and active involvement in household sustenance and income generation.

The low participation rate of women over 60 years (3.03%) raises the possibility that older women's involvement in cassava production may be restricted by their physical roles. The predominance of women between the ages of 31 and 50 in cassava-related activities is consistent with research showing that middle-aged women are the most engaged members of agricultural value chains. Otunba-Payne (2020) claims that women in this age range are crucial to the production and processing of cassava because they frequently combine domestic duties with commercial endeavors. Their involvement is motivated by the necessity to provide income and sustain household sustenance.

The fact that a significant percentage of participants are married (77.78%) emphasizes how important cassava is to household livelihoods. 22.22% of women are widowed, which reflects their reliance on cassava for both food security and income, particularly in the absence of spousal assistance. Marital status may affect involvement in the value chain or access to resources, as seen by the low proportion of unmarried and divorced women. Onyemauwa (2012) noted that married women depend on cassava cultivation for home food security and revenue creation, which is consistent with the significant prevalence of married women (77.78%) in the cassava value chain. Another important group is widowed women (22.22%), who frequently use cassava as a coping strategy to maintain their families after losing the support of their spouses. This emphasizes how crucial the crop is as a safety net for disadvantaged populations.

The majority of households (55.56%) have six to ten individuals, whereas smaller households (33.33%) have one to five members. The importance of cassava as a staple crop for food security is highlighted by the fact that larger households may depend more on its production to meet both income and consumption needs. Women's involvement in cassava farming is strongly influenced by household size. Larger households with six to ten individuals predominate because they need to produce more food and earn more money to support their families. Because bigger families frequently depend on cassava growing for both subsistence and financial requirements, Amadi (2020) observed a positive correlation between household size and participation intensity.

The majority of women (55.56%) have completed secondary education, whilst lower percentages have completed adult education (11.11%) or primary education (12.12%). This implies that women in the cassava value chain often have moderate levels of education, which may have an impact on their capacity to use better farming techniques or obtain loans.

The high percentage of women with secondary education (55.56%) indicates that having a moderate level of education improves their capacity to access resources and adopt better practices. This result is consistent with that of Amadi (2020), who found that education greatly boosts women's involvement in cassava processing by enhancing their ability to make decisions and access information. Participants' low levels of tertiary education, however, point to a divide that might impede women's access to higher-value activities along the value chain.

Only 22.22% of women cultivate less than one hectare, and none cultivate more than four. The majority of women (71.71%) work on small farms of one to two hectares. This illustrates the limitations on land access, which are frequently prejudiced against women, and underlines the subsistence character of cassava growing. The small farm sizes (1-2 hectares for 71.71% of respondents) are indicative of women's limited access to land, a prevalent issue noted in the literature on cassava cultivation. According to Otunba-Payne (2020), women's capacity to increase productivity is hampered by their little land ownership. In a similar vein, Onyemauwa (2012) emphasized that in cassava farming, farm size is an important factor in determining productivity and income production.

The majority (66.66%) make between ₦101,000 and

₦200,000 per year, while a lesser percentage (33.33%) make between ₦201,000 and ₦300,000. According to this revenue distribution, cassava planting gives women a moderate income, but it is still not enough to significantly reduce poverty or promote economic empowerment.

The majority of women (66.66%) earns between ₦101,000 and ₦200,000 annually, which highlights the low economic returns from cassava cultivation. This is consistent with research by Amadi (2020), who found that while cassava business revenue has a good impact on women's engagement, it is still insufficient for meaningful economic empowerment. The necessity for measures like better processing technology and market access to boost profitability is highlighted by the low income levels.

According to Table 2, the majority of farmers (55.55%) prefer high-yielding varieties, whereas

Table 1. Socio-economic characteristics of respondents

Variable	Frequency N= 100	Percentages (100)	Mean
Age			
31-40	32	32.32	45.3
41-50	40	40.04	
51-60	25	25.25	
60&above	3	3.03	
Marital Status			
Single	0	0.0	
Married	77	77.78	
Divorced	1	1.01	
Widowed	22	22.22	
Household size			
1-5	33	33.33	
6-10	55	55.56	7
11-15	11	11.11	
16-20	1	1.01	
Level of Education			
Adult education	11	11.11	
Primary education	12	12.12	
Secondary education	55	55.56	
Tertiary education	22	22.22	
Farm size			
Less than one hectare	71	71.71	2.1 ha
1-2ha	29	29.29	
3-4ha	0	0	
5 ha & above	0	0	
Annual Income			
Less than ₦100,000	1	1.01	₦182,495
₦101,000-₦200,000	66	66.66	
₦201,000-₦300,000	33	33.33	
₦301,000-₦400,000	0	0	

Field survey, 2024

Table 2. Factors that influenced farmer's decision to adopt the newly released cassava varieties

Decision to Adopt	Frequency	Percentages
Early Maturing	22	22.22
High Yielding	55	55.55
High Income	23	22.23

Field survey, 2024

22.22% prefer early-maturing varieties and 22.23% concentrate on high-income types. The findings of Amadi (2020), who emphasized the significance of early maturing varieties in boosting food security and lowering production risks, are consistent with the early maturing results. This indicates that a sizable percentage of farmers value being able to harvest cassava earlier, which can be advantageous for a number of reasons, including market opportunities, food security, and risk management like reducing the impact of pests, diseases, or weather that could influence crops that mature later. It was observed from the findings that most farmers prefer high-yielding varieties, although early maturing and high-income kinds are significant.

This suggests that breeding programs should focus on developing varieties that combine high yields with other desirable traits like early maturity and market demand. Additionally, extension services should point out the benefits of adopting improved varieties to increase productivity and income among farmers The result from Table 3 showed ordinary least square regression estimates of the determinants of women participation in cassava production in Imo state, Nigeria. The F value was highly significant at 1% indicating goodness of fit of regression line. R^2 value of 0.8217 indicates that 82.17% variability in Participation of women in cassava production was explained by the independent variables. Coefficient of age was negative and significant at 5% probability level. This implies that an increase in age of farmer will lead to decrease in the Participation in cassava production. Coefficient of marital status was positive and significant at 1% level of probability, this implies that being married increases the likelihood of engaging in cassava production. Married people often have spouses and possibly children who can contribute labour for cassava production. Coefficient of household size was negative and significant at 5% probability level, this implies that an increase in household size will decrease in the participation in cassava production. This is in contrast with the a priori expectation. Households with larger size may have more members seeking off-farm employment or engaging in other income generating activities, thereby reducing the available labour for cassava cultivation. Coefficient of education was positive and highly significant at 1% probability level which implies that an increase in level of education will have a corresponding increase in level of participation in cassava cultivation. Educated farmers are more likely to adopt improved farming technology, it enhances farmers ability to access and interpret agricultural extension services, climate information etc. They can manage farm income more effectively secure loans for expanding their level of cassava production. This result is in agreement with the findings of Ejechi (2023) who discovered that the coefficient of the educational level was positive and significant at the 1% probability level. Farmer's education level has a positive and significant effect on sweet potato value addition and processing, implying that the likelihood of adding value and processing increases with the farmer's formal education level. Coefficient of farmers association was positive and highly significant at 1% probability level which suggest that being part of farmers group increases the likelihood of engaging in cassava production, they often benefit from bulk purchase of seeds, fertilizers and pesticides reducing costs and improving cassava production. Association also provide access to training programs, extension services and best farming practices leading to higher productivity. This result is in tandem to the earlier

Table 3. Determinants of Women Participation in Cassava Production

Participation	Coefficient.	Std. Err	T	P>|t|
Age	-.0459491	.013734	-3.35**	0.001
Marital status	.8439288	.1258844	6.70***	0.000
Household size	-.4540028	.153876	-2.95**	0.004
Education	.2316656	.0360548	6.43***	0.000
Association	.3802419	.0813654	4.67***	0.000
Credit	.27456	.1458405	1.88*	0.063
Farm size	-.6160358	.6072132	-1.01	0.313
Constant	1.521808	.54087	2.81**	0.006
R-squared	0.8217			
Adj R-squared	0.8080			
F	59.9***			

Field survey, 2024

work of Ejechi *et al*. (2022) who discovered that belonging to farmers association was positive and significant at 5% level indicating that membership to farmers association has a positive relationship with increase in income of sweet potato farmers in Ebonyi state. Coefficient of credit was positive and slightly significant at 10% probability level implying that access to credit increases cassava production participation, its effect is not very strong because of some reasons like limited credit utilization for farming, small loans that may not be enough to make a significant difference in cassava production or high interest rate or delay disbursement of loan which may make the farmer miss the planting season reducing its effectiveness in cassava production. This result is similar to the research of Agoh (2020), who found that access to credit enhances the respondent's involvement in the value addition of sweet potatoes at the 5% level of significance.

The result from Table 4 provides insights into the extent of women's control over income generated from cassava sales within households. It was discovered that (22.22%) of women studied have full control over the income from cassava sales. This shows that about 25% of the women polled make their own financial decisions. Nonetheless, the majority of women (77.78%) make joint decisions. This implies that the majority of women collaborate with others to make financial decisions, most likely their partners or family members.

This outcome is consistent with the findings of Ngoma-Kasanda and Sichilima (2016), who found that women's power over production and sales tends to decline as crops become more commercialized. Nonetheless, initiatives that encourage women's participation from production to marketing might promote the preservation of their ability to make decisions. Overall, a sizable minority of women have complete authority over financial management, despite the fact that a significant fraction of them share

Table 4: The Extent of Women Control on Income Generated Within the Household on Cassava Production

Income Control	Frequency	Percentage
Full control	22	22.22
Joint decision	77	77.78

Source: Computed from STATA 15

decision-making. This indicates a mix of autonomy and cooperation in these households.

Conclusion and Recommendation

In conclusion, both enabling and limiting variables affect women's involvement in cassava cultivation in Imo state. The importance of women in the cassava value chain is highlighted by socioeconomic factors. Notably, participation was positively correlated with education, marital status, membership in farmers' associations, and credit availability. These findings highlight the significance of social capital, financial resources, and knowledge in empowering women in the cassava industry while highlighting enduring issues like low incomes, restricted land access, and educational disparities.

Women's participation, productivity, and economic results in Imo State's cassava industry could be improved by addressing these obstacles with gender-sensitive policies and initiatives. A comprehensive picture of women's agency is also revealed by the analysis of income control: although a minority have complete control over cassava income, the majority take part in joint decision-making, which reflects both the continuation of traditional household dynamics and new opportunities for shared financial management.

It is recommended that Policy interventions aimed at improving access to education, credit, and cooperative membership, as well as promoting gender-equitable decision-making, are essential for enhancing women's participation and autonomy in the cassava sector.

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