© Kamla-Raj 2014
PRINT: ISSN 0970-9274 ONLINE: ISSN 2456-6608
J Hum Ecol, 47(3): 269-274 (2014)
DOI: 10.31901/24566608.2014/47.3.07

An Analysis of Constraints That Affect Smallholder Farmers in the Production of Tomatoes in Ga-Mphahlele, LepelleNkumbi Municipality, Limpopo Province, South Africa

L.L. Maliwichi[1], **T.K. Pfumayaramba**[2] **and T. Katlego**[2]

[1]Department of Consumer Science, School of Agriculture, University of Venda, South Africa
[2]Department of Agricultural Economics and Extension, School of Agriculture, University of Venda, South Africa

KEYWORDS Smallholder Farming.Tomato Production.Constraints. Gross Margin

ABSTRACT Theaim of this study was to analyse production constraints that often limit the profit and production of tomatoes in Mphahlele. This study used both primary and secondary data collection. The secondary data was collected using structured questionnaires and secondary data was collected using document review of journal articles, internet and books. A stratified sampling method was used to select the respondents. From a population of 43 smallholder farmers in Mphahlele village, 20 smallholder farmers were randomly selected. Descriptive statistics was used to analyse the demographic information of the farmers. A linear regression model was used to determine the impact of the selected variables to gross margin (dependent variable). Selected variables include age, gender, level of education, number of years in farming and farm size. From the regression analysis age, farm size and number of years in farming were found to have a positive influence on the gross margin. This means an increase in the age, farm size and number of years in farming will increase tomato production and profit. The two variables found to have a negative influence to gross margin were level of education and gender. These findings underscore the important role of extension officers in providing agriculture information to smallholder farmers.

INTRODUCTION

Tomatoes are one of the most widely cultivated 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 (ACIAR 2005). Studies have shown that tomato is grown commercially wherever agronomic conditions permit. Tomato, both for processing and fresh market has become one of themost important crops in agriculture for smallholder farmers (Anang et al. 2013). The major production areas of tomato in South Africa are Mooketsi, which contribute more than 47% of the total volume of tomatoes produced in the country, and Letaba, in the Limpopo province, Malelane in Mpumalanga and the Eastern Cape. The Limpopo province as a whole contributes more that 75% of the total tomato production in South Africa (DAFF 2011) with the Mooketsi and far north areas being the most significant production areas of the province.

Although tomato is one of the leading vegetable in South Africa; 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 (ACIAR 2005). 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 (Anang et al.2013).The impact of tomato production can be enhanced if yield losses and variability can be reduced (Horna et al. 2006). To ensure that smallholder farmers are consistent along the production and marketing chain, several issues need to be analysed and addressed. These include access to land and credit, on farm and off-farm infrastructure, management capacity, financial support, research and technology adoption. In Nigeria, Abu et al. (2011) found the following to be significant in impacting smallholder tomato farming: farm size, labour, seeds, and quantity of fertilizer used.Action must be taken to help small scale farmers in identifying and overcoming constraints that reduce the production of tomato (Bienabeet al. 2004; Tijaniet al. 2010).

MATERIAL AND METHODS

The study was conducted in two areas at Ga-Mphahlele, namely Linting and Dithabaneng which are situated about 58 km south of Polokwane and about 0.5 km east of Lebowakgomo shopping complex. It is located in the Capricorn district, LepelleNkumpiMunicipality, Limpopo province, South Africa. Many people in this area are subsistence farmers producing for own consumption, but surplus produce is sold to people who sell in the fresh produce market and this serves as a form of income generation source for many people in this area.

Data Types, Sources and Collection

Primary data was collected using structured questionnaires. Data on the biographic characteristics of farmers, and tomato production were collected from randomly selected farmers in both villages.

Sampling Procedures

The study sample was made up of farmers from four tomato projects randomly selected from Linting and Dithabaneng areas in LepelleNkumpi municipality in Limpopo province. From a population size of 43 farmers, project one had 10 farmers, project two had 13 farmers, project three had 11 and project four farmers.

A stratified sample was used to get the sample size of 20 from the total sample of 43. Fifty percent of farmers resulted in the sample size of 20. Four chairpersons from each project were interviewed as well as two extension officers from the department of agriculture.

Data Analysis

The data was analysed using SPSS Statistics and gross margin analysis. A linear regression model was used to determine factors that affect the profitability of the farmers.A linear regression model was used to determine the impact of selected variables on the gross margin. In this study selected variables are age, gender, level of education, farm size and number of years in farming.

The model is specified in this way:

$Y=\beta_0 + \beta_1 \text{Age} + \beta_2 \text{Gend} + \beta_3 \text{Fsize} + \beta_4 \text{Famyr} + \beta_5 \text{LEdn}$

Where,

Y=dependent variable (gross margin)

$\beta_0 - \beta_5$ = Parameters

Independents variables:

Age = age of farmer

Gend = dummy variable for gender of farmer (1 if female and 0 otherwise)

Fsize = size of the farm

Famyr = number of years farming tomatoes

Ledn = level of education

RESULTS AND DISCUSSION

The findings showed that the sample was made up of the age group 30-39, forming the largest proportion (35%) followed by the age 40-49, constituting 30% of the sample. The age group 20-29 and 50-59 constituted 15% 0f the sample and the age group with the least percentage is 60-69 which only constituting 5% of the sample. The interesting thing in this observation is that more youth might be involved in agriculture production leading to sustainable small holder farming in the long term. Since age group 60-69 has small percentage in terms of the sample size, people can depend on young people for food production and food security, because of young people may be more adaptive and more willing than older people to try new farming methods/technologies.

Table 1: Gender of farmers

Gender	*Percentage (%)*
Male	40
Female	60

The sample was composed of higher percentage of female constituting 60% of the sample revealing that that more females play a role in the production of food (Table 1).

Table 2 shows the number of years in farming, with year group 5-9, constituting 50% of the sample, followed by year group 1-4 (25%) and the lowest year group being year group 10-14 and 15-19 with 10% of the sample respectively. The fact that many farmers have more than 5 years' experienceinfarming is encouraging as increased productivity is often associated with experience in farming.

Table 2 shows the number of years in growing tomatoes, with year group 1-2 and 3-4 constituting 45% of the samplerespectively. Most

Table 2: Number of years of growing tomatoes

Number of years growing tomato	*Percentage (%)*
1-2	45
3-4	45
5-6	10

of these farmersdo not have more experience in growing tomatoes. Extension officers should teach these farmers on how to grow tomato so that they can gain more knowledge and skills.

A source of income plays an important role in the reduction of poverty for most of smallholder farmers. A large percentage (Table 3) of the farmers, that is 45% depend on the income generated (hawking) from their farming business. Their motive for farming is profit maximization. People who are on government grant, that is 40% of the sample (mostly the elderly) do farming to supplement their income. Ten percent of the sample depends on their monthly salary and only 5% of the farmers depend on pension, as source of income. The study findings may mean that these farmers are growing tomato to supplement their income.

Table 3: Sources of income

Source of income	*Percentage (%)*
Grant	40
Hawking	45
Pension	5
Salary	

The level of education plays an important role in farm decision making. Table 4 shows that forty-five percent of the sample has acquired secondary education. Ability to read and write plays an important role in the extension services as farming instructions can be distributed as educational pamphlets and books.Only 5% of the farmers have never gone to school.

Analysis of the gross margins showed that the highest gross-margin R8625 and the lowest profit being R90. Farmers with large farm size had larger gross-margins than those farming on the small farms. This is consistent with finding of Abu et al. (2011).

Table 4: Level of education

Level of education	*Percentage (%)*
None	5
Primary	25
Secondary	45
Tertiary	25

The following section discusses the results that were found using regression analysis. It includes discussions on the model summary, regression analysis and regression co-efficient.

Estimated Linear Model

Gross margin=-792.642 -0,399 AGE- 0.043 GENDER+0.745 FARM SIZE+0.524 YEARS IN FARMING+0.140 LEVEL OF EDUCATION

The results in Table 5 show that three variables in the model were significant namely farmer's age, farm size and number of years growing tomatoes. The coefficient for the age of the farmer was – 0.399 which means that for every additional year in a farmer's age would result in approximately 0.4 units decline in gross margin all other things held constant. Farm size and the number of years of experience farming tomatoes were significant and positive meaning that the larger the farm size or the more the number of years of farming tomatoes, the greater the gross margin. This is as expected from theoryof economies of scalethat is the cost of farming per unit is always lower on large farms.

The number of years in farming was also found to be significantly correlated with gross margin holding other factors constant, thus an increase on the number of years in farming will correspondently increase gross margin by 0.524. This also means that an increase in the number

Table 5: Inferential statistics analysis

Dependent variable: Tomato gross margin	*Standardized coefficients*		
Independent Variables	*B*	*T*	*Sig.*
(Constant)	-792.642	-0.566	0.581
Age	-0.399	-1.949*	0.072
Gend	-0.043	-0.275	0.788
Fsize	0.745	5.247***	0.000
Famyr	0.524	2.759**	0.015
Ledn	0.140	0.967	0.350
Adjusted R^2	0.650		

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

of years in farming will increase farming productivity because farmers will gain more experience in farming.

Age of the farmers was also found to be positively correlated with gross margin holding other factors constant, thus an increase in the age of the farmers will correspondently reduce gross margin by 0.399. This means that the older the farmers the high the reduction of gross margin because the farmers are getting older.

Gender was found to be insignificant at all levels of significance (that is 1%, 5% and 10%). Thus gender had little effect on the profit of the farmers. Level of education also had a little impact on the gross margin.

The adjusted R-Square is used to explain the model fit. The adjusted R-Square shows that the model explains approximately 65% of the variation in the dependent variable (that isgross margin). This means that the model explains or accounts for higher percentage of the dependent variable; therefore it is a good prediction model of the dependent variables.

Production and Marketing Constraints Experienced by Smallholder Farmers in Tomato Production

Production and the marketing of tomatoes by smallholder farmers call for production resources that include land, water, labour and capital. Poor access to these assets affects the way in which smallholder farmer's benefit from their farms and market (Bediako et al. 2007).Table 6 shows the constraints identified by the farmers and the percentage of farmers who faced the constraint.

Table 6: Production constraints identified on the farm

Challenges	*Farmers status*	
Diseases and pest	85%	
Lack water	75%	Borehole
	50%	Community dam
Lack of inputs	40%	
Lack of funds	15%	
Lack of transport	30%	
Lack of reliable market	35%	
Mechanisation	100%	
Lack of marketing information	75%	
Distance to market	75%	

Access to Resources and Support Services

Access to land, credit, water, mechanisation (transport), production input, extension service and supportive services to smallholder tomato production are important.

Access to Land

Land is regarded as one of the most important agricultural resources, playing a crucial role in agriculture productivity. All the farmers in the study had access to land for tomato production. Community leaders gave these farmers land so that they can farm and be able to support their families. The land given to these farmers is enough for production, but they don't have enough money to buy fence and also majority of this farmers don't utilise their whole farms due to lack of money to hire tractor and to buy fence and production inputs (seeds, fertilizers and pesticides). The size of the farm ranged from <1 hectare to >6 hectares as shown in Table 7.

Table 7: Land farm size

Land size in hectares	*Percentage %*
<1	0
1-2	65
3-4	20
5-6	15

Table 7 shows the land size of the farmers. The land size category of 1-2 ha comprised of the largest percentage (65%) of the sample, followed by land size 3-4 ha constituting 20% and land size 5-6 ha constituting 15%.

Access to Water for Irrigation

Water is the essential resource for the crop production in agriculture. In agriculture water is the key to production for most of smallholder farmers. In the entire projects water was identified as the major constraints limiting the production of tomato. The majority (75%) of farmers use boreholes for water for irrigation in their farms. Fifty percent of the farmers get water from the community dam, which is not sufficient for tomato production because sometimes in the community there is unavailability of water when the dam has low water levels. The majority of farmers interviewed were using traditional furrow and sprinkler method, as it is cheaper than the more expensive modern method of drip irrigation, which conserves water.

Mechanisation

Mechanisation includes the tractor and implements used on farm. The study revealed that the majority (100%) of farmers do not have their own tractors to farm. This is one of the reasons that make farmers to be unable to utilise all of their land. The respondents also revealed that they spend R350 and R400 to hire tractor for ploughing the land.

Access to Production Inputs

Agriculture production inputs include seeds, fertilizer and pesticides. Access to these resources will lead to improved productivity (Clottey et al. 2009; Gemechis et al. 2012; Anang et al. 2013). The study revealed that the majority of farmers do not have access to credit for tomato production, due to lack of information. Farmers are thus unable to buy seeds and fertilizers. The study also revealed that government does not provide farmers with inputs, it only provide inputs for selected projects that are effective in the area. These farmers were purchasing production inputs individually rather than in a cooperative because of distance from each other and differences inplanting time. Access to production inputs for the most of smallholder farmers is limited by the financial constraints and lack of information. Government need to support farmers with the relevant production inputs to improve farmers' productivity.

Access to Credit

Access to credit in farming plays an important role in increasing productivity. Lack of credit is one of the issues that hinder the production of tomatoes in Mphahlele tomato projects. The study has found that 75% of the farmers have access to credit and 25% of the farmers do not have access to credit due to lack of information and knowledge. It was also revealed that although famers have access to credit, are reluctant to take it because they are risk averse. Extension officers need to provide adequate credit information to these farmers.

Diseases and Pest Attack

Diseases and pest attack are the major constraints affecting smallholder farmers in the production of tomato. In the study, it was founds that majority of farmers are facing the problem of pests and diseases. During rainy season thepestsattacking the plants includes red spider and diseases identified aremalt rot and early blight. Majority of farmers lack income to purchase pesticides to control pest.

Lack of Transport

Access to transport by smallholder farmers plays a significant role in their ability to access market. Since tomatoes are highly are perishable, there is a sense of urgency in marketing these product as quickly and efficiently as possible in order to maintain their farm fresh value.

The study has found that all (100%) the smallholder farmers do not have their own transport to deliver their product to market. These farmers usually hire transport to deliver their produce to the market. Most of the time they are forced to sell their tomato in their community in order to cut down on transport cost. Extension officer need to address this issue by encouraging farmers to apply credits so that they can buy their own transport.

Distance to Market

Distance to market is another constraint that affects smallholder farmers in the production of tomatoes, particularly during harvesting time. This study has revealed that for 75% of the farmers they target and sell to nearby consumers to cut down on transport and storage costs. For 75% of farmers they market their tomatoes to hawkers in town. The government need to provide these farmers with enough information about the marketing of tomato especially through the fresh produce market.

Extension Service

Extension involves the conscious use of communication of information to help farmers to make sound farming decisions. The study has found that extension officers assist farmers with advice and provision of information on farming. Majority of farmers have revealed that extension officers usually organise meetings for them to meet agencies such as LIBSA (Limpopo Business Support Agency) and SEDA (Small Enterprise Development Agency) when they come

and hold presentation on the services they offer farmers.

From the study 100% of farmers revealed that they get assistance from extension officer and 50% of the farmers revealed that they don't get enough information from extension officer and that they are not satisfied with the information they get from extension officers. Extension officersusuallyvisit the farms to observe how farmers perform agriculture activities. Extension officers revealed that they use the participatory methodology to encourage more people to become more interested in farming. Farm visit and meetings with farmers are organized to allow farmers to meet agencies that support small holder farming.

CONCLUSION

The study revealed although the majority of farmers have access to land for tomato production, they often lack the capital to purchase farming inputs and intensify their production. The farm size and the number of years of experience in farming positively affected the farmers' gross margins as was expected. The most mentioned constraints affecting the farmers were lack of mechanisation, pests and disease, lack of information about markets as well as distance to markets and transport. Poor access to water was also a frequently mentioned constraint.

RECOMMENDATIONS

There is a need for programs that can link farmers to institutions that offer credit support to small holder farmers. Farmer access to land needs to increase since profitability was shown to increase with area under production as this creates economies of scale.

Majority of farmers indicated that they experience water scarcity. Access to water and good irrigation infrastructure has been found to be important contributors to profitable tomato farming. There is need for investment in water infrastructure so that farmers can expand their production and reduce yield flactuations. Farmer-extension officer contact is good but there is need for regular market information dissemination to farmers. Well trained and knowledgeable extension officers should design programmes to provide farmers with market, credit and production information.

REFERENCES

ACIAR 2005.Partners in Research for Development Magazine. Summer2005/6. From <http://aciar.gov.au/publication/pmg023> (Retrieved on 14 June 2013).

Abu O, Alumunku M, Tsue PT 2011. Can small-scale tomato farmers flourish in Benue State, Nigeria? *Journal of Agricultural Sciences*, 2(2): 77-82.

Anang BT, Zulkarnain ZA, Yusif S 2013. Production constraints measures to enhance the competitiveness of the tomato industry in Wenchi Municipal District of Ghana. *American Journal of Experimental Agriculture*, 3(4): 824-838.

Bediako, E, Showemimo JN, Ushawu Y 2007. Tomato production constraints at Bontanga irrigation project in the Northern Region of Ghana. *Journal of AppliedSciences*, 7(3): 459- 461.

Clottey VA, N Karbo N, Gyasi KO 2009. The tomato industry in northern Ghana: Production constraints and strategies to improve competitiveness. *African Journal of Food, Agriculture, Nutrition and Development, Agro-Science*, 2(1): 1436-1451.

Department of Agriculture Food and Fisheries (DAFF) 2011.A Profile of the South African Tomato Market Value Chain 2011.Pretoria. From <http://www.nda.agric.za/docs/AMCP/TOMATO MVC2012.pdf> (Retrieved on 6 November 2013).

Gemechis AO, Struik PC, Emana B 2012. Tomato Production in Ethiopia: Constraints and Opportunities. *Paper presented at the International Research on Food Security, Natural Resource Management and Rural Development Conference*, Gottingen, Germany, September (2012).

HornaD, Smale M, Falck-Zepeda J 2006. Assessing the Potential Economic Impact of Genetically Modified Crops in Ghana: Tomato, Garden Egg, Cabbage and Cassava.*PBS Report*,International Food Policy Research Institute.

Tijani AA, Ayanwaleb AOS, Baruwaa OI 2010. Profitability and constraints of tomato production under tropical conditions. *International Journal of Vegetable Science*, 16(2): 128- 133.