

# Transforming Family Food Systems in Ebonyi State Nigeria by Evaluating the Productivity of Home Gardens

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## ABSTRACT

The paper evaluating the productivity of home gardens in Ebonyi State as key towards transforming family food systems in the Ebonyi State in Southeastern Nigeria. Specific objectives were to: Identify the socio-economic characteristics of crop farmers in Ebonyi State,; Identify crop species dominant in the Ebonyi State home gardens; Determine crop densities in Ebonyi State, home gardens; Determine the costs and returns of home gardens crop production in Ebonyi State; and Determine home garden management approach in Ebonyi State. The population of the study comprised all the home gardeners in Ebonyi State. A total of 60 home gardens were used for the study. Data were collected by use of well-structured questionnaires and oral interviews were analyzed using descriptive statistics such as mean, frequency and percentages. **Objectives i, ii and iv** were achieved using descriptive statistics **Objective iii** was analyzed using the Cost and returns analysis model. The findings revealed that home gardening is predominantly practiced by individuals within the economically active age group, with a higher proportion of male participants. The high level of educational attainment among the farmers indicates a strong potential for the adoption of improved agricultural technologies and innovations. Farming was the primary occupation for most respondents, underscoring the importance of home gardening as a key livelihood activity in the study area. The income level of the farmers further suggests that home gardening contributes meaningfully to household welfare. In terms of production, cassava, maize, and okra were the dominant crops cultivated, largely for household consumption, highlighting the role of home gardens in enhancing food security. The cost and return analysis confirmed that home garden farming is a profitable enterprise in Ebonyi State, with positive gross margin, net income, and return on investment. Additionally, the adoption of integrated home garden management practices was relatively high, indicating that farmers are utilizing a combination of sustainable and improved techniques to enhance productivity. Overall, home gardening in Ebonyi State is a viable and profitable agricultural practice with significant potential for improving household food security, income generation, and sustainable agricultural development.

**Key words:** home garden, food system, management practice

## INTRODUCTION

Recent research findings have shown that up to 811 million people globally have been affected by hunger as of 2020 and about three billion people cannot afford healthy diet (Galhena *et al.*, 2013). In Nigeria, with the deepening inflation, the situation is such that one out of three people in Nigeria do not have access to adequate food and nutrition (Agu, 2021). Hunger has been on the rise recently in Nigeria, and 44% of the population were classified as moderately to severely food insecure in 2017 – 2019. More so, the depleting arable/cultivate land occasioned by population pressure and urbanization has reduced food production in Southeastern Nigeria.

Hence, there is a great need to increase food availability in Southeastern Nigeria, and the food availability needs to be sustainable.

In response to this burden, the United Nations in 2017, launched the Decade of family farming, 2019-2028 to achieve its Sustainable Development Goals. Family farming is the backbone of diverse innovative and dynamic agri-food systems. Family farming offers a unique opportunity to ensure food security and improve livelihood. Family farming is an integral part of food systems. The current food systems are delivering large amounts of expensive, unsafe, and unhealthy foods, which are produced in environmentally damaging and unsustainable ways, while households with untransformed food systems remain chronically poor and vulnerable to shocks and stresses.

A food system includes all aspects of growing, harvesting, packaging, processing, transporting, marketing and consuming food for people's nourishment. It includes all activities, infrastructural and environmental that support the growing, harvesting, processing, packaging and marketing as well as consuming all types of food materials, that is from farm to fork (FAO, 2018). According to FAO (2018), a sustainable food system is a food system that delivers food security and nutritious food for all the people in such a way that the economic, social, environmental and nutritional wellbeing for the present and the future generation are not compromised. Family farms produce more than 80% of the food in the world. With growing world population, increased vulnerability to climate extremes and low global food stocks, it is therefore time to rethink how to provide secure and resilient food systems, enhance economic opportunities for rural communities and create a healthy environment for mankind on earth. Family food systems need to become sustainable due to the rapidly increasing rate of hunger among rural and urban households (Galhena *et al.*, 2013).

The home garden is an integral part of the family farming and local food systems (Helena, 2023). Home gardening involves food production on small plots of land adjacent to human settlements. It provides food and income to households (Galhena *et al.*, 2015). It is conceived as an alternative to the increasing demand for food. It constitutes the multilayer system of ornamentals and medicinal plants (Lal, 2020). Home gardens being the oldest form of farming represents a system of land use which involves deliberate management of tree crops, shrubs and herbs in association with field and vegetable crops as well as livestock within the household environment (Aworinde and Erinoso, 2020). Recent studies have acknowledged that farm diversification in general and home gardens in particular can play an important role in improving nutritional outcomes (Bird *et al.*, 2019; Castañeda-Navarrete, 2021). Having a flourishing home garden can provide a variety of diets for the family which leads to better nutrition for family members.

Previous studies have examined the role of home gardens on smallholders' household-level nutritional outcomes (Baliki *et al.*, 2019; Castañeda-Navarrete, 2021; Depenbusch *et al.*, 2021,2022; Schreinemachers *et al.*, 2016). The studies showed that home garden interventions can increase the quantity and diversity of food produced and consumed at the household level. However, concrete evidence of the impact of home gardens on the productivity of home gardens hardly exists. A severe lack of in-field data has hindered our understanding of the form and function of home food gardens which in turn may hinder innovation and improvement (Cosortan, Ward, and Roetman, 2020). Southeastern Nigeria is being threatened by food insecurity (Agu, 2021). Ebonyi state is one of the states in the Southeastern Nigeria that is densely populated and having an agrarian culture. Therefore, there is a need to make the family food system in Ebonyi sustainable by transforming the productivity of the home gardens in the state.

Specific objectives were to:

1. Identify the socio-economic characteristics of crop farmers in Ebonyi State,
2. Identify crop species dominant in the Ebonyi State home gardens.
3. Determine crop densities in Ebonyi State, home gardens
4. Determine the costs and returns of home gardens crop production in Ebonyi State.
5. Determine home garden management approach in Ebonyi State.

## RESEARCH METHODOLOGY

The research was conducted in Ebonyi State in Southeastern Nigeria. Ebonyi State is bordered to the north by Benue State, Enugu State to the west, Cross River State to the east and Abia State to the south, with an estimated population of nearly 2.9 million as of 2016. Geographically, the state is divided between the Cross–Niger transition forests in the far south and the drier Guinean forest–savanna mosaic in the rest of the state. Economically, Ebonyi State is based around agriculture, primarily an agricultural region, ([https://en.wikipedia.org/wiki/Ebonyi\\_State](https://en.wikipedia.org/wiki/Ebonyi_State))

The population of the study comprised all the home gardeners in Ebonyi State. Three Local Government Areas were purposively selected. Four council wards from each of the Local Government Areas were purposively selected based on the size of the home gardens (0.5-1ha), giving a total of twelve (12) council wards. In each council wards five (5) compounds with home gardens were visited given a total of 60 home gardens. Data were collected by use of well-structured questionnaires and oral interviews for **Objectives i, ii, iii and v** were achieved using descriptive statistics, while **Objective iv** was analyzed using the Cost and returns analysis model.

The analysis of cost and return of home garden crop production was to find out production profitability. It was specified as follows:

$$\text{Profit} = TR - TC \quad \dots\dots\dots(1)$$

Net Return (NR) = Total Revenue – Total Costs

$$NR = TR - TC \quad \dots\dots\dots(2)$$

$$NR_i = \sum_{j=1}^n TVP_j - \sum_{k=1}^n TVC_k + FC_k \dots\dots\dots(3) -$$

Where:

i = 1 to n home gardeners

j = the j<sup>th</sup> produce of home gardeners

k = the k<sup>th</sup> input cost of home gardeners

n = number of home gardeners

TVP= Total value of Production (or gross output)

TVC = Total variable Costs

FC = Fixed Costs

## RESULTS AND DISCUSSION

The result of the socio-economic characteristics of home garden farmers in Ebonyi State showed that the mean age of home garden farmers was 40 years (Fig 1) with majority (75.4%) being male (Fig 2). This may be due to the fact that females are not always interested in farming due to its tedious nature which also corresponds with the findings of Adeloya and Oke (2025). On the other hand, 75.4% of the home garden farmers were married, indicating that they will likely have capable hands to help with home garden production (Fig 3). Results of the study revealed that most (55.1%) of the home garden farmers attained tertiary education (Fig 4) which aligns with the findings of Uzokwe, Giweze & Ofuoku (2016) indicating willingness to adopt new technologies associated with home garden techniques. Farming (75.4%) was their major occupation (Fig 5). Findings also showed that the home garden farmers had mean household size of 7 persons (Fig 6) and mean monthly income of ₦112,115.94, (Fig 7) indicating that they are medium-level income earners and this also corresponds with the findings of Enete and Mukaila (2024).

Fig 1-Age Characteristics of Ebonyi State Home Garden Farmers

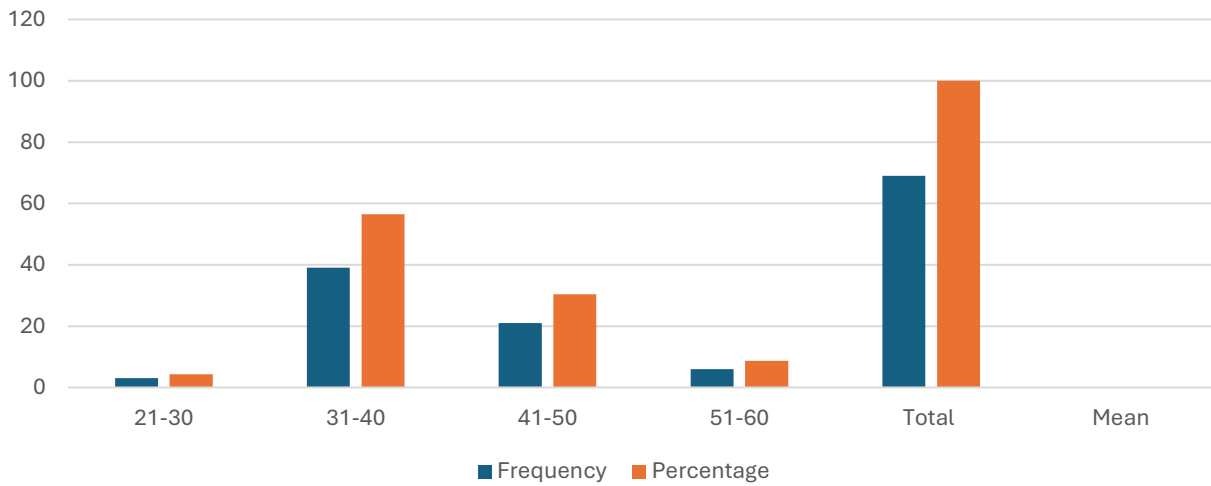


Fig 2- Gender Distribution of Ebonyi State Home Garden Farmers

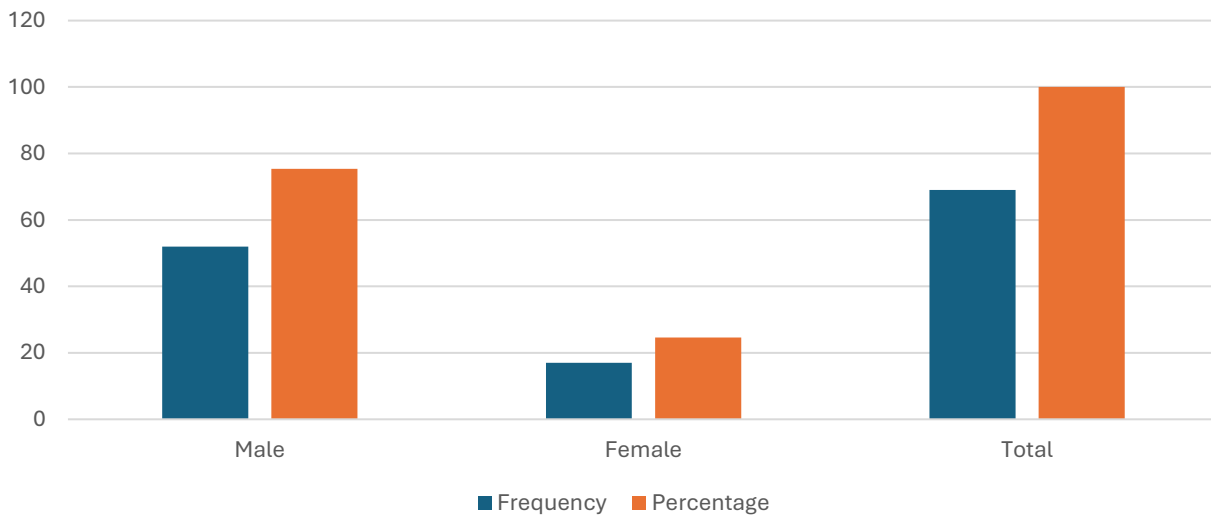


Fig 3- Marital Status of Ebonyi State Home Garden Farmers

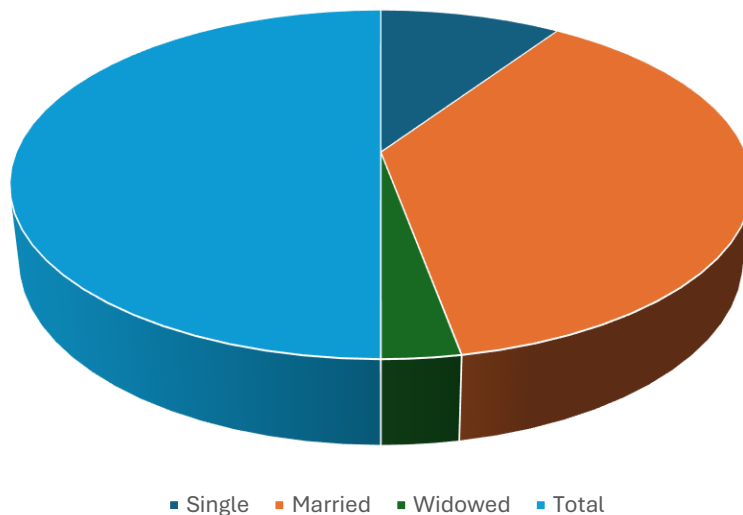


Fig 4- Education Level of Ebonyi State Home Garden Farmers

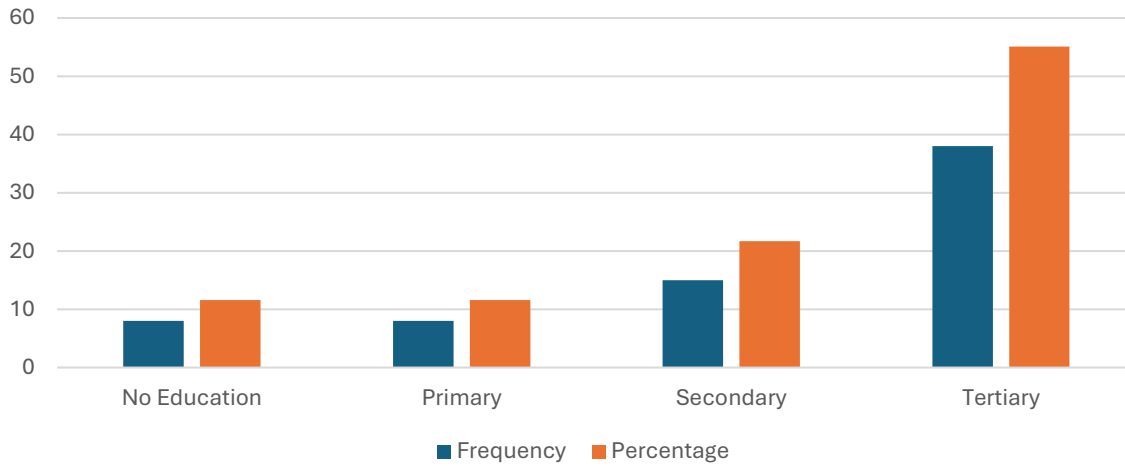


Fig 5- Occupation of Ebonyi State Home Garden Farmers

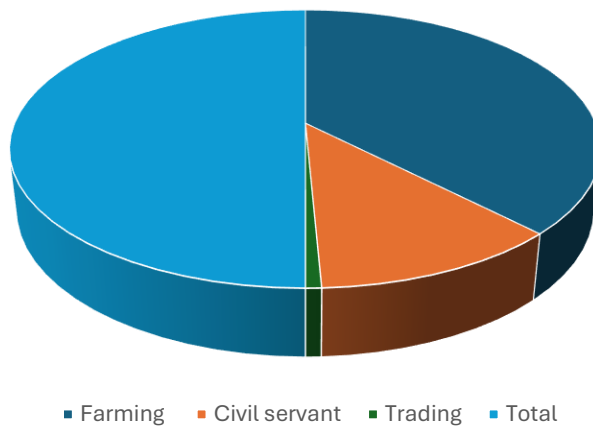
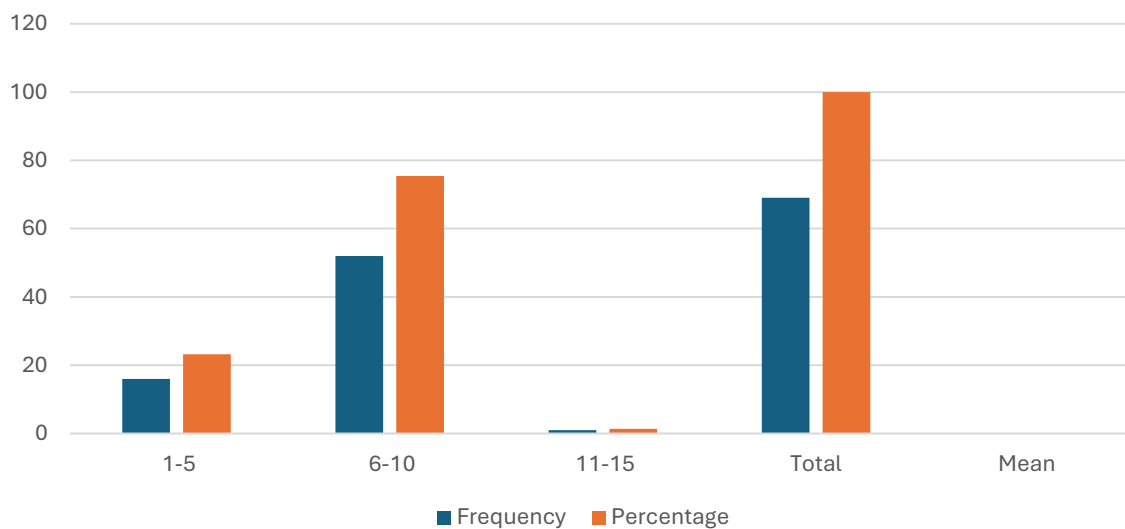
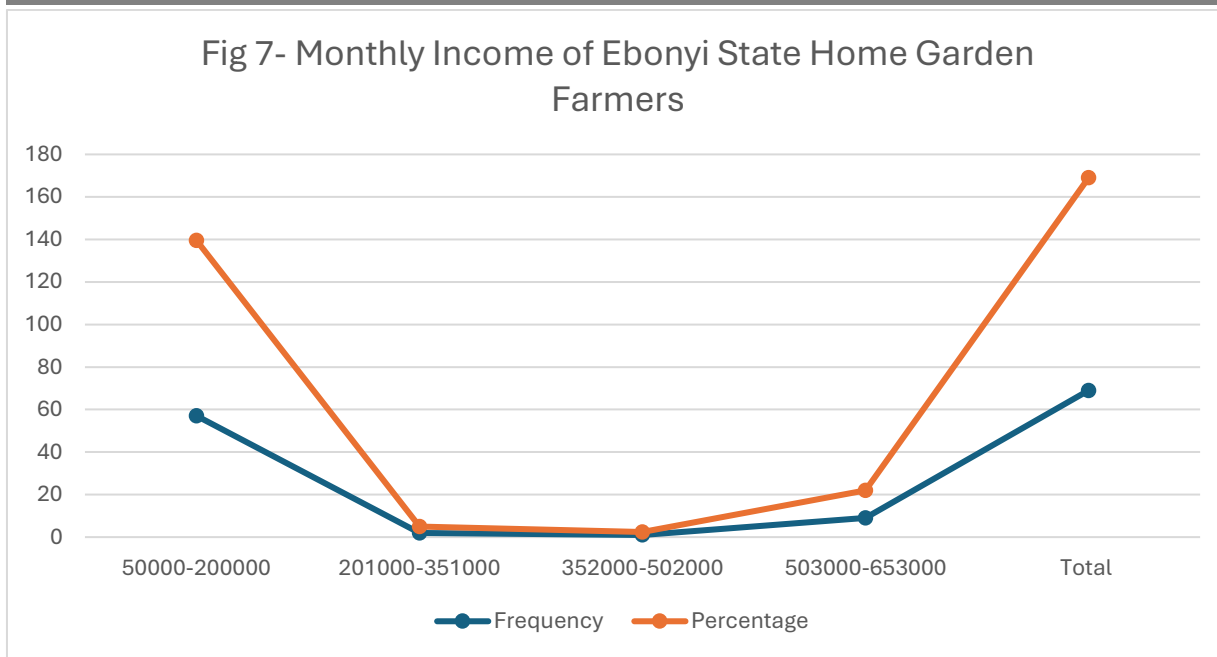


Fig 6- Household Size of Ebonyi State Home Garden Farmers





Results presented in Table 1 revealed that the dominant crop species in Ebonyi home garden are cassava (9.1%), maize (8.8%) and okra (8.4%). Other crops were also cultivated though in smaller proportions as seen in the table. This is because most home garden crops (cassava and maize) are grown for consumption. This is in tandem with the findings of Adeosun, Nnaji and Onyekigwe (2020).

Table 1: Crop Species Dominant in Ebonyi State Home Gardens

CROPS	FREQ	%	CROPS	FREQ	%
Cassava	63	9.1	Utazi	7	1.0
Maize	61	8.8	Cocoyam	36	5.2
Yam	57	8.2	Water leaf	33	4.8
Pumpkin	47	6.8	Pineapple	18	2.6
African spinach (Green)	30	4.3	Banana	25	3.6
Okra	58	8.4	Paw-paw	29	4.2
Pepper	48	6.9	Ginger	7	1.0
Plantain	30	4.3	Coconut	21	3.0
Tomato	22	3.2	Avocado pear	7	1.0
Bitter leaf	43	6.2	Turmeric	1	0.1
Curry leaf	19	2.7	<b>TOTAL</b>	<b>692</b>	<b>100</b>
Scent leaf	30	4.3			

**Field Survey Data, 2025.**

Table 2 shows the average crop density (number of stands) of crops cultivated in home garden in Ebonyi State. Result shows that cassava had 1,569 stands, followed by pepper with 1,174 stands and pumpkin with 1,049 stands. Ginger, avocado and turmeric had the least number of stands of 2, 1 and 1 respectively. Findings also showed that Ebonyi home garden farmers had a mean farm size of 6816.2M<sup>2</sup>.

Table 2: Crop Density (Number of Stands) in Ebonyi State Home Gardens

CROPS	MEAN CROP DENSITY	CROPS	CROP DENSITY
Cassava	1569	Bitter leaf	226
Maize	1045	Curry leaf	74
Yam	959	Scent leaf	75
Pumpkin	1049	Utazi	4
African spinach (Green)	220	Cocoyam	651

Okra	1043	Water leaf	333
Pepper	1174	Pineapple	23
Plantain	312	Coconut	107
Banana	280	Avacado pear	1
Pawpaw	13	Tumeric	1
Ginger	2	<b>Mean Farm Size</b>	6816.2M <sup>2</sup>
Tomato	163		

**Field Survey Data, 2025.**

Results in Table 3 show a total cost of ₦296,340 from the result of cost and return analysis of home garden crops in Ebonyi State. Home garden crops was profitable in the state as seen in the gross margin, net income and return on investment realized by the home garden farmers. The Gross margin was ₦194,560 with net income of ₦51,060 and return on investment of 0.17 (17%). This shows that the production of home garden crops is profitable in Ebonyi State because for every ₦1 spent by the home garden farmers in the state, they get a profit of ₦17. This finding is in tandem with the findings of Ebua, Azibo and Tambi (2025).

Table 4: Cost and Returns of Home Garden Crop Production in Ebonyi State

NAME OF CROP (VARIABLE COST)	QUANTITY	UNIT COST (₦)	TOTAL AMOUNT (₦)
Cassava Stem (bundle)	2	2,000	4,000
Maize seed (pack)	2	300	600
Cocoyam Sett	20	100	2,000
Pumpkin Seed	25	100	2,500
Tomato Seed (pack)	2	100	200
Pepper Seed (sachet)	2	150	300
Spinach Seed (sachet)	2	130	260
Avocado Pear Seedling	2	200	400
Coconut Seedling	4	3,000	12,000
Pineapple Sucker	10	500	5,000
Plantain Sucker	7	2,100	14,700
Banana Sucker	4	2,100	14,700
Ginger Rhizome	1	40	40
Turmeric Rhizome	1	40	40
Pawpaw Seedling	9	200	1,800
Fertilizer	1	45,000	45,000
Organic manure	5	800	4,000
Insecticide	1	4,500	4,500
Herbicide	1	4,500	4,500
Pesticide	1	4,500	4,500
Yam Setts/Seedling	20	700	14,000
Okra Seed	13	100	1,300
Transportation			16,500
<b>TOTAL VARIABLE COST (TVC)</b>			<b>152,840</b>
<b>Fixed Inputs</b>			
Wheel barrow	2	43,500	87,000
Hoe	2	4,000	8,000
Cutlass/machetes	2	5,000	10,000
Spade	1	7000	7000
Shovel	1	7000	7000
Garden fork	1	2500	2500
Watering can	1	22000	22000
<b>Total Fixed Cost(TFC)</b>			<b>143,500</b>
<b>Total Cost (TC)</b>			<b>296,340</b>

NAME OF CROP (REVENUE)			
Cassava (50kg bag)	7	10,000	70,000
Maize (50kg bag)	4	8,000	32,000
Yam (50kg bag)	10	10,000	100,000
Cocoyam (50kg bag)	6	4,500	27,000
Coconut (heads)	32	700	22,400
Avocado pear (basket)	5	5,300	26,500
Pineapple (heads)	0	0	0
Tomato (5kg painter)	4	5,000	20,000
Bitter leaf (bundle)	20	200	4,000
Curry leaf (bundle)	17	200	3,400
Scent leaf (bundle)	15	200	3,000
Utazi (bundle)	5	200	1,000
Pumpkin (bundle)	8	2,000	16,000
Water leaf (bundle)	15	300	4,500
African Spinach (bundle)	6	200	1,200
Pepper (5kg painter)	2	1,700	3,400
Okro (5kg painter)	4	3,000	12,000
Turmeric (5kg painter)	1	1,000	1,000
Ginger (5kg painter)	0	0	0
<b>Total Revenue (TR)</b>			<b>347,400</b>
<b>Gross Margin (GM) = (TR-TVC)</b>			<b>194,560</b>
<b>Net Income (NI) = (GM-TFC)</b>			<b>51,060</b>
<b>Return on Investment (ROI) = NI/TC X 100</b>			<b>0.17 (17%)</b>

The result on table 4 shows the rate of usage/adoption of home garden management practices. Findings show that the integrated approach (minimum tillage, planting plan, record keeping, soil testing, manure analysis and application, crop rotation, fertilizer measurement and application, use of improved varieties, mixed cropping and mono cropping) which was also noted by Adam and Abdulai (2023), was the best approach used by farmers with a mean of 3.9 making it the highest among all other approaches used by the home garden farmers.

Table 4: Rate of Usage/Adoption of Home Garden Management Practices in Ebonyi State

Home Garden Management Approach	Always Used (AU) (4)	Moderately Used (MU) (3)	Sparingly Used (SU) (2)	Not Used (NU) (1)	Mean
Organic Approach	41(59.4%)	17(24.6%)	8 (11.6%)	3(4.3%)	3.4
Inorganic Approach	23 (33.3%)	38 (55.1%)	6 (8.7%)	2 (2.9%)	3.2
Integrated Approach	60 (87%)	9 (13%)	-	-	3.9

**Field Survey Data, 2025.**

**CONCLUSION AND RECOMMENDATIONS**

The study examined the socio-economic characteristics, profitability, crop composition, and management practices of home garden farmers in Ebonyi State. The findings revealed that home gardening is predominantly practiced by individuals within the economically active age group, with a higher proportion of male participants. Many of the farmers were married and had relatively large household sizes, suggesting the availability of family labor to support home garden activities.

The high level of educational attainment among the farmers indicates a strong potential for the adoption of improved agricultural technologies and innovations. Farming was the primary occupation for most respondents, underscoring the importance of home gardening as a key livelihood activity in the study area. The income level of the farmers further suggests that home gardening contributes meaningfully to household welfare.

In terms of production, cassava, maize, and okra were the dominant crops cultivated, largely for household consumption, highlighting the role of home gardens in enhancing food security. The cost and return analysis confirmed that home garden farming is a profitable enterprise in Ebonyi State, with positive gross margin, net income, and return on investment. Additionally, the adoption of integrated home garden management practices was relatively high, indicating that farmers are utilizing a combination of sustainable and improved techniques to enhance productivity. Accordingly, home gardening in Ebonyi State is a viable and profitable agricultural practice with significant potential for improving household food security, income generation, and sustainable agricultural development.

Based on the findings of this study, the following recommendations are made:

1. Promotion of Gender Inclusion:

There is a need to encourage greater participation of women in home gardening through targeted interventions such as access to land, credit facilities, and labor-saving technologies in Ebonyi State.

2. Strengthening Agricultural Extension Services:

Extension agents in Ebonyi State should intensify efforts to disseminate improved home garden technologies and best management practices, particularly the integrated approach already being adopted by farmers.

3. Capacity Building and Training:

Regular training programs and workshops should be organized to further enhance farmers' knowledge on modern home garden techniques, soil management, and efficient resource utilization among home garden farmers in Ebonyi State.

4. Access to Credit and Inputs:

Government and financial institutions should provide affordable credit facilities and subsidized inputs (such as improved seeds, fertilizers, and tools) to home garden farmers in Ebonyi State to boost productivity and profitability.

5. Promotion of Value Addition and Market Access:

Home garden Farmers should be encouraged to engage in value addition (processing, packaging) and be linked to markets to increase income beyond subsistence production.

6. Support for Research and Innovation:

Further research should be conducted on improved crop varieties and sustainable home garden practices suited to local conditions in Ebonyi State.

7. Encouragement of Record Keeping:

Farmers should be trained and encouraged to maintain proper farm records to improve decision-making, financial management, and access to credit.

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