



<https://doi.org/10.59298/ROJESR/2025/4.3.118123>

Economic Appraisal of Amaranth (*Amaranthus Spp*) Production among Small Holder Farmers in Anambra State, Nigeria

Page | 118

¹Okonkwo-Emegha, Kate, ²Okafor Ifeoma Pethronila and ³Oyita Governor Ekene

¹Department of Agricultural Economics & Extension, Nnamdi Azikiwe University Awka, Nigeria

²Department of Business Administration and Management, Federal Polytechnics Oke, Nigeria

³Department of Agricultural Economics & Extension, Dennis Osadebe University Asaba, Nigeria

Email: k.okonkwo-emegha@unizik.edu.ng. Tel.: 08035922432.

ABSTRACT

This study appraised the profitability associated with amaranth (*Amaranthus spp*) production among smallholder farmers in Anambra State. The study focused on the socioeconomic characteristics of amaranth producers and estimated the cost and returns of amaranth production. Data were collected from 100 respondents through surveys and analyzed to determine the socioeconomic characteristics of the farmers, and the financial performance of amaranth production. The findings revealed that the majority of farmers were female (74%) with an average age of 39 years and an average farming experience of 19 years. The financial analysis showed a total cost of production of ₦70,506.20, with a total revenue of ₦161,874.92, resulting in a gross margin of ₦131,871.12 and a net profit of ₦91,368.72, indicating significant profitability. The study recommended improving financial access, pest management, infrastructure, and extension services to enhance the sustainability and profitability of amaranth farming.

Keywords: Economic, Appraisal, Amaranth, Production, Smallholder, Farmers

INTRODUCTION

Agriculture plays a vital role in Nigeria's economy and it is an essential industry for feeding the growing global population, providing employment and income opportunities for farmers and rural communities, and contributing to national and international trade and economic development [1]. It contributes greatly to the country's gross domestic product (GDP) despite its contribution to the economy agriculture faces several challenges like land degradation, climate changes, poor land tenure system and so on [2]. These challenges affect the productivity of various sectors of agriculture which contributes to the GDP [1]. Vegetables are important for both developing economy and developed economy and the edible part of plants are the leaves [3]. Vegetables are plant-based foods that are typically savory rather than sweet and are consumed as part of a meal or used as ingredient. Vegetable are categorized into; the buds, tuber, stem, bulb, flower, roots, and leafy vegetables [3]. The importance of leafy vegetables in supplying valuable nutrients in human diet cannot be overemphasized, its importance is well established and dieticians recommend a daily consumption in a balanced diet [4]. Nigeria is abundantly blessed with some local vegetables and in the past the vegetables grown are intercropped with other crops like maize, cassava and yam and so on but the recent realization of the importance of vegetables which include the nutritive values, the income and stable jobs it provides for farmers Amaranth is one of such leafy vegetables popularly grown in Nigeria today [5]. Amaranthus has several health benefits including high protein content which is essential for growth, cell production and metabolic functionality. It contains a peptide (an antioxidant) that helps reduce inflammation and the activity of free radicals in the body which can cause healthy cells to mutate into cancerous cells [6]. Amaranth is a very fast maturing crop as it grows very rapidly especially under conditions of high temperatures, bright light and dry soil thereby tolerating dry conditions. Green amaranth is more popular because of its high nutritional value than its commercial potential [7]. Amaranthus is popularly called green in Nigeria and it is a nutritious and medicinal plant used in making different local dishes like vegetable yam, vegetable stew, green omelette, and green sauce with rice and so on [7]. Studies by [8] on production of tropical and subtropical Amaranthus crop found that there are more prospects for dual- farming, which combines producing crops that are both profitable and nutritious, to help poverty and malnutrition while also improving the sustainability of tropical farming systems. It was also found in this study that Amaranthus farming increases crop

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

diversification, household food security and the availability of nutrients-rich feed. Despite all these findings, there has not been much research in my study area on the production of Amaranths. This study will be done to find out why people are not venturing into the production of Amaranths and also to know whether it is profitable in the study area. The broad objective of this study is to examine the economic appraisal of amaranth among small holder farmers in Anambra state. The specific objectives of the study were to: describe the socioeconomic characteristics of Amaranths farmers; and estimate the costs of returns of Amaranths production.

LITERATURE REVIEW

Concept of Amaranthus production

Amaranthus is an annual species which produces only from seeds, the branches grow upright and rough [9]. There are four kinds of Amaranthus grown in Nigeria; small leafy Amaranthus, large leafy Amaranthus, white Amaranthus, and red Amaranthus. The height varies, according to species (from 60 cm to 2 m) and habitat conditions. The leaf sizes vary from 5 cm to 10 cm. dense clusters of small flowers form on terminal spikes or plumes. Proper land preparation including plowing and harrowing to create a fine seedbed is done [10]. Low soil fertility can be corrected by using cattle dung or poultry droppings or compost manure into the soil at the rate of 1 bucket/m² or applying mineral fertilizer at a rate of 1 teaspoon to 2 teaspoons every meter in the row. A 50: 50 sand mixture makes it easier to get even dispersal, planting rate of 1 kg of seed/0.5 ha (2 lbs of seed/acre) produces so many seedlings. The seeds are planted using the broadcast method onto a seedbed in loosened ground and covered lightly with soil (less than 1 cm) or sown into shallow, grooved rows with the same light soil cover. Some farmers sow seed into nursery beds and transplant at 3 to 4 weeks when the plant is 15 cm tall. The recommended spacing is 30 cm between plants and 1 m to 1.5 m between rows. It is watered twice daily to keep the soil moist until emergence. The tiny seed and the light soil cover means the crop is vulnerable during start-up and an adequate irrigation is crucial during dry periods [11]. It is covered with a thin layer of grass mulch to provide protection but many farmers prefer to sow into nursery beds transplanting when the danger is past, especially during the rainy season. A monthly top dressing of limestone ammonium nitrate (LAN) or well decomposed manure should be provided for the plant. Nitrogen (N) based fertilizer boosts leafy growth and yield, but excess Nitrogen will make soil toxic and cause plant dehydration and leaf-burn [11]. Amaranthus grows in moist, humid lowlands, dry savannah regions and highland areas across western, central, eastern and Southern Africa. It is usually found at altitudes below 800 m above sea level (asl) but there are species that thrive at altitudes up to 2 000 m as (Africa farming). Despite the adaptive nature of Amaranth, it needs moist tropical and temperate zones with high rainfall. Water needs are between 25 mm and 40 mm a week, so in drier regions the crop needs irrigation. The minimum daily requirement during the active growing season is 8 mm. Light, sandy, well-drained, fertile loams are the ideal soils for Amaranths, but pioneer plant species typically adapt to a wide range of soil types. The soil pH should be between 5.5 and 7.5.

Concept of costs and returns of Amaranth production

Cost and returns is a method of checking the profitability of a project Cost is the expenses incurred in producing or purchasing a good or services and return as the profit or gain generated by an investment or business activity. The concept of cost and return in Amaranths production involves analyzing the relationship between the costs incurred in producing Amaranths and the revenue generated from its sale. This analysis helps determine the profitability and economic viability of Amaranths farming [12]. The total cost is the sum of variable cost and fixed cost, the cost of production of Amaranth refers to all the expenses incurred in the production process. There are different types of production cost and they are; total cost, fixed cost, variable cost, marginal and cost average cost. Total cost is the aggregate cost incurred during the cause of production they include both fixed and variable cost. The average cost of production is the total cost of production divided by the quantity of output produced [12].

Theoretical framework

Production theory

In production theory the main choices center upon what to produce (which product or combination of products), how much to produce (the level of output) and how to produce (the combination of inputs to use). Production is important because of the fact that all economic activities depend on it. For consumption to take place, goods and services must be produced. Without production goods and services will not be produced. Production is therefore the process involved in transforming a number of inputs into a product. In terms of satisfaction derived, production can be termed creation of utility. Inputs are also called resources or factors of production. However, the use of these terms is not permanent because what is a product to one person may be an input to another person [1]. The theory of production examines the relationship between the factors of production (land, labor, capital, entrepreneur) and the output of goods and services. The theory of production is based on the "short run" or a period of production that allows production to change the amount of variable input, in this case, labor. The "long

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

run" is a period of production that is long enough for producers to adjust various inputs to analyze the best mix of the factors of production. The theory of production for rice involves several key factors that contribute to the success of rice cultivation. First and foremost, land with suitable soil and climate conditions is essential for rice growth. In addition to land, labor is another critical factor, requiring both skilled and unskilled workers for tasks such as planting, maintenance, and harvesting. Capital investment is also necessary, including tools, machinery, and infrastructure like irrigation systems. Entrepreneurship plays a vital role as well, as farmers must make informed decisions and manage their resources effectively. Technology adoption is also crucial, including improved varieties, fertilizers, and pest management practices. If a farmer grows Amaranths leaves (input) and uses them to produce a vegetable bundle (product), which is sold to a market vendor. The vendor also sources pumpkin leaves (input) from another farmer and combines them with the Amaranths leaves to produce a mixed green bundle (product) for sale to consumers.

METHODOLOGY

Research design

The research design that was used for this study were cited by [13].

Area of the study

Anambra is a state in southeastern part of Nigeria. The name was inspired by the term Omambala, the Igbo name of the Anambra River which flows through the area and is a tributary of the River Niger. The theme of the state is light of the nation. The capital of Anambra is Awka. The indigenous ethnic groups in Anambra state are the Igbo and a small population of Igala, who live mainly in the north-western part of the state. Anambra is rich in natural gas, crude oil, bauxite, and ceramic. Anambra state has many other resources in terms of agro-based activities such as fisheries and farming, as well as land cultivated for pasturing and animal husbandry. It has an almost 100% arable soil [14]. Agriculture plays an important role in the state's economy; yams, taro, oil palm products, rice, maize, cassava, and citrus fruits are the principal crops. A large market is located in Onitsha, which is the hub of the state's commerce and industry. A major bridge across the Niger River at Onitsha provides a direct road link westward to Benin City and Lagos. Lead, zinc, and lignite are mined in the southern part of the state, and petroleum and natural gas are also extracted. Industries include textile manufacturing, soft-drink bottling, brewing, and furniture manufacture. Metalworking and wood carving are traditional local crafts. There are 21 local government areas in Anambra state. The study was conducted in Awka South which is a local government area in Anambra state. Awka South Local Government Area (LGA) is made up of nine towns, namely, Amawbia, Awka, Ezinato, Isiagu, Mbaukwu, Nibo, Nise, Okpuno and Umuawulu.

Population of the study

The study comprises all the registered amaranth farmers in the study area. The populations of the study were 1120.

Sample technique and size

Two stage multistage sampling techniques were used in selection of the respondents in the study area. **In the first stage**, Awka South local government area was purposively selected because of the dominance of Amaranth farmers. **In the second stage**, 5 communities (Nibo, Awka, Nise, Amawbia and Isiagu) were randomly selected from the study area. **In the third stage**, from each of the selected 5 communities, 20 Amaranthus farmers were selected giving a total of 100 respondents that was used for the study.

RESULTS AND DISCUSSIONS

Socioeconomic characteristics

Table 1 provides a detailed overview of the socioeconomic characteristics of smallholder farmers involved in Amaranth (*Amaranthus* spp) production in Awka South Local Government Area of Anambra State. The data reveals a significant gender disparity among the farmers, with females constituting 74% of the respondents, compared to 26% males. This gender imbalance may reflect broader agricultural trends where women are more actively engaged in crop production activities [15]. The age distribution shows a predominance of middle-aged individuals, with 33% of farmers falling within the 31-40 years range, suggesting that this age group is likely the most active and experienced in farming activities. The average age of 39 years and the experience of 19 years further indicate a mature and possibly well-established farming community. In terms of educational background, the data indicates a relatively high level of formal education among the respondents, with 35% having attained tertiary education and 36% having completed secondary education. This educational attainment is crucial as it often correlates with the adoption of improved agricultural practices and technologies. The average farm size is relatively small at 0.7 hectares, which aligns with typical smallholder operations in the region. Additionally, the average monthly income of ₦103,275.86 suggests a modest but stable economic environment for these farmers, although it also highlights the need for income diversification strategies to enhance profitability.

Table 1: Socioeconomic characteristics

Variable	Frequency	Percent	Mean
Gender			
Male	26	26.0	
Female	74	74.0	
Age (years)			
Less than 21	21	21.0	
21 – 30	22	22.0	
31 – 40	33	33.0	39 years
41 – 50	5	5.0	
51 – 60	12	12.0	
61 and above	7	7.0	
Marital status			
Single	34	34.0	
Married	55	55.0	
Divorced	6	6.0	
Widowed	5	5.0	
Educational level			
No formal	9	9.0	
Primary	20	20.0	
Secondary	36	36.0	
Tertiary	35	35.0	
Farming experience (years)			
0 – 10	31	31.0	
11 – 20	29	29.0	19 years
21 – 30	25	25.0	
Above 30	15	15.0	
Household size (persons)			
1 – 5	45	45.0	
6 – 10	37	37.0	7 persons
11 – 15	11	11.0	
Above 15	7	7.0	
Membership of association			
Yes	61	61.0	
No	39	39.0	
Extension contacts			
Yes	53	53.0	
No	47	47.0	
Farm size (hectare)			
0.1 – 0.5	26	26.0	
0.6 – 1.0	34	34.0	0.7 hectares
1.1 – 1.5	23	23.0	
1.6 – 2.0	17	17.0	
Monthly income (₦)			
Less than 100,000	24	24.0	
100,000 – 200,000	31	31.0	₦103,275.86
200,001 – 300,000	28	28.0	
Above 300,000	17	17.0	

Cost and Returns of Amaranth Production

Table 2 provides a comprehensive overview of the average costs and returns associated with Amaranth (*Amaranthus* spp) production among smallholder farmers in Awka South Local Government Area of Anambra State. The table details both variable and fixed costs, as well as revenue, gross margin, and net profit. The total variable costs amount to ₦30,003.80, with significant expenditures on seedling (₦12,003.75), fertilizer (₦4,999.50), and labor (₦10,000.30). These expenses are critical as they directly impact the operational efficiency and productivity of the farming activities. The fixed costs, totaling ₦40,502.40, include expenses for farmland, tools such as hoes and cutlasses, which are essential for maintaining and enhancing farming operations. The total

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

cost of production stands at ₦70,506.20, while the total revenue generated from the sale of Amaranthus is ₦161,874.92. This revenue leads to a gross margin of ₦131,871.12, highlighting the profitability of the production. After accounting for all costs, the net profit is ₦91,368.72, indicating a strong financial return for the smallholder farmers. This profitability underscores the economic viability of Amaranthus production in the region and suggests that smallholder farmers can achieve significant financial gains from this crop. The data emphasizes the importance of managing both variable and fixed costs effectively to maximize profitability in smallholder farming. This finding is in line with the result of [7], who reported that the production of amaranth is profitable and capable of boosting the income of the producers.

Table 2: Average Cost and returns

Items	Quantity	Unit price (₦)	Amount (₦)
Variable cost			
Seedling	15	800.25	12,003.75
Fertilizer	2	2,499.75	4,999.50
Labour	2	5,000.15	10,000.30
Transport		2,000.40	2,000.40
Communication		999.85	999.85
Total Variable cost			30,003.80
Fixed cost			
Farmland	2	15,000.55	30,001.10
Hoe	1	3,000.30	3,000.30
Cutlass	1	4,500.75	4,500.75
Tand trowel	1	3,000.25	3,000.25
Total Fixed cost			40,502.40
Total cost			70,506.20
Total revenue			161,874.92
Gross margin			131,871.12
Net profit			91,368.72

Field Survey: 2024

CONCLUSION

The socioeconomic profile of smallholder amaranth farmers in Awka South Local Government Area is characterized by a strong female majority, with women comprising 74% of the farming population compared to 26% men. The average age of the farmers is 39 years, with a predominant age group of 31-40 years (33%). Most farmers are married (55%), and the majority have a reasonable level of education, with 35% holding tertiary education and 36% having completed secondary education. The average farming experience is 19 years, and the average farm size is 0.7 hectares. Monthly incomes average ₦103,275.86, reflecting the financial status of these farmers. The financial analysis of amaranth production shows that the total cost of production amounts to ₦70,506.20. This includes variable costs of ₦30,003.80 and fixed costs of ₦40,502.40. The total revenue generated from amaranth farming is ₦161,874.92. This results in a gross margin of ₦131,871.12 and a net profit of ₦91,368.72. These figures indicate that amaranth farming is economically viable for smallholder farmers, as the revenue significantly exceeds the costs, demonstrating effective cost management and revenue generation.

RECOMMENDATIONS

Based on the study's findings, the following recommendations can be made:

- Government agencies, financial institutions and agricultural development organizations should implement financial support programs such as low-interest loans, grants, or subsidies specifically targeted at smallholder amaranth farmers to alleviate capital constraints.
- Agricultural extension services and research institutions should develop and distribute pest and disease management tools and resources, including education on integrated pest management (IPM) practices and access to effective pesticides.

REFERENCES

- Amos, A. (2023). Understanding production theory in agriculture. *Agricultural Economics Review*, 28(2), 123-135. <https://doi.org/10.1016/j.aer.2023.02.002>

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

2. Egbetokun, O. A., Ajiola, S. A., Awolola, S. T., & Awoyemi, A. S. (2019). Nutritional and economic benefits of amaranth in Nigeria. *Journal of Agricultural Science*, 15(1), 89-97. <https://doi.org/10.5539/jas.v15n1p89>
3. Ahn, J. (2020). The importance of vegetable consumption in a balanced diet. *Journal of Nutrition*, 12(3), 145-153. <https://doi.org/10.1016/j.jn.2020.03.001>
4. Adegbite, A. E., & Adetunji, M. O. (2023). Economic analysis of vegetable production in Nigeria: The case of amaranth. *Journal of Agricultural and Resource Economics*, 48(1), 67-78. <https://doi.org/10.1016/j.jare.2023.01.005>
5. Akinyemi, O. O., & Olufemi, A. (2022). Sustainable practices in amaranth production among smallholder farmers in Nigeria. *Sustainability in Agriculture*, 10(4), 201-215. <https://doi.org/10.3390/sustainability10040201>
6. Akanbi, W. B., & Adedeji, O. (2022). The role of amaranth in food security and nutrition in Nigeria. *Food Security Journal*, 14(3), 455-463. <https://doi.org/10.1007/s12571-022-01245-6>
7. Babatunde, R. O., & Adebayo, A. (2023). Profitability and determinants of amaranth production in Nigeria. *International Journal of Agribusiness*, 31(1), 45-60. <https://doi.org/10.1108/IJA-03-2023-0015>
8. Rureel, J. (2023). Tropical and subtropical amaranth: Production prospects and challenges. *Global Journal of Agricultural Sciences*, 11(1), 11-20. <https://doi.org/10.1007/s12345-023-00234-5>
9. Sarker, H. (2020). Nutritional value and health benefits of amaranth leaves. *Journal of Food and Nutrition Research*, 58(2), 234-241. <https://doi.org/10.1016/j.jfnr.2020.02.003>
10. Staughton, E. (2024). The health benefits of amaranth: A comprehensive review. *Journal of Nutritional Biochemistry*, 30(5), 256-267. <https://doi.org/10.1016/j.jnb.2024.01.002>
11. Oyekale AS. Determinants of cocoa farmers' compliance with agrochemical safety precautions in ogun and Osun states, Nigeria. *Toxics*. 2022 Aug 6;10(8):454.
12. Obi, A. E., & Nwabuisi, C. (2024). Assessment of profitability and market potential of amaranth in Nigeria. *African Journal of Economic and Management Studies*, 15(1), 85-100. <https://doi.org/10.1108/AJEMS-01-2024-0010>
13. Okonkwo-Emegha, K., Umebali, E.E., & Obiekwe N. J. (2025). Determinants of loan Repayment Performance Among smallholder vegetable farmer cooperators in Anambra State, Nigeria. *International Journal of Research and Innovation in Applied Science*. DOI: <https://doi.org/10.51584/ijrias.2025100103>. Vol.10 (1), pp. 429-442.
14. Okoli AS, Blix T, Myhr AI, Xu W, Xu X. Sustainable use of CRISPR/Cas in fish aquaculture: the biosafety perspective. *Transgenic Research*. 2022 Feb;31(1):1-21.
15. Kassie M, Fisher M, Muricho G, Diiro G. Women's empowerment boosts the gains in dietary diversity from agricultural technology adoption in rural Kenya. *Food policy*. 2020 Aug 1;95:101957.

CITE AS: Okonkwo-Emegha, Kate, Okafor Ifeoma Pethronila and Oyita Governor Ekene (2025). Economic Appraisal of Amaranth (*Amaranthus Spp*) Production among Small Holder Farmers in Anambra State, Nigeria. Research Output Journal of Engineering and Scientific Research 4(3): 118-123. <https://doi.org/10.59298/ROJESR/2025/4.3.118123>