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ECONOMIC ANALYSIS OF COST AND RETURNS AMONG COOPERATIVE TOMATO FARMERS IN ODEDA LOCAL GOVERNMENT AREA OF OGUN-STATE, NIGERIA

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ABSTRACT

The study examined econmics analysis of cost and returns among cooperative tomato farmers in Odeda local government area of Ogun-State, Nigeria. Data was gathered through a well-structured questionnaire administered to eighty (80) tomato farmers using a two-stage sampling technique. Both descriptive and inferential statistics were absorbed to analyzed the data. The result showed that majority of the respondents were male (90%), (68.7%) of them were educated and married (73.7%) while most of them were in their active years, with average family size of 4 persons with mean amount of ₦455,045.45 as monthly income. The calculated Rate of Return on investment (ROR), Profitability ratio (PR), Rate of returns on variable cost (RRVC) and Benefit-Cost ratio (B/C) were 35%, 0.59, 144.6% and 1.35 respectively. The findings further showed benefit-cost of 1.35, implying that for every ₦1.00 spent by the farmers on tomato production, 35 kobo was realised as profit, showing that the enterprise is profitable and economical since, benefit-cost ratio exceeded 1. Majority of farmers were predominantly rely on their personal savings, with minimal aid from cooperative societies.The study recommended that tomato farm Input such as fertilizers, seeds and others should be made available to the farmers at a subsidized rate and also try to provide credit facilities for the tomato farmers by government and non-government agencies. Timely and adequate training should be given to tomato farmers to acquire modern tomato production techniques. Tomato farmers should be educated on how to tackle constraints facing them.

Keywords: Tomatoes, Cost, Returns, Cooperative, Production, Farmers

INTRODUCTION

Tomatoes (*Lycopersicon esculentum Mill*.) constitute one of the most extensively cultivated vegetables across various regions of the globe, ranking second in significance in numerous countries (Ibeawuchi, 2015). In Nigeria, an annual cultivation area of approximately one million hectares is reported, accounting for about 18 percent of the average daily vegetable consumption in Nigerian households (Chidi, 2012). Nigeria is also recognized as the second-largest producer of tomatoes in Africa and ranks thirtieth globally, with an annual production of 1.701 million tonnes at an average yield of 25-30 tonnes per hectare (FAO, 2010). Tomatoes are arguably the most vital and widely enjoyed vegetable crop cultivated throughout the nation. They hold a prominent place in daily meal preparation, as they can be consumed both raw and cooked. Substantial quantities are utilized in the production of soups, juices, sauces, ketchups, purées, and pastes. Additionally, tomatoes find applications in canning industries; green tomatoes are employed for pickling and preservation. The seeds, extracted from the pulp and its residues, contain 24% oil, which is utilized for salad dressings and in the manufacture of margarine and soap. The residual press cake serves as both livestock feed and fertilizer. Furthermore, vegetables such as tomatoes not only cater to domestic consumption but also generate foreign exchange for producing countries through exportation. Tomato (*Solanum lycopersicum*) is a globally cultivated vegetable, celebrated for its nutritional value and culinary versatility. The production of tomatoes plays a pivotal role in the agricultural economy, contributing significantly to both domestic consumption and export markets. Nonetheless, the profitability of tomato cultivation can fluctuate across different regions due to factors such as climate, soil conditions, market dynamics, and production methodologies. In recent years, there has been a notable increase in vegetable production and yield per acre. The overall area dedicated to vegetable production was 881 thousand acres, yielding an output of 3,283 kg per acre in the year 2008-2009, while the total area of vegetable production reached 3,378 kg in the year 2010-2011, according to the Yearbook of Agricultural Statistics of Bangladesh, 2011. Tomatoes are a crucial vegetable consumed year-round and are classified into two categories based on their production seasons: rabi tomatoes and summer tomatoes. Despite the fact that tomato production represents a viable strategy for enhancing farm income and alleviating widespread poverty, insufficient attention has been directed toward its marketing aspects. Due to an imbalanced distribution system and the absence of an organized marketing framework, there is often a market glut of tomatoes during the primary production season, coupled with a scarcity of the commodity in other seasons (Adenegan and Adeoye, 2011). Furthermore, significant wastage of tomatoes occurs annually as harvested tomatoes are lost due to inadequate food supply chain management; price instability resulting from seasonal production fluctuations, and the preference of farmers and middlemen for urban markets over direct consumers due to low farm gate prices. Additionally, there exists a notable deficit between demand and supply within the country (Ugonna *et al.,* 2015). Tomatoes are cultivated year-round, with their peak season spanning from December to March. In the 2011-2012 fiscal year, the total production of tomatoes reached 255 thousand metric tons (BBS, 2012). They are widely embraced and utilized in a diverse array of culinary applications, both in their raw state and as cooked or processed products, more so than any other vegetable (Adugna, 2009). The tomato fruit contains 3-4% total sugars, 15-30 mg/100g of ascorbic acid, 7.5-10 mg/100ml of titratable acidity, and 20-50 mg/100g of lycopene—an

antioxidant recognized for its potential in cancer prevention, particularly concerning the prostate, lungs, and stomach. However, in contrast to cereals, the marketing of horticultural crops—especially vegetables and fruits—presents a more intricate and precarious endeavor due to their unique characteristics, such as high perishability, seasonality, and bulkiness, necessitating specialized handling. Consequently, the supply of vegetables is prone to various challenges, including significant price fluctuations. Tomato cultivation is widespread across Nigeria (Adenegan and Adeoye, 2011), and extensive cultivation can generate employment opportunities at both urban and rural levels. In fact, in 2013, Nigeria was recognized as the second largest producer of tomatoes in Africa and the thirteenth globally, with an estimated annual production of 1.7 million tonnes cultivated over one million hectares of land, yielding an average of 20-30 tons per hectare (YISA, 2013). Nevertheless, Nigeria remains the largest importer of tomato paste from China and Italy (YISA, 2013). In Bangladesh, research related to tomato cultivation has been minimal. In the Jamalpur region, Zaman *et al.,* (2006) explored the summer tomato's production potential, conducting a profitability study utilizing net returns and the Benefit-Cost Ratio (BCR). They found that the BCR for the research area was 3.2, with a net return of Tk. 690,464 per hectare. The acceptance and financial viability of an improved tomato variety in Bangladesh's Chittagong region were assessed by (Mohiuddin et, al., 2007), employing the Cobb-Douglas production model and tabular techniques. They discovered that farmers adopting the enhanced tomato variety faced numerous challenges, including a scarcity of high-quality seeds, adverse weather conditions, and the need for superior insecticides and fertilizers for tomato cultivation. One of the primary obstacles encountered by tomato growers was identified as the elevated cost of inputs. Karim *et al.,* (2009) investigated the profitability of summer BARI Hybrid tomato cultivation in the Jessore district of Bangladesh, using net returns and BCR for their analysis. They reported an average yield of 32.7 tons per hectare, with a BCR of 4.19 on a full cost basis and 5.09 on a cash cost basis. They highlighted high input prices and pest and disease infestations as significant issues affecting tomato production. Haque et al. (2012) examined the uptake and financial viability of the BARI winter tomato variety across several districts in Bangladesh, finding that the Raton and BARI hybrid tomato-5 varieties yielded greater profits than competing crops such as mustard, lentil, and potato. They investigated various challenges faced by farmers, noting that the primary constraints to BARI tomato cultivation included pest and disease pressure, inadequate technical expertise, insufficient storage facilities, and the unavailability of BARI tomato variety seeds at the appropriate time. A study by Shiblee *et, al.,* (2012) assessed the financial viability of several crops recommended by BARI, revealing that the BCR in their research area exceeded two, indicating that tomato cultivation was indeed profitable. In certain regions of Bangladesh, Khatun *et, al., (*2012) conducted research on the evaluation of post-harvest losses in tomatoes. The present investigation focuses on the profitability of tomato production while elucidating the relationship between socio-economic characteristics and the challenges faced by tomato growers. The broad objective of the study is to examine the econmics analysis of cost and returns among cooperative tomato farmers in Odeda local government area of Ogun-State, Nigeria. The specific objectives are to: describe the socio-economics charactaristics of the respondents, examine cost of production and returns from sales of tomatoes among the respondents and identify the sources of funds among farmers.

MATERIALS AND METHODS

Area of the Study

The study area was Odeda Local Government Area (LGA) of Ogun State, situated in the western region of Nigeria. Odeda is one of the twenty LGAs within Ogun State, with its headquarters located in Odeda town, positioned along the Abeokuta-Ibadan highway, approximately 20 kilometers from the state capital, Abeokuta. This LGA is geographically defined by latitude 7°13' North and longitude 3°31' East, covering a land mass of 1,560 square kilometers (or an area of 126,341 hectares) and housing a population of 109,449 inhabitants. It shares borders with the Ido LGA of Oyo State and the Abeokuta South LGA in Ogun State, exhibiting an average temperature of 30°C, although humidity levels can soar to as high as 95%. The rainy season spans from April to October, while the dry season extends from November to March (OGADEP, 2010). The predominant ethnic group in the area is the Yoruba, alongside a presence of Hausa and Igbo traders. Within the LGA, there exist 25 semi-urban settlements and 860 villages and hamlets, with notable local markets such as Kila (Ilugun) and Olodo, frequented by traders from the Ibadan and Abeokuta regions (OGADEP, 2010). The foodstuffs traded in these markets encompass gari, yam, cocoyam, sweet potato, maize, cassava, various vegetables, pepper, tomatoes, and cowpea, while the principal livestock includes goats, pigs, poultry, sheep, and cattle (OGADEP, 2010). The data for the study was procured from both primary and secondary sources. The primary data was obtained through the administration of a well structured questionnaire designed to capture pertinent information. Conversely, the secondary data was obtained from an array of published journal articles, textbooks, dissertations, reputable internet sources, and other relevant publications. Both descriptive and inferential statistics were employed to analyze the data. Descriptive statistics, including frequency tables, percentages, and means, were utilized to elucidate the socio-economic characteristics of cooperative tomato farmers, identify funding sources among farmers, and conduct a budgetary analysis to assess the costs and returns associated with tomato production. A two-stage sampling technique was employed to select tomato producers. From the four divisions in Ogun State, the Egba division was chosen for the initial stage of the study. The subsequent stage involved a purposive selection of the Odeda local government area, owing to its substantial contribution to tomato production within the study area. In the third stage, six villages or communities were selected from the previously identified local government area. Ultimately, a simple random sampling technique was utilized to select fifteen (15) tomato producers from each village, culminating in the administration of ninety (90) questionnaires to the respondents. Out of the ninety questionnaires distributed, ten were not retrieved, while eighty questionnaires were collected and utilized as the sample size for the study.

Analytical Technique

Budgetary analysis: Analysis of costs and returns was used to evaluate the profitability and rate of return on investment in tomato marketing in periodic markets in the study area. The return to marketing was determined using Gross Margin (GM) while profitability level was determined with Net Profit (NP).

$$GM = TR - TVC \quad (1)$$

where:

GM = Gross Margin (₦)

TR = Total Revenue (₦)

TVC = Total Variable Cost (₦)

$$\pi = TR - TC \quad (2)$$

OR
$\pi = GM - TFC$ (3)
where:
TC = Total Cost (N)
TC = TFC + TVC (4)
TFC = Total Fixed Cost (₦)
RRI = NI/TC (5)
where:
RRTVC = Rate of Return on Total Variable Cost (TC-TFC/TVC)
Profitability ratio = NI/TR (6)
Benefit cost ratio = B/C (7)

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Respondents

Table 1, revealed that males 90% while only 10% females engaged in tomato production in the study area This implied that tomato production is dominated by males. Results also revealed the data on age group of the tomato respondents that 37.5% respondents fell in the age group of < 30 years, 43.7% of them fell in the age group of 31-40 years, 12.5% fell in the age group of 41-50 years and 6.3% in the age group of 51-60. The results revealed that majority of the respondents were active, agile and youthful showed that they are in their productive and bracket age with an average of 36 years of age. This results was in agreement with Omonona *et, al.,* 2010 who claimed that majority (89%) of tomato farmers are in their bracket age. The findings also showed that 73.7% were married while only 26.3 were single, this viewed that majority of them were married and they had additional responsibilities to bear and the married farmers are likely to be under pressure to produce more output than single farmers. This finding, agrees with the findings of (Haruna, 2014). The findings revealed that 10.0% had less than 3 household size, 41.3% had 3-5 household size, 48.7% had had 8 or more household size with an average of 4 persons per household. This suggested a moderate household size that could maintain a balance between production and consumption providing leverage for profitable investment. This findings also revealed that 25.0% had < 5 years, 50.0% had 6-10 years, 15.0% had 11-15 years, 10.0% had 16-20 years. This implied that majority of the respondents had much experience. This also proved that majority of them had enough experience in their production to make their tomato enterprises increase efficiently. The data on education attainment revealed that 31.3%, 52.5%, and 16.2.% had secondary education, primary education, no formal education respectively. From the results, this implied that majority (68.7%) of them were educated. This findings is consistent with the studies of (Adugna, 2019) who asserted that farmers with high level of education has tendency to improve the profitability of their business. Results further revealed that 72.5% of the respondents were Christians while 22.5% practiced Islam and 5.0% of the respondents practiced traditional religion which translates that religious beliefs do not forbid tomato production in the study area. The findings also showed that 42.5% of the respondents spent < 3 years in cooperative, 27.5% of them joined cooperative between 3 and 6 years, while 13.8% and 16.2% of the respondents spent 7-10 and 11 years and more as cooperative members respectively. This indicated that majority (57.5%) of them had stayed in the cooperative societies for more than 3 years. The study also found monthly income of the respondents, the results revealed that 13.8% of the respondents usually generated less than equal ₦200,000 per month, followed by 26.2% of them generated between ₦200,001 and ₦400,000 monthly, 23.8% of them generated between ₦400,001and ₦600,000 per month then 36.2% of them generated between ₦600,001 or more with mean amount of ₦455,045.45. This indicated that monthly income of the respondents on tomato production is still low therefore, the farmers need to pay more attention to their financial contribution or savings to increase their income. The findings was in agreement with (Shiblee, 2012) asserted that the level of income determined the asset ownership.

Table 1: Distribution of Socio-economic Characteristics of the Respondents

Variable	Value	Frequency	Percentage	Cumulative frequency	Average
Sex	Male	72	90.0	90.0	
	Female	08	10.0	100.0	
Age (years)	≤30	30	37.5	37.5	
	31-40	35	43.7	81.2	
	41-50	10	12.5	93.7	
	51-60	5	6.3	100.0	36 years
Marital status	Single	21	26.3	26.3	
	Married	59	73.7	100.0	
Household size	<3	8	10.0	10.0	
	3-5	33	41.3	51.3	
	6 & above	39	48.7	100.0	4 persons
Farming experience (years)	≤5	20	25.0	25.0	
	6-10	40	50.0	75.0	
	11-15	12	15.0	90.0	
	16-20	8	10.0	100.0	8 years
Educational level (years)	No formal education	25	31.3	31.3	
	Primary education	42	52.5	83.8	
	Secondary education	13	16.2	100.0	
Religion	Christian	58	72.5	72.5	
	Islam	18	22.5	95.0	
	Traditionalist	4	5.0	100.0	
Cooperative membership	< 3	34	42.5	42.5	
	3-6	22	27.5	70.0	
	7-10	11	13.8	83.8	
	11 & above	13	16.2	100.0	

Variable	Value	Frequency	Percentage	Cumulative frequency	Average
Monthly income (₦)	< ₦200,000	11	13.8	13.8	
	₦200,001-₦400,000	21	26.2	40.0	
	₦400,001-₦600,000	19	23.8	63.8	
	₦600,001 & above	29	36.2	100.0	₦455,045.45
Total		**80**	**100**		

Source: Field Survey, 2025

Sources of Funds or Finance among Tomato Farmers Production

A variety of funding sources were utilized by tomato producers to initiate their cultivation endeavors. The findings indicated that 20% of the respondents financed their tomato farming through cooperative credit, while 8% secured funds from banking institutions and family support. A significant proportion, 56%, relied on their personal savings to underwrite their tomato farming activities. Additionally, 14% of the farmers employed a combination of personal savings and cooperative society credits to finance their operations, whereas a mere 1% sought financial assistance from money lenders for their tomato production. This underscores that the majority of farmers predominantly rely on their personal savings, with minimal aid from cooperative societies.

Table 2: Distribution of Source of Funds of Tomato Farmers in the Study Area

Source of Funds to Tomato Farmers	Frequency	(%)	Rank
Cooperatives	10	20.0	2nd
Banks	02	4.0	4th
Families and relatives	02	4.0	4th
Personal savings	28	56.0	1st
Cooperative and personal savings	7	14.0	3rd
Money lenders	1	2.0	6th
Total	**50**	**100**	

Source: Field Survey, 2025

Cost and Returns of Tomatoes Production

Estimated production margin per annum for tomato farmers evealed the Total Revenue (TR), Total Variable Cost (TVC), Total Fixed Cost (TFC) and Total Cost from tomato production were ₦2,320,000.56, ₦1,350,806.37, ₦366,874.00 and ₦1717678.37 respectively while the Gross Profit (GP) was ₦969,1942.19 and the Net Profits (NP) was ₦602,322.19 This results concur to the findings conducted by Ojo *et. al.,* (2009) using Gross Margin Analysis revealed that tomato production is profitable with net income of ₦85,306.92/ha/per annum. The calculated Rate of Return on investment (ROR), Profitability ratio (PR), Rate of returns on variable cost (RRVC) and Benefit-Cost ratio (B/C) were 35%, 0.59, 144.6% and 1.35 respectively. The costs and returns analysis revealed variable cost (78.64%) and fixed cost (21.36%) of the total cost of tomato production with labour cost (26.04%) and cost of empty baskets (20.68%) constituting the highest variable cost. The RORI was estimated as 0.35 (35%) in this study. This result is lower than the Zalkuwi *et, al.,* (2012) which was 0.78 (78%). The higher RORI revealed in this finding could be attributed to access to capital, resource efficiency, contribution from people who gave out capital in form of cash to producers to enable easy production of tomato and improved output. The findings further showed benefit-cost of 1.35, implying that for every ₦1.00 spent by the farmers on tomato production, 35kobo was realised as profit, this disclosed that the enterprise is profitable and economical since, benefit-cost ratio exceeded 1. The results was consistent with Sanusi and Dada (2016) who claimed that tomato business is viable and lucrative.

Table 3: Distribution of Cost and Sales Returns and Profitability of Tomatoes Production

Variables	Value (₦)	Percentage %
Total Revenue	**2,320,000.56**	
Fertilizer	75,479.11	4.40
Cost of labour	447,384.90	26.04
Seeds	84,342.36	4.91
Land preparation	355,321	20.68
Pesticides	67,712	3.94
Loading	50,000	2.91
Transportation	200,000	11.64
Other expenses	70,567	4.12
Total Variable Cost	**1,350,806.37**	**78.64**
Depreciation		
Cutlasses	32,350	1.88
Hoes	89,511.53	5.21
Rent on land	71,880.87	4.20
Loan interest on fixed capital %/ annum	5,675.60	0.33

Knapsacks	12,456	0.73
Gloves	5000	0.28
Cost of empty baskets and bowls	150,000	8.73
Total fixed cost	**366,874.00**	**21.36**
Total Cost (TC)	**1,717,678.37**	**100**
Net income (NI)	**602322.19**	
Gross margin (GM)	**969194.19**	
Profitability index (PI)	**0.59**	
Rate of return on Variable Cost (RRVC)	**144.6%**	
Benefit cost ratio B/C	**1.35**	
Return on investment (ROI)	**35%**	

Source: Field Survey, 2025

CONCLUSION

The result indicates that majority of the respondents were males (90%), (68.7%) of them were educated and married (73.7%) while most of them were in their active years, with average family size of 4 persons with mean amount of ₦455,045.45 as monthly income. The findings further showed benefit-cost of 1.35, implying that for every ₦1.00 spent by the farmers on tomato production, 35 kobo was realized as profit, with benefit-cost ratio exceeded 1, the enterprise is profitable and economical. Variety of funding sources were utilized by tomato producers to initiate their cultivation endeavours but majority of farmers were predominantly rely on their personal savings, with minimal aid from cooperative societies. Farmers can take necessary actions to enable them maximize gains and improve their well-being if other things remain the same.

RECOMMENDATION

Therefore, the study recommended that tomato farm Input such as fertilizer, seeds and others should be made available to farmers timely at a subsidized rate by government and non-government agencies. Timely and adequate training should be given to tomato farmers to acquire modern production techniques in order to boost their production. Tomato farmers should be educated on how to battle pests and diseases associated with tomato production and other constraints. Governments should provide credit facilities for the farmers.

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