ECONOMIC ANALYSIS OF WATERMELON PRODUCTION IN ISE ORUN LOCAL GOVERNMENT AREA OF EKITI STATE, NIGERIA

Adeleye, I. A., Fasuan, Y. O., Oke, D. M. and Olakunle, A. O.
Department of Agricultural Extension and Management, Federal Polytechnic Ado –Ekiti, Ekiti State
Correspondence details: adeleyeifeolu@yahoo.com

ABSTRACT
The study examined the economic analysis of watermelon production in Ise Orun Local Government area of Ekiti State, Nigeria. A multistage sampling procedure was used to select 105 respondents for this study. A questionnaire was used for data collection and data were analysed using descriptive statistical tools such as frequency counts, percentage and mean, and budgetary analysis. The average age was 57±10.8 years, majority were males (81.0%) and married (89.5%). The major factors influencing watermelon production include storage problems (46.7%), theft (53.3%), the prevalence of pests and diseases (55.2%), land tenure (53.3%) and market price (47.6%). For one hectare of watermelon, the gross margin was ₦662,493 with a cost-benefit ratio of ₦5.79, implying that for every ₦1.00 invested in watermelon production, there was a corresponding profit of ₦5.79. Severe constraints to watermelon production include inadequate capital (75.5%), cost of labour (69.6%), theft (58.4%) and flooding (55.1%). The study recommends that the land acquisition system that makes it hard for farmers to acquire agricultural land should be reviewed to allow the farmers to have more access to land. Also, government grants and loans should be made easy to access as this will reduce the cost incurred on inputs and help provide funds for the production activities.
Keywords: Watermelon, Economic Analysis, Production, Constraints, Farmers

INTRODUCTION

Watermelon, Citrullus lanatus, is one of the most widely cultivated crops globally, with China leading the world in production (FAO, 2023). In Africa, countries like Nigeria, Kenya, and South Africa are notable producers, with Nigeria producing 1,936,111 metric tons of watermelon in 2020 (FAO, 2022). Watermelon is a valuable crop due to its nutritional benefits, medicinal properties, and economic potential.

Watermelon is indeed low in calories and rich in water, vitamins A and C, and antioxidants particularly lycopene, a carotenoid known for its potential to reduce the risk of heart disease and certain cancers (Healthline, 2022). Potassium in watermelon also helps control blood pressure and prevents strokes. The fruit's high-water content and nutritional value make it an excellent choice for hot summer days.

Watermelon production is a profitable economic activity in Nigeria, particularly in the northern regions where it is widely cultivated (NIHORT, 2021). The crop's ready market and high demand make it an attractive venture for farmers. However, production challenges, such as inadequate storage and processing facilities, lead to market gluts and price fluctuations, affecting farmers' income and confidence in continuous production (NAERLS, 2022).

Despite its potential, watermelon production in Nigeria faces several challenges. In Ekiti State, for example, production is declining due to inefficient resource management, while demand is increasing due to growing awareness of the fruit's nutritional value (Ekiti State Government, 2008). The shortfall in watermelon supply leads to price increases during off-peak periods, making it unaffordable for many households and reducing per capita consumption rates (NAERLS, 2022). Watermelon production has significant economic and nutritional benefits but addressing production challenges is crucial to ensuring food security and improving farmers' livelihoods. By adopting improved technologies and efficient resource management practices, farmers can increase productivity and income. Policymakers and stakeholders must also prioritize investments in storage and processing facilities to reduce post-harvest losses and stabilize prices.

Production of fruit crops such as watermelon has remained relatively low despite its recognized nutritional and commercial value (Muhammad and Ismail, 2021). This underproduction is particularly concerning given the increasing awareness of watermelon's health benefits and growing market demand. The gap in production levels indicates a lack of in-depth understanding of the economic viability and efficiency of watermelon farming at the local level, especially in regions like Ekiti State, where production trends show a decline despite rising consumption.

There is limited empirical data specifically focused on the profitability, resource allocation, and production constraints of watermelon cultivation in Ise Orun Local Government Area. This presents a critical knowledge gap in local agricultural planning and decision-making. Addressing this gap is essential to guide farmers, policymakers, and agricultural extension agents in promoting more efficient and profitable watermelon production systems.

Therefore, this study aimed to assess the economic analysis of watermelon production in Ise-Orun Local Government Area of Ekiti State. The objectives of the study are to:

i. describe the socio-economic characteristics of the respondents

ii. analyse the costs and returns of watermelon production
iii. identify the factors affecting the production of watermelon
iv. identify the constraints associated with watermelon production in the study area.

METHODOLOGY

The study was carried out in Ise Orun Local Government Area of Ekiti State, Nigeria which lies within the tropical zone in the rain forest region of southwestern Nigeria. Ise/Orun Local Government Area is located at approximately latitude 7.4300° N and longitude 5.5100° E. Ekiti state has 16 local government councils, with a population of about 113,754 (NPC, 2006). The area is peculiar for horticultural crop production, and a large percentage of the inhabitants are farmers. Ise Orun Local Government Area covers a land area of 432 km², according to the 2006 census

The multistage sampling procedure was used in selecting the respondents. Ise Orun Local Government Area was purposively selected, due to its high production of watermelon. In the second stage, five villages were randomly selected from the eight (8) villages within the Local Government Area which were Afolu, Kojola, Ogbese, Araromi and Ise. Finally, at the third stage, a random sampling was employed in selecting 21 farmers from each of the villages based on the sample frame provided by the ADP officials. In total, 105 farmers were randomly selected for the study.

The dependent variable: costs and returns variables were considered as cost of hired labor (₦), cost of chemical fertilizer (₦), cost of seeds (₦), coat of insecticide and herbicide (₦), cost of depreciation on farm implement (₦), yield (Kg/ha) (₦), unit price (₦).

The independent variables: factors were considered as land tenure, government policy, manual weeding, rainfall, temperature, soil type. The variables were measured on a 5-point Likert scale of strongly agree-5, agree-4, undecided-3, disagree-2 and strongly disagree-1. Constraints were considered as inadequate storage facilities, inadequate extension contact, inadequate credits, pests and diseases, high cost of labour. The variables were measured on a 3-point scale of not severe-1, moderately severe-2, very severe-3.

Data were analysed using descriptive statistical tools such as frequency counts, percentage and mean. Farm budget analysis was constructed to estimate the production costs, revenue and gross margin accruable to the farmers. The equations used in estimating the various parameters are defined below:

GM = TR - TVC ……. (1)
TC = TFC + TVC …… (2)
NP = TR-TC …….. (3)

Where:
TC = Total cost, TFC = Total fixed cost, TVC= Total variable cost
GM = Gross margin, TR = Total revenue, NP = Net profit

Depreciation on tools was calculated by the straight-line method as follows: Depreciation = (cost of purchase - salvage value)/ useful life.

RESULTS AND DISCUSSION

Socioeconomic characteristics

The result in Table 1 revealed that 61.9% of the respondents were less than 60 years old with a mean age 57±10.84 years indicating the presence of middle-aged individuals and ageing farming population. Also, the result on age implies low youth population involvement in watermelon production in the study area. Also, implies that majority of the respondents are still within the productive working age, active, agile and can withstand the demands (labour) for watermelon farming. Ndanitsa *et al*. (2021) and Mairabo (2021) reported that the age of farmers is very critical in agricultural production, and that farmers below the age of 40 years are engaged in rigorous farm work to accomplish cultural practices such as planting, weeding, and harvesting. Majority of the respondents were males (81.0%), indicating dominance of male folks in watermelon production. Also, this is due to the traditional pattern that males are dominant in the farming system in the study area and because migrant farmers are mostly of male gender (Muhammad and Ismail, 2021). Furthermore, majority of the farmers (89.5%) were married, and are therefore expected to be stable and settled in their chosen vocation, also they can help each other and utilise family labour to enhance watermelon production in the study area. Majority (68.6%) of the respondents had at least primary education, thus indicating a high level of literacy in the study area. This will also ease the problem of training farmers on how to access and effectively utilise agricultural credit obtained (Ndanitsa *et al*., 2021). Education plays a pivotal role in enhancing livelihood opportunities, improving food security, and reducing poverty. A study by Awotide *et al*. (2021) found that higher educational attainment among smallholder farmers in Nigeria significantly increases their access to credit and adoption of improved agricultural practices, leading to better productivity and income. Similarly, Olowolafe *et al*. (2022) highlighted that educated farmers are more likely to implement effective postharvest handling techniques, thereby reducing losses and improving market access. The average years of experience in watermelon production experience was 27± 12.08 years, implying that that farmer in the study area have the necessary experience to increase their

watermelon production given a considerable level of inputs.

The mean household size was 8±2.90 persons; indicating a large household size and this might help solve the problems associated with shortage of labour in the study area. Also, large household size may serve as source of cheap and readily available farm labour depending on the compaction and very likely increased output (Ojo *et al*., 2020). Majority (73.3%) of the farmers had a farm size of 1-3ha, and 26.7% had a farm size of 4-6ha. The average farm size was 3±1.08 hectares. Although this size is relatively larger than typical subsistence farms, it still indicates that many watermelon farmers in the study area may be operating within a semi-commercial or transitional production system, characterised by limited mechanization and input use. This may reflect constraints in access to capital, technology, or extension services, which are necessary for scaling up to fully commercial farming.. Also, 28.6% inherited their land, 49.5% rented their land while 8.6% purchased their land personally. Thus, the major means of land acquisition in the study area was by rent. This indicates that most of the watermelon farmers in the study area incur certain cost for farmland which increases the cost of watermelon production. Majority of the respondents were members of the cooperative societies (62.9%) and 37.1% of the respondents were non- member of any cooperative society. This could be that most of the farmers were well informed about the benefits of membership which could help in obtaining information on how to improve and boost production or probably due to the fact that cooperative didn't have enough capacity to meet their needs (Ayanwale and Bamire, 2021). Membership of cooperative is very important as it enhances access to information on improved technologies, markets and credits for the purchase of inputs and payment of hired labour.

Table 1: Socio-economic characteristics of the respondents (n=105)

Variable	Frequency	Percentage	Mean	Std. Deviation
Age (years)				
Under 30	1	1.0		
31-35	18	17.1		
46-60	46	43.8	57	10.84
Above 61	40	38.1		
Sex				
Female	20	19.0		
Male	85	81.0		
Marital status				
Married	94	89.5		
Divorced	5	4.8		
Widow/widowers	6	5.7		
Educational status				
No formal education	33	31.4		
Primary education	55	52.4		
Secondary education	17	16.2		
Household size				
Under 5	15	14.3		
6-10	74	70.5	8	2.90
11-15	13	12.4		
Above 16	3	2.9		
Farm size(hectares)				
1-3	77	73.3	3	1.08
4-6	28	26.7		
Farmland acquisition				
Inherited	30	28.6		
Rent	52	49.5		
Gift	2	1.9		
Family land	12	11.4		
Personal	9	8.6		
Cooperative membership				
Yes	66	62.9		
No	39	37.1		

Source: Field survey, 2024

Factors affecting watermelon production.

Table 2 reveals the various factors affecting watermelon production. The majority of the farmers strongly agreed that storage of watermelon (46.7%), theft (53.3%), prevalence of pests and diseases (55.2%), land tenure (53.3%) and market price of watermelon (47.6%) are the foremost factors affecting the production of watermelon in the study area. However, some of the respondents strongly disagreed that manual weeding (61.9%), type of soil (61.0%), government polices (64.8%) affect the production of watermelon in the sense that the farmers carried out an average of two weeding in watermelon production. This is because watermelon suppresses weed growth after full establishment. Therefore, the farmers are not faced with weeding difficulty till harvesting. Watermelon may be grown on a variety of soils; therefore, the soil type cannot affect the production. Also, there is no government policy hindering the production of watermelon in the study area and land is always allocated to any interested person who would like to engage in farming (Adeoye and Balogun, 2022).

Table 2: Factors affecting watermelon production (year 2024)

Factors	SA (%)	A (%)	UD (%)	D (%)	SD (%)
Land tenure	53.3	34.3	2.9	7.6	1.9
Prevalence of pests and disease	55.2	15.2	17.1	9.5	2.9
Government policies	1.0	15.2	12.4	6.7	64.8
Manual weeding	-0.0	22.9	7.6	7.6	61.9
Duration of rainfall	54.3	26.7	9.5	8.6	1.0
Temperature	49.5	37.1	8.6	3.8	1.0
Type of soil	1.9	21.0	14.3	1.9	61.0
Storage problems	46.7	10.5	20.0	14.3	6.6
Transportation	57.1	18.1	12.4	9.5	2.9
Theft	53.3	15.2	11.4	10.5	9.5
Market price of watermelon	47.6	35.2	13.3	2.9	1.0

Note: SA-strongly agreed, A-agreed, UD-undecided, D-disagreed, SD-strongly disagreed
Source: Field survey, 2024

Costs and returns of watermelon production (year 2024)

The estimates of the budgetary analysis for watermelon are presented in Table 3. The average total variable cost (TVC) of hired labour, chemical fertilizer, seeds, herbicides/insecticide amounted to ₦87, 507 per month. From the Table, labor accounted for about 3.19% of the total production cost, while analysis of other variables shows that the percentages share of seeds (18.80%) and other costs are 35.67%, and 42.35%, respectively.

Table 3: Average costs and returns of watermelon production in the study areas (Naira/hectare) (year 2024)

	Items	Mean value (N)	Percentage of variable cost
A	**Revenue**		
	Average yield 1500@₦500	750,000.00	
B	**Variable cost**		
	Cost of hired labour	2,788.00	3.19
	Cost of chemical/fertilizer	31,210.00	35.67
	Cost of seeds	16,447.00	18.80
	Cost of herbicides	37,062.00	42.35
	Total variable cost (TVC)	87,507.00	100
C	**Fixed cost**		
	Depreciation of farm equipments (hoe, cutlass, etc)	42,074.00	
	Total cost of production		
	TC=TVC+TFC	129,581.00	
D	**Gross Margin (GM)**		
	GM=TR-TVC	662,493	
E	**Net Farm Income**		
	NFI= TR-TC	620,419	
	Return on Investment		
	Benefit cost ratio =TR/TC	5.79	

Source: Field survey, 2024

While the average total fixed cost (TFC) depreciated for farm implements amounted to ₦42, 074. Average total cost (TC) amounted to ₦129, 581. The costs and return analysis show gross margin of ₦662, 493 per ha. This when divided by a year gives a monthly income of ₦55, 207.75. The cost-benefit ratio shows a figure of 5.79, meaning for every one naira invested in Watermelon farming, an additional ₦5.79 kobo will be realized. This strong profitability implies that watermelon farming can serve as a viable means of livelihood improvement for smallholder farmers, especially in regions where land and inputs are moderately accessible. It also implies that watermelon production is a highly viable enterprise, capable of generating substantial returns on investment, consistent with the findings of Ojo *et al.* (2020), who reported similar profitability trends among watermelon farmers in Niger State.

Total variable costs (TVC): 2,788+31,210 + 16,447 + 37,062 = ₦87, 507

Total costs (TC): 87,507 + 42,074 = ₦129,581

Gross Margin (GM): 750,000 - 87,507 = ₦662,493

Cost-Benefit Ratio: 750,000 ÷ 129,581= ₦5.79kobo

Constraints of watermelon production

Table 4 shows the major constraints affecting watermelon production in the study area, ranked based on their severity as reported by the respondents. A significant majority (75.5%) of the farmers identified inadequate access to capital or credit facilities as the most pressing constraint. This underscores the critical role of financing in expanding production capacity, acquiring inputs, and adopting modern technologies. Limited access to credit has consistently been a key barrier to productivity among smallholder farmers in Nigeria, a finding supported by Awotide *et al.* (2021), who emphasised that credit constraints significantly reduce farm output and efficiency.

The second most severe constraint, as reported by 69.6% of the farmers, was the high cost of labor. Most respondents noted that they lack access to or the ability to collectively invest in labor-saving technologies such as mechanized equipment, which would otherwise lower labor costs and increase productivity. This reflects the broader issue of under-mechanization in Nigerian agriculture.

Theft (58.4%) ranked third, highlighting a security challenge for farmers, particularly during harvest. This concern affects farmers' confidence and investment in expanding production. Flooding (55.1%) was ranked fourth, with farmers reporting yield losses due to water logging and erosion. The lack of proper tillage infrastructure, drainage systems, and flood control measures worsens the impact of seasonal floods.

Other constraints including inadequate storage facilities, poor market prices, and transportation challenges were reported by 48.6% of farmers. The heavy and perishable nature of watermelon, combined with poor road infrastructure, increases post-harvest losses and transport costs. These issues are consistent with findings by Olowolafe *et al.* (2022), who reported that poor rural infrastructure and lack of preservation facilities significantly hinder the marketing of perishable crops like watermelon.

Additional but less severe constraints included the lack of improved seeds (45.2%), inadequate extension services (36.5%), and pests and diseases (24.4%). These constraints reflect systemic issues in technology dissemination, research-to-farm linkage, and pest management.

Table 4: Constraints faced by watermelon farmers in Production

Constraints	Percentage (%)	Rank
Inadequate credit facilities	75.5	1st
High cost of labour	69.6	2nd
Theft	58.4	3rd
Flooding	55.1	4th
Inadequate storage facilities	48.6	5th
Poor market price	48.6	5th
Inadequate transportation	48.6	5th
Lack of improved seeds	45.2	6th
Inadequate extension contacts	36.5	7th
Pest and diseases	24.6	8th

Source: Field survey, 2024

CONCLUSION AND RECOMMENDATIONS

It can be concluded that the majority of the watermelon farmers in the study area are relatively young and within their productive age, with the average age suggesting they are still active in farming activities. Most of the respondents were male, indicating that watermelon farming in the area is male-dominated. In addition, a large proportion of the farmers are married, which could suggest a degree of household stability that may positively influence farming decisions and labor availability. The identified factors affecting watermelon production include storage of watermelon, theft, prevalence of pests and diseases, land tenure and

market price. Findings showed that watermelon production in the study area is a profitable business. The study identified some of the constraints faced by the farmers in watermelon production which inadequate capital, lack of labour, theft and flooding. It is recommended that the land acquisition system that makes it hard for farmers to acquire agricultural land should be reviewed to allow farmers have access to land for farming purposes. Also, government grants and loans should be made easy to access as this will reduce the cost incurred on inputs and help provide funds for the production activities. There was need to find a way of improving labour availability through the provision of tractor hiring services by the cooperative society to ensure adequate labour supply.

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