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ECONOMIC EVALUATION OF OKRA (Abelmoschus esculentus L) PRODUCTION IN AYAMELUM LOCAL GOVERNMENT AREA, ANAMBRA STATE

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ABSTRACT

The economic analysis of okra production among smallholder farmers in Ayamelum Local Government Area of Anambra was conducted, utilizing cross-sectional data from 100 randomly sampled respondents. The study employed various analytical techniques, including descriptive statistics, budgetary analysis, and linear regression modeling. The socio-economic characteristics of okra farmers revealed a dominance of female farmers (66%) in the study area, with the majority falling within the age range of 41-60 (50%). Married individuals constituted the largest group (52%), and the majority had completed only primary education (43%). Farmers had an average farming experience of 10.45 years and an average household size of 8.68. Additionally, almost half of the farmers (45%) were members of a cooperative association, while 39% had access to extension contacts. The cost and returns analysis indicated the financial viability of okra production, with positive gross margins, net returns, and a profitability index of 51.2%. The return on investment was 0.91, signifying a positive venture for okra farmers.

Keywords: Evaluation, Economic, Okra, Production.

1. INTRODUCTION

Agriculture is the driver of economic growth, supplies food to the teaming population, and also provide employment for poverty reduction (Nwaobiala and Ogbonna, 2014).
Okra, (abelmoschus esculentus), is an annual herb and a vital vegetable crop grown largely in tropical nations around the world, covering 2.5 million hectares and yielding 10.5 million tonnes each year (Food and Agriculture Organization of the United Nations, 2020).

Okra has a high value to the economy and its significant amounts of protein, carbohydrates, and vitamin C is very nutritive and edible. Okra and soybeans both contain essential and non-essential amino acids in similar amounts. As a result, it is essential to human diet. Young, immature fruits are vital sources of fresh fruit and vegetables that can be consumed in a variety of ways. You might boil, fry, or sauté them. According to (Okonkwo-Emegha, Achoja & Okeke, 2019) okra just like other vegetables is valued for its immature edible green pod, which can be boiled, fried, and made into salad soup. Its leaves and seeds play an immense role in the human diet, its flowers often possess high ornamental and medicinal values.

According to the National Horticultural Research Institute (NIHORT), Nigeria is one of the largest producers of okra globally, accounting for a significant share of the country's vegetable exports (NIHORT, 2020). The global okra production is estimated to be around 9.96 million tons, India leading with 6.18 million tons followed by Nigeria with 1.82 million tons (Food and Agriculture Organization Corporate Statistical Database, 2020). It is grown in a variety of forms, including white velvet, green velvet, long pod, lady finger, and dwarf green pods, each of which has a different height of the plant, size, color, and maturity period for the fruit. Okra is a

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vegetable that is a vital component of the world's food production and helps to keep people healthy and ward off disease. They are rich in essential nutrients that the body needs to eat and repair itself for healthy living (Okonkwo-Emegha, Umebali & Obiekwe, 2025).

Osalusi, Rachael, Okeke, Ogunsola (2019) carried out a study to analyse the profitability of okra production among small holder okra farmers in Akinyele local government area, Oyo state. They reported that most of the respondents were male (90.7%) and married (73.3%) and the major problems faced by the respondents in the study area included inadequate transport facilities, weather condition and high cost of input.

Nwaobiala and Ogbonna (2014) also conducted a study to determine factors affecting adoption of okra technology packages by farmers and the cost and returns from okra farming in Aninri Local Government Area of Enugu State and their results showed that that okra production in the study area was highly profitable and also that non access to credit, pest and disease infestation and poor extension services were problems affecting okra production in the study.

Despite the nutritional value and health benefits of okra there are few literature that exist in Ayamelum local government area to indicate if the production of Okra is profitable or not. This is the gap that this research seeks to fill in by analyzing the economic evaluation of okra production in ayamelum local government area of Anambra state. Therefore, the broad objective of this study was to analyze the economic evaluation of okra production in Ayamelum Local Government Area of Anambra State. However, the specific objectives were to: (i). describe the socio-economic characteristics of okra producers. (ii). estimate the costs and returns associated with okra production.

2. LITERATURE REVIEW

2.1 Concept of Okra production

Okra [Abelmoschus esculentus (L.) Moench] is a nutrient-rich economically important vegetable crop grown in tropical and sub-tropical regions of the world. The global okra production is estimated to be around 9.96 million tons, India leading with 6.18 million tons followed by Nigeria with 1.82 million tons, FAOSTAT (2020). It is an important annual fruit vegetable commonly grown in the tropics and warmer temperate regions of the world (Patil, 2015). In developing countries like Nigeria, the dynamics of local agricultural conditions with government policies has an adverse effect on production (Emegha et al., 2025).

Land Preparation

Seedbed preparation

According to Coolong and Kelley, early land preparation is an important step in growing a good okra crop and turning the soil early will give crop residues time to decompose before okra is planted. Early land preparation also allows for many weed seed to germinate. These seedlings should be killed as you disk the soil before planting. (Coolong & Kelley, 2017). To ensure a healthy crop stand and the highest yield, thoroughly prepare the field. To stop weeds from growing, plough the field two to three times every week. For greater root penetration, plow to a depth of 15–20 cm. After plowing, harrow the ground to compact and level it. A properly pulverized dirt encourages healthy soil aeration and improves root development. After the last harrowing, dig furrows 100 cm apart between the rows. In Nigeria today, there are so many

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distractions in farming due to exploitation of environmental resources and bandit activities which has affected the farmers from preparing the right beds and spacing for planting (Emegha, 2023).

Soil Requirements of Okra

Okra is tolerant of a wide range of soil pH, but prefers soil with a pH between 6.0 and 6.8. If the soil pH is below 5.8, it should be limed to increase the pH to 6.0 or more, (Brandenberger, Shefler, Damicone, and Rebek, 2019). Okra is generally grown in locations where the crop will receive full sunlight throughout the day. Soil types for okra production can vary, with loams and sandy loams preferred, but even heavier soils can produce well if the soil drains well enough to prevent water-logging. (Brandenberger et al., 2019).

Fertilizer Application

- Apply 20 bags of organic fertilizer and 2-3 bags of complete fertilizer (14-14-14) per hectare. Before planting, apply the fertilizer inside the furrows and cover with fine dirt.
- Side-dress urea (46-0-0) at a rate of 10 grams or one (1) tablespoon per hill 30 days after planting (DAP). (Cubero & Baquiran, 2017)

Planting

Okra is commonly planted directly in the field, as it is sensitive to transplanting. To ensure successful germination, it is essential to use high-quality okra seeds. Approximately five (5) kilograms of okra seeds are required to plant one hectare. Before planting, soak the seeds in water overnight to promote uniform germination (Smith, 2023). To create optimal conditions for the seeds, plant them in slightly moist soil at a rate of 2-3 seeds per hill. Maintain a distance of 30 centimeters between hills to provide sufficient space for growth. The ideal planting depth ranges from 2 to 5 centimeters. After emergence, it is essential to monitor the field and replant missing hills three (3) days after emergence (DAE) to ensure uniformity and maximize yield potential.

Irrigation

Water is a critical factor in crop production, and okra is no exception. Adequate and regular irrigation is essential for healthy plant growth and development. The water requirements may vary depending on the prevailing season and soil type. Furrow irrigation is a recommended method for watering okra plants. Water the plants every 7 to 14 days, taking into consideration the environmental conditions and the moisture levels in the soil. Proper irrigation helps maintain adequate moisture levels, preventing water stress and supporting the overall health of the plants. At 15 days after planting (DAP), thin the plants, leaving only two (2) seedlings per hill. This thinning process ensures that the healthier plants have enough space and resources to thrive. (Brandenberger et al., 2019). Agriculture performs a specific function in the maintenance of the systemic equilibrium especially in a single inter-connected system (Emegha, 2020).

2.2. Cultivation and Weeding

During the early growth stage of okra, effective weeding is crucial to prevent weed competition. Weeds can hinder the growth of young okra plants and reduce overall yield. At 15 days after emergence (DAE), consider off-barring the plants to minimize weed growth and interference. When cultivating the soil, be cautious and maintain a distance of 10 centimeters away from the base of the plants to avoid damaging their delicate roots. One month after

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emergence or 15 days after off-barring, hill-up the soil around the base of the plants. This technique provides stability and additional support to the growing plants. (Ndiritu, 2023). To further ensure proper weed control, manual hand-pulling of any remaining weeds located between the plants is recommended. This meticulous approach to weeding will prevent unwanted vegetation from competing with the crops for nutrients and sunlight, leading to improved crop yield and overall health.

2.3 Pests Management for Okra Cultivation

Okra plants are generally resistant to insect pests and diseases, but it is crucial to carefully monitor the field to ensure the plants remain free from potential infestations. In economic evaluation decision making is very necessary and do not align with a singular case but to a good number of cases (Elechi, Offor & Emegha, 2019). The two most significant pests that can affect okra are the cotton stainer and stink bug, while the most serious fungal diseases include cercospora blight, powdery mildew, fruit rot, and root knot nematode (Coolong, 2017). Preventive measures can be adopted to reduce the likelihood of pests becoming a problem. Field sanitation, planting resistant varieties of okra, and implementing crop rotation are effective ways to prevent pests from taking hold and causing damage to the crop. In severe infestations, as a last resort, it may be necessary to apply pesticides following the recommended dosage provided by the manufacturers.

2.4 Ratooning (Optional Practice)

Ratooning is an optional agricultural practice that involves cutting the stems of mature plants to stimulate branching and the emergence of new shoots. This practice can be employed as a cost-saving measure during okra production. After harvesting, cut the stems of the old plants, leaving approximately one foot from the ground. Shallow cultivation between rows using a plow can be done, and side-dress the hills with 10 grams of urea per hill to promote the emergence of new shoots (Cubero and Baquiran, 2017).

2.5 Harvesting and Postharvest Operation

Okra typically starts flowering around 40 to 75 days after planting (DAP). For the best quality, harvest young and tender fruits about 4-6 days from the onset of flowering. Immature fruits are preferable for table consumption. Harvesting should be done every 2-3 days, selecting fruits that measure 3 to 4 inches in size. Harvesting okra in the morning or late afternoon is recommended to maintain freshness and extend shelf life. Attention to postharvest operations is crucial for obtaining high-quality okra that commands better prices in the market. Sort and discard malformed and diseased fruits to ensure only top-quality produce is offered for sale**.** Packaging can be done in woven baskets, polyethylene bags, boxes, or wooden crates lined with banana leaves or old newspapers. This packaging method helps prevent bruising and damage during transportation. It is essential not to overload the containers to avoid compaction of the produce, which could lead to spoilage and reduced quality.

3. METHODOLOGY

Research Design

This study employed survey research design.

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Area of study

The research area for this study was Ayamelum local government area (LGA) in Anambra State, Nigeria, focusing on the cultivation and significance of okra (Abelmoschus esculentus) as a major crop. Ayamelum LGA is one of the 21 local government areas in Anambra State, situated in the south-eastern region of Nigeria. The state is bounded by Delta state to the west, Imo state to the south, Enugu state to the east, and Kogi state to the north. (Wikipedia.org/wiki/anambrastate, 2022). Anambra State has an estimated population of 9,000,000 million people (National Population Commission, 2022) and is primarily inhabited by the Igbo ethnic group. The state's geographical coordinates lie between longitude 6º35E and 7º21E and latitude of 5º38N and 6º47E (Wikipedia.org/wiki/anambrastate, 2022). Ayamelum has its administrative headquarters in Anaku. Its region is strategically positioned on the boundary between the states of Enugu and Anambra. This area is renowned for its towns, which are noteworthy for their food production activities. The complete list of communities in Ayamelum, Local Government, Anambra State, Nigeria, includes Omor, Umueje, Omasi, Igbakwu, Umumbo, Anaku, Umuerum, and Ifite Ogwari. (Ene, 2022). The study area possesses significant economic and agricultural potential, capable of generating revenue and providing employment opportunities for its residents. Currently, the Otuocha-Omor-Adani federal road serves as the sole access route to the local government area (LGA), Within Anambra State, the study area stands out as a key region for okra cultivation.

The land area of the study area spans approximately 196 km2 and experienced a population increase from 223,641 in 2017 to 233,763 persons in 2019, based on a growth rate of 3.2% projected from the 2006. The economic practice of the people in the area are farming, fishing, crafting and animal husbandry.

Population of the Study

The population of the study comprises of all the registered okra farmers (1,025) in Ayamelum LGA of Anambra State.

Sampling Technique and Sample Size

A multi-stage sampling technique was employed.

In the first stage, Ayamelum local government was be purposely selected because of the dominance of okra producers. In the second stage, a random selection process was used to choose five (5) communities out of the eight (8) communities under consideration. The selected communities included: Omor, Anaku, Umumbo, Ifite-Ogwari, and Omasi. In the final stage, twenty (20) okra farmers were randomly chosen from each of the previously selected communities. This resulted in a total of 100 respondents who formed the sample size for the study.

Method of data collection

Data was collected from a primary source using a validated structured questionnaire for this study, aligning with the study's objectives. Secondary data was also use, it was obtained from textbook, journal, reports, and internet.

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Validation of the instruments

Validity of a research instrument assesses the extent to which the instrument measures what it is designed to measure, it is the degree to which the results are truthful. For the validity of the instruments, the drafts of the questionnaires was given to an expert in the department to review and criticize the various items on the instrument, as regards its clarity, relevance, appropriateness of language and response patterns as they relate to the study. Suggestions and modifications from the expert was used to improve the research instrument and ensure that questions asked are well understood by the respondents.

Method of Data Analysis

To achieve the study's objectives, the data was analyzed using various statistical techniques:

Objective (I) was analyzed using descriptive statistics, such as frequency, percentage, mean, and standard deviation. Objective (II) was analyzed using gross margin analysis.

4. RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of Okra Farmers

The socioeconomic characteristics of okra farmers is presented in table 1.

Sex Distribution: Male farmers make up 34.0% of the sample, while female farmers constitute the majority at 66%. This is an indication that female farmers dominated okra production in the study area. Age Distribution: The majority of farmers fall within the age range of 41-60, making up 50.0% of the sample. Farmers below 20 years old and above 60 years old each represent 14.0% and 15.0% of the sample, respectively. The last 21.0% are within the age bracket of 21 – 40 years. Equally, the average age was 43.46 indicating that farmers in the study are still energetic and in their active farming age. The result is also consistent with the findings of Kehinde & Kehinde (2022) and Babalola, Alemoru, and Lawal (2020).

Marital Status: Married individuals constitute the largest group at 52.0%, followed by single and widowed/widower individuals, each accounting for 21.0%. Divorced individuals make up 6.0% of the sample. This implies that married individuals dominate the enterprise. Moreover, the results align with the findings of Okeke, et al., (2016) who reported that okra producers are dominated by married individuals.

Level of Education: The educational distribution shows that the majority of okra farmers have completed primary school (43.0%), followed by secondary school (32.0%), and tertiary education (23.0%). Only a small percentage (2.0%) have a postgraduate degree. This result suggests that the okra farmers in the area are not well educated and this may affect their productivity and adoption of agricultural technology. The education levels shows similarities with the findings of Babalola, Alemoru, & Lawal (2020) who stated that greater percentage (72%) of vegetable farmers are educated.

Farming Experience: The largest group of farmers has been involved in farming for 11-15 years (32.0%), followed by 6-10 years (18.0%), less than 6 years (20.0%), and 16 years and above (30.0%). The mean farming experience is 10.45 years. This implies that farmers in the area have relatively over a decade of experience in the enterprise. This is in line with the findings of

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Okonkwo-Emegha, Isibor and Adejoh, (2024) who stated that the average years of experience of vegetable farmers are 12 years.

Household Size: The majority of farmers have household sizes of 11 and above (40.0%), followed by 6-10 people (34.0%) and less than 6 people (26.0%). The average household size of 8.68 is an indication that farmers in the area are likely to make use of more family labour in the production process. This is relatively similar to the findings of (Kehinde & Kehinde, 2022)

Cooperation Association: Almost half of the farmers (45.0%) are part of a cooperation association, while the remaining 55% are not members. Only this 45.0% are likely to enjoy the benefit of cooperative principles.

Access to Extension Contacts: About 39.0% of the farmers have access to extension contacts, while 61% do not. This could result from the fact that the majority of the farmers are not members of agricultural cooperation. This findings is in line with the report of Okonkwo-Emegha, (2025) who reported that (75%) of smallholder farmers does not have contact with the extension workers.

Farm Size: The majority of farmers have a farm size between 0 and 0.50 hectares (51.0%), followed by above 1.00 hectares (23.0%) and 0.51-1.00 hectares (19.0%). The mean farm size is 0.56 hectares. This is a confirmation that okra production is in a small holding.

Table.1: Socio-economic characteristics of okra farmers

Socioeconomic characteristics	Frequency	Percentages (%)	Mean
Sex:			
Male	34	34.0	
Female	66	66.0	
Age:			
less than 20	14	14.0	
21- 40	21	21.0	43.46
41- 60	50	50.0	
Above 60	15	15.0	
Marital Status:			
Single	21	21.0	
Divorced	6	6.0	
Widow/widower	21	21.0	
Married	52	52.0	
Level of education:			
Primary school	43	43.0	
Secondary school	32	32.0	
Tertiary education)	23	23.0	
Postgraduate degree	2	2.0	
Farming Experience (years):			
Less than 6	17	20.0	

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6-10 years	32	18.0	
11-15 years	43	32.0	10.45
16 and above	8	30.0	
Household Size:			
Less than 6	26	26.0	
6-10 people	34	34.0	8.68
11 and above	40	40.0	
Cooperation association:			
Yes	45	45.0	
No	55	55.0	
Access to extension contacts			
Yes	39	39.0	
No	61	61.0	
Farm Size (Hectare):			
0 - 0.50 ha	81	51.0	
0.51 - 1.00 ha	15	19.0	
above 1.00ha	4	23.0	0.56

Source: Field Survey, 2025.

4.2 Estimation of the Costs and Returns of Okra Production

The cost and returns of okra farmers are presented in Table 2. Okra sales revenue is calculated based on the quantity (16.78) and unit price (₦20,000), resulting in a total revenue of ₦335,600.

Variable costs include expenses that vary with the level of production which constitute seed cost, fertilizer cost, agrochemical, labour cost. The cost incurred as logistics, and the rent on Land. Thus the total variable cost sums up to ₦163,726. Also, ₦12,000 is allocated for depreciation on assets as a fixed cost of production. This result in a total cost of ₦175,726.

The gross margin which is the difference between sales revenue and variable costs, totals ₦171,874. Whereas, the Net return represents the profit after accounting for both variable costs and depreciation. In this case, it is ₦159,874.

Furthermore, the profitability index is calculated as a percentage, indicating that the project is 51.2% profitable. This suggests a positive return on investment. Lastly, the return on investment is 0.91, suggesting that for every ₦1 invested, ₦0.91 is returned as profit.

The analysis indicates that okra production is financially viable, with a positive gross margin, net return, and a profitability index above 50%. The return on investment of 0.91 further suggests that the project is generating a positive return, making it a potentially profitable venture for okra farmers. Additionally, this is consistent with the findings of Okeke et al., (2016) and Okonkwo-Emegha et al. (2020) who both found vegetable production to be financially viable and profitable.

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Table 2: Estimation of the costs and returns of okra production

Items Description	Quantity	Unit Price (N)	Amount (N)
Sales Revenue:			
Okro (basket)	16.78	20000	**335,600.00**
Variable cost (VC):			
Seed (pack)	7.4	600	4,440.00
Fertilizer (kg)	98.4	540	53,136.00
Agrochemicals (litre)	3.2	4500	14,400.00
Labour	21	3550	74,550.00
Logistics			6,000.00
Rent on land	0.56	20000	11,200.00
Total variable cost			163,726.00
Depreciation on assets			12,000.00
Total cost			**175,726.00**
Gross margin			171,874.00
Net return			**159,874.00**
Profitability index			51.2%
Return on Investment			**0.91**

Source: Field Survey, 2025.

5. CONCLUSION

The study on the economic analysis of okra production in Ayamelum Local Government Area reveals a complex interplay of socio-economic factors, costs, returns, and constraints. The study highlights the profitability of okra production but also emphasizes the challenges faced by farmers. The age, marital status, education, and access to credit were found to be positively influencing production, while constraints such as poor access roads and inadequate capital were identified as significant challenges.

6. RECOMMENDATION

Based on the findings, the following recommendations are made:

1. Encourage initiatives to involve more young farmers in okra production to ensure sustainable practices and knowledge transfer. This will help to revitalize the aging farming population and secure the future of the industry.

2. Promote educational programs to enhance farmers' knowledge and skills, particularly addressing challenges related to climate change and land fragmentation. This will help to improve adaptive capacity and resilience of the farmers.

3. Explore mechanisms for providing financial support to farmers, focusing on reducing the drudgery of operations and high labor costs. This will help to improve efficiency and profitability of the farmers.

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