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Analysis of economic viability of small-scale okra production in Ethiope East Local Government Area of Delta State, Nigeria

Veronica Uchechukwu Ikenga [1, *], Agatha Oghenemne Edewor [1], Davina Okompu Aberji [2] and Ogheneove Akpogheneoyibo- Owigho [3]

[1] *Department of Agricultural Economics, Faculty of Agriculture, Delta State University, Abraka, Delta State, Nigeria.*
[2] *Department of Agricultural Extension, Faculty of Agriculture, Dennis Osadebay University, Anwai, Nigeria.*
[3] *Department of Agricultural Economics, Delta State University of Scence and Technology, Ozoro, Delta State, Nigeria*

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Abstract

This study was conducted to analyze the economic viability of small-scale okra production in Ethiope East Local Government Area of Delta State. A simple random sampling technique was used to collect data from 120 respondents through the use of questionnaire. The data collected were analyzed using descriptive statistics, gross margin and regression analysis. The result showed that majority (80.7%) of the respondents were female with a mean age 41 years. The average household size was 4 persons while the mean farm size was 1.41 hectares. About (44.6%) of the respondents had a farming experience between 6 – 10 years. The total revenue generated from small-scale okra production was ₦1,419,344.50. The total production cost was ₦954,142.53 and the gross margin, was ₦519,817.72 with a net return of ₦465,201.98. The benefit-cost ratio indicated 1.49. The multiple regression result showed that education, farm experience, source of credit and farm size has a positive and significant influence on viability of small-scale okra production at 1% level of probability. Based on the findings of this study, it is therefore recommended that government should establish price stabilization mechanisms or cooperatives that can negotiate bulk purchasing agreements to secure more stable prices for inputs for sustainability.

Keywords: Okra production; Economic viability; Small-scale farming; Profitability analysis; Gross margin; Benefit-cost ratio

1. Introduction

Vegetable cultivation is a vital source of earnings for medium and small farmers [1]. Okra (*Abelmoschus esculentus*), a vegetable crop, was first domesticated in West and Central Africa, and is now grown widely across the tropics [3]. In Nigeria, Okra is in third position in Nigeria after tomatoes and peppers in consumption and area of production [3]. It is one of the principal vegetable crops grown in Nigeria in spite of poor productivity [2]. Its high nutritional content (carbohydrates, proteins, vitamin C, and essential amino acids) is also present in its leaves, buds, flowers, and even seeds, which are extracted into oil, vegetable curd, or coffee substitutes [3]. Some types (white velvet, green velvet, long pod, lady finger, dwarf green pods) are also cultivated for their unique properties [4].

Though research has shown that okra production can be profitable with research documenting improved returns on medium-scale farms [5, 6], high family labour expenses and inefficient use of resources remain the primary challenges [7]. For Nigeria, okra is produced in most small-scale farms that are characterized by low capital, land access, and labor [1]. Production costs such as cost of land preparation, inputs, labor, and overheads are profitability determinants [8], whereas potential yield determinants include seed quality, plant population, soil fertility, and climatic condition [9].

* Corresponding author: Veronica U Ikenga

Climate factors (temperature, rainfall, soil type) and socio-economic (credit availability, land ownership, availability of labour) also determine the economic viability of okra cultivation [8]. Okra is generally neglected in favor of staple crops like yam, cassava, or maize even though it has its benefits. With increasing vegetable consumption driven by population growth and health initiatives [10, 11], supply constraints exacerbated by high input costs and post-harvest issues raise questions on the profitability and viability of small-scale okra production. This study examines the economic viability of okra cultivation in Ethiope East Local Government Area (LGA), Delta State with a view to contributing to enhanced-targeted agricultural policies. Specifically, the study evaluated the economic performance of small-scale okra production within rural households and assessed the factors influencing the viability of small-scale okra production in the study area.

2. Material and methods

The study was conducted in Ethiope East LGA, Delta Central, an area that covers 380 km^2 and a population of 276,700. The location, being an oil-producing area, consists of three districts and 67 villages, where the main inhabitants' occupation is farming, civil service, and petty trading. It was selected because of intensive farming activities, which range from cassava, plantain, maize, okra, yam to pumpkin farming. A two-stage sampling process was employed - the first stage was a purposive sampling and selection of 15 densely okra farming communities; and the second stage was a random selection of eight farmers per community giving a total of 120 respondents. The data were collected through structured questionnaires and interviews on socio-economic characteristics, economic performance, production viability factors, financial management practices, and problems and opportunities in okra production.

Regression analysis was used to identify factors influencing viability.

The multiple regression model is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e_i \ldots\ldots\ldots (eqn\ 1)$$

Where:

- Y = Profit level (viability)
- X_1 = Age (years)
- X_2 = Farm experience (years)
- X_3 = Household size (number)
- X_4 = Farm size (ha)
- X_5 = Years of schooling (years)

Gross margin analysis evaluated economic performance, with model equations:

$$TC = TVC + TFC \ldots\ldots\ldots (eqn\ 2)$$

$$GM = TR + TVC \ldots\ldots\ldots (eqn\ 3)$$

$$NR = TR + TC \ldots\ldots\ldots (eqn\ 4)$$

Key:

TC = Total Cost, TVC = Total Variable Cost, TFC = Total Fixed Cost, GM = Gross Margin, TR = Total Revenue, NR = Net Return

3. Results and discussion

3.1. Socio-economic Characteristics of Respondents

The socioeconomic characteristics of the respondents is presented in Table 1. The table shows that okra production at small scale in Ethiope East LGA, Delta State, is predominantly being undertaken by women, with 80.7% of female and 19.3% male respondents, and middle-aged farmers (mean age = 41, where 34.5% were between the ages of 40–49 years) [4, 12]. Most of the farmers are married (62.2%), which would suggest that household chores can enhance productivity [4]. There is limited education, with 35.3% having primary and 34.5% secondary education, and 24.4%

lacking formal education; and the need for readily accessible extension services and training [13]. Farmers have a mean farm experience of 9 years, with 44.6% having 6–10 years and 30.2% 11–15 years, placing them beyond the learning phase but in need of more sophisticated assistance [4]. Furthermore, extension contact is not regular, with 53.7% being contacted only once a year, which may limit their access to new technologies and practices [14].

Most of the families (79.8%) are small with an average household size of 4 which could constrain labour availability and farm expansion [3]. Most (71.4%) of the farmers belong to cooperative societies, which can boost access to aggregated resources, bargaining capacity, and market entry [3]. Financially, 68.0% rely on informal sources of credit and only 31.9% formal sources, which is a reflection of a self-sufficient but restrictive investment policy [11]. Land acquisition is diverse as 42.9% received land from relatives, 36.1% inherited, 6.7% purchased, and 14.2% leased it. Farm sizes are small, with an average of 1.41 hectares, 35.3% working on 0.1–0.9 hectares and 43.7% on 1.0–1.9 hectares, highlighting the small scale of operations [13].

Table 1 Socio-economic Characteristics of Respondents

Parameter	**Frequency**	**Percentage**	**Mean**
Gender			
Male	23	19.3	
Female	96	80.7	
Age			
20 – 29	24	20.2	
30 – 39	29	24.4	
40 – 49	41	34.5	41
50 – 59	18	15.0	
60 – 69	7	5.9	
Marital status			
Single	25	21.0	
Married	74	62.2	
Widow	20	16.8	
Educational level			
No education	29	24.4	
Primary education	42	35.3	
Secondary education	41	34.5	
Tertiary education	7	5.8	
Farming experience			
1 – 5	24	24	
6 – 10	53	44.6	
11 – 15	36	30.2	9.05
16 – 20	5	4.2	
20 – 25	1	0.8	
Extension contact			
Monthly	16	13.4	
Quarterly	39	32.8	

Yearly	64	53.7	
Household size			
1 – 5	95	79.8	
6 – 10	22	18.4	4
11 – 15	2	1.6	
Member cooperative society			
No	34	28.6	
Yes	85	71.4	
Source of credit			
Formal	38	31.9	
Informal	81	68.0	
land ownership			
bought	8	6.7	
inherited	43	36.1	
Family	51	42.9	
Lease	17	14.2	
Farm size			
0.1 – 0.9 hectare	42	35.3	
1.0 – 1.9 hectares	52	43.7	
2.0 – 2.9 hectares	20	16.8	1.41
3.0 – 3.9 hectares	5	4.2	
Labor used			
Hired	32	26.9	
Family	53	44.5	
Both	34	28.5	

Source: Field Survey Data (2024)

3.2. Economic performance of small-scale okra production

The financial analysis of small-scale okra production in Ethiope East Local Government Area, Delta State, is presented in Table 2 revealing the economic viability of small-scale okra production for rural households. The total cost of production, comprising both variable and fixed costs, amounted to ₦954,154.53. Major expenses included seedlings (₦116,640.80), fertilizers (₦83,035.60), herbicides (₦266,114.80), pesticides (₦156,614.80), labor (₦200,700.00), and transportation (₦76,420.80), contributing to a total variable cost of ₦899,526.78. Fixed costs including farmland (₦45,600.00) and equipment (₦9,015.74) gave a total of ₦54,615.74. With a total revenue of ₦1,419,344.50, the gross margin calculated as revenue minus variable cost stood at ₦519,817.72, while the net return, derived after accounting for fixed costs, was ₦465,201.98. The benefit-cost ratio gave a value of 0.49 which indicated that the viability of the small-scale okra production in the study area. The ROI was 1.49 which revealed that every ₦1 invested yields a return of ₦0.49, reinforcing the financial sustainability of okra farming in the study area.

These findings align with previous research, demonstrating that small-scale okra farming remains a profitable venture. The study results are consistent with Ekunwe [4], who reported a benefit-cost ratio of 2.99 and a return on investment of 2.03, indicating high profitability. Similarly, Alabi [3] found a gross margin of ₦619,325.77 and a net farm income of ₦559,194.76 per hectare, further validating the financial viability of smallholder okra production. Kshash and Oda [1] also highlighted the positive economic returns of okra farming, emphasizing favorable metrics such as profit per hectare and operating ratios. The consistent profitability demonstrated across these studies suggests that okra farming can

serve as a reliable income source for small-scale farmers. Encouraging investment in improved farming techniques, land expansion, and crop diversification could further enhance the economic benefits and sustainability of okra production in the region.

Table 2 Average Cost and Profitability of Okra Production

Items	**Amount (₦)**
Seedlings	116,640.8
Fertilizer	83,035.6
Herbicides	266,114.8
Pesticides	156,614.8
Labour	200,700
Transport	76,420.8
Total Variable Cost	899,526.78
Farm Land	45,600
Equipment	9,015.74
Total Fixed Cost	54,615.74
Total Cost	954,154.53
Total Revenue	1,419,344.5
Total Variable Cost	899,526.78
Total Fixed Cost	54,615.74
Total Cost	954,142 .53
Gross Margin (GM) = TR- TVC	519,817.72
Net Return (NR) = GM - TFC	465,201 .98
Return on investment (ROI) = NR/TC	0.49
Benefit - Cost – Ratio = TR/ TC	1.49

Source: Field Survey Data (2024).

3.3. Factors influencing the viability of small-scale okra production in the study area

The multiple regression was performed to assess the factors influencing the viability of small-scale okra production as shown in Table 3. The overall model fit was 96.3% ($R^2 = 0.674$, $p < 0.05$) as shown in Table 3. This means that the variables can correctly predict level of viability by 67.4%.

Table 3 Factors influencing the viability of small-scale okra production in the study area

Model	**Unstandardized Coeff.**		**Std. Coeff.**	**T**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	1552.951	582.907		5.664	0.000
Gender	-357.005	151.391	-0.193	-2.358	0.020
Age	7.002	7.076	0.124	0.990	0.325
Marital status	-320.599	112.797	-0.273	-2.842	0.005
Household size	296.820	72.814	0.358	4.076	0.000
Education	10.771	20.048	0.066	3.537	0.002

Farm experience	19.002	83.741	0.019	2.227	0.001
Extension	21.262	32.721	0.052	0.650	0.517
cooperative	-27.267	124.750	0.017	-0.219	0.810
Credit	187.514	128.045	0.124	2.464	0.006
landownership	-81.067	77.055	-0.091	-1.052	0.295
Farm size	129.540	98.547	0.111	2.714	0.002
Labour used	49.492	77.417	0.052	0.639	0.524
Model summary					
R Square	0.674				
Adjusted R Square	0.602				
F Stat.	15.173				

Source: Field Survey Data (2024).

The result showed that gender has a negative and significant ($p<0.05$) influence on viability of small-scale okra production. This suggest that female farmers may face more challenges, such as limited access to resources or social constraints, which could hinder their productivity. The result indicated that marital status has a positive and significant ($p<0.01$) influence on viability of small-scale okra production. This indicated that married individuals may benefit from shared responsibilities and increased labor availability hence enhancing their farming operations. The result also indicated that household size has a positive and significant ($p<0.01$) influence on viability of small-scale okra production [13]. This implies that larger households may have more labor resources, enabling more efficient management of okra production. The result indicated that education, farm experience, source of credit and farm size has a positive and significant influence on viability of small-scale okra production at 1% level of probability [13]. The result implied that educated farmers are likely to adopt improved farming practices and technologies, leading to better yields and that larger farms benefit from economies of scale, increasing overall viability and profitability in okra production.

4. Conclusion

The study of the economic viability of small-scale okra farming in Ethiope East Local Government Area, Delta State, reveals that okra production is a rewarding agricultural venture for rural farmers. The economic implication reveals a positive net gain and a benefit-cost ratio of 1.49 indicated that farmers have high returns on their investment. Despite constraints of high input costs and limited credit access, smallholder farmers possess the benefits of membership in cooperative organizations, having household labor to utilize, and farm experience that improve their performance economically. The study also identifies education and size of farm as important factors that improve productivity and profitability. On the basis of findings of this study, the following were suggested:

- Due to unstable input prices, the government must set up price stabilization mechanisms or cooperatives that can negotiate in bulk and agree on purchase prices to get more stable input prices. Moreover, create and promote input price forecasting tools to assist farmers in better planning.
- Since herbicides/pesticides are highly costly, farmers will have to push for the use of integrated pest management (IPM) practices that reduce costly chemical use. Promote production and accessibility of low-cost and effective herbicides and pesticides with government subsidies or partnerships with agrochemical companies.
- Microfinance or low-interest loans should be made available directly for buying farm equipment by the government. Provide grants or subsidies for essential equipment under schemes of the government or NGOs.

Compliance with ethical standards

Disclosure of conflict of interest

There was no conflict of interest in carrying out this study.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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