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Determinants Of Performance Among Smallholder Tomato Farmers And Tomato Traders In Kilolo District, Tanzania

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Abstract

This study was conducted to determine the performance among smallholder tomato farmers and tomato traders in Kilolo District Tanzania. The study employed a cross sectional research design. It covered a sample of 242 respondents. This included 133 smallholder tomato farmers and 109 tomato traders. A simple random sampling technique was used to select smallholder tomato farmers from three major tomato growing villages. Snow ball sampling techniques was employed to select tomato traders from two major markets in Kilolo District. Data were collected using semi-structured questionnaire. Quantitative data were analysed using means, frequencies, percentages, one way analysis of variance and independent samples-t test. Results indicated that there were significant differences in sales volume and gross margins among smallholder tomato farmers and tomato traders. The differences were due to post harvest losses and price fluctuations. Interventions should focus on improving harvesting, preservation, packaging and transportation practices.

Key words: Gross margin, sales volume, smallholder tomato farmers, tomato traders postharvest loss, Kilolo, Tanzania

1.0 Introduction

Tomatoes are one of the most widely cultivated crops in Tanzania. Iringa region is one of the largest producers of tomatoes in Tanzania. Tomatoes are cultivated mostly in Kilolo and Iringa Rural District (URT, 2012). Production of tomatoes has gained its credibility for providing sustainable income, nutritional security and for providing employment opportunities (URT, 2012, Anang, et al, 2013). Despite all potentials, smallholder tomato farmers still receive low income from tomato produce due to high transaction costs. Tomato producers face a number of transaction costs when producing and marketing of tomatoes. Transaction costs emanate from asymmetric market information, high transportation costs and imperfections in markets for credit.

In addition, tomato farmers suffer due to inadequate infrastructure especially storage facilities, absence of demand forecasting and inadequate value-addition (Weinberger and Lumpkin 2007). Smallholder farmers also lack information on scientific cultivation practices, market prices, consumer preferences and market linkages. Consequently, smallholder tomato farmers operate under high transaction costs that prevent them from taking advantage of the market opportunities and thus poor performance in terms of sales and gross margin. Despite measures taken by the government to raise income of the rural smallholder farmers through various policies example "KILIMO KWANZA", still smallholder farmers perform poorly.

This study contributes to the literature by providing evidence of the determinants of performance among smallholder tomato farmers and tomato traders in Kilolo District, Tanzania. This paper hypothesizes that there is significant variation in performance among smallholder tomato farmers and tomato traders. The performance indicators used in this study included sales volume and gross margin.

2. Methodology

This study employed a cross – sectional research design while employing quantitative methods. Bryman, (2012) articulate that cross sectional design is used so as to obtain an overall picture of what is happening in a group at a particular point in time. This study was conducted in three villages namely Madizini, Masukanzi in Ilula ward and Lugalo in Lugalo ward in Kilolo District in Iringa region. Kilolo district was selected because it was the leading producer of tomatoes in Iringa Region (NBS, 2012). Many people in this area are smallholder farmers producing tomatoes for sale. This serves as a form of income generation source for many people in this area.

A multistage sampling technique was used to select sample areas. At the first stage Kilolo district was purposely selected. The second stage involved selection of one division out of three divisions in Kilolo District. At this stage Mazombe division was purposively selected. The third stage involved selection of three villages namely Masukanzi and Madizini in Ilula ward and Lugalo village in Lugalo ward from Mazombe division. A random sampling technique was employed to select the three villages. At village level a simple random sampling techniques was used to select a sample of households producing tomatoes from the sampling frame. The total sample size comprised of 133 smallholder tomato farmers.

Two wholesale markets namely Tanzania Social Action Fund market located in Ilula ward and Mlamke market located in Lugalo ward were purposely selected out of three markets in the division. These markets are the two main tomato collection points in Mazombe Division where farmers/assemblers bulk tomatoes waiting for traders from urban areas especially Dar es Salaam. Snowball sampling was used to identify traders

for interview who came to the two major markets to purchase tomatoes. The total sample size comprised of 109 traders.

Both primary and secondary data were collected from the respondents. Data from the sample farmers and traders were collected using semi structured questionnaire. The questionnaire was administered to tomato farmers and tomato traders through face-to-face interviews. The type of primary data collected included quantity of tomatoes, harvested, quantity of tomatoes bought and sold, buying price, selling price, transportation costs, market charges, loading and unloading costs, transport costs and costs incurred in purchasing production inputs such as seeds, fertilizer and pesticides. Secondary data on the economy of Iringa region, tomato production in the region, previous studies on transaction costs facing smallholder farmers was collected from Kilolo District Agricultural office. Also, journal, research reports and websites were consulted to generate relevant secondary data. Data collected was analyzed using means, percentages, one way analysis of variance (ANOVA) and the Independent samples t-tests.

Two types of performance indicators namely sales volume and gross margin per *tenga* of tomatoes were used as indicators in the analysis of performance among smallholder tomato farmers and tomato traders. In most cases smallholder farmers and traders use a *tenga in Kiswahili* for selling tomatoes (1 *tenga*=20kg). Sales volume as indicator of performance was measured in *tengas* of tomatoes sold per farmer. Gross margin per *tenga* was used as a proxy for profitability. Gross margin is essentially the difference between the gross revenue and the variable costs and are reported in Tanzania shillings (Tshs) per *tenga* of tomatoes sold. (I USD=Tshs 1600-2000 for the year 2010).

The basic equation for GM and GMPT computation is presented as follows:
GM = GR – TVC, Where GM = Gross Margin; GR = Gross revenue; TVC = Total variable costs ; GMPT = GM/QS; GMPT= Gross margin per *tenga* of tomatoes sold (Tsh per tenga); QS= Quantity sold

Gross revenue was calculated using the prevailing market price of the tomato for the April-June 2010 tomato growing season along with the quantity of tomato sold as reported by the respondents. Gross margin does not take into account overheads, capital investment, or cost of borrowed capital. Such approach is adopted because small scale farmers do not often incur much of these costs and partly because such information is often difficult to obtain. Thus data provided should not be misinterpreted as net profits.

Total variable costs for the farmers were mainly costs of inputs spent on production of tomatoes (seeds, fertilizer and fungicides) and hired labour. The average labour costs

were costs incurred for example on land preparation, cultivation, sowing, weeding and harvesting. Total variables costs for the traders were mainly costs incurred in loading, unloading, market charges, purchase of packaging materials (*tenga*) and transport costs and were obtained by multiplying quantity of produce bought and sold by their corresponding unit variable costs.

3.0 Results and discussions

3.1 Tomato production and marketing

Production and marketing of tomatoes involved two main actors; smallholder tomato farmers and tomato traders. The main actors at the production node were the small holder tomato farmers who were found to cultivate an average of 0.30 acres. Successful production of tomatoes required purchased inputs such as seeds, fertilizer, pesticides and hired labour. On average a farmer incurred a total of Tshs 133,260 as variable costs for seeds, fertilizers, pesticides and hired labour.

Approximately 58% of the sampled farmers sold their tomatoes through assemblers at farm gate because farmers wanted to save transport costs, loading and unloading costs. Assemblers played a very crucial role in the fresh tomato supply chain since they had several close links with many local smallholder producers and wholesalers who come from different parts of the country to purchase tomatoes (Mwagike and Mdoe, 2015). The study found that on average farmers sold about 65 *tengas* out of 88 *tengas* harvested. This indicates that losses were about 23 *tengas* (26%) of the tomatoes harvested. Average selling price was Tshs 7 515 per *tenga* of tomatoes. This finding concurs with the finding by Suryavanshi *et al.* (2006) and Adimabuno (2010) who found that most smallholder tomato farmers sold their produce through assemblers because farmers wanted to save transport cost and to reduce post harvest losses. Approximately 18% of the sampled farmers sold their fresh tomatoes to wholesalers. Approximately 24% of the smallholder tomato farmers reported to sell their tomatoes through processors, retailers and directly to consumers. The findings suggest that 76% of the sampled farmers sold their produce to different categories of middlemen. This finding concur with the finding by Mwagike and Mdoe (2015) who found that middlemen played a very crucial role in linking smallholder tomato farmers with Dar-es-salaam markets.

On average tomato traders bought 1,038 tengas at Tshs 9541.On the other hand tomato traders sold 1002 tenga at Tshs 22,905. Traders sold their tomatoes to other wholesalers, retailers or directly to consumers. This indicates that losses were about 36 tengas (4%) of the tomatoes bought. Volume of fresh tomatoes sold by each smallholder tomato farmers and tomato traders and gross margin per *tenga* obtained by smallholder tomato farmers and tomato traders were used as indicators of performance. Independent samples-t-test was conducted to compare sales volume by farmers and traders. As shown in Table 1, the average sales volume for traders in April-June 2010 tomato growing season was significantly ($P<0.01$) higher than that of smallholder farmers.

Table 1: Comparison of volume of tomatoes sold by farmers and traders in April-June 2010 tomato growing season

Actor category	Volume of tomatoes in tengas		
	N	**Mean**	**SD**
Farmers	133	65.20	13.82
Traders	109	1002	1483.13
Farmers Vs traders= - t=7.294***, ***Significant at P<0.01			

Table 2 summarizes the gross margin obtained by farmers in the three sample villages in April-June 2010 tomato growing season. ANOVA results in Table 2 show that there was no significant difference in GM for the farmer categories.

Table 2: Gross margin for farmers across villages in April-June 2010 tomato growing season in Tshs

Item	Madizini (n=44)	Masukanzi (n=44)	Lugalo (n=45)	Whole sample (n=133)
Total variable costs in Tshs	125 860	130 520	143 180	133 260
Quantity sold in tengas	61.38	62.20	71.86	65.20
Selling price per tenga	7 352	7 295	7 888	7 515
Gross revenue in Tshs	452 270	454 800	566 370	491 710
Gross margin in Tshs	326 410	324 280	423 190	358 450
Gross margin per tenga of tomatoes sold	5 144	5 066	5 858	5 360

F=1.723** **Significant at P<0.05

The gross margin across trader categories is shown in Table 3. As shown in Table 3, gross margin per *tenga* of tomatoes sold, vary across the three trader categories. The ANOVA results in Table 3 show that the variation in gross margins for the trader categories was statistically significant ($p<0.05$) for the mean pairs compared. The difference was due to wastage during transportation as a result of poor storage facilities especially at the retail node of the supply chain (37%). These findings support the findings reported by MMA (2008) that about 48-50% of the horticultural produce is wasted at retail level due to lack of markets and lack of storage facilities

Table 3: Gross margin obtained by traders in April-June 2010 tomato growing season (Tshs per tenga)

Activity	Assemblers (n=36)	Wholesalers (n=40)	Retailers (n=33)	Whole sample (n=109)
Quantity bought in tenga	2 226	608	265	1 038
Purchase price	7 861	11 200	9 424	9 541
Total purchase price	16 578 000	6 631 300	2 483 00	8 660 500
Total loading, unloading and transport	2 437 800	1 890 600	189 090	1 556 200
Packaging materials	667 960	269 230	56 273	336 440
Market charges	445 310	121 600	53 091	207 770
Total marketing costs	3 551 000	2 281 400	298 450	2 100 400
Total costs incurred	201 29000	8 912 700	2 781 600	10 761 000
Quantity sold in tenga	2 218	597	167	10 02
Selling price per unit tenga	16 611	25 850	26 200	22 905
Gross revenue in Tshs	35 385 000	15 366 000	4 265 600	18617000
Gross margin in Tshs	15 256 000	6 453 200	1 484 000	7856300
GM per tenga of tomatoes sold	7 204	10 458	7 904	8610

*F=3. 695** **Significant at P<0.05*

Table 4 compares average gross margin per *tenga* of tomatoes sold for the whole sample of farmers and average gross per *tenga* of tomatoes sold for the whole sample of traders. As shown in Table 4 the mean gross per *tenga* of tomatoes sold by traders was significantly (P<0.01) higher than that of farmers. The difference in gross margins between the two groups was due to difference in the volume of tomatoes handled. Traders handled significantly large volumes of fresh tomatoes hence achieving economies of scale leading to decrease in cost per *tenga* of tomatoes handled

Table 4: Comparison of gross margin among farmers and traders in April-June 2010 tomato growing season

Type of chain actor	Gross margin in Tshs	
	Mean	SD
Farmers	5 360	2 235.14
Traders	8 610	5 642.75

*Gross margin per tenga of tomatoes sold: Farmers Vs Trader-t=6.087***,***Significant at P<0.01*

T-statistics in Tables 1 and 4 indicate that there were significant differences (p<0.01) in sales volume and gross margin per *tenga* of tomatoes sold by farmers and traders. This finding suggest acceptance of hypothesis that there are significant differences in

the performance among smallholder tomato farmers and tomato traders The finding show that tomato traders performed well in terms of sales volume and gross margin. The difference in performance may be due to post harvest losses, price fluctuations, lack of market information, limited access to markets, lack of access to credit and differences in unit variable costs spent on production and marketing of tomatoes. These results support the findings of Maliwichi, *et al* (2014) who found that majority of smallholder farmers do not have access to credit for tomato production and they also lack information about market demand and prices and therefore high transaction costs.

In Tanzania, the production and supply of many agricultural commodities is largely seasonal. This seasonality is more evident in perishable crops such as fruits and vegetables which allow for a small time lag between harvest and usage. Due to seasonality traders adjust their prices based on the nature of supply. As supply decreases prices are adjusted upwards and vice versa. This cyclical nature of tomato production and supply is reflected in the consistent variations in the average rural wholesale price of tomatoes. It is clear that seasonality affect not only the quantity and quality of the commodity supplied, but also other fundamental variables of market performance such as market infrastructure, levels of transaction costs, prices and trade flows between actors.

Conclusion and policy implications

The findings of the study have shown that there were differences in sales volume and gross margin among smallholder tomato farmers and tomato traders. This was attributed to post harvest losses which accounted for 26-37% of the tomatoes produced and sold. The losses occurred at the farm gate during harvesting, loading, transportation and unloading. Moreover, the differences in sales volume and gross margin were due to price fluctuations and differences in variable costs incurred by smallholder farmers and traders. Thus interventions should focus on improving harvesting, preservation, packaging and transportation practices. This should be coupled with imparting knowledge and skills on small scale processing of tomatoes especially during the peak period.

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