

ECONOMIC ANALYSIS OF FRESH TOMATO MARKETERS IN BAUCHI METROPOLIS OF BAUCHI STATE, NIGERIA

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ABSTRACT

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This study was carried out to analyze economics of fresh tomato marketers in Bauchi metropolis of Bauchi State, Nigeria. A total of fifty (50) tomato marketers were selected from three major markets using a simple random sampling technique. Descriptive statistics and farm budgetary techniques were used to analyze the data. The costs and returns analysis revealed variable cost (99.99%) and fixed cost (0.01% of the total cost of tomato marketing with acquisition cost (87.46%) and cost of empty baskets (4.37%) constituting the highest. The findings of returns per naira invested of 1.20k disclosed that the enterprise is profitable. The cost of marketing was ₦68,670.00, total revenue was ₦80,000.00 and the net income of ₦11,330.00 was realized, indicating highly profitable. The study further revealed that high cost of purchase during lean season (46%), lack of storage facilities (30%) and difficulty in purchasing good quality during lean or off-season were the major constraints confronting fresh tomato marketers in the study area. It was recommended that timely dissemination of product information to all intending fresh tomato marketers in the study area and other surrounding communities would encourage and enhance their marketing performance. It was further recommended for the need to restructure the layout of the markets to make it corporate and habitable especially during and after raining season.

Keywords: Marketing, Pricing efficiency, Tomato, Market intelligence, Bauchi, Nigeria.

INTRODUCTION

Agriculture is an important sector in most developing countries. As such, increase in agricultural productivity depends heavily on its marketability so as to improve its vital roles in a national economy. Efficient market does not only link sellers and buyers in reacting to current situations in supply and demand but rather has a dynamic role to play in stimulating consumption of outputs which are essential elements of economic development. Katharina and Stefan (2011) reported that the concept of marketing subsumes a set of different innovative advertising instruments which aim at gaining a large effect with a small budget. This could be achieved through different guerrilla instruments such as ambient, sensation, viral, buzz and ambush marketing which tries to evoke the effect of gaining the attention of a large number of recipients at relatively low cost by means of a surprise effect and a diffusion effect for condoning both consumer behavior and managerial perspectives. Agricultural marketing is defined as the performance of all the activities involved in the flow of agricultural products and services from the initial points of agricultural production until they reach the hands of the ultimate consumers. It is interested in everything that happens to crops after its leaves the farm gate; making decision, taking actions and bearing the responsibility of the action. Agricultural marketing also articulates all processes that take place from when the farmer plans to meet specified demands and market prospects to when the producers finally gets it to the consumers. It also recognizes the mutual independence between farmers and marketing middlemen which is the whole essence of marketing in management decision making.

Aminu (2009) pointed out that in a typical vegetable marketing, retailers were observed to sell both tomato and onion at the same time in addition to other vegetables like hot pepper, sweet pepper, cabbage, salad and in some cases, chilies pepper. The crops were sold in heaps, small baskets and metal containers of varying weights. The marketing of these crops which does not require much capital, however, essentially require experience and good rapport with the commission agents and farmers. Tomatoes marketing begin at the farm gate. Olukosi and Isitor (2004) explained that the marketing task involves transferring goods from producers to consumers. It is the marketing function that ensures that consumer acquires the product in the form, places and time desired. The basic trend in agricultural production is increase in the value added off-farm activities through post harvest processing and marketing leading to decrease in the percentage of the final consumer reaching the farm gate. Marketing stimulates production, enterprise and specialization, hence resulting in an improved productivity of all sectors of the national economy. As the economy of a nation grows, the gap between farmers and consumers widened and the task of marketing becomes more complex (Abbott, 1987). In a research conducted by Oladejo and Sanusi (2008), the net returns to marketing were affected by estimated marketing costs and selected personal characteristics of marketers. The authors further disclosed that the marketers in the study area were carrying out their distributing function using diverse channels revealing that 10.9% claimed to supply their wares in wholesales

while the remaining 26.4%, 42.7% and 20% sells directly to the retailers, final consumers and processors/food vendors, respectively.

Tomatoes are important in the daily meal preparation since it can be eaten raw or cooked. Larger quantities are used to produce soups, juice and sauces, ketchups, purees and paste. The paper further noted that it could be used in canning industries and green tomatoes are used for pickles and preserve. The seeds which are extracted from the pulp and its residues contain 24% oil which is used for salad dressing and in the manufacturing of margarine and soap. The residual press cake is used as stock feed as well as fertilizer. In addition, vegetable such as tomato apart from being consumed at home also earns foreign exchange to the producer countries, due to exportation.

The intermediary middlemen marketers even though perform greater role in the income flow of farmers, they are faced with problems of transporting farm products to the ultimate consumers, that is, the market thereby leading to delays in supply. In order to solve or reduce the problems, it is necessary to provide empirical information on costs and returns associated with products and marketing of tomatoes (Sani *et al.*, 2011; Singh, 2004).

Okoronkwo and Agu (2011) stated that communication create a viable platform for generating wealth and enabler of change thereby releasing people's creative potential and knowledge. This implies that it helps individuals and enterprises to conduct processes more efficiently anywhere in the world.

A well developed marketing system is expected to complement the farm production effort towards the realization of its desirable goals through the provision of time, place, possession and form utilities. The production and marketing system of tomato consist of a myriad of relationship and arrangements which are based on structure-conduct-relationship paradigms at each marketing level, that is, from the producers to the consumers. In order to ensure stable supply of tomato throughout the year, the market structure should first be considered in addition to examining how they are procured and disposed. This can best be achieved through critical analysis of profitability; strengths, weaknesses, opportunities and threats (SWOT) of fresh tomato marketing. Massaoud and Srinivass (2012) revealed that there is the tendency to increase producer's share in the consumer's price if the number of intermediaries is reduced and the government intervenes pro-actively in order to organize and structure the marketing cooperative unions so that the farmer can use these unions as a profitable channels to sell their produce. In this regards, the problem of irregular supply can be solved by forward contracts to be signed between producers and marketing body.

Marketing functions are specialized activities performed in accomplishing the marketing process. These functions are broadly classified as follows: physical functions, exchange functions, facilitating functions. The task of collecting, sorting, interpreting and disseminating among variety of data required for the smooth operation of the marketing process and for efficient functioning of marketing is referred to as market intelligence. Most decisions on pricing, channels, storage, and transportation depends on the accurate information available. Kluwana *et al.* (2011) reported that supply chain management requires integration of processes between supply chain members in all functional areas including sourcing, manufacturing and distribution. This barrier has been categorized into different levels: managerial, organizational, technological, individual, financial, social and cultural.

However, Yayock *et al.* (1998) classified the intermediaries associated with the marketing of farm produce into several categories viz; local and urban. The local traders live in the village takes their produce to the market and then sells collections in village markets, either through village retailers or directly to consumers while the urban traders on the other hand purchases farm produce in rural markets from retailers or directly from farmers, and transport the material to other markets or to urban centres for sale and his purchases are larger than the local trader. Retailers generally purchase produce from wholesalers and sells to the consumers who buy in small quantities at a time. The functions performed by retailers of farm produce include: reducing produce to small units where relatively low-income consumers can easily afford or buy, buying and displaying produce for sale at places that are convenient to consumers and sorting, processing and repackaging produce to suit consumers' needs. The wholesalers as individuals who rent stalls in urban markets and handle large quantities of farm produce performing marketing functions such as buying, storing and financing the exchange produce. Marketing through wholesalers, channels has important advantages. Firstly, wholesalers buy produce from farmers or local traders and sell to the retailers, to other wholesaler's domestic and foreign markets and to manufacturers and agricultural processors. Secondly, wholesalers often finance the movement of produce and invariably bear most of the marketing risks. In general, farmers who are able to sell their produce directly to wholesalers at the village markets has better chance of receiving higher prices than those who dispose of theirs through local traders to wholesalers. The transporter is another intermediary in the chain of middlemen who perform marketing functions. The transporter conveys farm produce from place to place by means of animal power and various types of motor vehicles.

Marketing costs are the actual expenses incurred in the process of marketing. Olukosi and Isitor (2004) revealed that the marketing costs are often measured in terms of middlemen which simply reflect the share of the consumers' income that is required to cover the costs incurred in the marketing process. The author observed that as more and more costly services are added, the farmer's share of expected returns will be reduced. However, the

author listed the marketing costs to include: cost of assembling, distribution cost, and cost of transportation, handling charges, marketing charges, cost of packaging, taxes and levies.

Marketing margin is the difference between the price paid by consumers and that received. Differences in price are usually made up of margins taken by the wholesalers and retailers in addition to transport and other charges. Marketing margins could be described as the price paid for the collection of marketing services rendered by marketing agencies in the process of marketing the farm products. Marketing margin is therefore the price for all utilities adding and functions performed by the marketing systems. The size of the marketing margin is sometimes influenced by the degree of processing of the commodity in question, its bulkiness and unit values as well as perishability. Adegeye and Dittoh (1985) added those marketing margins are mostly governed by the demand and supply of marketing services.

Olukosi and Isitor (2004) defined marketing channel as the path of a commodity from its raw form to the finished form. The sequence of intermediaries and market through which goods find their way from producers to the consumers is referred to as market channel. Tomatoes are transported from the farm to the nearest assembly market for the consumer or wholesalers who assemble them to a big city market and sell to other wholesaler, retailers or producers. Odukoya *et al.* (2007) revealed that Nigeria is blessed with enormous biodiversity resources. Variation in antioxidant activity of the vegetable may be due to the differences in the structures of phenolic compounds primarily related to their hydroxylation and methylation patterns and increased lag time of binding vegetable phenols with lipoproteins which subsequently protect them from oxidation. The human body cannot produce ascorbic acid, so it must be obtained entirely through one's diet. The amount of ascorbic acid leafy vegetables varies greatly due to weather, maturity stage and storage. Since vitamin C is easily oxidized, storage and the cooking in air leads to the eventual oxidation of vitamin C by oxygen in the atmosphere. These vegetables were obtained from the open market where they are directly exposed to the effects of sunlight and rain so the degree of freshness is relative which will eventually affect its marketing margin.

While the broad objective of the study was to analyze economics of fresh tomato marketers in Bauchi metropolis of Bauchi State, Nigeria. The specific objectives were to: determine the socio-economic characteristics of fresh tomato marketers; the Strength, Weakness, Opportunities and Threats (SWOT) of tomato marketers; assess costs and returns of tomato marketers in Bauchi metropolis; identify the major constraints that hindered the efficient market performance of fresh tomato marketers in the study area.

MATERIALS AND METHODS

The study area

The study was carried out in three markets within Bauchi metropolis namely: Muda Lawal, Wunti and Yelwa markets. Bauchi State which is situated in Northern Nigeria lies between latitude $10^{\circ} 20' N$ and $10^{\circ} 10' E$. with an altitude of 670.2m above sea level. However, Bauchi metropolis lies within the western part of Bauchi State and is bounded to the North by Darazo Local Government, the East by Alkaleri Local Government and the West by Toro Local Government area. The metropolis is a typically located Northern Guinea Savannah ecological zone of Nigeria. According to Bauchi State Agricultural Development Programme - BSADP (1996), the climate of Bauchi State is characterized by a well defined wet and dry seasons. The wet season lasts for about five months (May-September) and the dry season (October - April). The annual rainfall ranges from 1,000mm - 1,300mm. BASDP (1996) further revealed that the temperature is usually in the hottest month with maximum temperature of $40.56^{\circ} C$ while the coldest months are usually December and January with minimum temperatures of 6.11° and $22^{\circ} C$, respectively. Eman and Sherif (2009) confirm this where it was reported that temperature at North Egypt was raised with a value of $1.05^{\circ} C$ during summer in the last century while at South, a non-significant low warming trend was observed during the same period. The implication of temperature in the marketing of perishable crops like tomatoes cannot be overemphasized for policy making.

As described by BSADP (1994), the study area composed of open savannah woodland with trees up to six meters or higher. The vegetation under cultivation however has been reduced to acacia shrubs with grasses of about 3.5 m. BSADP (1996) explained that the topography is made up of dissected plain and pediments without cropping hills of intrusive rocks and granites. The soil consist of weakly developed and non-leached ferruginous soils of alluvial and colluvial origins. The soil is thus characterized by sandy-clay texture with low pH, low organic carbon, low nitrogen content, low available phosphorus and high cation exchange capacity (CEC).

The population of the State is predominantly rural and agricultural, about 80% of them is still depending on farming although at subsistence level due to lack of funds for financing agricultural activities. According to National Population Census (2006), the metropolis has a total population of 493, 810 people constituting 11% of the entire people of the States. And the major occupation of the metropolitan people is civil service and trading. Only few of the people are engaged in farming while many combine farming with civil service.

Sample Size and Sampling Technique:

A total of 50 tomato marketers were randomly selected from Muda Lawal, Wunti and Yelwa Tudu markets in proportion to the size of the markets participants, consequently, twenty (20), twenty (20) and ten (10) respondents were selected, respectively. Three markets were randomly selected using proportional sampling technique. Differences in population of tomato marketers and differences in level of the overall economic activities were considered. The data were collected using a semi-structured questionnaire.

Analytical technique

In this study, the socio-economic characteristics of the respondents were analyzed using descriptive statistics (mean, frequency, and percentages). The Gross Margin model was specified from the point of view of estimation of total expenses (costs) as well as various returns or revenue within a marketing period.

$$\text{Total Cost (TC)} = \text{TVC} + \text{TFC} \quad \dots(1)$$

where, TVC = Total variable cost; TFC = Total fixed cost.

$$\text{Total Revenue (TR)} = Q \cdot P_y \quad \dots(2)$$

where, Q = Quantities of tomatoes sold in a baskets; P_y = Unit price of tomatoes in baskets.

$$\text{Gross Margin (GM)} = \text{GI} - \text{TVC} \quad \dots(3)$$

where, GI = Gross income; TVC = Total variable cost.

$$\text{Net Income (NI)} = \text{GI} - \text{TC} \quad \dots(4)$$

To determine the profitability of tomato marketers, some ratios were calculated to show the overall performance of the business thus:

$$\text{Gross Ratio (GR)} = \text{TC} / \text{TR} \quad \dots(5)$$

where, TC = Total cost; TR = Total revenue.

$$\text{Operating Ratio (OR)} = \text{TVC} / \text{TR} \quad \dots(6)$$

where, TVC = Total variable cost; TR = Total returns.

$$\text{Fixed Ratio (FR)} = \text{TFC} / \text{TR} \quad \dots(7)$$

where, TFC = Total fixed cost; TR = Total revenue.

In order to determine the value or usefulness of assets in the study area, depreciation was specified (being the loss in value of the capital assets involved in the marketing system over time due to age, obsolescence, tears and wears).

$$\text{Depreciation (D)} = \text{OP} - \text{RP} \quad \dots(8)$$

where, OP = Original price of assets; RP = Re-sale price of assets.

RESULTS AND DISCUSSION

The socio-economic characteristics of the respondents are presented in Table 1. Accordingly, the table revealed that majority (40%) belongs to the active population group of 36-40 years. The findings signified that they are relatively young and active to engage in marketing. Only 12% of the respondents are less than 25 years old, while 18.00% fell between the age bracket of 40 and above. This also indicated that old people are more engaged in tomato marketing than middle aged in the study area. This finding is in agreement with Abbott (1987) revealing that as the economy of a nation grows, the gap between farmers and consumers widened and the task of marketing becomes more complex.

It was further revealed that majority (88%) of the respondents were men while only 12% were women. The very low percentage that accounted for women participation in tomato marketing has to do with religion and culture of the people in the study area, which emphasized more on domestic economic activities of women than outdoor home ventures. Another factor could likely be connected with the tedious nature of the business, in which most women are considered to be weak in handling it than their men counterpart. Most of the respondents were married with 98% while 2% were unmarried. This result indicated that family size of 6-10 and 1-5 accounted for 46% and 32%, respectively. While 14% and 8% accounted for family size of 11-15 and 16 and above, respectively. The result implies that only small to medium family size holders in the study area were engaged in the raw tomato business. The very low percentage of family size may perhaps be connected with few numbers of wives in the marriage institution even when predominated by Muslims faithful whose religion permit practicing of polygamy. Majority (76%) of the respondents had post primary education while minority (24%) had primary education. The results signifies that the sample size are fairly educated which is of significant importance in their marketing decision making process. This finding is in consonance with Aighemi and Lyonga (1989) that revealed that literate traders that have been found to adopt new marketing ideas more faster than illiterate's ones and would find it relatively easy in their dealings with people more especially in the exchange process. Majority (40%) had 6-10 years of experience while 30% had 1-5 years of experience. The results revealed that majority of the respondents in the study area were household (76%), followed by hotels (10%), industrial processors (8%) and caterers (6%). This implies that the high percentage of household consumers is likely connected with the affordability of the tomatoes being sold in bits and the nutritional status of tomato which contains vitamin "A" nutrient transformed into active healthy living individuals consumed as diet, provide taste and variety in prepared food. Retailers (60%)

and wholesalers (40%) were discovered as market intermediaries. The results of factors influencing prices of fresh tomatoes are presented in Table 2. The table shows that 62% accounted for colour of tomato, followed by size of tomato (28%) while 10% accounted for weight-juice potential. This results implies that higher percentages of colour and size of tomato which are the physical characteristics tends to gain most of the buyers attention due to its attraction, than its weight-juice potential which has to do with its internal characteristics that are not easily be seen.

Profitability analysis

The profitability of marketing of fresh tomatoes is indicated in Table 3. The table revealed variable cost (99.99%) and fixed cost (0.01%) of the total cost of marketing fresh tomatoes in the study area. The results further indicated that the cost of acquisition (87.46%), cost of empty basket (4.37%) and transportation cost (2.04%) were the major variable costs incurred in tomato marketing. Based on the computation per basket, the average basket of tomato was 50kg and average price per basket was ₦3,000, total cost of marketing was ₦68,670 while the total revenue of ₦80,000 was realized making a net income per ton of ₦11,330. In review of this costs and returns results, the raw tomato marketing in Bauchi metropolis was highly profitable since the gross ratio (0.86) was positive and less than one. This finding is in consonance with Sani and Haruna (2010) concluding that the cost and returns analysis of vegetable crop production was economically viable and sustainable based on the applied planning model implying that supply response was not a problem but rather value addition and marketing components of the produce which needed to be planned and sustained.

SWOT analysis of tomato marketers

Table 4 revealed the results of the Strengths, Weaknesses; Opportunities and Threats (SWOT) of the fresh tomato marketers in Bauchi metropolis of Bauchi State, Nigeria. The results on the strengths majority stating tax free (12.47%), weaknesses majority (10.72%), opportunities majority (11.72%) and 12.22% being the highest responses on the threats, that is, perishability of the raw tomato products faced by the sample size in the study area. These findings revealed that there are a lot of strengths of the marketers being noticed and other potential opportunities that are available but yet to be explored by the sample size in the study area.

Constraints faced by tomato marketers

Table 5 shows that 46% of the marketers were faced with the problem of high cost of purchasing from farm gate during lean season production, this could be as a result of the seasonality nature of the crop follow by lack of storage facilities that accounted for 30%, difficulty to purchase as a result of production fluctuation (10%) and other constraints (14%).

CONCLUSION AND RECOMMENDATIONS

Tomato marketing in the study area is profitable as revealed by the study. This is because it has generated ₦1.20k as returns per naira invested. This is an indication that the performance of tomato marketing based on profit is good and equally viable as indicated by the cost ratios that are less than 1. The profit of the fresh tomato marketing generally depends on how fast they were able to sell off the tomato due to the nature of its perishability. Based on the findings, it was recommended that fresh tomato marketers in the study area should be organized to act under an umbrella of a marketing union in order to enhance market performance; provision of processing plant in strategic locations by the governments or non-governmental organization will help to reduce marketing risk of tomato. The left over fresh tomatoes not sold could be forwarded for processing and finally, Bauchi State Government was advised and encouraged to provide infrastructural facilities especially electricity, which may help to extend the period of marketing of fresh tomatoes and improved method of storage by refrigeration. Also there is the need to restructure the layout of the markets to make it corporate and habitable especially during and after raining seasons.

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Table 1: Distribution of respondents according to socio-economic characteristics

Parameters	Frequency	Percentage
Age (Years):		
20-25	6	12.00
26-30	7	14.00
31-35	8	16.00
36-40	20	40.00
40 and above	9	18.00
Total	50	100.00
Sex:		
Male	44	88.00
Female	6	12.00
Total	50	100.00
Marital Status:		
Married	1	2.0
Unmarried	49	98.00
Total	50	100.00
Household Size:		
1-5	16	
6-10	23	32.00
11-15	7	46.00
16 and above	4	14.00
Total	50	8.00
		100.00
Education:		
Primary		
Post Primary	12	24.00
Total	38	76.00
	50	100.00
Marketing Experience:		
1-5	15	30
6-10	20	40
11-15	6	12
16 and above	9	18
Total	50	100
Selling Points:		
Household	38	76
Hotels	5	10
Industrial Processors	4	8
Caterers	3	6
Total	50	100
Intermediaries:		
Wholesale	20	40
Retail	30	60
Total	50	100

Source: Field Survey, (2010)

Table 2: Distribution of fresh tomato marketers according to factors influencing price

Factors	Frequency	Percentage
Colour	31	62
Size	14	28
Weight-juice potential	5	10
Total	50	100

Source: Field Survey, (2010)

Table 3: Costs and returns analysis of fresh tomato marketing in Naira per basket

Cost items	Returns (₦/tone)
Variable Cost	
Acquisition cost	60,000 (87.46)
Transportation cost	1,400 (2.04)
Cost of empty basket	3,000 (4.37)
Cost of loading and off-loading	1,000 (1.46)
Taxes	1,600 (2.33)
Labour	1,000 (1.46)
Cost of water	600 (0.87)
Total Variable Cost (TVC):	68,600 (99.99)
Fixed Cost (FC)	
Depreciation of Rent	70 (0.01)
Total Fixed Cost (TFC):	70
Total Cost: (Naira):	68,670
Returns	
Gross income (Q x P.y)	80,000
Net income (GI – TC)	11,330
Return/Naira invested (GI/TC)	1.2
Ratio	
Operating ratio (TVC/GI)	0.86
Fixed ratio (TFC/GI)	0.02
Gross ratio (TC/GI)	0.86
Total ratio:	1.74

Note: Figures in parenthesis shows the percentage of the total.

Source: field survey, (2010)

Table 4: Distribution Of respondents according to strengths, weaknesses, opportunities and threats (SWOT)

Variables	Frequency*	Percentage
Strengths:		
Tax free.	50	12.47
Isolated market location.	36	8.98
Level of literacy.	31	7.73
Weaknesses:		
Poor preservation method.	38	9.48
Inadequate power supply.	29	7.23
Absence of processing industries.	21	5.24
Inadequate supply of tomatoes.	43	10.72
Opportunities:		
Standard of measurement.	12	2.99
Financial assistance from government.	47	11.72
Threats:		
Perishability of the product.	49	12.22
Price fluctuation.	22	5.49
Lack of storage facilities.	13	3.24
High cost of transportation.	10	2.49
Total:	401	

Source: Field Survey, (2010). *Multiple responses.

Table 5: Distribution of respondents according to constraints

Constraints	Frequency	Percentage
Difficult to purchase during a season	5	10
Storage problem due to change in season	15	30
High cost of purchase during lean season	23	46
All of the above	7	14
Total	50	100

Source: Field Survey, (2010)