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An Analysis Of Constraints That Affect Smallholder Farmers In The Marketing Of Tomatoes In Mbeya Urban And Peri-Urban, Tanzania

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Abstract: *Agricultural produce from small-scale farmers is often lost after production due to so many marketing challenges which make it difficult for small-scale farmers to explore full market potentials and they also reduce incentives of participation in formal (commercial) or high-value markets. The main objective of the study was to identify and analyse factors affecting (constraints) marketing of tomatoes among small-scale farmers. Data were collected with structured questionnaire and analyzed using descriptive and regression analysis. Results showed that prominent constraints of marketing tomatoes among the small-scale farmers were: lack of access to credit, lack of access to storage facilities, lack of market information, lack of finance for farming, poorly developed village markets, poor producer prices, high perishability of produce, low patronage, inadequate access roads, small size of transport and high transportation costs. Variables that significantly influenced wet season net farm income were: gender (t = 3.913), farm size (t = 4.100), number of causal labourers (t = 6.126), access to storage (t = -2.132), grading of products (t= 3.712) and access to extension services (t = 1.757). Recommendations suggested include: enabling accessibility through the development of better infrastructure in the form of storage facilities, roads for transportation and communication systems; and the formation of marketing cooperatives to overcome high transportation costs, small size of transport and individual small marketing output problems in order to attract and penetrate high value-markets.*

1. Introduction

Tomatoes are one of the most widely cultivated horticultural crops in the country. They are grown for home consumption in the backyard of almost every homestead across sub-Saharan Africa. They are the important source of vitamins and an important cash crop for both smallholders, medium-scale commercial farmers [1]. Studies have shown that tomato is grown commercially wherever agronomic conditions permit. Tomato, both for processing and fresh market has become one of the most important crops in agriculture for smallholder farmers [3]. Tomato is an important source of income for rural, urban and peri-urban farmers, provides employment, and supply nutrients for millions of Tanzanian people. Tomato production is higher than any other fruit and vegetable crop in Tanzania with a total production of 129,578 tons, which represents 51 percent of the total fruit and vegetable production. This is followed by cabbage with 41,495 tons (16.3%) and onions with 36,087 tons (14.2%) [20]. Mbeya is among of 30 regions of Tanzania country, Mbeya is one of the five region that form the southern highland region, that are Iringa, Njombe, Ruvuma, Katavi, Rukwa and Mbeya itself . Mbeya region is listed into four main producer of tomatoes in Tanzania that are Iringa with 4248 ha, Tanga with 1289 ha, Kilimanjaro with 900 ha, Dar es salaam (Temeke district) with 353 ha and Mbeya itself which have 380 ha [20].

Although tomato is one of the leading vegetable in Tanzania; the area planted to tomato has been declining due to diseases, pests, bad weather condition pests, low quality seeds, and non availability of inputs. Tomato yields in smallholder cropping systems in Africa have generally been found to far below potential for example 7 tons/ha and 10 tons/ha for Tanzania and Uganda respectively compared to 100 tons/ha achieved by commercial farmers in Zimbabwe [1]. Smallholder tomato production has been identified as being important in poverty reduction mainly because it can offer employment and thus income to members of households that would otherwise not work [3].The impact of tomato production can be enhanced if yield losses and variability can be reduced [9]. To ensure

that smallholder farmers are consistent along the marketing chain, several issues need to be analysed and addressed [11].

Marketing is a business activity associated with the flow of goods and services from producers to consumers [4]. Marketing of agricultural products begins on the farm with planning of production to meet specific demand and market prospects [5]. Marketing information and market prices guide the farmer in making informed decisions [19], and also assist farmers for planning at pre-planting stage and to sell the surpluses that have been produced. In the absence of marketing information, the retail end of the industry does not respond to supply and demand and the pricing is artificially static or unchanged [22].

Marketing plays a critical role in meeting the overall goals of economic development [5], food security, poverty alleviation and sustainable agriculture, especially among smallholder farmers in developing countries [22]. Deficiencies in rural infrastructure services result in poor functioning domestic markets with little spatial and temporal integration, low price transmission and weak international competitiveness [16].

Marketing constraints or challenges arise due to many factors such as limited knowledge and use of market information, lack of access to high-value reliable markets, high transactional costs, distance from the markets, poor quality of products, lack of storage facilities, low educational levels of small-scale farmers, poor agricultural extension services, lack of financial support [4], inadequate property rights [15], inadequate and inaccessible market infrastructure, lack of adequate access to finance, socio-economic factors of the farmer, for example: training, farming experience, age, level of education and household size, lack of access to decent roads, price risk and uncertainty, electricity, poor communication [17], information regarding prices, inadequate local markets, lack of bargaining power, excess of intermediaries [22].

These marketing constraints constitute the greatest barrier for small-scale farmers when it comes to access high-value markets [8], and these factors restrain farmers from making decisions to participate in the market [19]. Access to markets is an essential requirement for the poor in rural areas. It may also be easy to access markets, but retaining one's position in the market is more difficult and participation of small-scale farmers in high-value markets is unsatisfactory [8], and the perishable nature of tomatoes necessitate effective marketing channels [22]. Therefore, overcoming marketing constraints is critical for small-scale farmers to access lucrative markets [8]. Shifting the focus from production-oriented programmes to more market-oriented interventions will place a renew attention on institutions of collective action, such as farmer groups, as an efficient mechanism for enhancing market performance [7].

The main objective of the study was to identify and analyse factors affecting marketing of Tomatoes among small-scale farmers in Mbeya city and its peri-urban areas. The specific objectives of the study were to identify and analyse demographics; socio-economic characteristics of the small-scale tomato farmers in the study area; the factors affecting marketing tomatoes; and the effect of socio-economic and personal characteristics on the farmers' wet season net farm incomes.

2. Methodology

Mbeya City [16] is situated in the south western part of Tanzania along the Tanzania Zambia (TANZAM) highway and the Tanzania Zambia Railway line (TAZARA). It is located within Mbeya District, lying between latitudes 8°50' and 8°57' South of the equator and between longitudes 33°30' and 35°35' East of the Greenwich meridian and borders. Mbeya City is the headquarters of Mbeya region and is conveniently accessible by road and railway from Dar es Salaam (830km North East). Administratively, Mbeya City is divided into two divisions namely lyunga and Sisimba which are further subdivided into 36 Wards as shown on the map (Figure 1) and 181 neighbourhoods. Major economic activities in the city include commerce and trade, agriculture and livestock keeping, industrial production and service provision. It is estimated that 33.3% of City residents depend on agriculture for their livelihood. 21% are employed in the public sector mainly dealing with service provision and 43.4% are engaged in the informal sector where they work with small scale production, petty trade and selling of agricultural crops and 2.3% contribute as family workers and other businesses. Mbeya City Council is situated at an elevated land along the slopes of Mount Mbeya ranges at an altitude rising from 1600 to 2400 meters above sea level. The city is characterized by moderate climate, with the mean annual rainfall of 1200 mm received between November – May which is accompanied with mean temperature ranging between 11^0C – 25^0C.

A simple random sampling method was used to draw a sample size of 47 small-scale tomato farmers from the target population of Uyole irrigation valley registered farmers. Primary data were obtained by using a well-structured questionnaire as a data collection tool. The questionnaire was designed to elicit data on the demographic data, marketing constraints/challenges and socio-economic

characteristics. The questions in the questionnaire were both closed and open-ended questions. The data from completed questionnaires were coded, captured and analysed using Statistical Package for Social Sciences (SPSS) version 16.

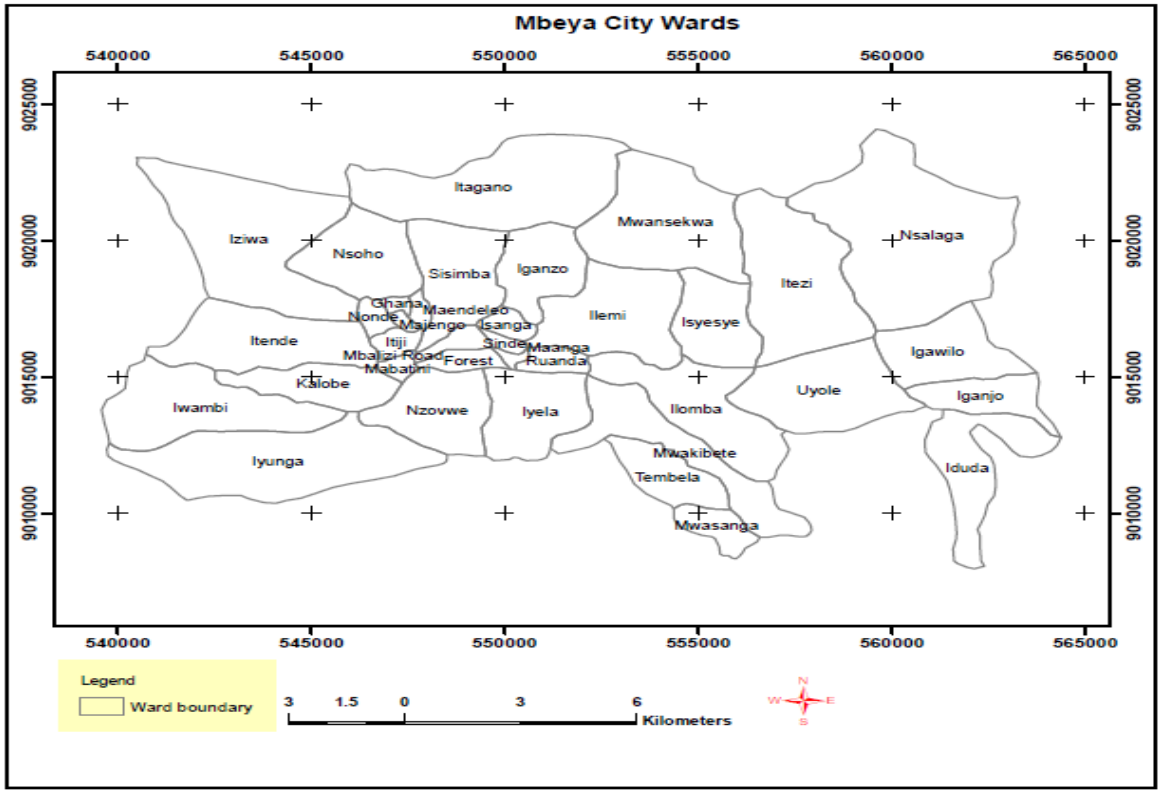

Figure 1: Map of Mbeya City Council Ward Boundary

Descriptive statistics (frequencies and percentages) was employed in order to determine the factors/constraints among the small-scale vegetable farmers, while multiple regression analysis was employed in order to analyse the effects of socio-economic characteristics on the monthly net farm incomes of the small-scale vegetable farmers from vegetable sales. The multiple regression model was specified as shown below. The assumptions of least square method regarding linearity, normality and homoscedasticity were ensured.

$$y_i = \alpha + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + \ldots + b_nx_n + \varepsilon_i$$

Where: y_i = = Wet season net incomes of the respondents in TZS (dependent variable); and the independent variables are:- x_1 = Gender; x_2 = Age; x_3 = Marital Status; x_4 = Educational Level; x_5 = Number of dependents; x_6 = Farm size in cultivation; x_7 = Number of employees; x_8 = Non-farming activities; x_9 = Access to storage facilities; x_{10} = Grading of products; x_{11} = Access to market information; x_{12} = Borrow money for farming activities; x_{13} = Keeping of marketing records; x_{14} = Access to extension services and ε_i = Error term

3. Results and Discussion

Table 1 below shows the demographic characteristics for the small-scale tomato farmers in the study area. It indicates that 21.3% of the farmers fell within the group of 20-39 years, 41.7% within 40-59 years, 27.7% within 60-79 years and 8.5% was above 80 years old. The lack of interest of young people in farming may have a negative impact on agricultural development because the current farmers

are aging. This may be because of the emigration of young people from rural areas to urban areas for non-agricultural jobs. The results also revealed that 40.4% of the farmers were males and 59.6% were females. These findings indicate that the study area was female dominant in tomato marketing. This may be because tomato marketing is very tedious to the extent that men cannot cope or might be because women take most responsibility of their household food security.

The results on Table 1 also show 44.7% of the respondents were married. According to Moobi and Oladele [12], high percentage of married farmers helps to provide family labour. The results also show 72.3% of primary education level among the farmers. According to Botlhoko and Oladele [5], literate farmers are likely to adopt new innovation than illiterate farmers, hence, their productivity increases and greater farms' returns. Majority (78.7%) of the farmers had farming experience of less than or equal to twenty years. Botlhoko and Oladele [5] stated that farming experience is important, thus, it comes with year of practice. The average farm size and size in cultivation of the farmers were mean 4.9009 and 0.385 acres, respectively. According to [5], farm size has no effect to greater returns because small farms can produce far more per hectare than large farms.

The findings in Table 1 further show that majority (53.2%) of the farmers acquired their land through communal tenure. The land tenure by communal which is predominant pattern of land ownership does not ensure security, but personal land tenure ensures security and sustainable use of land which is essential to maximize farm investment and returns. The findings also show that 83.0% of the farmers had no contact with government extension agents. This imply that most of the farmers in the study area are likely not to increase agricultural production and productivity due to the lack of knowledge, demonstrations and the information to be received from the agents which may shift the balance between success and failure of the farmers. The average wet season net farm income of the farmers was TZS 2,000,000. This shows that majority of the farmers return from tomato sales was low. This may be because of poor producer price, lack of markets and patronage. Table1 further shows that almost all the farmers (93.6%) in the area had farming as their primary occupation which also reviews farming as their source of income. According to [5], people make use of agriculture to ensure food security, hence, income generation.

Table 1: Shows the demographic characteristics for the small-scale tomato farmers in the study area.

Variables	Frequency	Percentage
Age		
20-39	10	21.3
40-59	20	41.7
60-79	13	27.7
≥80	4	8.5
Gender		
Males	19	40.4
Females	28	59.6
Marital status		
Single	18	38.3
Married	21	44.7
Divorced	3	6.4
Widow	5	10.6
Education level		
None	3	6.4
Primary	34	72.3
Secondary	19	19.1
Post-secondary	1	2.1
Years in Farming/experience		
≤20	37	78.7
21-60	8	17.0
≥60	2	4.3
Farm size (acres)		
≤1	39	83.0
2-4	4	8.5
≥5	4	8.5
Land tenure		
Personal	20	42.6
Communal	25	53.2
Rented	2	4.2
Extension services/contacts		
Yes	8	17.0
No	39	83.0
Level of farm income (TZS*)		
0-1,000,000	7	14.9
1000001-2000,000	23	48.9
2000001-5,000,000	13	27.6
≥-5,000,001	4	8.6
Non-farming activities		
Yes	3	6.4
No	44	93.6

*U$ 1 is equivalent to TZS 2,233

Table 2 presents socio-economic characteristics of the farmers' rural communities. Majority (61.7%) of the farmers indicated the aged of agricultural owner-operators and agricultural workers. This may be because of emigration of young people from agriculture to seek for better jobs in urban areas. The results also show 83.0% and 51.1% level of

unemployment rate and degree of remoteness respectively. This may be because most of the people in rural areas are illiterate and situated far from market areas. Table 2 further shows that 51.1% and 59.6% of the farmers indicated high level of lack of marketing information available and the need for support and training for marketing service personnel respectively. Table 2 further shows that about 75% of the farmers indicated the need for communication strategies that facilitate effective flow of information between government agencies and farming communities. This may be the results of inappropriate ratio of government agencies to farmers. According to URT [21] the ratio of government extension agents to farmers in the study area is 1:1000. In this situation, the government extension agents may not be able to visit all farmers within a week, hence productivity level declines.

Table 2: The socio-economic characteristics of the farmers' urban and peri-urban communities

Socio-economic variables	High	Moderate	Low
Aged of agricultural owner-operators and agricultural workers	8 (17.0)	29 (61.7)	10(21.3)
Unemployment rate	39 (83.0)	7 (14.9)	1 (2.1)
Degree of remoteness	24 (51.1)	17 (36.2)	6 (12.8)
The lack of marketing information available for farmers	24 (51.1)	20 (42.6)	3 (6.4)
The need for support and training for marketing service personnel	28 (59.6)	18 (38.3)	1 (2.1)
The need for communication strategies that facilitate effective flow of information between government agencies and farming communities	35 (74.5)	12 (25.5)	0 (0.0)

Table 3 shows results factors (constraints) affecting marketing of tomatoes among the small-scale farmers in the study area. The results show that 87.2% and 53.2% of farmers did not have access to credit and storage facilities respectively. The lack of access to credit may be because many small-scale farmers do not have properties that may be held as collateral and may also result from the lack of information about available sources of lenders, types of credits offered and the interest rates charged by borrowers. According to Ozowa [14] stated that awareness of existing loan facilities is inhibited by low level of literacy among small-scale farmers. Adeleke et al. [2] stated that the main reason for commercial banks not to lend money to agricultural enterprises is because of it being risky. Cong et al. [9] stated that due to the lack of storage facilities, farmers tend to use traditional techniques which cause humidity to produce high loss and reduce quality of produce for small-scale farmers. Table 3 further shows that majority (85.1%) of the farmers did not have access to marketing information. According to Dorward and Kydd [6], businesses in urban and peri-urban areas are attributed by weak information on potential market players, prices and innovations. Saxena [18] further stated that producers are often in agricultural practices, but not in effective and efficient marketing methods. Majority (57.4%) of the farmers did not grade their produce before being sold and this may have led decline in farm income. The results also show that 100.0% of the farmers did not have insurance against natural disasters, loss of income, theft and fluctuating market prices. According to Newton [13], insurance could be used as collateral for loans and it also enforces farmers to improve on farming standards for them to be eligible for payments on incurring losses.

Table 3: Factors (constraints) affecting marketing of tomatoes among the small-scale farmers in the study area

Constraints	Yes		No	
	Frequency	%	Frequency	%
Access to credit	6	12.8	41	87.2
Access to storage	22	46.8	25	53.2
Grading of produce	20	42.6	27	57.4
Access to marketing information	7	14.9	40	85.1
Insurance against theft, loss of income:	0	0.0	47	100.0

Figure 2 shows the level of factors (constraints) affecting marketing of tomato farmers in the study area. The results show that about 63.8% farmers experienced low patronage. This may result from inconsistency in production and persistence supply of produce to consumers. The results also show that

74.5% and 70.2% of the farmers experienced poorly developed markets and the lack of credit for Tom-processing respectively. This may be due to the lack of credit information among the small-scale farmers. Cong et al. [9] stated that the lack of processing facilities and processing knowledge is also a constraint among small-scale farmers. The results in Figure 2 further show that about 59.6% farmers were also constrained by the lack or poor farmer market access roads. These may have limited transportation of product for better markets. However, it may have also retarded quick distribution of produce after harvesting, hence, perishability of the products. Thus, less income that could be made from sales of low quantity and poor quality products. Adeleke et al. [2] stated that road systems are the most serious infrastructural bottleneck facing agriculture.

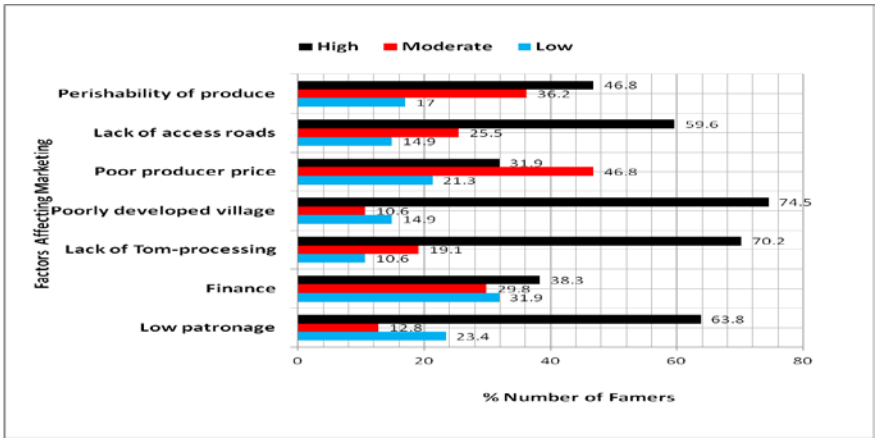

Figure 2: The level of factors (constraints) affecting marketing of tomatoes among the small-scale farmers

Table 4 shows the results of other factors affecting the small-scale tomato farmers in marketing their produce. The results show that about 48.9% of the farmers sold their produce in both farm gate and local neighbourhood markets but majority on farm gate. These maybe due to the small quantity produced, poor quality and lack of contract marketing. Table 4 also shows that majority (57.4%) of the farmers were located more than five kilometers away from market places. This may be because many small-scale farmers stay in home lands which are far from market places. The results further show that about 72.3% of the farmer adopted an individual marketing system. This may be associated with the lack of knowledge in the formation of group or cooperative marketing among the farmers. Majority (61.7%) of the farmers hired transport to distribute farm produce to their neighbourhood market points and the problems mostly associated when distributing their produce to the markets were small size of transport, high transport costs & lack/poor transport.

Table 5 presents the results of the multiple regressions on the effects of the socio-economic and personal characteristics of the farmers on their wet season net farm income. A deterministic regression function was employed to the data and the regression estimates of the relationship between dependent variable (farmers' wet season net farm income) and independent variables (socio-economic and personal characteristics) were determined. The independent variables were significantly related to the farmers' wet season net farm income with F value of 9.406 at $p < 0.001$. Also, R value of 0.897 shows that there was a strong correlation between independent variables and farmers' wet season net income (dependent variable).

Table 4: Other Factors Affecting the Small-Scale Tomato Farmers in Marketing their Produce

Constraints	Frequency	Percent
Product market place		
-Farm gate	11	24.3
-Local street markets	6	12.8
-Supermarkets	1	2.1
-Farm gate &local street/hamlet markets	23	48.9
-Local markets &Supermarkets	1	2.1
-All of the above	7	10.6
Distance from farm to market places		
-1-2km	2	4.3
-3-4km	18	38.3
≥ 5km	27	57.4
Marketing systems adopted		
-Individual marketing	34	72.3
-Contract marketing	1	2.1
-Group/co-operative marketing	3	6.4
-Individual & contract marketing	6	12.8
-All of the above	3	6.4
The ownership of transport of transfer produce to market points		
-Own transport (motorcycles)	15	31.9
-Hired transport (individual)	29	61.7
-Hired transport (group)	3	6.4
Problems experienced when moving produce to markets		
-None	3	6.4
-Lack/poor transport	5	10.6
-high transport costs	8	17.0
-small size of transport	11	23.4
-Damage to produce, small size of transport &high transport costs	4	8.5
-Small size of transport, high transport costs & Lack/poor transport	16	34.0

The results in Table 5 further predicted 80.4 percent (R2 = 0.804) variation in the dependent variable was explained by the independent variables. Durbin-Watson statistics was 2.135. Fourteen independent variables were used. However, six out of the fourteen independent variables had statistically significant effect on the dependent variable (farmers' wet season net farm income). The significant independent variables were: gender (t = 3.913); farm size in cultivation (t = 4.100); number of casual labourers (t = 6.126); access to storage facilities (t = -2.132); grading of products (t = 3.335) and access to extension services (t = 1.757). These findings imply that an increase the number of males in farming, increase farm size in cultivation, employees, grading of products and improved extension services could increase the wet season net farm income. However, it declines with the decreasing of access to storage facilities.

Table 5: Parameter Estimates of the Multiple Regression Analysis of the Effects of Socio-Economic Factors and Personal Characteristics on the Wet Season Net Farm Income of the Small Scale Tomato Farmers

Variables	**Unstandardized coefficients**		**Standardized coefficients**		
B	***Std. Error***		***Beta***	***t-test***	***Sig.***
Constant	2126.431	3431.852	.353	.620	.540
Gender	3818.118	975.854	-.183	3.913	**.000*** **
Age	-56.480	38.538	.138	-1.466	.153
Marital status	1485.724	1466.622	.053	1.013	.319
Educational level	1141.697	2041.731	-.046	.559	.580
Number of dependents	-120.103	241.317	.392	-.498	.622
Farm size	68.538	16.715	.552	4.100	**.000*** **

Number of casual labourers	514.562	83.990	-.046	6.126	**.000*** **
Non-farming activities	-502.607	1094.582	-.259	-.459	.649
Access to storage	-2757.747	1293.620	.368	-2.132	**.041***
Grade of products	3951.485	1064.507	-.005	3.712	**.001****
Access to market information	-71.888	1639.936	.148	-.044	.965
Borrow money for farming activities	951.837	1206.756	-.111	1.617	.116
Keeping of marketing records	-2406.744	2122.373	.181	-1.134	.265
Access to extension services	2555.132	1454.605		1.757	**.089***
R	.897				
R2	.804				
Adjusted R2	.719				
Durbin-Watson	2.135				
F	9.406				
P	**.000*** **				

Figures in parentheses are significant: * significant at 1%; ** significant at 5% and *** significant at 10%

4. Conclusion and Recommendation

Marketing of tomatoes plays a critical role in meeting the overall goals of sustainable agriculture, food security and poverty alleviation, particularly among small-scale farmers in urban and peri-urban areas. Prominent constraints of marketing tomatoes among the small-scale farmers were: lack of access to credit, lack of access to storage facilities, lack of market information, lack of finance for farming, poorly developed markets, poor producer prices, high perishability of produce, low patronage, inadequate access roads, small size of transport and high transportation costs. Significant determinants are gender; farm size in cultivation; number of employees; access to storage facilities; grading of products and access to extension services. In view of the results, it is therefore recommended that, the formation of marketing cooperatives would enable the farmers to market their products together to address individual small marketing output constraints, small size of transport and high transportation costs in order to attract and penetrate high value-markets. There is also a need to provide effective and efficient quality extension services in order to equip farmers with important skills in the areas of tomato production and supply of useful marketing information for the farmers. Emphasis should also be on enabling accessibility through the development of better infrastructure in the form of storage facilities, roads for transportation and communication systems.

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