Evaluation of the Effects of Gender Mainstreaming on Cassava Production in Etche Local Government Area

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Abstract

The study was done in Etche local government Area of Rivers State and focused on the effects of gender mainstreaming on cassava production in the study Area. The study evaluated the impact of production variables on cassava output using four regression models, analyzed the gross margins and discriminatory variables in cassava production activities in male only, female only and male/female jointly owned cassava production activities. Data showed a consistent positive and significant relationship in male farms and revenue across all four models. This suggests farms with higher male labor input tend to generate more revenue. Data also reveals a pattern in specific production activities. Male involvement in land preparation and processing showed a positive association with revenue, particularly evident in the Double-log and Exponential models. Conversely, the data suggest a negative relationship between female involvement in planting and weeding activities and farm revenue and consistently significant across all models. This is crucial and demands tactical interpretation. The adjusted R^2 was over 60% suggesting the regression model explained significantly the relationship between the dependent and independent variables. Male-owned farms showed higher yield and profit compared to female-owned farms, interestingly; female-owned farms had a slightly higher gross margin. 73.3% of females reported limited access to land and credits. For agricultural inputs, 53.3% of females faced limited access. The disparity widens for insufficient agricultural machinery, with 78.9% of females affected. In terms of training, 74.4% of females reported limited access. Cultural norms limited 52.2% of females while household responsibilities constrained 60% of females. Limited decision-making power affects 61.1% of females. Interestingly, limited education affected more males (60%) than females. Physical security concerns are relatively evenly distributed, with 52.2% of females and 47.8% of males reporting this issue. The researchers therefore recommend a synergistic relationship between the genders to scale up agricultural productivity in response to the outcome of the results amongst others.

Keywords: Gender, mainstreaming, cassava, production

Introduction: Globally, Gender mainstreaming is a concept adopted in promoting gender equality and addressing issues of gender-bases and discrimination (UN Women, 2022). The concept was developed in the 1990s at the United Nations Fourth World Conference on Women, in Beijing in 1995. It advocated for Action to mainstream the gender perspective in all policies and programs globally (UN, 1995). It is seen as a medium in assessing the implications for women and men in any action, such as legislations, policies or programmes in all areas of human endeavour and at all levels. It aims at making both women and men's interests and experiences integral aspects in the design, implementation, monitoring and evaluation of policies and programmes in political, economic and societal concerns so that both gender can benefit equally (ECOSOC, 1997). The foregoing implies the main aim of gender mainstreaming is achieving gender equality through addressing underlying causes of gender biases and ensures that the views and experiences of both women and men are given equal consideration and integrated into all policies, programs, and practices (UN Women, 2022). It acknowledges gender-biases and inequalities are acutely entrenched in social, cultural, economic, and political structures, and addressing them will require systematic and comprehensive approaches (Caglar, 2013). In agriculture, gender mainstreaming is seen as a critical factor in achieving sustainable development and food security (FAO, 2019).

Gender based economic discriminations have exacerbated inequitable distribution of benefits and resources in the cassava value chain. Ezeano, Ume, Okeke, & Gbughemobi (2022) observed women often are marginalized in profits distribution in cassava production and processing. This has limited their ability to reinvest in their farms and enhance their livelihoods. Omotayo, Ogunniyi, Tchereni, & Nkonki-Mandleni, (2021) opined this biased distribution of resources and benefits undermines women's economic empowerment perpetuating cycles of poverty among female cassava farmers. In addition, the perpetuation of gender biases and social inequality remains a significant issue in the cassava producing sector in Etche Local Government Area. Traditional gender roles and norms reinforce stereotypes that limit women's decision-making roles and participation in leadership within farm organizations and structures. Some schools of thought believe these social barriers inhibit women's ability to influence policies and practices in the agricultural sector. Ojo, Baiyegunhi, & Salami, (2021) in the same vein considers these stereotypes are contributing to the

undervaluation of women's contributions to the cassava value chain. Gender mainstreaming advocacy and initiatives may have been highlighted in some quarters to address these issues, their effectiveness in making the women visible in several contending issues in the agriculture and the cassava sector in particular in the study area remain unclear. It is therefore imperative to address the impact of these gender mainstreaming efforts in the study area and identify existing gaps and challenges and deliver evidence-based policies and interventions. This study therefore aims to address some existing knowledge gaps by examining the effects of gender mainstreaming on cassava production in the study area with the ultimate goal of promoting gender equality and address existing biases in the sector. Summarily, it will elucidate valuable understanding of gender dynamics in agriculture, specifically in cassava production. By assessing current gender roles and disparities influencing gender mainstreaming effectiveness, the research may provide crucial clues for policymakers, agricultural extension services, and development agencies. The findings may thereby usher in evidence-based policy formulation that may lead to equitable and sustainable agricultural practices. By identifying disparities in productivity the research can highlight areas where targeted interventions may be needed. Literature suggests women are the principal food producers; however, they remain to a considerable extent relegated partners in the agricultural scene. Inadequate gender disaggregated data suggests women's contribution to agriculture is inadequately represented and their specific needs ignored in agricultural development planning. Nevertheless, women's potentials in agricultural planning and policies need be prioritized if the goal of the 1996 world food summit of halving the number of hungry people in the world is to be achieved. Rights to equal participation and recognition in the agricultural scene can only come through if the relevant policies and plans reinforce these rights by spelling them out (Stephens, 2021).

The agricultural sector accounts for a reasonable proportion of the Gross Domestic Product (GDP), employs a substantive number of the workforce and, the main source of **Linear regression model**

livelihood for the majority of the Nigeria's households. It also accounts for a sizeable share of all economic activities and livelihoods among smallholder farmers. Though both men and women contribute significantly to agricultural production, their access however to agricultural resources differs (FAO, 2010). This bias in access and control of agricultural resources may inhibit agricultural intensification. The acceptance and integration of gender concerns into national agricultural programmes will therefore be a welcome development. Though there have been genders policies aimed at reducing gender inequalities, gaps still remain mostly due to implementation. Amoah (2010), posits that little has been achieved beyond rhetoric and paperwork in attempts to mainstreaming gender policies especially where it concerns enhancing agricultural productivity. To address these gaps, this study aimed: 1) to examine Gender roles and disparities on the revenue of cassava farmers with gender biases 2) to assess average Gross-margin of various farm-ownership and the effect of gender variability on it and 3) Gender discriminating factors limiting productivity of cassava farming in the study area

Methods and material: The study was conducted in Etche Local Government Area of Rivers State, Nigeria. Agriculture is the primary economic activity in Etche. The major crops grown in the area include cassava, yam, maize, vegetables, and some cash crops like oil palm and rubber. Farming practices in the area are predominantly small-scale and subsistence-based; most farmers rely on traditional methods with limited access to modern agricultural technologies and inputs. Data collection was through the distribution of structured questionnaire to selected cassava producers. Interview schedules were also adopted for selected uneducated cassava farmers. Data was analyzed using four regression models, gross margin, descriptive and inferential statistical techniques in line with research objectives. The regression models helped in determining the effect of gender variability on the productivity of cassava producers in Etche. The four regression models are Linear, Semi-Log, Double Log, and Exponential models.

The linear regression model assumes a direct relationship between gender variability and revenue. The general form of the linear regression model is:

$Y = \beta_0$ to $\beta_8 X + \epsilon$

Where:

Y = Revenue from cassava production (dependent variable)

X = independent variables represented thus:

X1 = Decision making

X2 = Land preparation

X3 = Planting

X4 = Weeding

X5 = Harvesting

X6 = Processing

X7 = Marketing

X8 = Workload

$\beta 0$ = Intercept

$\beta 1$ = Coefficient of the log-transformed production costs

ϵ = Error term

$\beta 0$ = Intercept (constant term)

$\beta 1$ = Slope coefficient of the total production costs

ϵ = Error term (random disturbances)

Semi-Log Model

The semi-log model transforms the independent variable (total production costs) into a logarithmic form while keeping the dependent variable (revenue) in its original linear form. The specification of the semi-log model is:

$Y = \beta 0$ to $\beta 8 \log(X) + \epsilon$

Where

Y = Revenue from cassava production (dependent variable)

$\log(X)$ = Natural logarithm of independent variables (indicated above)

$\beta 0$ = Intercept

$\beta 1$ = Coefficient of the log-transformed production costs

ϵ = Error term

Double Log Model

In the double log model, both the dependent and independent variables are log-transformed. This model measures the elasticity of revenue with respect to production costs. The double log model is specified as:

$\log(Y) = \beta 0$ to $\beta 1 \log(X) + \epsilon$

Where:

$\log(Y)$ = Natural logarithm of revenue from cassava production (dependent variable)

$\log(X)$ = Natural logarithm of independent variables viz:

Exponential Model

The exponential model assumes that the relationship between production costs and revenue grows at an exponential rate. The model is expressed as:

$\log(Y) = \beta 0$ to $\beta 8 X + \epsilon$

Where:

$\log(Y)$ = Natural logarithm of revenue from goat production (dependent variable)

X = The independent variables (indicated above)

$\beta 0$ = Intercept

$\beta 1$ = Coefficient of the total production costs

ϵ = Error term

$Y = \beta 0 + \beta 1 X 1 + \beta 2 X 2 + ... + \beta k X k + \varepsilon$

Where:

Y = Revenue of cassava farmers

$\beta 0$ = Constant or intercept term

$\beta 1, \beta 2, ..., \beta k$ = Regression coefficients representing the effects of independent variables (indicated above)

ε = Error term capturing unexplained variatio

Results and Discussion

Table 1 discusses the impact of gender variability on the revenue of cassava producers and how gender status has affected the revenue base in the enterprise. The findings of the study is shown in the table below

Table1: Gender roles and disparities on revenue of cassava farmers

Variables	Linear	Semi-log	Double-log	Exponential
Constant	1157242.810 (2.245)**	1210475.842 (3.073)*	13.513 (62.766)*	13.352 (47.892)*
Decision Maker	20589.240 (0.150)	205133.329 (0.914)	0.154 (1.258)	0.048 (0.653)
Land Preparation	233629.424 (1.146)	608239.771 (1.211)	1.091 (3.974)*	0.443 (4.016)*
Planting	-312522.269 (-3.463)*	-661469.392 (-4.081)*	-0.406 (-4.580)*	-0.197 (-4.033)*
Weeding	-541190.710 (-4.287)*	-959242.764 (-4.458)*	-0.533 (-4.529)*	-0.307 (-4.495)*
Harvesting	281053.382 (2.422)**	477463.392 (2.329)**	-0.171 (-1.529)	-0.078 (-1.240)
Processing	87078.296 (1.036)	172875.176 (1.133)	0.223 (2.679)*	0.119 (2.622)*
Marketing	-6872.479 (-0.058)	-138552.438 (-0.671)	0.258 (2.286)**	0.183 (2.872)*
Workload	520738.919 (6.095)*	886970.898 (6.091)*	0.493 (6.194)*	0.285 (6.170)*
R-square	0.647	0.653	0.692	0.694
Adjusted R-square	0.613	0.618	0.661	0.663
F-statistic	18.586*	19.098*	22.715*	22.930*

* Significant at 1% level ** Significant at 5% level
Source: Onyenwem, 2024

The observation from the table is consistently positive and significant in the relationship between overall male workload and farm revenue across all four models. This suggests that farms with higher male labor input tend to generate more revenue. However, this finding should be interpreted with caution. Rather than indicating inherent productivity differences between genders, it likely reflects deeper structural inequalities in the agricultural sector. These may include disparities in access to resources, training opportunities, improved technologies, and markets - factors that have been widely documented in Nigerian agriculture. For instance, Otekunrin, Momoh, & Ayinde (2021) highlighted similar gender-based disparities in access to agricultural resources and their impact on farm performance across various regions in Nigeria. The data also reveals interesting patterns in specific production activities. Male involvement in land preparation and processing shows a positive association with revenue, particularly evident in the Double-log and Exponential models. This aligns with findings from other studies in Nigeria, such as Ogunniyi, Oluseyi, Adeyemi, Kabir & Philips (2018), who found that male-headed cassava farming households in Oyo State tended to have higher technical efficiency. The positive relationship between male involvement in processing and revenue is particularly noteworthy, as processing is traditionally considered a female domain in cassava production. This could indicate a shift in gender roles or, more likely, suggest that male involvement in processing is associated with larger-scale or more mechanized operations. Tarawali, Iyangbe, Udensi, Ilona, Osun, Okater, & Asumugha, (2014) noted that mechanization in cassava processing can significantly increase productivity and profitability, which might explain this association if men have better access to such technologies.

Conversely, the data shows a negative relationship between female involvement in planting and weeding activities and farm revenue, consistently significant across all models. This finding is crucial and warrants careful interpretation. It doesn't necessarily imply that women are less efficient at these tasks. Instead, it likely reflects broader structural inequalities in the agricultural sector. For example, Adeyemo, , Ajani, & Nahunnaro (2019) found that in Oyo State, female cassava farmers often had less access to improved varieties, fertilizers, and mechanization. Such disparities could explain the lower productivity associated with female-dominated tasks, highlighting the need for targeted interventions to address these inequalities. Interestingly, the gender of the primary decision-maker doesn't show statistical significance across any of the models. This is somewhat surprising and contrasts with some other studies in Nigeria. For instance, Adeyemo and Kuhlmann (2017) found that the gender of the primary decision-maker significantly influenced the adoption of improved practices in cassava farming. This discrepancy might be specific to the Etche LGA context or could suggest that decision-making power alone doesn't directly translate to revenue differences without accompanying access to resources and opportunities. The mixed results for activities like harvesting and marketing across different models suggest that the relationship between gender roles in these activities and farm revenue is complex and may depend on various contextual factors. This complexity underscores the need for nuanced, context-specific approaches when designing interventions to promote gender equality in cassava farming.

Table 3: Average Gross-margin of various farm-ownership

Variable	Female-owned Farm	Male-owned Farm	Jointly-owned Farm
TOTAL YIELD	3500.00	4286.67	6800.00
PRICE/KG	366.0000	397.3333	386.3333
TC	483566.6667	700766.6667	896300.0000
REVENUE	1302800.0000	1698133.3333	2598000.0000
PROFIT	819233.3333	997366.6667	1701700.0000
GROSS MARGIN	0.6041	0.5701	0.6521

Source: Onyenwem 2024

For female-owned farms, the average yield was 3,500 kg, with total revenue of ₦1,302,800. Profit and gross margin were ₦819,233.33 and 0.6041 respectively. Male-owned farms recorded an average yield of 4,286.67 kg, with revenue of ₦1,698,133.33. Profit and gross margin were ₦997,366.67 and 0.5701 respectively. The highest productivity, profit and gross margin were recorded in jointly owned cassava producing ventures. They demonstrated the highest performance across all metrics with an average yield of 6,800 kg and revenue of ₦2,598,000. Profit and gross margin were ₦1,701,700 and 0.6521 respectively. It is obvious that jointly-owned farms posted the most productive and profitable venture among the three ownership types. They also had the highest yield, revenue, profit, and gross margin. This suggests that collaborative efforts between male and female farmers may lead to greater efficiency in resource utilization and better overall farm performance. Male-owned farms had higher yield, revenue, profit and gross margin compared to female-owned farms, but interestingly, female-owned farms had a slightly higher gross margin. Suggestively, while male-owned farms may have posted higher production volumes, female-owned farms may be more efficient in managing costs. The result aligns with some studies on gender dynamics in Nigerian agriculture. Oseni, Corral, Goldstein, & Winters. (2015) found that female-managed farms in Nigeria were 28% less productive than male-managed ones primarily due to limited access to inputs. However, field data suggests female-owned farms may be more efficient in cost management which reflected in higher gross margin. The better performance of jointly-owned farms agrees with the study of Kafle, Michelson, & Winter-Nelson (2022), who indicated that joint decision-making in agricultural households can lead to improved agricultural productivity outcomes. This supports the idea of combining resources by both genders in farming operations. The lower yield and revenue of female-owned farms can be contextualized by the gender discriminating factors indicated in table 3 below. For example, 73.3% of females reported limited access to land and inadequate credit access, unlike their male counterparts. These disparities in resource access may have contributed to the productivity gap observed. However, it is observed that despite these challenges, female-owned farms displayed some level of competitiveness in gross margin values. This suggests women farmers in Nigeria may be employing novel strategies in overcoming resource constraints and maintain farm profitability.

Table 3: Gender discriminating factors limiting productivity of cassava farming

Variable	Category	Frequency	Percentage
Limited access to land	Female	66	73.3%
	Male	24	26.7%
Lack of credit access	Female	66	73.3%
	Male	24	26.7%
Limited access to agricultural inputs	Female	48	53.3%
	Male	42	46.7%
Insufficient agricultural machinery	Female	71	78.9%
	Male	19	21.1%
Limited access to training	Female	67	74.4%
	Male	23	25.6%
Cultural norms limitation	Female	47	52.2%
	Male	43	47.8%
Household responsibility constraint	Female	54	60.0%
	Male	36	40.0%

Variable	Category	Frequency	Percentage
Limited decision-making power	Female	55	61.1%
	Male	35	38.9%
Limited education	Female	36	40.0%
	Male	54	60.0%
Physical security concern	Female	47	52.2%
	Male	43	47.8%

Source: Onyenwem, 2024

The table 3 shows the statistics of male and female farmers affected by various limitations. These findings indicated significant gender disparities in cassava production, particularly access to resources, training, and decision-making. The result aligns with recent studies in Nigeria and highlights persistent challenges faced by female farmers. Ojo et al. (2020) observed similar barriers and attributed it to cultural norms and traditional land tenure systems that most a times preclude the female gender. The limited access to agricultural inputs and machinery reported corroborates Adeyeye et al. (2017) findings that suggest the female cassava producers in southwestern Nigeria had less access to modern agricultural technologies, leading to lower yields and reduced income. The substantial gap in access to training observed is consistent with the findings of Otekunrin et al. (2019) in Ogun State, Nigeria that suggest female cassava producers had less access to extension services and agricultural training programs, significantly impacting their adoption of improved cassava varieties and modern farming techniques. This knowledge gap the study suggests contributed to the perpetuation of productivity disparities between male and female cassava producers. The result of cultural norms and household responsibilities as factors limiting female farmers' productivity, aligning with the study of Ogunniyi et al. (2020) which suggest sociocultural norms and domestic responsibilities often restrict women's participation in agricultural decision-making processes in rural Nigeria, limiting their ability to allocate resources effectively and adopt new farming practices. Interestingly, there is an even distribution of physical security concerns between the genders which contrasts the works of Onyeneke, Amadi, & Anosike (2019) in southeastern Nigeria that suggests female cassava farmers were more likely to face security challenges, particularly when traveling to markets or accessing remote farmlands. This discrepancy may suggest regional variations in security concerns or changes in the security landscape over time.

Conclusion: The results suggest that while progress has been made towards gender parity in cassava production representation in Etche LGA, significant gender-based disparities persist in various aspects of cassava production. These disparities are evident in access to resources, roles in farming activities which may be impacting farm productivity. The superior performance of jointly-owned farms underscores the potential benefits of collaborative efforts between male and female farmers. However, the persistent gender discriminating factors identified in the study, such as limited access to land, credit, machinery, and training for female farmers, continue to hinder the full realization of gender mainstreaming in the cassava producing sector.

Recommendation: With respect to the foregoing, the researchers make the following recommendation; . a gender unit should be set up in every local government to initiate mainstreaming and implementation process. ; . policy makers should ensure gender synergistic policies and endeavor to incorporate women who may be marginal farmers in planning and decision-making programmes; gender mainstreaming should ensure equitable participation of all the genders to ensure gender equity and, policies on gender-specific issues should indicate how they are to be addressed and ensure gender specific policies are accompanied by equitable resource allocations.

Reference

Adeyemo, T. A., & Kuhlmann, K. (2017). Factors influencing the adoption of improved cassava varieties
in Southwestern Nigeria. Journal of Agricultural Extension, 21(3), 1-14.

Adeyemo, T. A., Ajani, O. I. Y., & Nahunnaro, H. (2019). Socio-economic determinants of cassava
production in Taraba State, Nigeria. Journal of Agricultural Sciences, 64(2), 193-206.

Adeyemo, T. A., Ogunniyi, A., Oluseyi, O. K., & Ajala, A. O. (2019). Gender analysis of productivity and
technical efficiency among small-holder cassava farmers in Southwest Nigeria. Journal of Agricultural Sciences, 64(2), 169-182.

Adeyeye, J. A., Ogunleye, K. Y., & Akinbile, L. A. (2017). Factors affecting the use of improved cassava
production technologies among farmers in Oyo State, Nigeria. Journal of Agricultural Extension, 21(1), 14-26.

Caglar, G. (2013). Gender mainstreaming. Politics & Gender, 9(3), 336-344.

Economic and Social Council (ECOSOC). (1997). Report of the Economic and Social Council for 1997.
United Nations.

Ezeani, C. I., Ume, C. O., Okeke, C. C., & Gbughemobi, B. O. (2022). Influence of gender on cassava value
chain in Anambra State, Nigeria. International Journal of Agriculture and Rural Development, 25(1), 5694-5702.

FAO & ECOWAS. (2018). National Gender Profile of Agriculture and livelihoods. FAO.

FAO. (2010). The State of Food and Agriculture. Women in Agriculture Closing the gender gap
for development. Rome, Italy. Retrieved Feb., 2025, from https://www.fao.org/3/I2050E/i2050e.pdf

Food and Agriculture Organization (FAO). (2019). National gender profile of agriculture and rural.
livelihoods – Nigeria. FAO

Kafle, K., Michelson, H., & Winter-Nelson, A. (2022). Joint decision-making and agricultural productivity:
Evidence from Nigeria. World Development, 151, 105728.

Ogunniyi, A., Oluseyi, O. K., Adeyemi, O., Kabir, S. K., & Philips, F. (2018). Scaling up agricultural
innovation for inclusive livelihood and productivity outcomes in sub-Saharan Africa: The case of Nigeria. African Development Review, 30(S1), 125-139.

Ogunniyi, L. T., Ajao, A. O., Oladejo, J. A., & Oluwasola, O. (2020). Gender differentials in technical
 efficiency of cassava production in Oyo State, Nigeria. Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, 20(1), 389-396.

Ojo, T. O., Baiyegunhi, L. J. S., & Salami, A. O. (2021). Adoption of climate-smart agricultural practices
and the welfare of smallholder cassava farmers: Evidence from Nigeria. Technology in Society, 67, 101752. https://doi.org/10.1016/j.techsoc.2021.101752

Omotayo, A. O., Ogunniyi, A. I., Tchereni, B. H., & Nkonki-Mandleni, B. (2021). Understanding the link
between households' poverty and food security in South West Nigeria. The Journal of Developing Areas, 55(1), 123-138. https://doi.org/10.1353/jda.2021.0007

Onyeneke, R. U., Amadi, M. U., & Anosike, F. C. (2019). Resilience of households with different livelihood
portfolios to climate change in Umuahia North Local Government Area of Abia State, Nigeria. Journal of Environmental Management and Tourism, 10(5), 1109-1122.

Oseni, G., Corral, P., Goldstein, M., & Winters, P. (2015). Explaining gender differentials in agricultural
production in Nigeria. Agricultural Economics, 46(3), 285-310.

Otekunrin, O. A., Otekunrin, O. A., Momoh, S., & Ayinde, I. A. (2021). How far has Africa gone in
achieving the zero hunger target? Evidence from Nigeria. Global Food Security, 28, 100488.

Otekunrin, O. A., Otekunrin, O. A., Sawicka, B., & Ayinde, I. A. (2019). Three decades of fighting against
hunger in Africa: Progress, challenges and opportunities. World Nutrition, 10(3), 22-46.

Stephen, A (2021). Gender issues in agricultural and rural development policy in Asia and the Pacific.
FAO bulletin. Culled 2025 from https://www.fao.org/4/x0177e/x0177e04.htm#P825_63589

Tarawali, G., Iyangbe, C., Udensi, U. E., Ilona, P., Osun, T., Okater, C., & Asumugha, G. N. (2014).
Commercial-scale adoption of improved cassava varieties: A baseline study to highlight constraints of large-scale cassava based agro-processing industries in Southern Nigeria. Journal of Food, Agriculture and Environment, 10(3-4), 689-694.

UN Women. (2022). Concepts and definitions. https://www

United Nations (UN). (1995). Beijing Declaration and Platform for Action. United Nations.