PROFITABILITY ANALYSIS OF MARKETING TOMATO IN ODEDA LOCAL GOVERNMENT AREA OF OGUN STATE, NIGERIA

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ABSTRACT

This study assessed profitability of tomato marketing in Odeda Local Government Area, Ogun State. Primary data collected from 80 marketers from Olodo and Kila markets through a two-stage sampling technique were analyzed using descriptive statistics, budgetary techniques, student-t statistic and OLS regression model. Results showed that marketers in both markets were all females with an average age of 35 and 33 years in Olodo and Kila, respectively; About 45% and 38.% of the marketers in Olodo and Kila markets were married with an average household size of 5 (42.5%) and 4 (30%) persons, respectively. However, 35% each had 11 – 15 years marketing experience in both markets. Budgetary analysis showed that Olodo and Kila marketers had an average net profit of ₦16,300 and ₦11,550/basket/month with rate of return on investment of 0.35 and 0.21, respectively. The major constraints associated with tomato marketing were high cost of purchasing tomato (32.5% in Olodo and 25.0% in Kila), inadequate preservation (17.5% in Olodo and 15.0% in Kila), and high transportation cost (15.0% in Olodo and 20.0% in Kila). Regression analysis showed that transportation cost ($p < 0.05$), household size ($p < 0.01$) and income ($p < 0.1$) were the determinants of tomato marketing margin in both markets. T-test showed that there was a significant difference ($p < 0.05$) between the net profit of marketers in both markets. Tomato marketing was a profitable enterprise in the study area. It was recommended that identified constraints be addressed to enhance greater tomato marketing profit in the study area.

Keywords: Tomato, marketers, marketing efficiency, profitability, constraints

INTRODUCTION

Agricultural marketing is one of the important branches of marketing that deals with the exchange of agricultural goods. Conventional definition of agricultural marketing states that agricultural marketing starts when the crop is harvested. But the concept has been changed, as it is a process, which starts with the farmer's decision to produce saleable farm commodities involving all aspects of marketing structure or system both financial and institutional with economic considerations including products assembly, preparation for the market, distribution and use by the final consumer (Kaini and Werner, 1998). It comprises of all the activities from production to consumption such as harvesting, grading, packaging, storing, price fixation, selling and buying. Agricultural marketing deals with all the

activities, agencies and policies involved in the procurement of farm inputs by the farmers and movement of agricultural products from the farm to the consumers (Kiruthiga et al., 2015).

Inter-community marketing activities are common pre-occupation among marketers in Nigeria even on the entire African continent. The marketers, who trade in agricultural and non-agricultural commodities, operate both within and across wide geographical areas. Marketers in cross-community and/or inter-state trade, most times transport their commodities to nearby and distant locations for sale on market days. Also, they frequently purchase other commodities – mostly agricultural produce, which are usually sold on return to the home-community or home-state. Men, women and children of diverse tribes and ethnic lineages commonly operate in these markets.

In Nigeria, local markets are either periodic or non-periodic in nature. Periodic markets can also be called Food Hubs; these are markets that hold at regular intervals, for instance every four days (5-day markets) or eight days (9-day markets). In these markets, middlemen and small farm producers, among other stakeholders, have ample opportunity of coming together to execute market-related and social transactions (Yusuf, 2012). Three notable local boundary markets in Ogun State are: the *Mamu* market, which is patronized by people (i.e. natives and non-natives) from *Ibadan* and *Ijebu* axis; the *Kila (Ilugun)* and *Olodo* markets, which are patronized by marketers from *Ibadan* and *Abeokuta* axis; and *Mowe* and *Ibafo* markets, which are patronized by the people from *Lagos* and *Abeokuta* axis. Foodstuff(s) traded in these markets include gari, groundnut oil, palm oil, pepper, tomatoes, rice, beans, plantain, banana, yam, yam flour, cassava, cassava flour, cocoyam, potatoes, maize, vegetables and fruits. All these markets operate in a periodic manner (OGADEP, 2010).

Tomato (*Lycopersicon esculuntum* Mill) is one of the most important vegetables which supplies vitamins, minerals and fibres to its consumers and is of high nutritional values. It is widely accepted and commonly used in a variety of dishes as raw, cooked or processed products more than any other vegetable (Adugna, 2009). Tomato fruit provides 3 - 4% total sugar, 15 - 30mg/100g ascorbic acid; 7.5 - 10 mg/100ml titratable acidity and 20 - 50mg/100g fruit weight of lycopene - anti-oxidants for cancer prevention especially those of the prostate gland, lungs and stomach. However, unlike cereals, the marketing of horticultural crops, in general; and vegetables and fruits in particular, is more complex and risky because of the special characteristics such as highly perishable nature, seasonality and bulkiness; thus, needs special care. As a result, the supply of vegetables is subjected to various problems including wide fluctuation in prices. Tomato is cultivated almost throughout Nigeria (Adenegan and Adeoye, 2011); cultivation on a large area can generate employment both at the urban and rural levels. In actual fact, in 2013, Nigeria is ranked as the second largest tomato producer in Africa and thirteenth in the world with an estimated total annual production of 1.7 million tonnes cultivated on 1 million hectares of land and an average yield of 20 - 30 tons/hectare (YISA, 2013). Yet,

Nigeria is the largest importer of tomato paste from China and Italy (YISA, 2013).

Despite the fact that tomato production is a viable option to increase farm income and hence alleviate widespread poverty, considerable attention has not been given to its marketing aspects; because of the imbalance in distribution system and lack of organized marketing system, there is always a market glut of tomato in main production season and scarcity of the commodity in other seasons (Adenegan and Adeoye, 2011).

However, there is wastage of tomato annually as tomatoes harvested in the country are lost due to poor food supply chain management; price instability resulting from seasonal fluctuation in production and the supply preference of farmers and middlemen for urban markets than direct users due to low farm gate prices. Moreover, there is a gap deficit between demand and supply in the country (Ugonna et al., 2015). These factors and others can reduce profit accruable to marketers in the study area. Hence, the study will answer the following research questions: what are the socio-economic characteristics of tomato marketers in the study area; identify the constraints to tomato marketing in periodic markets in the study area; what the cost and return to tomato marketing in periodic markets in the study area is and what factors influence marketing margin of tomato in the study area?

Therefore, this study determined the profitability and factors affecting tomato marketing in Odeda Local Government area, Ogun State, Nigeria. This will bridge the gap in knowledge on marketing of tomato; provide useful information that could be used to formulate marketing development programs; and improve organization of periodic markets. The objectives were to describe the socio-economic characteristics of tomato marketers in the study area; identify the constraints to tomato marketing in periodic markets in the study area; evaluate the cost and return in tomato marketing in periodic markets in the study area; and determine the factors affecting the marketing margin of tomato in periodic markets in the study area.

Hypothesis

(1) H_o: There is no significant difference in the socio-economic characteristics of Olodo and Kila tomato marketers

(2) H_o: There is no significant difference between the net profit of Olodo and Kila tomato marketers.

MATERIALS AND METHODS

Description of the Study Area

This study was carried out in Odeda Local Government Area (LGA) of Ogun State in the western part of Nigeria. Odeda is one of the twenty LGAs in Ogun State. Its headquarter is at Odeda town located along Abeokuta-Ibadan high way; about 20 kilometres from the State capital (Abeokuta). The LGA lies within latitude $7^o13"$ North and longitude of $3^o31"$ East with a land mass of 1,560km^2 (or land area of 126,341ha) and a population of 109,449 people (NBS, 2009). It shares boundary with Ido LGA of Oyo State and Abeokuta-South LGA in Ogun State and has an average temperature of 30^0C but humidity could be as high as 95% and the raining season is from April to October while the dry season is between November and March (OGADEP, 2010).

The dominant tribal group in the area is the Yoruba with some Hausas and Igbo traders. In the LGA, there are 25 semi-urban settlements, 860 villages and hamlets with a notable local boun 93 market - Kila (Ilugun) and Olodo market which is being patronized by marketers from Ibadan and Abeokuta axis (OGADEP, 2010). Some of the foodstuff(s) traded in these markets include gari, yam, cocoyam, sweet potato, maize, cassava, vegetables, pepper, tomatoes and cowpea and the major livestock include goats, pigs, poultry, sheep and cattle (OGADEP, 2010).

Table 1: Distribution of tomato marketers by socio-economic characteristics

	OLODO			KILA		
Characteristics	**Frequency**	**Percentage**	**Mean**	**Frequency**	**Percentage**	**Mean**
Age (years)						
21 – 30	9	22.5		15	37.5	
31 – 40	17	42.5		16	40.0	
41 – 50	7	17.5		3	7.5	
51 – 60	4	10		3	7.5	
≥ 61	3	7.5		3	7.5	
Total	***40***	***100.0***	***35***	***40***	***100.0***	***33***
Gender						
Male	0	0		0	0	
Female	40	100.0		40	100.0	
Total	***40***	***100.0***		***40***	***100.0***	
Marital Status						
Single	12	30.0		14	35.0	
Married	18	45.0		15	37.5	
Divorced	5	12.5		7	17.5	
Widowed	5	12.5		4	10.0	
Total	***40***	***100.0***		***40***	***100.0***	
Household Size (No)						
1 - 3 persons	9	22.5		17	42.5	
4 - 6 persons	17	42.5		12	30.0	
7 - 9 persons	8	20.0		6	15.0	
≥ 10	6	15.0		5	12.5	
Total	***40***	***100.0***	***5***	***40***	***100.0***	***4***
Level of Education						
No Formal	20	50.0		23	57.5	
Primary	11	27.5		8	20.0	
Secondary	9	22.5		9	22.5	
Total	***40***	***100.0***		***40***	***100.0***	
Tomato Marketing Experience (Years)						
1 – 5	8	20.0		13	32.5	
6 – 10	13	32.5		10	25.0	
11 – 15	14	35.0		14	35.0	
≥16	5	12.5		3	7.5	
Total	***40***	***100.0***	***13***	***40***	***100.0***	***10***
Income ₦						
≤5,000	9	22.5		11	27.5	
5,001 - 7,000	11	27.5		7	17.5	
7,001 - 9,000	10	25.0		9	22.5	
9,001 - 11,000	4	10.0		8	20.0	
≥11,001	6	15.0		5	12.5	
Total	***40***	***100.0***	***6,000***	***40***	***100.0***	***5,500***

Source: Field Survey, 2014

Table 2: Distribution of tomato marketers by constraints associated with tomato marketing in Olodo and Kila markets

	OLODO		KILA	
Constraints	**Frequency**	**Percentage**	**Frequency**	**Percentage**
High transportation cost	6	15.0	8	20.0
Inadequate preservation	7	17.5	6	15.0
High marketing cost	6	15.0	5	12.5
High storage cost	4	10.0	5	12.5
High market levy	4	10.0	4	10.0
Shortage of Labour	0	0.0	2	5.0
High tomato purchasing cost	13	32.5	10	25.0
Total	**40**	**100.0**	**40**	**100.0**

Source: Field Survey, 2014

Table 3: Costs and Returns per basket per month on Tomato Marketing in Olodo and Kila Markets

	OLODO		***KILA***	
Items	***Amount (₦)***	***Percentage***	***Amount (₦)***	***Percentage***
Revenue	***62,650***		***66,200***	
Inputs (Marketing operations)				
Cost of storage	3,500	8.4	3,650	7.2
Market levy	1,000	2.4	1,250	2.5
Local government levy	1,500	3.6	1,500	3.0
Cost of transportation	4,350	10.4	5,000	9.9
Cost of loading and offloading	3,000	7.2	7,650	15.1
Cost of purchasing tomato	15,000	35.8	16,500	32.6
Cost of baskets	5,000	11.9	6,000	11.9
Others	8,500	20.3	9,000	17.8
Total Variable Cost	***41,850***	***100.0***	***50,550***	***100.0***
Total Fixed Cost	***4,500***	***-***	***4,100***	***-***
Total Cost	***46,350***	***-***	***54,650***	***-***
Gross Margin	***20,800***	***-***	***15,650***	***-***
Net Margin	***16,300***	***-***	***11,550***	***-***
Rate of Return on Investment	***0.352***	***-***	***0.211***	***-***

Source: Field Survey, 2014

Sources and Methods of Data Collection

Primary data were obtained through a pre-tested questionnaire and oral interview eliciting information on some socio-economic characteristics of the tomato marketers, factors affecting marketing margin of tomato marketers; and the problems confronting marketability of tomato in the study area.

Sampling Technique

A two-stage sampling technique was used to select eighty (80) tomato marketers in the study area. The first stage involved purposive selection of a boundary market (Olodo and Kila markets) from all periodic markets in Ogun State and the second stage involved a simple random sampling technique of 40 tomato marketers which were selected from the list obtained from tomato marketers' associations in the

selected markets. The survey was conducted using a pre-tested well-structured questionnaire.

Analytical Techniques

The following analytical tools were employed in the analysis.

(i) Descriptive Statistics: the use of frequency distributions and percentages were adopted to describe the socio-economic characteristics of the marketers and to identify the constraints to tomato marketing in selected in the study area.

(ii) 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).

$GM = TR - TVC$ ……. (i)

where:
GM = Gross Margin (₦)
TR = Total Revenue (₦)
TVC = Total Variable Cost (₦)

$TVC = X_1 + X_2 + X_3 + X_4 + X_5 + X_6 + X_7 + X_8$ …… (ii)

X_1 = Cost of storage (₦)
X_2 = Market levy (₦)
X_3 = Local government levy (₦)
X_4 = Cost of transportation (₦)
X_5 = Cost of loading and offloading (₦)
X_6 = Cost of purchasing tomato (₦)
X_7 = Cost of baskets (₦)
X_8 = other variable costs (₦)

$\pi = TR - TC$……...(iii)

OR

$\pi = GM - TFC$ …….. (iv)

where:
π = Net Margin = Profit (₦)
GM = as defined previously
TR = as previously defined
TC = Total Cost (₦)

$TC = TFC + TVC$ ……. (v)

TFC = Total Fixed Cost (₦)

$RRI = \frac{\pi}{TC}$ ……...…… (vi)

where:
RRI = Rate of Return on Investment
π = as defined previously
TC = as previously defined

Hypothesis Testing

A student-t test was conducted using the formula below:

$$t = \frac{X_i - X_j}{\sqrt{\frac{S_i}{n_i} + \frac{S_j}{n_j}}}$$ ……..... (vii)

where:
X_i = Mean net profit for Olodo tomato marketers,
X_j = Mean net profit for Kila tomato marketers,
S_i = Sample variance for Olodo tomato marketers
S_j = Sample variance for Kila tomato marketers
n_i = Number of Olodo tomato marketers
n_j = Number of Kila tomato marketers

(iii) **Marketing Margin:** Marketing margin is the difference between purchase and resale price of a commodity.

$MM = \frac{SP - CP}{SP} \times 100$…… (viii)

where:
MM = marketing margin (₦)
SP = selling price (₦)
CP = cost price (₦)

(iv) **Regression Analysis:** this was used to determine the factors influencing Marketing Margin and this was accomplished with the use of Ordinary Least Square (OLS) regression technique.

The implicit form of the regression model is:

$Y = f(X_1, X_2, X_3, X_4, X_5, \mu)$ …… (ix)

where:
Y = Marketing margin (₦)
X_1 = Transportation cost (₦)
X_2 = Household size (number of people)
X_3 = Education levels of marketers (years)
X_4 = Marketing experience of tomato marketers (years)
X_5 = Household income of tomato marketers (₦)
X_6 = Constraint of tomato marketing (1 if there is constraint, zero otherwise)
μ = Error term (which is assumed to have zero mean and constant variable)

Three functional forms were estimated to obtain the lead equation and the explicit forms of the regression model are as specified below:

Linear function

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + \mu \quad \text{(x)}$$

Semi-log function

$$Y = a + b_1\log x_1 + b_2\log x_2 + b_3\log x_3 + b_4\log x_4 + b_5\log x_5 + \mu \quad \text{(xi)}$$

Double log function

$$\log Y = a + b_1\log x_1 + b_2\log x_2 + b_3\log x_3 + b_4\log x_4 + b_5\log x_5 + \mu \quad \text{(xii)}$$

where:
a = Constant
b_1, b_2, b_3, b_4, b_5 = Regression Coefficients
X_1,.....X_5 = as previously defined
μ = Error term

RESULTS AND DISCUSSION

Socio-economic Characteristics of Tomato Marketers

Table 1 shows the distribution of tomato marketers by socio-economic characteristics in the study area. About 42.5% and 40.0% were within the age group of 31 - 40 years with mean age of 35 and 33 years in Olodo and Kila markets respectively which falls within the economically active working age group. This implies that most of the sampled tomato marketers were relatively young. Besides, in both markets, all the respondents were female; this could be attributed to gender role in the society. Women are mostly involved in marketing of agricultural produce in Southwest Nigeria while men are the major producers. About 45.0% and 37.5% of the marketers in Olodo and Kila markets were married with an average household size of 5 (42.5%) and 4 (30%) persons in Olodo and Kila markets respectively. This implies that more family labour will be employed in tomato marketing enterprise.

Furthermore, 50.0% and 57.5% of the marketers in Olodo and Kila respectively were not formally educated. Lack of formal/low level of education could have necessitated the involvement of the respondents in tomato marketing due to the perceptional attitude of low capital investment in agricultural produce marketing by many people. However, 35% each had 11 – 15 years marketing experience in both markets and this could be an indication that the marketers possess substantial wealth of experience which could influence profitability in the study area. Some (27.5%) of the marketers earned between ₦5000.00 - ₦7000.00 income per week in Olodo market while 27.5% earned below ₦5000.00 income per week in Kila market.

Description of Tomato Marketers according to Constraints Associated with Tomato Marketing in Olodo and Kila Markets

Table 2 shows that 32.5% of the marketers were faced with the problem of high

purchasing price of tomato from the wholesalers in Olodo market; this problem could have a ripple effect on the consumers since the retailers will want to make profit on investment, thereby increasing the price of tomato at the consumer level. Also in Kila market, 25% of the marketers were faced with problem of high cost of purchasing produce from wholesalers during lean production season; this could be as a result of the seasonal nature of the crop. Furthermore, inadequate preservation accounted for 17.5% of the problems faced by tomato marketers in Olodo market while 15.0% were having the same problem in Kila market. High market levy from both local government authority and market leaders accounted for 10.0% each of the constraints faced by marketers in Olodo and Kila markets.

The Costs and Returns Structure of Tomato Marketing in Olodo and Kila Markets

The gross margin analysis was used to determine the net profit of tomato marketers in Olodo and Kila markets. The breakdown of the costs and returns are as shown in Table 3. For Kila marketers, the cost of purchase of tomato from wholesalers amounted to 32.6% of the total variable cost which was lower compared to that of the tomato marketers in Olodo market (35.8% of the total variable cost). The Total Fixed Cost was depreciated using the straight line method. Olodo tomato marketers incurred a total variable cost of ₦41,850; a total fixed cost of ₦4,500 and earned a total revenue of ₦62,650 per basket per month. A total variable cost of ₦50,550 was incurred by Kila tomato marketers with a total fixed cost of ₦4,100 and a earned total revenue amounting to ₦66,200. Olodo tomato marketers had an average net profit of ₦16,300/basket/month while it was ₦11,550/basket/month for Kila. The rate of return on investment was 0.35 for the Olodo tomato marketers and 0.21 for the Kila tomato marketers; which means that one naira invested marketing tomato in Olodo and Kila yielded a 35 kobo and 21 kobo returns, respectively.

Table 4: Difference between Mean Net Profit/Basket/Month of Olodo and Kila Tomato Marketers

Categories	Mean	Standard Error	N	t-Statistic	P-Value
Olodo	1.511795	0.131788	40	17.836**	0.05
Kila	1.027115	0.011321	40		

**Significant at 5%

Source: Field Survey, 2014

Table 5: Result of estimation of functional forms

Model	Significant Variables	R^2	Adjusted R^2	F- Statistic
	OLODO			
Linear	3	0.547	0.7659	48.37
Semi-Log	2	0.246	0.3629	26.98
Double log	1	0.136	0.2729	25.07
	KILA			
Linear	4	0.3480	0.5459	63.87
Semi-Log	1	0.1960	0.3509	24.10
Double log	1	0.1145	0.1739	21.64

Significant at 1%, **significant at 5%, *significant at 10% ***Source: Field Survey, 2014

Net Profit/Basket/Month of Tomato Marketers in Olodo and Kila Markets

Table 4 showed the result of the t-test of difference between mean net profit of tomato marketers in Olodo and Kila markets (₦16,300.00 and ₦11,550.00), respectively. The t-test showed that there is a significant difference ($p < 0.05$) between the net profit of tomato marketers in Olodo and Kila markets.

Factors Influencing Marketing Margin of Tomato

This was determined using the ordinary least square regression analysis. Three functional forms (linear, semi-log, double-log functions) were used to estimate the factors affecting marketing margin of tomato marketers in the study area. The linear regression was chosen as the lead equation using statistical, mathematical, economics and econometrics criteria (Table 5).

Factors Affecting Tomato Marketing Margin in Olodo and Kila Markets

In Olodo market, transportation cost had a negative influence ($p < 0.05$) on tomato marketing margin (Table 6) and this implies that as the transportation cost increases by ₦1, the marketing margin reduced by ₦0.83 unit. Also, household size had a negative effect on tomato marketing margin ($p < 0.01$) which implies that as the household size increases by 1 person, the marketing margin reduced by ₦0.002. However, household income was a positive determinant ($p < 0.10$) of marketing margin in the market which implies that as income increases by ₦1, marketing margin increased by ₦0.0004.

In Kila market, transportation cost had a negative effect ($p < 0.05$) on tomato marketing margin (Table 6) which implies that as the transportation cost increases by ₦1, marketing margin decreased by ₦0.46. Similarly, Table 6 showed that household size had a negative influence on the marketing margin ($p < 0.01$) which implies that as the household size increases by 1 person, the marketing margin decreased by ₦0.003. Furthermore, marketing experience had a positive effect ($p < 0.10$) on tomato marketing margin (Table 6) which implies that a year increase in marketing experience, marketing margin increased by ₦0.01. Equally, household income had a positive influence ($p < 0.10$) on tomato marketing margin (Table 6) implying that as income increases by ₦1, marketing margin increased by ₦0.0004.

Table 6: Determinants of tomato marketing margin in Olodo and Kila markets

Variables	OLODO		KILA	
	Coefficients	t-value	Coefficients	t-value
Constant	-1.0701	-1.2526	2.0502	1.2676
Transportation cost	-0.0950**	-2.3300	-0.0480**	-2.3600
Household size	-0.2130***	-4.5297	-0.4523***	-3.4247
Education level	0.1796	0.7242	0.1675	0.6241
Marketing experience	-0.0032	-0.1634	0.5643**	2.7865
Income	0.000032*	1.9036	0.000036*	1.8936
R^2	0.5659	-	0.5480	-
Adjusted R^2	0.5470	-	0.5459	-
F-statistic	48.37	-	63.87	-

*** Significant at 1%, ** Significant at 5%, * Significant at 10%

Source: Field Survey, 2014

CONCLUSION AND RECOMMENDATION

Tomato marketing in both markets was found profitable with Olodo marketers having more profit than Kila marketers. More so, the rate of return on investment (0.35) for Olodo tomato marketers was higher than that (0.21) of Kila tomato marketers. The study recommends that tomato marketers should strengthen themselves by forming cooperative groups whereby tomato could be purchased in bulk on behalf of members at a reduced purchase cost. In addition, stakeholders should improve the transportation system in order to reduce transportation cost and deterioration during transportation.

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