

ECONOMIC ANALYSIS OF SMALL-SCALE VEGETABLE PRODUCTION IN IBARAPA CENTRAL LOCAL GOVERNMENT AREA, OYO STATE, NIGERIA

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Abstract

This study assessed the economic analysis of small-scale vegetable production in the Ibarapa Central Local Government Area of Oyo State, Nigeria. The research explores the socio-economic characteristics of vegetable farmers, identifies the types of vegetables cultivated, determines the profitability of vegetable farming, and examines the constraints faced by producers. A multi-stage sampling procedure was used to select 80 respondents, and primary data was collected using interview guides. Descriptive statistics and Gross Margin Analysis were employed for data analysis. The findings indicate that the majority of vegetable farmers are within their economically productive age, predominantly Muslim, and married, with a significant proportion having primary education. *Amaranthus* spp., jute mallow (*Ewedu*), and water leaf (*Gbure*) were the most commonly cultivated varieties. Vegetable production was found to be profitable, with a benefit-cost ratio of 1.22. Key constraints identified include inadequate access to quality seeds, fertilizers, and pesticides, limited market access, challenges in pest and disease control, and unpredictable weather patterns. The study recommends government intervention in providing access roads, loan facilities, and subsidized agricultural inputs to enhance profitability and productivity in the vegetable sector.

Keywords: *Vegetable production, economic analysis, profitability, small-scale farming, Oyo State, Nigeria.*

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Introduction

Vegetables are an essential component of the Nigerian diet, considered crucial for a complete traditional meal. However, in developing countries, vegetable consumption often falls below the FAO recommendation of 75 kg per year per capita (206 g per day) (FAO, 2020). Vegetable crops contribute significantly to income security and the nutritional well-being of many households globally, providing 30 to 50 percent of iron and vitamin A in resource-poor diets (Dury et al., 2017). Widely cultivated vegetable crops

in Sub-Saharan Africa, especially by small-scale farmers in Nigeria, include tomatoes, okra, pepper, and cabbage (Alao and Shuaibu, 2021). In Nigeria, vegetable production occurs across different agro-ecological zones, serving as both a source of income and food for commercial and small-scale farmers (Yusuf & Adenegan, 2020). Despite this, the range of cultivated vegetables is limited, and production is concentrated in specific areas. Production scales vary from backyard gardens for home consumption to large-scale

operations for domestic and export markets (Ojo and Adebayo, 2012).

Protective cultivation, such as using nets or screens, has been widely adopted to mitigate adverse climatic conditions and reduce excessive solar radiation, weather effects, and pest/bird damage. Such structures enhance productivity and returns by reducing yield losses from insects, diseases, heavy rains, and sunburn, and provide protection against biotic and abiotic stresses (Hussain and Singh, 2022). Studies have shown that plastic net covers significantly improve total fruit yield and returns for tomato crops, and net shade can reduce insect populations by 80%, leading to 1.5 to 2 times greater marketable yields compared to open fields. Growing cabbage under nets has also been shown to reduce insect incidence by 38–72% and result in significantly higher returns (Hussain and Singh, 2022). Greenhouses, a more advanced protective structure, allow for controlled or partially controlled environments, resulting in higher yields than open-field conditions.

Small-scale irrigation systems are vital for dry season farming in Nigeria. However, irrigation farming in Nigeria and Africa is relatively low, with only 6% of the total cultivated area irrigated, compared to 37% in Asia and 14% in Latin America (World Bank, 2018). Over two-thirds of existing irrigated land in Africa is concentrated in five countries: Egypt, Madagascar, Morocco, South Africa, and Sudan (IFPRI, 2018). Given that irrigated crop yields in Africa can be more than double rain-fed yields, investment in irrigation development, particularly in areas with high potential, is crucial (Nwajiuba and Nweke, 2017). The Nigerian Federal Government, with support from the World Bank and African Development Fund, initiated the National FADAMA Development Project (2008–2016) to develop irrigation systems (FMARD, 2017). Dry season vegetable production commonly occurs along riverbanks in Nigeria (NAERLS and FMARD, 2019).

Despite a target set in 2000 for food self-sufficiency in African countries, little progress has been made, evident in excess capacity in the agro-industrial sector, rising food prices, and increasing food imports (FAO et al., 2022). Accelerated agricultural growth, essential for broad economic growth, requires the sound application of science and technology through improved seeds, fertilizers, agrochemicals, and other agronomic practices (World Bank, 2018). However, without an efficient and cost-effective supply of these inputs at the farm gate, science-based agricultural productivity growth cannot be achieved. Furthermore, with the withdrawal of subsidies and privatization, input markets remain underdeveloped and fragmented, leading to farmers receiving poor quality inputs at unreasonably high prices, despite the private sector's potential to supply inputs cost-effectively (Adekunle and Fatunbi, 2012). Stagnant production technology among the largely small-scale farming community in Nigeria is a significant constraint to vegetable production (Yusuf and Adenegan, 2020).

Problem Statement

Small-scale vegetable production is a vital sector for local livelihoods and food security in Oyo State's agrarian landscape. However, there is a fundamental gap in the economic nuances of such endeavor. The absence of in-depth examination of the cost of production hinders farmers from making effective choices regarding resource allocation and pricing (Ojo and Adebayo, 2012). Doubt regarding general profitability, as impacted by market fluctuations and input costs, poses difficulty, dissuades entry, and restricts vegetable availability during dry seasons (Yusuf and Adenegan, 2020). This leads to short-term vegetable scarcity and forces people to resort to substitutes which may not be in a position to meet their nutritional requirements (Dury et al., 2017). Additionally, market constraints, transportation problems, and lack of market accessibility also enhance the challenges of

small-scale vegetable producers in the region (Nwajiuba and Nweke, 2017). This study aims to bridge these knowledge gaps by conducting an in-depth economic analysis to unveil the opportunities and challenges inherent in small-scale vegetable production in Ibarapa Central Local Government of Oyo State.

Objectives of the Study

The general objective of this study is to assess the economic analysis of small-scale vegetable production in Ibarapa Central Local Government Area of Oyo State.

The specific objectives are to:

1. describe the socio-economic characteristics of the respondents in the study area;
2. identify various types of vegetables produced in the study area;
3. determine the profitability of vegetable production in the study area;
4. identify constraints to vegetable production in the study area.

Justification of the Study

This study on vegetable production in Ibarapa Central Local Government Area of Oyo State is significant because it contributes to local economic development, assists in making agricultural policy, resolves the problem of food security, and provides knowledge on resource allocation and sustainability in vegetable production at the small-scale level (FAO *et al.*, 2022; Yusuf and Adenegan, 2020). Socio-economic contribution of small-scale vegetable production to local farmers remains not very well known. While this agrarian activity has the potential to boost the socio-economic development of the community, the level of influence it has on income generation, employment, and rural development needs to be very clear and unveiled (Dury *et al.*, 2017; Ojo and Adebayo, 2012). The research endeavors to debunk such complexities and provide insightful information to policymakers in order to enhance the farming venture, ultimately

coming up with sustainable economic development of small-scale farming businesses that can enhance livelihoods as well as combat food insecurity in the nation (World Bank, 2018; IFPRI, 2018).

Methodology

The Yoruba ethnic population constitutes the majority in this homogenous study population, Ibarapa Central Local Government Area of Oyo State, Nigeria. The Local Government Area is constituted by ten (10) political wards that consist of Idofin, Pako Titun, Isale Pembo, Oja Igboora, Igboole etc. It is situated between 7°15 North and 3°300 East of the equator and has the wet and dry seasons. The mean yearly rainfall is estimated at 1,278mm and sunshine hours range from 2.4 hours in August to 7 hours in February with a mean temperature of 27°C. Three vegetation types exist within the area depending on the dominant climatic and soil conditions. They are Forest, Savannah and Derived savannah. The forest zone's high relative humidity favors the cultivation of tree crops such as cocoa, kolanut, citrus and oil palm and arable crops such as yam, cassava, golden melon, cucumber and maize. The derived savannah has a mixture of forest and savannah vegetation. (Sanusi, 2019)

Primary data were obtained from the vegetable producers using the guide for an interview. A Two-stage sampling method was used in this study. During the first stage, six political wards were chosen randomly from the ten political wards of the Local Government Area. The second stage involved purposive sampling to select vegetable farmers in each of the selected wards and twenty respondents were selected randomly from each of the six wards, totaling 120 respondents as the sample size. Descriptive statistics was used to analyze the socio-economic profile of households, the various types of vegetables produced and the farmers' constraints (Alao and Shuaibu, 2021). Gross Margin Analysis was used in determining the profitability of vegetable production (Yusuf and Adenegan, 2020).

The models used for estimation are:

$$GMI = \sum TR - \sum TVC \text{ (i)}$$

$$TR = P_y \cdot Y_i \text{ (ii)}$$

$$TVC = P_x \cdot X \text{ (iii)}$$

$$TC = TVC + TFC \text{ (iv)}$$

$$NFI = GM - TFC \text{ (v)}$$

Where:

GMI = Gross Margin Income (₦)

TR = Total Revenue (₦)

TVC = Total Variable Cost (₦)

TC = Total Cost (₦)

NFI = Net Farm Income (₦)

P_y = Unit Price of Output Produced (₦)

Y = Quantity of Output (Kg)

P_x = Unit Price of Variable Inputs Used (₦)

X_i = Quantity of Variable Inputs (Kg)

These models were used to determine the costs and returns associated with vegetable production.

Results and Discussion

Socioeconomic Characteristics of Vegetable Farmers

Table 1 presents the socio-economic characteristics of the vegetable farmers in the study area. The results indicate that the mean age was 38 years. This suggests that the

majority of respondents are in their economically productive age. It was also revealed that majority (72.50%) were Muslims while few (23.33%) were Christians and only minority (4.17%) were traditional worshippers. This implies that the area was Muslim dominated. The respondents were majorly (74.17%) married while the rest few were divorced, or widowed/widower (15%) and single (10.83%). This shows that the majority respondents were family people with family responsibilities. Majority (85.83%) were females while just few (14.17%) were males. This implies that vegetable production was more of female livelihood activity than males. The results further revealed that there were more (48.33%) respondents with primary education than those with secondary education (20.83%), tertiary education (4.17%) and those with no formal education (26.67%). This suggests that the respondents were learned irrespective of the level. The mean household size which was 6 persons affirmed their marital status and level of responsibility while the mean farm size was 4 acres. The mean year of farming experience was 9 years while the mean monthly income was ₦98,673.03. This implies that they were experienced with good proceeds from their production.

Table 1: Socioeconomic Characteristic of Vegetable Farmers in the Study Area

Variables	Frequency	Percentage	Mean
Age			
Less than 30	38	31.67	37.5
30 – 40	54	45.00	
40 - 50	16	13.33	
Above 50	12	10.00	
Religion			
Christianity	28	23.33	
Islam	87	72.50	
Traditional	5	4.17	
Marital Status			
Single	13	10.83	
Married	89	74.17	
Divorced/Separated/Widow	18	15.00	
Sex			
Male	17	14.17	
Female	103	85.83	
Educational Qualification			
No Formal	32	26.67	

Primary	58	48.33	
Secondary	25	20.83	
Tertiary	5	4.17	
Farming Experience (years)			
Less than 5	30	25.00	
5 - 10	62	51.67	9.4
Above 10	28	23.33	
Farm Size			
Less than 5	63	52.50	4.3
5 – 10	41	34.17	
Above 10	16	13.33	
Household Size			
Less than 4	28	23.33	
4 – 8	87	72.50	6
Above 8	5	4.17	
Income			
Less than 50,000	28	23.33	
50,000 – 100,000	67	55.83	98,673.03
Above 100,000	25	20.83	
Total	120	100.0	

Source: Field Survey, 2024

Vegetable Varieties Cultivated in the Study Area

Table 2 illustrates the various vegetable types cultivated by the respondents. The most commonly planted variety was Amaranthus spp., reported by 83.33% of respondents. Other widely cultivated vegetables included jute mallow (Ewedu) (60.00%), water leaf (Gbure) (58.33%), fluted pumpkin leaf

(Ugwu) (52.50%), and okra (Ila) (48.33%). Additionally, Hibridus (Isapa) (51.67%), scent leaf (Efinrin) (33.33%), and Yoruba bolagi (Ebolo) (30.83%) were also cultivated. This implies that Amaranthus spp was most common variety followed by Ewedu in the study area. Gbure, Ugwu and Isapa were also planted by a good number of the respondents.

Table 2: Distribution of Respondents based on Vegetable Varieties Cultivated (n=120)

Vegetable Varieties Planted*	Frequency	Percentage
Amaranthus spp	100	83.33
Jute mallow (Ewedu)	72	60.00
Water leaf (Gbure)	70	58.33
Fluted pumpkin leaf (Ugwu)	63	52.50
Hibridus (Isapa)	62	51.67
African spinach (Efo tete)	57	47.50
Scent leaf (Efinrin)	40	33.33
Green Amaranthus (Efo Abalaye)	38	31.67
Yoruba bolagi (Ebolo)	37	30.83
Bitter leaf (Ewuro)	20	16.67
Malabar spinach (Amunututu)	18	15.00
Eggplant leaf (Efo Igbo)	16	13.33

Source: Field Survey, 2024

Profitability of Vegetable Production in the Study Area

The profitability analysis of vegetable production is presented in Table 3. The Total

Variable Cost was estimated as ₦87,572.09 per hectare, while the Total Fixed Cost, calculated at a 10% depreciation rate on equipment, was ₦6,962.17 per hectare. The

Total Cost amounted to ₦94,534.26 per acre. Total Revenue generated from the sale of vegetables was estimated at ₦115,983.73 per acre. The Gross Margin was ₦28,411.64 per acre, and the Net Farm Income was ₦21,449.47 per acre. The study found out that vegetable production is profitable in the area, evidenced by a benefit-cost ratio of 1.22,

meaning that for every ₦1 invested, a profit of ₦0.22 is realized. This implies that vegetable production is profitable in Ibarapa Central LGA of Oyo State. This finding aligned with the discovery of Ojo and Apata, (2019) that vegetable production is profitable in Southwest, Nigeria.

Table 3: Profitability of Vegetable Production in the Study Area (n=120)

Items of Cost	Total Cost (₦)
A. Variable Cost	
Cost of Land preparation	25,653.51
Cost of rent on land	7,531.67
Cost of seeds/seedling per hectare	15,772.84
Cost of Labour for planting	6,953.04
Cost of fertilizers and other Agrochemicals	15,853.92
Cost of Weeding per hectare	5,953.17
Transportation cost	9,853.94
Total Variable Cost	87,572.09
B. Fixed Cost	
10% Depreciation rate on equipment	6,962.17
Total Cost (A + B)	94,534.26
Revenue from sale of Vegetables	115,983.73
Gross Margin = TR – TVC	28,411.64
Net Farm Income (NFI) = TR – TC	21,449.47
Benefit Cost Ratio = TR÷TC	1.22

Source: Field Survey, 2024

Constraints to Vegetable Production

Table 4 presents the perceived constraints associated with vegetable production by the vegetable farmers, ranked by Weighted Mean Score (WMS). "Inadequate access to quality seeds, fertilizers and pesticides" was identified as the primary constraint, with a WMS of 2.82. "Limited access to markets and difficulties in reaching potential buyers" (WMS = 2.71), "Challenges in controlling pests and diseases" (WMS = 2.52), and "Unpredictable weather patterns such as droughts or excessive rainfall" (WMS = 2.43) were ranked 2nd, 3rd, and 4th, respectively. Other notable constraints included "Inadequate access to credit or financial services" (WMS = 2.17), ranked 5th,

while "Difficulty in finding and retaining skilled labour in vegetable production" (WMS = 1.96) and "Inadequate suitable fertile land for production" (WMS = 1.74) were ranked 6th and 7th respectively. These showed that the major constraints faced by the respondents in vegetable production were inadequate access to quality seeds, fertilizers and pesticides, limited access to markets and difficulties in reaching potential buyers and challenges in controlling pest and disease. This is in line with the findings of Amao *et al*, (2020) who discovered that the major constraints to vegetable production were high cost of improved inputs pest and diseases and inadequate facilities.

Table 4: Distribution of Respondents based of Constraints Associated with Vegetable Production in the Study Area

STATEMENTS	MAJOR CONSTRAINTS Freq (%)	MINOR CONSTRAINTS Freq (%)	NOT A CONSTRAINTS Freq (%)	WMS	Rank
Inadequate access to quality seeds, fertilizers and pesticides	73 (60.83)	33 (27.50)	14 (11.67)	2.82	1 st
Limited access to markets and difficulties in reaching potential buyers	67 (55.83)	43 (35.83)	10 (8.33)	2.71	2 nd
Challenges in controlling pests and diseases	71 (59.17)	34 (28.33)	15 (12.50)	2.52	3 rd
Unpredictable weather patterns such as droughts or excessive rainfall	76 (63.33)	23 (19.17)	21 (17.50)	2.43	4 th
Inadequate access to credit or financial services	46 (38.33)	64 (53.33)	10 (8.33)	2.17	5 th
Difficulty in finding and retaining skilled labour in vegetable production	61 (50.83)	45 (37.50)	14 (11.67)	1.96	6 th
Inadequate suitable fertile land for production	60 (50.00)	46 (38.33)	14 (11.67)	1.74	7 th

Source: Field Survey, 2024

Conclusion and Recommendations

This study concludes that small-scale vegetable production in Ibarapa Central Local Government Area of Oyo State is a profitable venture, as evidenced by the positive benefit-cost ratio. The farming community is largely composed of economically active individuals, cultivating a range of popular indigenous vegetable varieties. However, the sector faces significant challenges, particularly concerning access to essential inputs, market access, pest and disease management, and climate variability.

Based on the findings, the following recommendations are made:

The government should prioritize the provision of access roads to facilitate the transportation of vegetable produce to markets, thereby boosting profitability. Loan facilities should be made accessible to vegetable farmers to address their financial constraints and enhance their capacity for production and market access. Insecticides and pesticides should be provided at subsidized prices to improve productivity and profitability by mitigating pest and disease challenges.

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