



Analysis of Maize Profitability among Smallholder Farmers in Mbinga District, Tanzania

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ABSTRACT

This cross-sectional study analyzed the profitability of maize production among smallholder farmers in Mbinga District, Ruvuma, Tanzania. A multistage sampling procedure was applied to select 120 smallholder farmers. Data was collected by using semi-structured questionnaires and then analyzed by using descriptive statistics and farm budgeting technique. The results reveal that Gross Margin for maize enterprise was 1,182,650.79 TZS per hectare. This implies that maize farming is a profitable enterprise in the study area. The study recommends that the government should promote financing mechanisms to facilitate conducive environment for investment in the subsector. More, it is recommended that the government should manage the inputs subsidy provision by using participatory techniques. Further, the government should regulate informal maize markets to protect the welfare of farmers. Moreover, youth, women and people with disabilities should utilise the funds (10% of councils' budgets) available at the Local Government Authorities to engage in agricultural activities. This will ultimately offer an opportunity to reduce unemployment in such localities.

Key words: smallholder farmers, maize production, profitability, gross margin analysis, costs

1. Introduction

The national development vision 'Tanzania Development Vision' (TDV) 2025 is set to accelerate economic transformation of Tanzania. Among other initiatives it recognises food self-sufficiency and household food security strategy as a central goal in attaining high-quality livelihood among her citizens. This is mostly achieved by predominantly focusing on major food crops that can suffice the strategy. Lyimo et al., (2014) identified that more than 80% of the Tanzanian population consumes maize by regarding it as a major source of food. Suleiman and Rosentrater (2015) identified that maize crop accounts for about thirty-one percent of total food produced in Tanzania. It constitutes 75% of the cereal consumption countrywide with its per capita consumption standing at 128 kilogrammes per annum. The crop contributes 35%, on average, to a daily calories consumption (BEFS, 2013; Zorya et al., 2011). Peter et al., (2013) depicted that the amount consumed per day per person for maize is nearly 400 grammes in Tanzania. Maize has been a grown and a consumed staple annual food crop for most of the Tanzanian households. It has the strength of being grown in almost all agro ecological zones in United Republic of Tanzania (USAID, 2010). Eighty percent of maize is produced by small-scale farmers who grow it mainly for subsistence and a little as a cash crop (Wilson & Lewis, 2015). It is estimated that between 65 and 80 percent of all maize produced is consumed within the producing households and the rest of only 20 percent to 35 percent is channeled to the markets (Wilson & Lewis, 2015).

Ruvuma region is among the major maize producer regions in Tanzania. It is along the Southern highlands zone that offers a high volume of the maize yield in the country. The region has an area approximately being planted into maize, where cassava ranks the second, with 19% being the largest planted area with annual crops (2007/08 National Sample Census of Agriculture [NSCA], 2012). The area approximately planted into maize constitutes about fifty percent of the area occupied with annual crops in the region. Compared to its area for crop plantations, the region has to significantly increase maize production and rip the advantages from it. This is due to its proximity to the export markets such as Mozambique which turns out to be another important opportunity to raise its local maize production. Among the significant maize producer districts in Ruvuma region, Mbinga district has the opportunity to contribute largely to the share of the grain basket. This is due to the reason that it has the largest area 65,770 hectares which accommodate cereal plantations followed by Tunduru district with 63,089 hectares, Namtumbo district with 38,163 hectares, Songea Rural District 37,284 hectares and Songea Urban District 5,687 hectares (NSCA, 2012).

Mbinga district has the largest area for maize cultivation. It has the opportunity to boost maize production within the region and ultimately contribute to a basket in raising national production capacity of maize. Raising local and national production capacity may account in fulfilling the objectives of self-food sufficiency and food security within the country. It is rationally considered as a cheap source of calories compared to fruits, vegetables and animal source protein foods. For that case; the crop is considered as the highest priority and the most important strategy for achieving household food security in the country (FAO, 2016; Homann-Kee et al., 2013). Despite the importance it has both for food security and economic well-being among communities, maize production and productivity among producing households is stand at 1.2 – 1.5 tonnes/ha compared (World Bank, 2015; URT, 2015; DTMA, 2014; URT, 2008).

The government has designed diverse sectoral and macro initiatives to pilot and transform the country into a middle-income nation by 2025. These initiatives include; the National Strategy for Growth and Reduction of Poverty (NSGRP I and II), introduction of District Agricultural Development Plans (DADPs), Agricultural Sector Development Programme (ASDP), Japan Policy and Human Development (JPHD), the Eastern Africa Agricultural Productivity Programme (EAAPP), and Southern Agricultural Growth Corridor of Tanzania (SAGCOT). These initiatives aim at, among others, revolutionising agriculture which promotes economic growth. This entails boosting up crops production and commercialization. Technically, the initiatives are imperative in enhancing food security and improving peoples' livelihood by transforming subsistence agriculture to a commercialised one.

However, despite these efforts in place, maize production and productivity are unstable and unaccounted important for commercial purposes to most smallholder farmers (URT, 2015; MAFAP, 2015; Baha, 2013; URT, 2011; MAFC, 2011; Suri, 2011). Hitherto, considerable studies have been conducted on maize sub sector in Tanzania (Barreiro-Hurle, 2012; URT, 2015; Mcharo, 2013; Suleiman and Rosentrater, 2013; Lyimo et al, 2014; Suleiman et al, 2015; Urassa, 2015; Wilson et al, 2015). The studies have mainly grounded on perception, use of improved maize varieties, maize production on the context of post-harvest losses and the risk of mycotoxins contamination, production efficiency, storage, value chain, incentives and disincentives, and production in the context of reforms of 1980's in Tanzania. Although substantial research has been devoted to maize sub sector, still there is an empirical gap on the analysis of the crop profitability among the smallholder households.

This study analysed the profitability of maize production among smallholder farmers in Mbinga District, Tanzania. Specific and crucial attention is directed on understanding analysing the input costs, demographic features and profitability of maize production within the district. The purpose of this study was to analyse the profitability of maize enterprise among smallholder farmers in the district.

2. Materials and Methods

This questionnaire based study was conducted in Mbinga District, Ruvuma, Tanzania. The district has the potential of largest area for maize cultivation within the region. The study employed a multi-stage sampling procedure to select 120 smallholder maize farmers. At first stage, the district was purposively selected. The second stage involved a random selection of four (04) wards; Kigonsera, Kikolo, Matiri, and Mpepai. The last stage involved a proportional selection of smallholder farmers from each ward to form a sample of 120 respondents. Semi-structured questionnaire was used for data collection in the households. The data collected included farmers' socioeconomic characteristics, amount of maize harvested (output), cost of input, price for maize sold and the quantity of the output sold.

Data was described by using descriptive statistics i.e. frequency, means and percentages. While, the Gross Margin Analysis (GMA) one of the farm budgeting technique was employed to estimate the profitability of maize produced. GMA was ideal because it assesses the financial performance of the farming enterprise by using the input-output data obtained. Further, Olukosi, Isitor and Ode (2006) describe GMA as useful method in computing profitability of small-scale agribusinesses. It is the difference between gross values of production and the gross variable costs. Gross margin excludes the fixed costs incurred in the maize production process. The formula used for GMA is described in (1)

$$GM = PQ - \sum_{i=1}^n x_i y_i \dots \dots \dots (1)$$

Where:

- GM** means gross margin of the farming enterprise
- P** stands for the price of maize output
- Q** stands for quantity of maize output
- PQ** stands for the total revenue
- X_i** stands for a unit price of the variable input i;
- Y_i** stands for the quantity of variable input i used
- n** stands for a number of variable inputs used

3. Results and Discussion

A total of 120 smallholder farmers were valid for data analysis. Table 1 presents the characteristics of the smallholder farmers in the study area. A detailed analysis is presented in the subsection 3.1:-

3.1 Socioeconomic profile of smallholder maize farmers

This study used a sample of 120 smallholder maize farmers. Among the respondents, males were 94 comprising 78.3% of the sample and females were 26 that comprised 21.7% of the sample. From Table 1, it is shown that majority of the household heads were males while few household heads were females. This exhibits that a larger number of males participated in maize farming. This was fuelled by higher demand of manpower in the on-farm activities. These results align with Fakayode et al., (2009) who determined that majority (95.5%) of households were male-headed in their study area.

Also, age is among the most important features in studying the particular phenomenon in the society. It is evidenced from Table 1 that majority of the farmers were of the age ranged between 15 and 59 years. This denotes that maize farming activities are relatively performed by young people who are principally active and productive in the study area. The findings relate with Onuk et al., (2010) who conducted a study on the economic analysis of maize production in Nigeria.

More, marital status of the farmers was examined so as to provide an overview of their marriage status within the study area. The group of the married respondents dominated the sample by 86% while the respondents who were divorced formed a minority group of 1% implying that divorced couples were very few the study area. Generally, this means that the output from the maize farming was a joint effort of the married couples as it is associated with the supply of labour. This notion is coincided with Amaza et al., (2006) who asserted that family labour is assumed to be easily accessible and influenced under the presence of married couples.

Further, the level of education of the farmers was described because it capacitates them on learning various ways to improve their livelihood status. As presented in Table 1, the farmers with primary education comprised majority 87.5% of the sample. Also, farmers with secondary and tertiary education occupied 10.8% and 1.7% respectively. The study findings imply that the farmers attained formal education that enabled them to read, write, and interpret farm operations' information. This is evidenced in Ahmed et al., (2013), Onojah et al., (2013) and Fakayode et al., (2009) who identified that formal education was attained by majority farmers in their study areas.

Furthermore, farming experience results show that the age ranging between 20 to 29 years occupied 40% of the farmers. Also, the age ranging between 10 and 19 years occupied 20% of the sample and was the least. The findings denote that large portion of the smallholder farmers are well experienced with maize farming. This is in line with Oyewole (2012) who determined that productivity is directly related with years of farming experience. This is geared by the competences acquired in mastering the production techniques among farmers.

Moreover, results show that maize farming was predominantly conducted to majority of farm sizes (plots) ranging between 2.6 and 5.0 acres (1.05 to 2.02 hectares) that occupied 67.5% of sample. The average farm size (plots) was 4.56 acre (1.85 hectares). This signifies that the farming activity in the study area was principally occupied by smallholder farmers. These findings are in accordance with Olayide (2013) who identified the smallholder farms that ranged from 0.1 hectare to 5.99 hectares in Nigeria.

Table 1: Demographic profile of smallholder maize farmers in the study area

Variables	Frequency	Percentage
Gender		
Female	26	21.7
Male	94	78.3
Age Group		
15 - 29	21	17.5
30 - 44	49	40.8
45 - 59	47	39.2
60 - 74	03	02.5
Marital Status		
Married	104	86.0
Single	006	05.0
Widowed	007	06.0
Separated	002	02.0
Divorced	001	01.0
Level of education		
Primary education	105	87.5
Secondary education	013	10.8
Tertiary education	002	01.7
Farming experience (years)		
0 - 9	39	32.5
10 - 19	20	06.7
20 - 29	40	33.3
30 - 39	21	07.5
Farm size (acre)		
<2.5	06	05.0
2.6 - 5.0	81	67.5
5.1 - 7.5	23	19.2
7.6 - 10.0	10	08.3
Quantity produced (120 kg/bag)		
<26	64	40.8
26 - 50	51	42.5
51 - 75	16	07.5
76 - 100	09	04.2
>100	20	05.0
Total	100	100

Source: Survey data, 2017

3.2 Gross Margin Estimation

The data collected from 120 smallholder maize farmers was used to estimate the gross margins. This was performed by estimating all the variable costs associated with maize production in the study area. Then, the gross margin was estimated by using the difference between the gross value of revenue of maize sales and the gross variable cost. The analysis determined the per hectare gross margin as 1,182,650.79 Tanzania shillings (TZS). This is clearly shown in Table 2.

Table 2: Gross Margin estimates for maize production per hectare

Cost and yield items	Mean Value (TZS)	% of Variable Cost
(A) Variable Cost in Tshs.		
Labour	168,471.06	30.52
Fertilizer	146,505.96	26.54
Seed	48,957.22	8.87
Overheads	188,014.97	34.06
(B) Total Variable Cost (TVC)	551,949.21	100
(C) Total Fixed Cost (TFC)	34,090.91	100
(D) Total Cost (TC)	586,040.12	
(E) Yield in 120kg bag	20.65	
(F) Gross Income (GI)*	1,734,600	
Gross Margin (GM) = (F – B)	<u>1,182,650.79</u>	

Source: Survey data, 2017

From Table 2, TVC were the operating costs in the maize production process. The study revealed that the source of labor was both family and hired. The estimation for returns to family labor employed the principle of opportunity cost that, at the farm level, it served as a substitute for hired labour. As a such, the payment for family labour was equal to the prevailing wage rate for hired labour. Further, the results identify that the TVC averaged to 551,949.21 TZS per hectare, and a Gross Income (GI) is averaged to 1,734,600 TZS per hectare. Thus, the profitability for maize enterprise is estimated to be 1,182,650.79 TZS per hectare in the study area. This confirms that maize farming is generally profitable in the study area. This avails the opportunity for commercialisation of maize enterprise by respective households. In fact, the farming activity exposes numerable opportunities to farmers. These are such as: - giving access to pay school fees, purchasing transport facilities such as a motorcycle, conducting the construction and renovation of buildings, purchasing other household assets and financing medical expenses.

The results of this study are in consonance with the studies by (Afolami & Ogunwande, 2021; Alemu et al., 2021; Yisa et al., 2018; Liverpool-Tasie et al., 2016; Mohammed et al., 2013; Sadiq et al., 2013; Olujeno, 2008). The studies analysed the profitability of the maize production in various localities. It is generally ascertained that maize production was profitable for the smallholder farmers. This scenario was promoted by a number of issues such as the presence of conducive and supportive agricultural policies which promote maize farming in the localities. This indicates that the productive sectors in such economies are offered with sufficient support by their governments and stakeholders. In return, the subsector contributes to the household welfare and economic growth of such countries.

4. Conclusion and Recommendations

The study analysed the profitability of maize production among smallholder farmers in Mbinga District, Tanzania. It employed a multistage sampling procedure to select 120 respondents. The collected data were analysed descriptively and farm management tool (gross margin). The results revealed that total variable costs and gross revenue in the production process were 551,949.21 TZS and 1,734,600.00 TZS respectively. Further, the profit margin of maize production was 1,182,650.79 TZS per hectare in the study area. The results indicate that maize farming is profitable business in the study area.

The study recommends that the government should promote financing mechanisms to create conducive environment for investment in the subsector. More, it is recommended that the government should manage the input subsidy provision by using participatory techniques. Further, the government should regulate informal markets for maize since they distort welfare of smallholder farmers. Moreover, youth, women and people with disabilities should utilise the funds (10% of councils' budgets) from the Local Government Authorities to engage in agricultural activities. This will ultimately improve household livelihood among farmers together with the stakeholders that will involve in the value chain for maize production in the study area.

Conflict of interest

The author declares no conflict of interest

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