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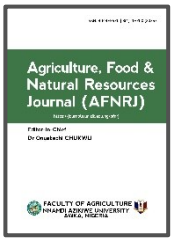

Original Article

Economic impact of backyard yam farming on household livelihoods in Delta North agricultural zone, Nigeria

OPEN ACCESS

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ABSTRACT

The study assessed the economic importance of backyard yam farming among households in the Delta North Agricultural Zone, Nigeria. Multistage random sampling was used to select a total of 385 households across seven Local Government Areas for the study. Data were collected with the use of a structured questionnaire. Descriptive statistics such as frequency count, percentage, mean, gross margin, and multiple regression were used for data analysis. The mean net profit earned by the farmers was ₦151,575.93, and the benefit-cost ratio of 2.63 indicated that backyard yam farming is profitable. Its contribution to household income was relatively low, averaging 15.2%, which suggests complementarity in livelihood. The significant determinants of income were farm size (β = 0.725, p-value <0.01), labour cost (β = -0.456, p-value <0.01), access to credit (β = 0.193, p-value <0.05), and farming experience (β = 0.287, p-value <0.01). Some of the identified binding constraints include pests (mean = 2.76), limited access to credit (mean = 2.54), and declining soil fertility (mean = 2.53). Identified coping strategies include traditional pest control (mean = 2.74), income diversification (mean = 2.84), and farmer groups (mean = 2.71). It was recommended that specific interventions involving improved credit facilities, mechanization, and extension services are required for improving productivity and sustainability.

KEYWORDS: *Economic contribution, Household income, Profitability, Delta State*

INTRODUCTION

Agriculture is one of the strong pillars of the Nigerian economy, playing a major role in employment, food security, and rural development (Oyita & Aberji, 2024). Root and tuber crops, including yams (*Dioscorea spp.*), are vital components of agricultural staples and sources of income for millions of households across Nigeria. Yam farming features prominently in the rural livelihoods of Delta State, where the crop is vital to household food security and the economy (Michael et al., 2021). Nigeria accounts for more than 60% of world production, and the total annual output is about 45 million metric tonnes (Food and Agriculture Organization [FAO], 2021; Nwankwo et al., 2023).

Backyard farming, including yam cultivation, is one of the informal but vital agricultural activities in most Nigerian communities. Farming has been defined as small-scale agricultural activities conducted either in home gardens or adjacent plots; it is an important feature of food production, especially for subsistence farming households (Enete & Mukaila, 2024). In Delta State, where large-scale farming is

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always confronted with a constrained land resource, backyard yam farming has emerged as part of strategies to maximize the limited land resource for economic and nutritional gains. This small-scale farming practice at the household level ensures a year-round food supply and reduces dependence on staple foods bought from the market, thereby improving household-level food security (Amaefula, 2021).

Beyond the household, there are economic gains associated with yam farming. Yam constitutes a crop with high value in Nigerian markets and has an established demand level both locally and internationally (Ojadi, 2022). With backyard yam farming, households get opportunities for additional income that emanate from the sale of excess yields. The income realized from the sale of yams is often used to finance other vital activities, such as education, health care, and inputs for the farm. Besides, yam farming has cultural importance in Delta State, where yams symbolize wealth and are at the centre of every traditional festival, ceremony, and transition stages (Enete & Mukaila, 2024). Among the several constraints facing backyard yam farming, such constraints as poor access to improved varieties of yams, less fertile soils, and inadequate extension services mainly constrain productivity and profitability (Aphane & Muchopa, 2024).

However, resilience and resourcefulness by farmers in the Delta State have continued to enable them to use backyard farming as a way of livelihood improvement. The wider socio-economic context also underlines the relevance of this study. As urbanization and land-use change continue in Delta State, the need to maximize small-scale farming activities, such as backyard yam farming, becomes even more urgent. This knowledge can be used in policy interventions designed to enhance agricultural productivity and household welfare. In addition, the documented experiences of the yam farmers could provide useful knowledge on sustainable farm practices that have balanced economic growth with environmental conservation (Kleih et al., 2019).

Previous studies have persistently indicated that yam production in Nigeria holds great economic and nutritional value. For example, Bassey (2017) indicated how yam farming could help ensure household food security and reduce poverty in rural areas. On the other hand, the works of Baba et al. (2021) have researched the profitability of yam farming for small-holder farmers and its functions regarding the generation of income and social mobility. Yet, studies often either focus on relatively more extended farming or generalized agricultural practices and disregard specific backyard yam farming. Available literature by Ovharhe et al. (2020), Mukaila & Enete (2025), Inyang (2024), and Enete & Mukaila (2024) on backyard farming in general has shown its contribution to improving food security and resource utilization in resource-poor households. Aphane & Muchopa (2024) and Inyang (2024) have indicated that backyard farming acts as a shock absorber in the case of economic shocks and food insecurity. None of these existing studies has specifically addressed the economic value of backyard yam farming around Delta North, where yams are culturally and economically important.

Another gap in extant literature is the scarcity of information about particular challenges that backyard yam farmers grapple with in Delta State. For instance, Bassey (2017) mentions some of the more general problems affecting yam farming are limited access to inputs, poor extension services, and deteriorating soil fertility. Though such findings are of great importance, they fail to portray the experiences and strategies of the backyard yam farmers who work on smaller plots of land and have heavy dependence on household labour. Nevertheless, the contribution of backyard yam farming to household income, food security, and resilience remains a mystery in the face of land scarcity and economic uncertainty. In fact, this information gap beclouds the formulation of specific interventions that will help smallholder farmers optimize their practice and reach dignified livelihoods.

In the Delta North Agricultural Zone, where land fragmentation and urbanization are high (Samuel et al., 2019), backyard yam farming presents a privileged niche to optimize limited land for economic and nutritional gains. However, its economic potentials are not well explored, hence leaving little evidence for policymakers and development practitioners to develop effective support mechanisms in place. With these gaps in mind, the present study shall therefore attempt to fill the knowledge gap by examining the economic contributions of backyard yam farming among households in the Delta North Agricultural Zone. The paper will therefore add to the body of knowledge by focusing on this often-neglected area of yam farming and providing empirical data to inform policies and programs to improve the productivity and sustainability of backyard farming systems. The main objective of the study is to examine the economic contribution of backyard yam farming among households in the Delta North Agricultural Zone, Delta State, Nigeria.

MATERIALS AND METHOD

The study was carried out in the Delta North agricultural zone of Delta State, Nigeria, and covered nine Local Government Areas (LGAs). The study population comprised back-yard yam-farming households who had small farm sizes (≤0.25 ha) for their subsistence as well as for commercial activities. The study used multistage sampling to gather 385 selected respondents from seven LGAs with five communities each and eleven households per community through random selection based on Yamane's formula (Yamane, 1967). The research utilized structured questionnaires together with Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) to gather data about demographic information and topics related to costs and revenues, and challenges. The research analysed data through descriptive statistics, which included means, frequencies, and percentages, in addition to inferential statistics involving multiple regression analysis to establish income determinants and gross margin analysis to study profitability.

Model Specification

Gross Margin Analysis

The Gross Margin Analysis model that was used to estimate the profitability of backyard yam farming is stated as follows;

$$GM = TR - TVC \quad (2)$$

$$TC = TVC + TFC \quad (3)$$

$$NR = GM - TFC \quad (4)$$

$$BCR = {}^{TR}/_{TC} \quad (5)$$

Where: GM = Gross margin, TVC = Total variables cost, TC = Total cost, TFC = Total fixed cost, NR = Net Returns, and BCR = Benefit cost ratio

Regression Model

To analyze determinants of income, the following multiple linear regression model was used:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e_i \quad (6)$$

Where: Y = Income from backyard yam farming (₦), X_1 = Farm size (square meters), X_2 = Labour cost (₦). X_3 = Access to credit (yes or no), X_4 = Farming experience (years), β_0 = Intercept, β_1, β_2, β_3, β_4 = Coefficients of independent variables, and e = Error term.

RESULTS AND DISCUSSIONS

Socioeconomic characteristics of the respondents

The socioeconomic characteristics of the farmers who took part in backyard yam farming in Delta North Agricultural Zone, Delta State, as revealed in Table 1, present a fair gender distribution (52.7% male and 47.3% female), indicating that yam farming is not male-dominated. This contrasts with Ovharhe et al. (2020), who indicated higher female participation in vegetable farming.

The average age of 41 years indicates that economically active people predominate, with more than 50% falling within the 31–50 years bracket, although youth involvement is limited (23.4%) as a result of urban migration (Mbah, 2021). Most of the respondents (58.4%) were married, as also reported by Mukaila & Enete (2025), who explained marital stability in terms of better agricultural resource allocation. Levels of education were remarkable, with 40.3% possessing secondary education and 33.5% achieving tertiary education, in line with Isaiah (2024), who underscored the significance of education towards better farming methods. The mean farming experience was 17 years, corroborating the argument by Oduntan (2019) that experience increases efficiency. Household size had a mean of 6 individuals, indicating the importance of family labor in yam cultivation (Egbeadumah et al., 2022). The mean farm size being 780.1 square meters indicates that the respondents were smallholder farmers, supporting Mukaila & Enete (2025) on the importance of small-scale agriculture in food security.

Table 1: Socioeconomic characteristics of the respondents

Variable	Freq.	Percent	Mean
Gender			
Male	203	52.7	
Female	182	47.3	
Age (years)			
Less than 21	22	5.7	
21 – 30	68	17.7	
31 – 40	113	29.4	
41 – 50	85	22.1	41 years
51 – 60	54	14.0	
61 and above	43	11.2	
Marital status			
Single	115	29.9	
Married	225	58.4	
Divorced	18	4.7	
Widowed	27	7.0	
Educational level			
No formal	28	7.3	
Primary	73	19.0	
Secondary	155	40.3	
Tertiary	129	33.5	
Farming experience (years)			
0 – 10	135	35.1	
11 – 20	112	29.1	17 years
21 – 30	92	23.9	
Above 30	46	11.9	
Household size (persons)			
1 – 5	181	47.0	
6 – 10	135	35.1	6 persons
11 – 15	49	12.7	
Above 15	20	5.2	
Farm size (square meters)			
100 – 500	103	26.8	
501 – 900	111	28.8	780.1 m^2
901 – 1,300	92	23.9	
Above 1,300	79	20.5	
Major occupation			
Farming	195	50.6	
Trading	91	23.6	
Artisan	50	13.0	
Civil servant	49	12.7	
Monthly income (₦): $1 = ₦1,600			
Less than 50,000	98	25.5	
50,000 – 100,000	180	46.8	₦83,550.04
100,001 – 150,000	72	18.7	
Above 150,000	35	9.1	
Access to credit			
Yes	125	32.5	
No	260	67.5	
Ownership of farmland			
Yes	228	59.2	
No	157	40.8	

Source: *Authors' computation (2025)*

Cost and Revenue of Backyard Yam Farming

The result in Table 2 shows that the total expense for backyard yam farming in the Delta North agricultural zone is ₦92,825.07 and is split into 76.62% variable costs and 23.38% fixed costs. Study results align with Aphane & Muchopa (2024) and Ume et al. (2020), who found profitability exists despite resource inefficiencies, as land preparation and seed yam purchase, together with labour costs, contribute most to variable expenses. The ₦244,401.00 total revenue produced a net profit of ₦151,575.93 along with a benefit-cost ratio (BCR) of 2.63, which demonstrates its sustainability and profit-generating potential (Michael et al., 2021). The ₦173,277.16 gross margin indicates that backyard farming creates both better food security and enhanced household welfare (Mukaila & Enete, 2025). The revenue generated from selling 82 tubers at ₦2,980.50 each supports yam farming as a tool for poverty alleviation, according to Hassan et al. (2024) and Enete & Mukaila (2024).

Table 2: Cost and Revenue of Backyard Yam Farming

Items	Quantity	Unit Price (₦)	Amount (₦)	% Of Total Cost
Variable Cost				
Land preparation	780 m²	30.25	23,595.00	25.42
Seed yams purchase	30 tubers	600.75	18,022.50	19.42
Fertilizer and manure	10 kg	950.25	9,502.50	10.24
Labour cost	8-man days	1,500.33	12,002.64	12.93
Pesticides and herbicides	2 litters	4,000.60	8,001.20	8.62
Total Variable Cost			71,123.84	76.62
Fixed Cost				
Hoe	1	1,900.50	1,900.50	2.05
Cutlass	1	5,750.25	5,750.25	6.19
Digger	1	7,200.33	7,200.33	7.76
Shovel	1	6,850.15	6,850.15	7.38
Total Fixed Cost			21,701.23	23.38
Total Cost			92,825.07	100.00
Total Revenue	82 tubers	2,980.50	244,401.00	
Gross Margin			173,277.16	
Net Profit			151,575.93	
Benefit Cost Ratio (BCR)			2.63	

Note that $1USD = ₦1,600. ***Source:*** *Authors' computation (2025)*

Proportion of Household Income Derived from Backyard Yam Farming

Table 3 shows the contribution of backyard yam farming to household income in the Delta North. The agricultural zone of Delta State indicates that it was highly variable across households. A high proportion of the respondents, 36.6%, derive less than 10% from backyard yam farming, while another 31.7% earned between 10% and 20% with a mean contribution of 15.2%. This implies that backyard yam farming cannot be regarded as the most important livelihood activity for many households, but rather a complementary source of income. In this regard, Ovharhe et al. (2020) reported that backyard farming with yam cropping contributed to the income and food security of households. Relatively, the low-income contribution in this study could be linked to the small-scale nature of yam farming or to competing household activities.

Further, 21.8% of respondents earned between 21% and 30% of their income from backyard yam farming, while only a small proportion (6%) derived between 31% and 40%, and even fewer (2.3% and 1.6%) reported earning 41%–50% and above 50%, respectively. This disparity simply brings out the heterogeneity in the production of backyard yam farming activities and their resultant economic gains for households. Enete & Mukaila (2024) also found that households practicing backyard agriculture had different income levels, and the practice was a very important shock absorber. The limited households with more than 30% of their income coming from backyard yam farming would then suggest that both profitability and scalability may be limited by such constraining factors as small farm size, resource access, and market constraints.

Table 3: Proportion of household income derived from backyard yam farming

Proportion of Income (%)	Frequency	Percentage (%)	Mean
Less than 10%	141	36.6	
10% - 20%	122	31.7	15.2%
21% - 30%	84	21.8	
31% - 40%	23	6.0	
41% - 50%	9	2.3	
Above 50%	6	1.6	
Total	385	100.0	

Source: *Authors' computation (2025)*

The foregoing agrees with earlier findings on the backyard agriculture economy. Mukaila & Enete (2025) indicated that household garden agriculture contributed highly to food security and stability in economic standing. On the contrary, the contribution of income being low in this present study from backyard yam farming, therefore calls for a policy intervention

for its viability enhancement. This would include credit facilities, extension services in agriculture, and the use of improved varieties to increase their production and earnings from yam sales. According to Aphane & Muchopa (2024), household-specific factors include targeting farm size and farming experience, which will enhance the backyard farming economic contribution to the household livelihood.

Determinants of Income from Backyard Yam Farming

The results in Table 4 provide in-depth insight into the determinants of income from backyard yam farming among households in the Delta North Agricultural Zone of Nigeria. In fact, the model is statistically reliable as justified by the magnitude of the R-square value of 0.684, indicating that 68.4% variation in the income emanating from backyard yam farming across the study area is explained within the model specification. The F-statistic is 56.243, significant, and therefore confirms the overall validity of the model. Besides, the Durbin-Watson statistic of 1.985 indicates very minimal autocorrelation in the residuals, which means that the estimates are reliable. These results have brought to the fore the critical role that farm size, labor cost, access to credit, and farming experience play in determining income derived from backyard yam farming.

The coefficient of farm size is $\beta = 0.725$ and is statistically significant at $p < 0.01$; this means a larger farm size strongly increases income, and households with a larger farm size have significantly higher incomes.

Table 4: Determinants of income from backyard yam farming

Variable	Coefficient	Standard Error	t-Statistic	p-Value
Constant	1250.346	310.245	4.030	0.000
Farm size	0.725***	0.122	5.943	0.000
Labour cost	-0.456***	0.138	-3.304	0.001
Access to credit	0.193**	0.076	2.539	0.012
Farming experience	0.287***	0.094	3.053	0.003
Model Summary				
R-Squared	0.684		F-Statistic	56.243
Adjusted R-Squared	0.672		Durbin-Watson	1.985

**** and ** are significant at 1% and 5% respectively.* ***Source:*** *Authors' computation (2025)*

This finding agrees with Egbeadumah et al. (2022), who reported that a larger farm size increased yam output and profitability in Taraba State. This means that with more land dedicated to yam farming, households are better positioned for higher yields, hence higher incomes. On the other hand, labour cost is negatively related to income, with a coefficient of -0.456 and a p-value of less than 0.01; this suggests that a higher expenditure on labour reduces profitability. This corroborates the finding of Ume et al. (2020), who reported high labour cost as one of the critical constraints affecting yam farming profitability in Southeast Nigeria. This underlines the need for interventions to reduce labor costs, such as promoting mechanization and labor-saving technologies that can improve efficiency.

Another significant determinant is access to credit ($\beta = 0.193$, $p < 0.05$), which points out that households with access to financial resources are better equipped to invest in improved inputs, modern farming techniques, and expansion of farming activities, which enhance income. This corroborates Mukaila & Enete (2025), who stressed that credit facilities were very important in enhancing food security and income through backyard farming. Similarly, farming experience ($\beta = 0.287$, $p < 0.01$) positively influences income, showing that experienced farmers are able to make better decisions, utilize resources effectively, and apply practices that increase productivity. This is in agreement with Michael et al. (2021), who found farming experience to be one of the key determinants in enhancing technical efficiency and increasing income from yam production.

Challenges Faced by Households Engaged in Backyard Yam Farming

The identified challenges, as shown in Table 5 in backyard yam farming among households in the Delta North Agricultural Zone, Delta State, reveal that farmers face other key constraints. Farmers strongly agreed, with a mean score of 2.76, that pests and diseases were the major challenge. This result is supported by Inyang (2024), who reported that in backyard farming, the top challenges faced by the farmers were pests and diseases. In a related study, Ume et al. (2020) reiterated the negative effect of pests and diseases on yam production in Southeast Nigeria, stating that they are among the major factors leading to low yield and economic losses. Such challenges call for effective pest management strategies that would help improve productivity through the adoption of integrated pest management practices.

Issues such as access to credit and market became prominent, with mean scores of 2.54 and 2.56, respectively. Lack of access to credit is one of the recurring issues in agricultural studies. For example, Mukaila & Enete (2025) found that microcredit, specifically meant for household garden agriculture, significantly improved the food security of the household. Specifically, Ume et al. (2020) emphasized that limited accessibility to credit for farming hampers input purchasing and produces a negative result. On one side, a deficit of market access impinges on selling farm produce, including sales at considerable distances.

Table 5: Challenges faced by households engaged in backyard yam farming

Challenges	SA	A	D	SD	Weighted Mean	Std. Dev.	Remark
Pests and Diseases	120 (31.2)	112 (29.1)	95 (24.7)	58 (15.1)	2.76	0.954	Agree
Lack of Access to Credit	90 (23.4)	105 (27.3)	115 (29.9)	75 (19.5)	2.54	0.976	Agree
Inadequate Access to Market	98 (25.5)	90 (23.4)	123 (31.9)	74 (19.2)	2.56	0.970	Agree
Climate Change (e.g., drought, flooding)	70 (18.2)	85 (22.1)	130 (33.8)	100 (26.0)	2.33	0.974	Disagree
Soil Fertility Decline	100 (26.0)	78 (20.3)	130 (33.8)	77 (20.0)	2.53	0.989	Agree
Lack of Technical Expertise	50 (13.0)	80 (20.8)	140 (36.4)	115 (29.9)	2.17	0.928	Disagree
Land Tenure Issues	105 (27.3)	115 (29.9)	105 (27.3)	60 (15.6)	2.69	0.916	Agree

Where: SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree. Decision: mean >2.5 is Disagree, mean ≥2.5 is Agree. ***Source:*** *Authors' computation (2025)*

Regarding household involvement, there is, first, enhanced involvement with improved services by extension services and market links for more income creation, food security, and others, according to Aphane & Muchopa (2024). Other binding constraints, such as land tenure problems (mean = 2.69) and decline in soil fertility (mean = 2.53), further constrain the practice of backyard yam farming. Insecure ownership and disputes over land ownership led to limited long-term investment in farming. This agrees with Oduntan (2019), who reported that land-related constraints significantly influenced yam productivity in Ekiti State. Soil fertility decline contributes to worsening the challenge of production. According to Ume et al. (2020), yam cropping activities, among other environmental effects, have contributed to nutrient loss. To ensure that backyard yam farming is sustainable in the region, such challenges will need targeted interventions that address improving access to secure land tenure systems and encouraging soil fertility management practices.

Coping Mechanisms Employed by Households to Address the Challenges Encountered in Backyard Yam Farming

Results in Table 6 present the coping strategies adopted by households in the Delta North agricultural zone, Delta State, Nigeria, in responding to constraints in backyard yam farming. The results show that the respondents accept the use of traditional methods of pest control (mean = 2.74), diversification of income sources (mean = 2.84), and farmer group membership (mean = 2.71). They disagree, however, with improved farming practices (mean = 2.47) and accessing government support programs (mean = 2.39). These results thus indicate that the households' first order of strategies to address challenges are mostly those that are locally available and collective rather than advanced or institutional mechanisms. The findings by Inyang (2024) support the adoption of traditional methods of pest control and income diversification, hence reliance on local practices and multiple sources of income in backyard farming to increase food security and income generation. Besides, farmer groups formed in a coping way reflect the importance of social capital and collective action in farming, which has also been encouraged by Egbeadumah et al. (2022) as one of the consolidating approaches of resources that improve access to technologies, opening better marketing opportunities. However, low adoption of the improved farming practice signifies the gap in the area of technical know-how and delivery in the extension service observed in Michael et al. (2021), where contacts from the extension agents had been identified to improve efficiency in the production of yams.

The disagreement with access to government support programs points toward problems in institutional support and policy implementations, as can be seen in Isaiah's (2024) work, wherein he found that positive attitudes of the yam farmers regarding training by ADP were not beyond income and land access problems. This therefore calls for targeted government intervention to bridge the gap in support, as the households would be enabled to adopt sustainable farming practices and be facilitated in accessing the resources needed for overcoming the constraint in backyard yam farming. Their addressing could significantly enhance the backyard farming economic contribution to household livelihoods within the region.

Table 6: Coping mechanisms employed by households to address the challenges encountered in backyard yam farming

Coping mechanisms	SA	A	D	SD	Weighted Mean	Std. Dev.	Remark
Use of Traditional Pest Control Methods	107 (27.8)	119 (30.9)	109 (28.3)	50 (13.0)	2.74	0.899	Agree
Diversification of Income Sources	129 (33.5)	113 (29.4)	96 (24.9)	47 (12.2)	2.84	0.895	Agree
Improved Farming Practices (e.g., crop rotation, mulching)	89 (23.1)	83 (21.6)	132 (34.3)	81 (21.0)	2.47	0.947	Disagree
Accessing Government Support Programs	73 (19.0)	91 (23.6)	135 (35.1)	86 (22.3)	2.39	0.964	Disagree
Forming Farmer Groups	118 (30.6)	107 (27.8)	92 (23.9)	68 (17.7)	2.71	0.891	Agree

Where: SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree. Decision: mean >2.5 is Disagree, mean ≥2.5 is Agree. ***Source:*** *Authors' computation (2025)*

CONCLUSION AND RECOMMENDATION

The study has shown that backyard yam farming contributes a lot economically and nutritionally to households in the Delta North Agricultural Zone, Delta State, Nigeria. Small-scale backyard yam farming was found to be a profitable venture with immense benefits to food security and improvement of household income. Gross margin and benefit-cost ratio analyses confirm that this venture is financially viable, whereas determinants of income point to the importance of farm size, access to credit, and farming experience in enhancing profitability. However, the crucial limitations to this farming practice include infestation and disease-pest problems, inadequate access to credit, and high labour costs, which reduce the potential benefits accruing from the system. Reliance on traditional coping strategies, such as pest control and farmer group collaborations, underlines one aspect of resilience for farmers but at the same time indicates urgent needs for more robust and institutionalized support mechanisms. This set of challenges, having to do with specific interventions like increasing access to agricultural credit, improving access to labor-saving technologies, and enhancing extension services, offers the possibility to increase productivity in yam farming within home gardens and render it more sustainable. The resulting effects on the livelihoods of these small-scale farmers will be translated into conditions of rural development and food security within Delta State.

The following recommendations were made based on the findings of the study:

i. Access to credit, especially for smallholder farmers, could be enhanced through policies that raise investment in productive assets and increase income.
ii. Efforts should be made to encourage labour-saving innovations and mechanization to reduce high labour costs that greatly erode profitability.
iii. Increasing farm size via community land-sharing or government-assisted access to land could raise household income, given the positive relationship that exists between the two variables, farm size and income.

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Authors Contributions

GEO: Conceptualization, Methodology. BOI: Formal analysis, writing original draft. DEO & OEI: Data curation, supervision

Ethical Statement

Not applicable

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