

Economic Impact of Value Chain Development Programme on Net Farm Income among Cassava Farmers in Southeast Nigeria

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Abstract: This study evaluates the economic impact of participation in the Value Chain Development Programme (VCDP) on the net farm income of cassava farmers in Anambra and Enugu States, Nigeria. Utilizing primary survey data from 600 smallholder cassava farmers (334 participants and 266 non-participants), the analysis employs an Augmented Inverse Probability Weighting (AIPW) estimator to control for selection bias and endogeneity, with Propensity Score Matching (PSM) and independent samples t-tests used as robustness checks. The findings show that VCDP participants generated substantially higher total revenue than non-participants (₦2,639,486.78 and ₦1,724,681.80), largely driven by higher yield outputs among participants (33.68 tonnes) compared with non-participants (21.98 tonnes) rather than price differentials. Descriptive analysis reveals an observed mean net farm income of ₦2,223,971 for participants compared to ₦1,409,672 for non-participants. The doubly robust AIPW estimation confirms a positive, statistically significant causal effect, indicating that VCDP participation increased annual net farm income by ₦813,903.30 ($p < 0.001$). Robustness checks using PSM showed a highly consistent treatment effect of ₦805,227.70 ($p < 0.001$). Post-estimation diagnostics confirm that propensity score weighting successfully eliminated covariate imbalances, ensuring reliable counterfactual comparisons. Therefore, the study concluded that integrated value-chain interventions effectively enhance farm profitability and smallholder economic welfare, supporting the expansion of coordinated agricultural support models and recommends strengthening and expanding integrated VCDP support, particularly interventions that improve productivity, timely input access, market linkages, and access to agricultural finance, to sustain and broaden income gains among cassava farmers.

Keywords: Value Chain Development Programme (VCDP), Net Farm Income, Cassava Farmers, Augmented Inverse Probability Weighting (AIPW), South-Eastern Nigeria.

INTRODUCTION

Cassava is an important food and cash crop in Nigeria and contributes substantially to household livelihoods, rural employment and agro-processing activities (FAO, 2023; Liverpool-Tasie *et al.*, 2022; NBS, 2023). Smallholder farmers dominate cassava production, but their economic returns are often constrained by limited access to improved production inputs, finance, extension services, processing facilities and reliable markets (Barrett *et al.*, 2022). These constraints can reduce productivity, increase production and transaction costs, and limit farmers' ability to participate profitably in agricultural value chains (Donovan *et al.*, 2015). Consequently, improving the economic performance of cassava farming requires interventions that address constraints across production,

marketing, processing and access to productive resources rather than focusing solely on farm-level production (Reardon *et al.*, 2009; World Bank, 2022).

Agricultural value chain development programmes have increasingly been promoted as a strategy for improving the economic welfare of smallholder farmers by linking production with input markets, financial services, technical support, processing and output markets such interventions can influence farm profitability through several pathways. (Donovan *et al.*, 2015; Reardon *et al.*, 2009). Improved access to production inputs and extension services can enhance productivity, while access to credit can ease liquidity constraints and facilitate investment in farm operations (Arouna *et al.*, 2021; Wossen *et al.*, 2017). Similarly, stronger market linkages, collective marketing and

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processing support can improve farmers' bargaining position, reduce post-harvest losses and create opportunities for value addition (FAO, 2022; Verhofstadt & Maertens, 2021). The combined effects of these interventions may increase farm revenue and, ultimately, net farm income.

In Nigeria, the Value Chain Development Programme (VCDP) was implemented to strengthen selected agricultural value chains, including cassava, by improving smallholder farmers' access to productive resources, markets, finance, technical services and value-addition opportunities (IFAD, 2023). The programme adopts a value-chain approach that extends beyond primary production to include farmer organizations, market linkages, processing and other forms of support intended to improve incomes and food security (IFAD, 2024). Thus, VCDP provides an important policy intervention through which the economic effects of coordinated agricultural support can be assessed.

Despite the increasing emphasis on agricultural value-chain interventions, evidence on their causal effects on the net farm income of cassava farmers in Southeast Nigeria remains limited. Existing studies have often focused on individual components of agricultural support, productivity, technology adoption or general welfare outcomes, while less attention has been given to the overall economic effect of participation in an integrated value-chain development programme. Moreover, simple comparisons of participants and non-participants may be misleading because farmers who participate in development programmes may differ systematically from those who do not (Caliendo & Kopeinig, 2008; Wooldridge, 2020). Differences in access to credit, cooperative membership, extension services and other characteristics can influence both programme participation and farm income (Khonje *et al.*, 2015; Wossen *et al.*, 2021). Therefore, an appropriate counterfactual-based impact evaluation is required to isolate the effect attributable to VCDP participation (Becerril & Abdulai, 2010).

This study therefore examines the economic impact of the Value Chain Development Programme on the net farm income of cassava farmers in Southeast Nigeria. Specifically, the study estimates the effect of VCDP participation on farmers' net farm income using an augmented inverse probability weighting (AIPW) estimator, while propensity score matching (PSM) was employed as robustness checks. By providing evidence on whether participation in an integrated value-chain intervention translates into higher farm profitability, the study contributes to the assessment of agricultural development programmes and provides evidence relevant to the design and implementation of policies

aimed at improving the economic welfare of smallholder cassava farmers.

METHODOLOGY

Study Area

The study was conducted in Anambra and Enugu States, located in South-eastern Nigeria. The region is a major agricultural zone featuring favorable agro-ecological conditions, tropical climates (annual rainfall of 1,500–2,000 mm), and fertile soils suitable for cassava and staple crop production (NBS, 2023). Agriculture serves as the primary source of rural employment, income, and food security across both states. Anambra State covers approximately 4,844 km² (latitudes 5°40'–6°47' N; longitudes 6°36'–7°21' E) with an average temperature of 26°C–28°C (Anambra State Government, 2023) while Enugu State spans roughly 7,161 km² (latitudes 5°56'–7°06' N; longitudes 6°53'–7°55' E) with distinct wet and dry seasons (Enugu State Government, 2023).

These states were purposively selected due to their strategic importance in cassava production and active participation in the IFAD-supported VCDP, which provides local farmers with improved planting materials, extension advisory services, capacity building, credit access, and processing infrastructure.

Sampling Procedure and Sample Size

A multi-stage sampling technique was employed to select 600 smallholder cassava farmers, comprising 334 VCDP participants and 266 non-participants. In the first stage, Anambra and Enugu States were purposively selected due to their active VCDP implementation and high cassava production intensity. The second and third stages involved selecting participating Local Government Areas (LGAs), communities, and farmer groups based on the programme framework. Finally, individual cassava farmers were randomly sampled from VCDP beneficiary registers and adjacent non-beneficiary lists to enable comparative empirical analysis.

Data Collection and Analytical Framework

Primary data were collected from 600 cassava farmers, comprising 334 VCDP participants and 266 non-participants in Southeast Nigeria, using a structured questionnaire. Net farm income (NFI) was used to estimate farmers income; t-test was used to test whether NFI differ significantly between participants and non-participants, while Augmented Inverse Probability weighting (AIPW) estimator was employed to estimate the causal effect of VCDP participation on net farm income.

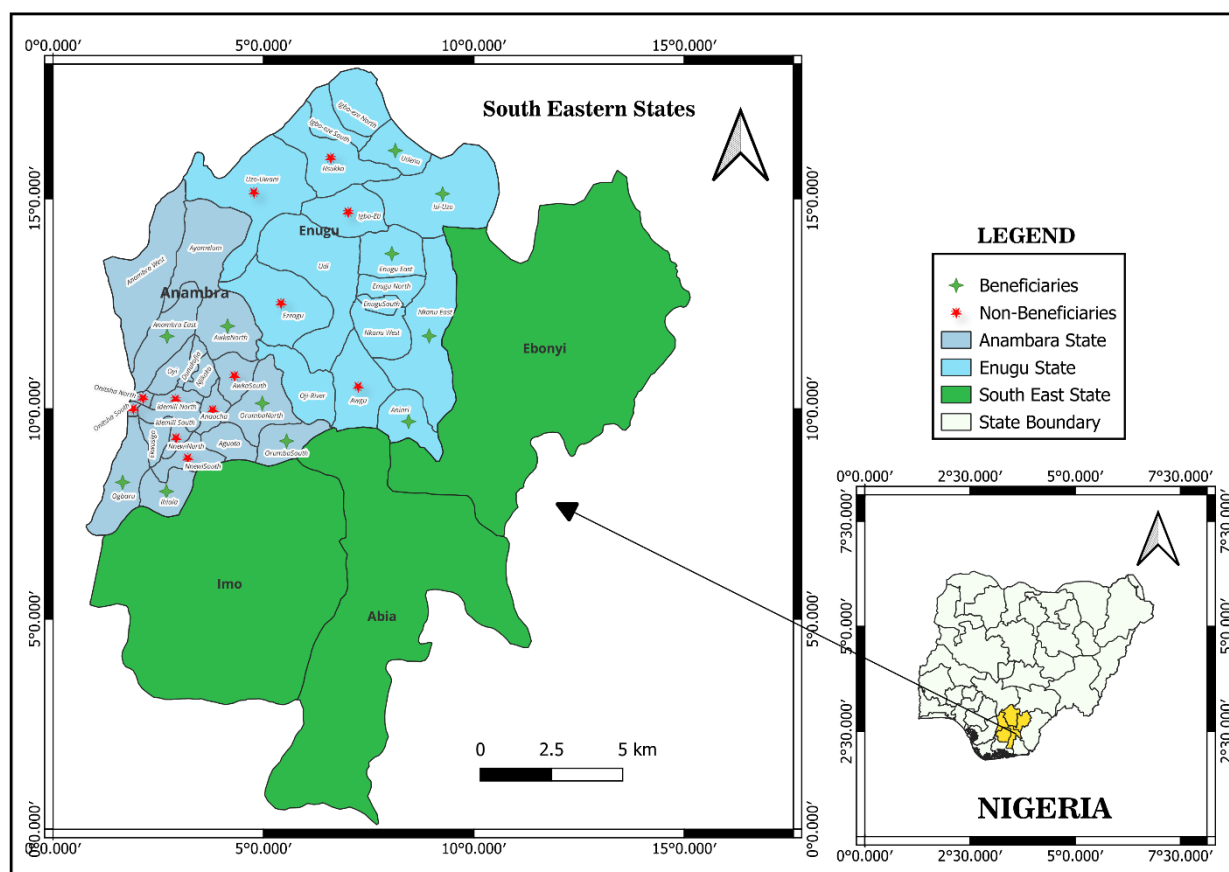


Figure 1: Map of Southeast Nigeria showing the study area

Source: Office of the Surveyor-General of the Federation (OSGOF), 2018; IFAD, 2020.

Model Specification

Net Farm Income

Net Farm Income (NFI) was used to determine the income from cassava production in the research area. The following is the formula for estimating net farm income.

$$NFI = TR + TC$$

where NFI is for net farm income; TR stands for Total Revenue; and TC stands for total cost of production.

$$TVC + TFC = TC.$$

$$\sum_{i=1}^c P_{yi}Y_i - \sum_{j=1}^c P_{xi}X_j - \sum_{k=1}^c f_k \dots \dots \dots 1$$

Where;

Y_i = Output (cassava, tons/ha)

P_{yi} = unit price of cassava (₦),

X_j = quantity of variable input (cassava stem, fertilizer, labour, insecticides and herbicide),

P_{xi} = price per unit of variable inputs,

f_k = cost of fixed input (where k = knap-sack sprayer, hoe, and cutlass) and

Σ = summation sign.

In this study, the fixed cost of farm implements such knap-sack sprayers, hoes, and cutlasses were computed using the value of depreciation computed for each asset.

The following are the details of the straight-line depreciation method:

$$D = \frac{P-S}{N} \dots \dots \dots 2$$

Where:

D = Depreciation (₦ per year)

p = Purchase price of the asset (₦)

s = Salvage value of the asset (₦)

N = Expected useful life of the asset (years)

Augmented Inverse Probability Weighting (AIPW)

Augmented Inverse Probability Weighting (AIPW) also known as the Augmented Inverse Propensity Weighted estimator is a doubly robust method for estimating causal effects in observational studies was used to measure the impact of VCDP on income of cassava farmers.

Treatment/Participation Model

The first step involves estimating the probability of VCDP participation using a Logit model:

$$Y_i = P(Y_i = 1|X_i) = \frac{1}{1+e^{-Z_i}} = \frac{e^{Z_i}}{1+e^{Z_i}} \dots \dots \dots 3$$

Where Y_i is the binary dependent variable (1 if the farmer participates in VCDP, 0 otherwise), and Z_i is a linear combination of explanatory variables expressed as:

$$Z_i = \ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \sum_{k=1}^{11} \beta_k X_{ki} + \varepsilon_i \dots \dots \dots 4$$

Implicitly, the model is stated as;

$$Y = f(X_1, X_2, \dots, X_9, U_i) \dots\dots\dots 5$$

Explicitly it is expressed as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + X_{11} + \mu \dots\dots\dots 6$$

Where:

Y = Participation in VCDP (1 or 0 if otherwise)

β_0 = constant

X_1 = Age (years)

X_2 = Sex (male = 0, female = 1)

X_3 = Household size (number of people)

X_4 = Formal Education status in years

X_5 = Access to Extension Services (Number)

X_6 = Membership to cooperative (Yes = 1, No = 0)

X_7 = Household Income (₦)

X_8 = Access to credit (₦)

X_9 = Farming experience (years)

X_{10} = Distance to market (km)

X_{11} = Farm size (hectares)

Outcome Model

The potential-outcome model for NFI:

$$Y_i(d) = \alpha_d + X_i' \gamma_d + \varepsilon_i, d \in \{0, 1\} \dots\dots\dots 7$$

where:

$Y_i(d)$ = potential NFI under treatment status d ;

X_i = observed covariates;

γ_d = outcome-model parameters;

ε_i = error term.

AIPW Estimator

Suppose:

- A_i is a binary treatment indicator (1 = treated, 0 = control),
- Y_i is the observed outcome,
- X_i are pre-treatment covariates,
- $e(X_i) = P(A_i = 1 | X_i)$ is the propensity score,
- $\mu(X_i, a) = E[Y_i | X_i, A_i = a]$ is the outcome regression model.

AIPW estimator for the mean potential outcome under treatment ($a = 1$) can be written as:

$$\mu^{AIPW}(1) = \frac{i}{n} \sum_{i=1}^n \left[\frac{A_i}{e(X_i)} (Y_i - \mu(X_i, 1)) + \mu(X_i, 1) \right] \dots\dots\dots 8$$

and similarly for control ($a = 0$):

$$\mu^{AIPW}(0) = \frac{i}{n} \sum_{i=1}^n \left[\frac{1-A_i}{1-e(X_i)} (Y_i - \mu(X_i, 0)) + \mu(X_i, 0) \right] \dots\dots\dots 9$$

Then the Average Treatment Effect (ATE) estimator is $\mu^{AIPW}(1) - \mu^{AIPW}(0)$

RESULTS AND DISCUSSION

Table 1 shows that VCDP participants achieved better observed economic performance than non-participants. Participants recorded a higher average cassava output of 33.68 tonnes, compared with 21.98 tonnes for non-participants, while the average selling prices were almost identical at ₦78,369.56 and ₦78,465.96 per tonne, respectively. Thus, the higher total revenue of participants (₦2,639,486.78 compared with ₦1,724,681.80) appears to be primarily associated with their higher output rather than differences in selling prices. This is consistent with VCDP's emphasis on productivity enhancement, input support, technical assistance and market development (IFAD, 2026). Evidence from VCDP implementation also reports productivity improvements associated with programme interventions (IFAD, 2023).

Participants nevertheless incurred higher production costs, with total variable and fixed costs of ₦380,430.09 and ₦41,125.43, respectively, compared with ₦291,505.68 and ₦31,598.91 among non-participants. Labour was the largest variable-cost component for both groups. The higher input expenditure among participants is consistent with evidence that labour, credit access, farm resources and institutional participation influence cassava production efficiency and profitability in Nigeria (Edaba et al., 2024; Tanimonure et al., 2025). However, the additional costs were more than compensated for by the higher revenue generated by participants.

Consequently, participants recorded a mean NFI of ₦2,217,931.26, compared with ₦1,401,577.21 among non-participants, representing approximately 58.2% higher NFI. NFI per tonne was also slightly higher among participants (₦65,853.07) than non-participants (₦63,766.02). This finding is broadly consistent with evidence that improved access to credit, market linkages, cooperative organizations and value-addition opportunities can enhance the economic returns of cassava farming (Iheyi & Kim, 2025; Tanimonure et al., 2025). It also accords with the broader objective of VCDP to improve productivity, market access and rural incomes (IFAD, 2026).

Table 1: Net Farm Income of VCDP Participants and Non-Participants (per hectare)

Income Component	VCDP Participants (n=334)	Non-Participants (n=266)
A. Revenue		
Total output (tonnes)	33.68	21.98
Price (₦/tonne)	78,369.56	78,465.96
Total Revenue (₦)	2,639,486.78	1,724,681.80
B. Variable Costs		
Labour	143,351.82	111,313.25

Income Component	VCDP Participants (n=334)	Non-Participants (n=266)
Planting materials	68,385.72	52,898.19
Fertiliser	69,364.84	50,501.64
Herbicide	37,992.07	29,387.88
Insecticide	18,996.03	14,693.94
Other variable costs	42,339.62	32,710.78
Total Variable Cost (TVC)	380,430.09	291,505.68
C. Fixed Costs		
Knapsack sprayer depreciation	20,422.67	15,704.73
Hoe depreciation	12,373.64	9,504.03
Cutlass depreciation	8,329.12	6,390.15
Total Fixed Cost (TFC)	41,125.43	31,598.91
Total Cost (TC = TVC + TFC)	421,555.52	323,104.59
Net Farm Income (NFI)	2,217,931.26	1,401,577.21
Net Farm Income/tonne (₦)	65,853.07	63,766.02

Source: Author's computation from field survey data 2026

Table 2 shows a significant difference in the net farm income of VCDP participants and non-participants. The mean NFI was ₦2,223,971 for VCDP participants compared with ₦1,409,672 for non-participants, giving an observed mean difference of approximately ₦814,299. The t-test result ($t = -8.71$; $p < 0.01$) indicates that the difference is statistically significant at the 1% level. Thus, the null hypothesis of no significant difference in mean net farm income between VCDP participants and non-participants is rejected. The negative sign of the t-statistic reflects the direction of the group comparison and does not imply that participants had lower income. The higher NFI among participants indicates stronger observed economic performance and is consistent with the economic rationale of VCDP, which seeks to improve smallholder productivity, access to inputs, technical assistance, finance and markets along the cassava value chain (IFAD, 2026). Evidence from VCDP implementation similarly reports improvements in cassava productivity following increased access to production inputs and technical support (IFAD, 2023). The finding is also consistent with recent empirical evidence on cassava farming in Nigeria. Tanimonure *et*

al., (2025) found that cassava farming was profitable and identified credit access, farm size, farmers' association membership, farming experience and distance to market as important determinants of farm profit. Similarly, Kaka *et al.*, (2024) reported positive net farm income among cassava farmers in Kebbi State, while identifying inadequate capital, unstable prices and high input costs as important constraints to profitability. Evidence from Olutumise *et al.*, (2024) also demonstrates that production decisions and resource constraints can substantially influence the net revenue obtained by Nigerian cassava farmers.

The statistically significant income difference therefore provides descriptive evidence that VCDP participants performed better economically than non-participants. This finding indicates that participants enjoyed greater farm profitability. The result agrees with Ayenew *et al.*, (2020), who found that participation in agricultural value-chain interventions improved farmers' income through enhanced productivity and access to productive resources.

Table 2: Independent Samples t-test of Net Farm Income between VCDP Participants and Non-participants

Variable	Participants	Non-Participants	Mean difference (₦)	t-value	p-value
Net farm Income (₦)	334	226	814,298.50	-8.71	0.000***
Mean	2,223,971	1,409,672			
SD	1,311,577	872,684.70			

***sig at 1%, **sig at 5%, *sig at 10%, NS Not Significant

Source: Author's computation from field survey data, 2026.

Pre-Estimation Tests

Raw Covariate Balance before Adjustment

Table 3 shows that most observed covariates were reasonably balanced between VCDP participants and non-participants before matching or weighting. Age, gender, farm size, and farming experience had very small standardized mean differences, while household size was close to the acceptable threshold. However, education

years (0.159) showed moderate imbalance, while credit access (0.539) exhibited substantial imbalance, indicating an important pre-treatment difference between the two groups. Since absolute SMD values below 0.10 are generally considered acceptable (Austin, 2009; Stuart, 2010), these results justify the use of AIPW, IPW, and PSM to reduce observable selection bias and improve the credibility of the counterfactual.

Table 3: Raw Covariate Balance before Adjustment

Variable	Std. Diff (Raw)	Interpretation
Age	-0.003	Balanced
Gender	-0.060	Balanced
Household size	-0.100	Mild imbalance
Education years	0.159	Moderate imbalance
Farm size	0.001	Balanced
Credit access	0.539	Severe imbalance
Farming experience	-0.013	Balanced

Source: Author's computation from field survey data, 2026.

Propensity Score Distribution

Table 4 shows that the propensity scores of VCDP participants and non-participants had substantial overlap, with mean scores of 0.410 and 0.485, respectively. The treated group had scores ranging from 0.196 to 0.687, while the control group ranged from 0.213 to 0.665, giving a common support region of approximately 0.213–0.665. This indicates that comparable participants and non-participants existed

across the observed characteristics, satisfying the overlap (common support) condition required for propensity score-based estimation (Caliendo & Kopeinig, 2008; Stuart, 2010). The relatively similar standard deviations also suggest limited concerns about extreme propensity scores and unstable weights (Imbens & Rubin, 2015). Overall, the results support the suitability of PSM, IPW, and AIPW for estimating the effects of VCDP participation.

Table 4: Propensity Score Distribution

Group	Mean pscore	Std. Dev.	Min	Max	N
Treated (VCDP=1)	0.410	0.135	0.196	0.687	334
Control (VCDP=0)	0.485	0.126	0.213	0.665	266

Source: Author's computation from field survey data, 2026.

Estimation Diagnostics

Table 5 shows that VCDP participation had a positive and statistically significant effect on annual net farm income. The AIPW estimate indicates that participation increased annual net farm income by approximately ₦813,903.30 ($p < 0.001$), with estimated income of ₦2,222,799.30 for participants compared with ₦1,408,896.00 for non-participants. This finding is consistent with evidence that value-chain interventions improve farmers' access to productive inputs, extension services, finance and markets, thereby enhancing productivity and farm income (Ayenew *et al.*, 2020; FAO, 2023; IFAD, 2024; Barrett *et al.*, 2022).

The result is further supported by Bellemare (2012), Abate *et al.*, (2022), and Amare *et al.*, (2019), who linked market integration, cooperative participation and access to financial services with improved farm incomes. However, evidence from Masset *et al.*, (2012) and Abdulai and Huffman (2014) indicates that income gains from agricultural interventions can vary depending on institutional support and farmers' access to complementary resources. The consistency of positive income effects across the t-test, PSM, and AIPW estimates strengthens the robustness of the finding. In conclusion, the results indicate that VCDP participation substantially improved farmers' farm income and economic welfare.

Table 5: Impact of VCDP Participation on Cassava Farmers' Income

Variable	Coefficient (₦)	Std. Err.	z-value	p-value
Average Treatment Effect (ATE) (VCDP=1 vs 0)	813,903.30	89,537.15	9.09	0.000* **
PO mean (non-participants)	1,408,896.00	53,395.68	26.39	0.000* **
PO mean (Participants)*	2,222,799.30	—	—	—

***sig at 1%, **sig at 5%, *sig at 10%, NS Not Significant

Source: Author's computation from field survey data,

Post-Estimation Diagnostics

Covariate Balance after Weighting

Table 6 shows that covariate balance improved substantially after propensity score weighting. Before weighting, most covariates were reasonably balanced, although education (SMD = 0.159) showed moderate imbalance and credit access (SMD = 0.539) showed substantial imbalance, indicating differences in financial access between participants and non-participants.

Similar selection patterns have been reported in agricultural intervention studies (Abdulai & Huffman, 2014; Kassie *et al.*, 2011). After weighting, all standardized differences fell between 0.003 and 0.019, well below the recommended 0.10 threshold, while the credit-access imbalance declined from 0.539 to 0.003 and education from 0.159 to 0.009 (Austin, 2009). The variance ratios also fell within the acceptable 0.80–1.25 range (Stuart, 2010). These results indicate that

weighting successfully improved comparability between the two groups, supporting the reliability of the subsequent AIPW, IPW and PSM estimates.

Table 6: Covariate Balance after Weighting

Variable	Std. Diff (Raw)	Std. Diff (Weighted)	Variance Ratio (Raw)	Variance Ratio (Weighted)
Age	-0.003	0.005	0.876	0.871
Gender	-0.060	-0.010	1.047	1.008
Household size	-0.100	0.003	0.977	0.965
Education	0.159	0.009	1.130	1.163
Farm size	0.001	0.019	1.009	0.948
Credit access	0.539	0.003	1.161	1.001
Experience	-0.013	0.006	0.902	0.895

Source: Author's computation from field survey data, 2026

Table 7 shows that both AIPW and PSM produced positive and statistically significant estimates of the effect of VCDP participation on net farm income. The AIPW estimate was ₦813,903.30 ($p < 0.001$), while the one-to-one PSM estimate was ₦805,227.70 ($p < 0.001$) with a difference of ₦8,675.60 between the estimates. This indicates a high degree of consistency across the two estimators. This robustness supports the conclusion that VCDP participation substantially

increased the net farm income of cassava farmers. The finding is consistent with the programme's emphasis on productivity enhancement, input access, finance, technical assistance and market linkages (IFAD, 2026), as well as evidence linking access to productive resources and markets with improved cassava profitability (Edaba *et al.*, 2024; Tanimonure *et al.*, 2025).

Table 7: Robustness Comparison across Estimators

Estimator	ATE (₦)	SE (₦)	Z	p-value
AIPW	813,903.30	89,537.15	9.09	0.000***
PSM	805,227.70	74,349.97	10.83	0.000***

***sig at 1%, **sig at 5%, *sig at 10%, NS Not Significant

Source: Author's computation from field survey data, 2026

CONCLUSION

This study demonstrates that participation in the IFAD-supported Value Chain Development Programme (VCDP) has a positive and statistically significant causal effect on the economic performance of smallholder cassava farmers in Southeast Nigeria. By expanding output through enhanced access to improved planting materials, credit, extension advisory services, and processing support, participants achieved substantially higher net farm incomes than non-participants, despite incurring higher total production costs. The consistency of the results across doubly robust Augmented Inverse Probability Weighting (AIPW) and Propensity Score Matching (PSM) techniques confirms that integrated value-chain interventions effectively address structural farmgate and post-farmgate bottlenecks to drive commercialization and elevate rural livelihoods.

Policy Recommendations

The following recommendations were suggested for policy action based on the findings from this study:

- State Ministries of Agriculture, VCDP management and development partners should extend the programme's integrated package of improved planting materials, fertilizers, technical extension and financial support to non-participating farming communities. This is

justified by the study's finding that VCDP participation significantly increased net farm income and that the income advantage was largely associated with higher production output. Timely delivery of inputs should also be coordinated with local planting calendars to sustain productivity gains.

- VCDP should collaborate with microfinance institutions, agricultural banks and farmer cooperatives to provide flexible credit facilities that support production and labour expenses. At the same time, the frequency and quality of extension visits should be improved, with emphasis on efficient input use, improved agronomic practices, pest and disease management, cost control and post-harvest handling. These measures would help farmers convert productivity gains into sustained improvements in net farm income.
- VCDP and relevant agricultural agencies should strengthen linkages between cassava farmers, processors, aggregators and industrial buyers while supporting decentralized processing and aggregation centres near production communities. Improved market information, collective marketing, transparent pricing arrangements and reduced transportation and

post-harvest costs would help farmers better commercialize their increased output and enhance the income gains associated with VCDP participation.

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