An evaluation of Challenges Facing Smallholder Orange Farmers in Muheza District, Tanzania

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ABSTRACT

Most of Tanzanian population lives in rural areas where their livelihoods depend on smallholding agriculture which contribute substantially in GDP of the country. Notwithstanding these contributions to household income and food security, the sector is beleaguered with several challenges which work against their success. Hence, this study conducted in order to assess challenges that face orange farmers in Muheza District, in Tanzania. Data collected was using structured questionnaires administered to a randomly selected 135 orange farmers from three wards. Descriptive statistics and Ordinary Least Square (OLS) regression were used to analyze challenges facing orange production. Multiple responses' analysis revealed that high production costs (85.9%) shortage of rainfall (83.0%), inaccessibility to market information (77.39%) and poor farming practices (63.7%) were the major challenges that farmers reported facing in orange production in the study area. The OLS results show that, the independent variables such as high production cost and shortage of rainfall significantly (P<0.001) challenged farmers engaging with orange production. Also, shortage of agricultural inputs and poor farming practices were significant (P<0.01) challenges that faced by orange farmers. Production cost, inadequate market accessibility and theft did not significantly (P>0.05) challenged orange farmers. The study recommends that Government should employ more extension officers and provide adequate working facilities; consequently this will enable efficient transfer of technologies and hence, will reduce the habit of poor farming practices and will probably increase orange productivity and farmers' income. Moreover, Government should also make effort on subsidising agricultural inputs to increase its affordability to orange farmers which in turn will lead to improve in productivity and farmers' income.

Keywords: *Citrus, challenges, oranges, smallholder farming*

1.0 INTRODUCTION

In Tanzania agriculture is the mainstay of the economy, contributing about 30 percent of GDP and employing 67 percent of the labor force, with women contributing more than 70 percent of the labor (USAID, 2018). Thus, the importance of agriculture in both poverty reduction and economic growth deserves a special attention (URT, 2012). Smallholder farmers face a number of challenges, including an increased demand for cash income to pay for services previously provided by the state; a growing emphasis on the production of commodity crops; and a land tenure system that creates uncertainty about future access to farmland. According to Tilt (2008), farmers in less developed regions, where infrastructure is poorly developed and access to markets is limited, must often find their own solutions to their economic problems. In addition,

productivity in these areas is low and families are often forced to supplement farm incomes from other livelihood activities. Decisions will depend on perceptions of risk and the potential returns, as well as local tradition and culture (Twomlow *et al.*, 2002). Moreover, Ashrafi *et al.*(2007) in their study in Iran have enumerated several characteristics which relevant to peasant farming system e.g. lack of control over water use, land fragmentation, difficulties in transferring inputs to farmlands and also in transferring products to markets, low level of mechanization, low financial power, farmers' unawareness about modern technologies, high illiteracy rate, low access to modern technologies, human resource erosion, application of traditional methods for cultivation, risk aversion, low access to credits, exploitation of natural resources due to farmers' unawareness, and low productivity rate. Furthermore, Fami *et al.* (2009) in their study classified the challenges of Iranian peasantry in five factors including technical-technological, managerial, economic-financial challenges, marketing-infrastructural challenges, and spatial-geographical challenges.

URT (2013) revealed that, agriculture is the dominant economic activity of Muheza District population. The significance of this sector is reflected by the fact that 80% of the economically active population of Muheza District depend on agriculture (URT, 2013). Orange is one of the most important crops in Muheza District outstandingly in quest of improving rural farmers' income (Makorere and Mbiha, 2012). In Muheza district, normally, oranges are produced throughout the year. Every four months oranges flower and two months later the fruits ripen which gives two seasons per year. The production season is between May and November with peak season between May and August. The period from September to November is low seasons, while December to April is regarded as a period of orange scarcity. However, orange farmers in this district encounters various challenges in this endeavour, such as paucity of reliable market information, high cost of production etc which leads them to get low yields and consequently low income. Nevertheless, challenges that are facing these farmers while conducting their farming activities are more or less the same especially those dealing with oranges production in Sub-Saharan African. Hence, this study was conducted in order to assess challenges that are facing smallholder orange farmers in Muheza district.

2.0 METHODOLOGY

2.1 Study Area

This study was conducted in Muheza district in Tanga region specifically at Kwafungo, Mtindiro and Songa wards. This district was selected due to fact that it happened to be a major area where orange farming activities in Tanzania are practiced. Muheza district is in the Northern Eastern part of Tanga region; it lies between latitudes 5.0^o and 5.4^o South of equator and longitudes 39.0^o East of Greenwich. The district is bordered to the North by Mkinga district, to the East by Tanga city and Indian Ocean, to the South by Pangani district and to the West by Korogwe district. Muheza district has an area of 1,974 km^2, whereby land area covers 1,961 km^2 and area covered by the ocean is 13 km^2 along the coast (Muheza District Council, 2014).

2.2 Research Design and Data Collection

The cross-sectional research design used to undertake this study. The design allows collection of data at one point in a time. The design is easier and economical especially where there exist resource constraints. Both structured and unstructured interviews were used to collect data from orange farmers. Also, observation and focus group discussions with orange farmers were employed in order to obtain more relevant data. Additionally, documentary review was used to obtain secondary data. Systematic random sampling was employed in order to get a sample of 135 orange farmers, 45 from each ward. In addition, purposive sampling was employed to get key informants i.e. three agriculture extension officers, one from each ward and agriculture officer from the district level.

2.3 Data Analysis

Data was analyzed using the Statistical Package for Social Sciences (SPSS) Version 20. Descriptive statistics (frequencies and percentages) was used to accomplish initial analysis of challenges facing orange farmers. Furthermore, in order to get an insight which challenges are particularly significant than others, the study employed Ordinary Least Square (OLS) regression analysis.

The following model was used for OLS regression analysis:-

$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \beta_6 X_{6i} + \beta_7 X_{7i} + \varepsilon_i$

Y_i = Orange production in kg/ha

β_0 = Regression constant

X_1 = Production cost

X_2 = Accessibility to market information

X_3 = Affordability to farm inputs

X_4 = Poor farming practices

X_5 = Shortage of rainfall

X_6 = Productivity of land

X_7 = Theft

$B_0 \ldots \beta_7$ are parameters to be estimated

ε represent the error term.

The description of the explanatory variables and their expected relationships with the dependent variable are presented in Table 1.

Table 3: **Summary of independent variables for regression analysis on challenges facing orange farmers**

Variable	Description	Expected Sign
Cost of Production (X_1)	Continuous: TZS per Ha	-
Accessibility to market information (X_2)	Categorical: Dummy: 1 = if yes 0 = if otherwise	-
Affordability to farm inputs (X_3)	Categorical: (Dummy: 1 = if yes 0 = if otherwise)	-
Poor farming practices (X_4)	Categorical: (Dummy 1 = if yes 0 = if otherwise)	-
Shortage of rainfall (X_5)	Categorical: (Dummy: 1 = if yes 0 = if otherwise)	-
Productivity of land (X_6)	Categorical: (Dummy: 1 High, 2 = Moderate and 3 =Low)	-
Theft (X_7)	Continuous: Estimate of loss through theft in kg per ha	-

3.0 RESULTS AND DISCUSSION

3.1 Challenges Facing Farmers Engaging in Oranges Production Based on Descriptive Statistics and Focus groups Discussion (FGD)

3.1.1 High production cost

High production cost was mentioned by the majority (85%) of respondents as a major challenge affecting production of orange in the study area (Table 2). Findings from focus group discussions revealed that the cost of hiring labour ranged from TZS 30,000 up to TZS 40,000 per acre and orange husbandry activities normally are twice or thrice per year. Cost of hiring labour for pruning and removal of excess flowers, ranges from TZS 25,000 up to TZS 35,000 per acre and this cost excludes the pruning equipment.

3.1.2 Shortage of rainfall

Shortage of rainfall (83.0%) was also observed as among the major challenges facing farmers dealing with orange production in study area consequently, most of orange produced become small in shape, unattractive in colour and contain little water in it. Some of orange trees observed to shrink while others found to shed leaves because of drought caused by shortage of rainfall. Agricultural productions which are totally reliant on rainfall inhibit attainment of maximum productivity. This finding is supported by Chang and Petersen (2003) who reported that citrus fruit requires water at different stages of growth in order to achieve good fruit yields and quality. These stages are namely the flowering, fruit set, new flush development period, fruit development period

and after harvesting period. Consequently, shortage of rainfall tends to reduce orange production in the study area.

3.1.3 Accessibility to market information

Accessibility to the market information was another challenge facing orange farmers in study area. This was mentioned by 77.8% of the respondents. During focus group discussions one member said that:-

> *"Most farmers sell their orange while on tree after which trader takes over and contact different actors for harvesting, counting, packing, bulking and transporting".*

These findings corroborate those of Ouko and Kuindwa (2004) who reported that supply and demand information usually failed to reach farmers so as to enable them to plan for their production to benefit from off-season high price. However, despite of that, farmers in study area still faces challenges of getting reliable market prices for most part of harvesting seasons due to some policy issues emanated now and then from vastly market in Kenya. For instance, a study reported that Kenya imposed total market ban to Tanzanian traders from selling oranges directly to its market without using Kenyan's market brokers in early 2000 (Mbiha and Maerere, 2003).

3.1.4 Poor farming practice

Poor farming practice was mentioned by 63.7% of respondents as among the challenges in the study area. Insufficient knowledge and skills in citrus farming practices and low application of fertilizers and insecticides among farmers found to be among major critical factors constraining orange production in the study area. This study observed that farmers apply minimal crop farming practices. Poor crop husbandry practices such as pruning and weeding affect oranges production negatively. Furthermore, during the fieldwork many orange farms found to be engulfed with long grasses which inhibit citrus trees from producing better citrus fruits in terms of quality, shape and quantity. These findings concur with ECI (2003) who reported that oranges are produced without any fertilizers or pesticides in Muheza district. In addition, MMA (2008) reported that most farmers apply minimal crop husbandry practices as there is no spraying, pruning or removal of surplus flowers. It is advised that where oranges grow in monoculture; slashing of undergrowth and grass should take place once or twice a year.

3.1.5 The productivity of land

Findings revealed that productivity of the land (57%) was among challenges in orange production. Low productivity of land normally, caused by excessive use of land for growing oranges for a long period of time. The use of natural or industrial fertilizers seasonally can improve the land productivity. During focus group discussion one member said that:-

> *"Responsible organs and people must encourage farmers to plant new trees to replace the ones that are old and those that are dead in order to increase orange production".*

These findings furthermore, confirmed by MMA (2008) which reported that new cropping systems needed that not only will increase the land productivity, but also maintain their resource base (soil quality, soil health and ecosystem health) and facilitate biodiversity in agricultural landscapes. Additionally, continue use of cultivated land without replenishment it with nutrient has contributed to a decline in soil fertility in Tanzania rural areas (URT, 2004).

3.1.6 Problem of theft

A result indicates that 56.3% of respondents mentioned theft as among challenges facing orange production. There are incidences whereby wicked pickers steal oranges from farm when picking and then hide them elsewhere for sale and usually to unfaithful middlemen who want to buy oranges at lower prices (Katimba, 2011). During focus group discussion Agriculture Extension Officer from Songa ward said that:-

> *"Stealing normally occurs during the counting process and this is a serious challenge especially to illiterate farmers. Substantial amounts of oranges lost trough this channel and hence reduces household income in every season".*

3.1.7 Affordability to farm inputs

About 53.3% of the respondents said that they fail to develop adequately their orange farms due to lack of fund to access farm inputs. These findings are in line with that of Makorere (2012) who reported that farmers fail to buy even pesticide, fertilizers, weed killers or cleaning the farm throughout the year. According to him, most of the orange farmers who do not have a financial means to acquire the necessary inputs, go to trader to ask for down payment before orange have ripened in order to have funds for farm maintenance. Sustainable citrus fruits production greatly depends on using good inputs. Orange production mostly affected by pest and insects which destroy oranges that are in the stage of harvesting. Notwithstanding, insecticides/pesticides were available to agro-dealers for TZS 30,000 per litre, but to most farmers they see this price to be too high to afford. Field work revealed that most of orange farmers were not applying fertilizer. However, the application of fertilizer such as industrial fertilizers or non-industrial (manure) is important for high yield and quality of fruit. This observation is in agreement with ECI (2003) who reported that most citrus fruits in Muheza district are produced without using fertilizers or pesticides/pesticides. In the study area small-scale farmers experience difficulties in acquiring technologically improved inputs and seedling trees than large-scale farmers. Lugendo (2012) reported that about 40% of oranges produced in Muheza district are damaged by pests and diseases every year.

Table 24: Challenges affecting orange production (n = 135)

Challenges	Responses	Percentage
High production cost	116	85.9%
Accessibility to market information	105	77.8%
Affordability to farm inputs	72	53.3%
Poor farming practices	86	63.7%
Shortage of rainfall	112	83.0%
Low productivity of land	77	57.0%
Problem of theft	76	56.3%

Note: percentages are based on multiple responses

3.2 Challenges Facing Orange Farmers Based on Regression Analysis

A Multiple linear regression analysis was further used to assess challenges facing farmers engaging in orange production in the area and results are presented in Table 3. The Ordinary Least Square results linking orange output (production) to farm challenges had F – value of 16.62. This indicated that the model used significantly ($p < 0.001$) account for the joint variation of independent variables with the dependent variable. In addition, the R^2 value indicates that the variables included in the estimated regression equation accounted for 53% of the variations in the model. This indicated that regression model was fairly good at explaining the relationships between the dependent variable and independent variables. Moreover, the independent variables such as high production cost, affordability to agricultural inputs, poor farming practices and shortage of rainfall were statistically significant.

Production cost had a significant ($p < 0.001$) influence on the orange production with the negative coefficient. This implies that increase in production cost would result into decreased orange output. Non affordability to agricultural inputs also significantly negatively affected orange production ($p < 0.01$). This finding is similar to that of Asafo-Adjei and Buabeng (2016) who reported that lack of access to improved seeds and other inputs to be among technical challenges facing Ghanaians farmers. Poor farming practice also negatively affected orange production significantly ($P < 0.01$). Apart from affordability, this could also be attributed to poor or lack of access to agricultural education and extension services among farmers. These findings corresponds with those of Shiferaw et al. (2006) which revealed that when farmers operate on independently, access to farm inputs/ or market outputs is invariably more limiting and products are usually low paid.

Furthermore, shortage of rainfall had a negative relationship with orange production and was statistically significant ($p < 0.001$). Access to water enhances orange production (output) as crops receive adequate moisture needed for plant growth. These findings concur with that of Mwatawala et al. (2016); they reported that production of crops depends much on the availability of rainfall which makes seeds to germinate. The unreliability of rainfall greatly affects the production of crops as the crops depend much on water. Accessibility to market information, productivity of land and theft did not significantly pose challenges in production of oranges in the study area ($P > 0.05$). However, unexpectedly accessibility to market information was positively related to orange yield. But both the productivity of land and theft negatively related to orange yield.

Table 35: Multiple linear regression analysis for challenges facing farmers in orange production

Independent variables	B	Std. Error	Sig.
Production cost	-4597.83	917.48	0.000***
Accessibility to market information	270.53	751.21	0.719
Affordability to farm inputs	-2005.94	677.97	0.004**
Poor farming practices	-1983.44	666.32	0.003**
Shortage of rainfall	-3051.78	838.98	0.000***

Independent variables	B	Std. Error	Sig.
Productivity of land	-908.41	641.92	0.159
Theft	-1024.33	637.56	0.111
Constant	15488.03	1222.03	0.000***

R^2 = 0.4781, F- value = 16.62, p < 0.001; ** Significant at p < 0.01, *** = Significant at p < 0.001

4.0 CONCLUSION AND RECOMMENDATIONS

The study concludes that affordability to agricultural inputs, poor farming practices, shortage of rainfall and high production costs were the significant challenges that facing orange farmers in Muheza district. Inaccessibility to market information, low productivity land and theft insignificantly challenged farmers engaging with production of oranges in the study area.

The study therefore makes the following recommendations;

- Government should employ more extension officers and should provide adequate working facilities to them in order to enable efficient transfer of technologies. This will reduce the habit of poor farming practices, consequently, orange productivity will improve which will lead to more income from orange farming.

- Since orange production is among the main agricultural activities from which the rural household depend on their livelihood in the study area, government and other stakeholders should find the way of reducing burden of production costs to oranges farmers through initiating input subsidy program. This will probably lead to increase in the use of agricultural inputs and orange productivity; consequently this will lead to increment in annual household income to many families in the study area.

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