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Role of Tomato Production in Household Income Poverty Reduction in Mvomero District, Tanzania

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Abstract - This study intended to determine the role of tomato production to household income poverty reduction in Mvomero District, Tanzania. Moreover, it examines the socioeconomic characteristics of the farmers, determines the status of tomato production, determines the contribution of tomato production and other income sources to the total annual household income and determines the contribution of tomato production to household expenditures. A total of 220 tomato farmers were involved in this study. A study employed a cross-sectional research design. Household survey, observations, Focus Group Discussion and documentary review employed to collect data. The collected data analyzed using computer software Statistical Package for Social Science version 20. Descriptive statistics such as frequencies, percentages, mean and standard deviations employed for data analysis. The study findings revealed that the average yield from tomato production was 9182.9 Kg per acre. Also, findings showed that the mean income from tomato production per year was TZS 1,198,136.4, livestock production (TZS 141,208.3), petty business (TZS 164,285.7) and other crops (TZS 396,192.7). Additionally, findings revealed that earnings from tomato production contribute 63% of the total annual household income. The contributions from other sources of income were livestock production (7%), petty trade (9%) and other crops (21%). Furthermore, findings revealed that earnings from tomato production help farmers in accessing food (66.4%) access to clothes (63.6%), access to healthcare (54.1%) access to children's education (54.5%) and access to housing (73.2%). The study concludes that tomato production contributes substantially to the total annual household income and household income poverty reduction. Therefore, the study recommends that government and other stakeholders should ensure the availability of inputs, assist in marketing and storage facilities and the establishment of agro-processing industries, consequently this will enable farmers to realize maximum output and hence income poverty reduction at the household level.

Keywords - Household, income poverty, Non-farm activities, Smallholder farmers, Tomato.

I. INTRODUCTION

1.1 Background Information

According to the World Bank (1996) [1], poverty alleviation describes strategies to eradicate poverty. Hence, it is any process which seeks to reduce the level of poverty in a community or among a group of people. Most approaches to poverty alleviation focus on income and subsidy measures. Globally, it is estimated that 1.3 billion people had incomes below the poverty line in 1993 and this had risen to more than 1.4 billion people in the year 2000.

Tanzania's National Strategy for Growth and Reduction of Poverty (URT, 2010) [2] states the target of income poverty (basic needs poverty) to 24% in the rural area is

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ambitious and it suggests that it requires a higher and faster growth rate of GDP in rural than in urban areas [3]. The prevalence of poverty is still high in Tanzania, and poverty overwhelmingly concentrates in rural areas where 87% of the poor population lives, and it is highest among household who depend on agriculture [3].

Agriculture is an important economic sector of the Tanzanian Economy and contributes about 29.1 percent of Gross Domestic Product (GDP) [4]. It is the main source of food, employment, raw materials for industries and foreign exchange earnings. Since Tanzania is endowed with a diversity of climatic and geographical zones, farmers grow a wide variety of annual and permanent crops. This includes food and cash crops as well as fruits, vegetables and spices.

Tomato (*Lycopersicon esculentum*) is the next most important vegetable crop after Irish potato in the world [5]. It is a relatively short duration crop which gives high yields, and it is therefore economically attractive. This crop belongs to the *Solanaceae* family, and which includes other well-known species such as tobacco, peppers and eggplant [6].

Tomatoes are one of the most widely cultivated horticultural crops in Tanzania. Commonly, they are grown for home consumption in the backyard of almost every farmhouse across sub-Saharan Africa. They are the important source of vitamins and an important cash crop for both smallholders, medium-scale commercial farmers [7]. 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 [8]. Tomato is an important source of income for rural, urban and peri-urban farmers, provides employment, and supply nutrients for millions of Tanzanian people [9]. 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 [8].

According to (NBS, 2017) [10] the total planted area as regards to tomatoes production for Tanzania was 54,520 ha of which 50,645 ha (92.9 percent) were in Mainland and 3,876 ha (7.1 percent) in Zanzibar. Among regions in Mainland, Morogoro had the largest planted area with tomato which was 19,195 ha (37.9 percent), followed by Iringa (3,890 ha; 7.7 percent) and Kilimanjaro (3,890 ha; 7.7 percent). Singida region recorded the lowest planted area with tomato 78 ha (0.2 percent).

Cropping is the most important livelihood activity in Mvomero District. Over 90% of farmers earn half or more of their cash income from this activity [11]. In addition, the available information confirms that for 52% of farmers, cultivation of tomatoes is the most important source of cash income from cropping. However, the average total income per household per year in the district is 881,731 TZS, and the average annual per capita income is 262,662 TZS [11].

The National Agriculture Policy of 2013 revolves around the goals of developing an efficient, competitive and profitable agricultural industry that contributes to the improvement of the livelihoods of Tanzanians and attainment of broad-based economic growth and poverty alleviation [12]. Despite all these efforts, the income poverty still prevails in a rural area whose people depend to large extent on agriculture as a source of income. Therefore, this study assesses the contribution of tomato production to household income poverty reduction in Mvomero District.

II. Research Methodology

2.1 Study Area

This study took place in Mvomero District. The district is among the six districts in Morogoro Region other districts include Kilosa, Kilombero, Morogoro Rural, Morogoro and Ulanga. The district, located at the northeast of Morogoro region at 6˚14' 8.2212’ South and 38˚ 41' 37.4928'' East. The study focused on the tomato production in Mvomero District since it is among the districts in which the majority of its inhabitants involve extensively in tomato farming in Tanzania.

2.2 Research Design and Data Collection Methods

This study employed a cross-sectional research design. This research design involves collecting data from different respondents at one point at a time. In addition, this design is cost-effective and takes little time while assuring the appropriate quality of data.

Structured questionnaires used to collect data from the respondents involving in tomato production. Also, direct observation used in cases where respondents were unable or not willing to provide the correct information, especially in collecting information about sources of income for the households. In addition, a focus group discussion with key informants and tomato farmers was another method for data collection. Furthermore, the study used a documentary review method to gather secondary data.

2.3 Sampling and Data Analysis

Sampling frame were the households involving in tomato production in the study area. Sampling unit was a household involved in tomato production, whereby the head of the household or his/her representative picked as respondent. A total of 220 tomato farmers were used as sample size in the current study. Correspondingly, in determining the number of farmers, the study adopted the formula of Cochran (1977) [13].

Moreover, both probability and non-probability sampling techniques employed in selecting required samples. Consequently, simple random sampling used to select 220 households for interview purposes. In addition, through non-probability sampling; key informants such as Agricultural Extension Officer, Village Executive Officers and Ward Executive Officers were purposively selected to take part in the study.

The data from completed questionnaires were coded before subjected to statistical analysis. In the current study data analyzed using Statistical Package for Social Science (SPSS) version 20. The descriptive statistics analysed included frequencies, percentages means, and standard deviations.

III. Results And Discussion

3.1 General Characteristics of the Respondents

The characteristics of respondents interviewed in this study indicated in Table 1. These included age, sex, marital status, and education level.

The findings revealed that 51.8% of respondents aged between 35-60 years, followed by those aged between 18-34 years (39.5%), and with few (8.6%) aged above 60 years. This implies that the majority (91.3%) of farmers are in the economically productive age group with immense experience in tomato farming. Samshunnahar and Islam (2016) [14] also found that about 95% of tomato farmers belonged to the age group below 60 years. According to Mandara (1998) [15], household members are considered economically productive from the age of 16 to 64 years. The age brackets below 16 years are children, a number of them may be attending schools and others too young to participate in farming activities. The age group above 64 years usually considered less economically active since the members are too old.

Moreover, the study revealed that the majority (86.4%) of farmers were males, while only 13.6% were females regardless of the fact that women are the major group of actors in most farm activities. The explanation for this situation is that the study targeted households' heads. With exception of the minority households which were female-headed, the majority were male-headed. Occasionally, females provide answers on behalf of their husbands when are not around. Sarris (2001) [16] reported that in most of the African agricultural societies the families customarily headed by males. However, the current findings concur with Ojo et al. (2009) [17] and Samshunnahar and Islam (2016) [14], they found out that tomato is male-dominated production in Niger state and Bangladesh, respectively.

Additionally, concerning marital status, the findings revealed that most (80.0%) respondents are married and 15.9% of respondents are single. Furthermore, the findings revealed that divorced, widowed and separated respondents altogether make 4.1% of respondents. According to Defoer (2003) [18] most of the African crop producer lives in families to facilitate the production of their farm crops. The members of the families are vital in providing the workforce on-farm activities.

Regarding education level, most (94%) respondents interviewed had primary education. Furthermore, the findings revealed that 6% of respondents had secondary education. According to Haggblade (2002) [19], in African countries most of the crop growers have no or exceptionally low education since they reserve most of their time in producing crops. Very few have attended only the primary level of education. Moreover, Defoer (2003) [18] revealed that the majority of Africans who depends on agricultural activities has a low level of education.

3.2 Size of Land Cultivated

The study findings showed that the average farm size under tomato production is 1.4 acres. This finding differs with a report by Moranga (2016) [20] in Kenya. In his study, the average farm size is 2.0 acre. Also, in this study, 83.6 % of the farmers cultivate a farm size of 1 acre. Additionally, farmers who cultivate a farm size of 1.1 to 3 acres make up 13.7 % and few (2.7%) cultivate a farm size above 3 acres (Table 2). This finding suggests that the majority of the farmers involving in tomato production are smallholder farmers.

Table 1: General characteristics of the respondents

Variable	Frequency	Percent
Age		
18-34	87	39.5
35-60	114	51.8
60+	19	8.6
Sex		
Male	190	86.4
Female	30	13.6
Marital status		
Married	176	80.0
Single	35	15.9
Divorced	3	1.4
Widowed	2	0.9
Separated	4	1.8
Education Level		
Primary	207	94
Secondary	13	6

Table 2: Area under Tomato Production

Area (acre)	Frequency	Percentage
1	184	83.6
1.1 -2	16	7.3
2.1 -3	14	6.4
>3	6	2.7

3.3 Tomato Yield

Initial analysis revealed that the average yield was 9182.9 kg per acre. The results in Table 3 provide distribution of yields of tomato production in the study area. Furthermore, the results exposed that the majority (46.8%) of farmers obtain the yield between 6001-10000 kg per acre. These findings are contrary to a study on tomato value chain analysis for local market and value chain development investment plan in Iringa (Tanzania), which revealed that one acre of tomato, can produce a yield of 14,250 kg [21]. However, the mean yield obtained from the current study is higher by about 4000 kg as compared to FAOSTAT (2016) [22] for Tanzania in general. According to Gielen et al. (1996) [23], Abate et al. (2000) [24] and Tumwine et al. (2002) [25] yields are generally lowest in tropical Africa as a result of both abiotic and biotic factors of which the latter include primarily insect pests, diseases, and weeds.

Table 3: Tomato yields produced

Tomato Yields (Kg /acre)	Frequency	Percentage
Yield categories		
< 2000	28	12.7
2001 – 6000	50	22.7
6001 – 10000	103	46.8
10001 -14000	20	9.1
14001 – 18000	7	3.2
18001 – 20000	1	0.5
> 20000	11	5.0
Total	220	100.0

3.4 The contribution of Tomato and other Income Sources to Total Annual Household Income

Results in Table 4 revealed that the mean income earned from tomato production per year is TZS 1,198,136.4 (USD 503.4). In addition, mean annual income from livestock production was TZS 141,208.3 (USD 59.3), petty business (TZS 164,285.7≈ USD 69.0) and other crops were TZS 396,192.7 (USD 166.5).

Tomato production contributes variably to the total household income among tomato farmers in Mvomero District. Results in Figure 1 revealed that tomato production is the main source of income contributing up to 63% of the total annual household income. Furthermore, contributions from other sources are as follows: petty business (9%), other crops (21%), and livestock production (7%). The implication for this is that an improved production of tomato in the study area through using improved inputs would probably bring an increase to the total household income which in turn might lead to poverty reduction. This should be accompanied by an improvement in marketing and storage facilities. On the other hand, through focus group discussions, farmers requested the Government and other stakeholders to the emphasis on the establishment of agro-processing industries. Consequently, there will be a reliable market for tomato which will lead to an increase in production and hence, to higher income among farmers. Further results show that in general crop production contributes 84% of total household income in the study area. This does not concur with Davis et al. (2017) [26]; they reported that all the countries from Sub-Saharan Africa in their sample earn at least 55 percent of their income from agricultural sources. Similarly, Birthal et al. (2014) [27] reported that crop production and non-farm activities account for 41.1% and 24.4% of total household income in India, respectively.

Table 4: Contribution of Tomato Production and other Income Sources to the Total Annual Household Income (in Tanzanian shillings (TZS)

Income sources		Average income	Std deviation
Tomato production		1,198,136.4	1,175,686.2
Livestock production		141,208.3	191,241.5
Petty business		164,285.7	113,033.2
Other crops	396,192.7	536,671.4	
Total	1,899,823.1	2016632.3	

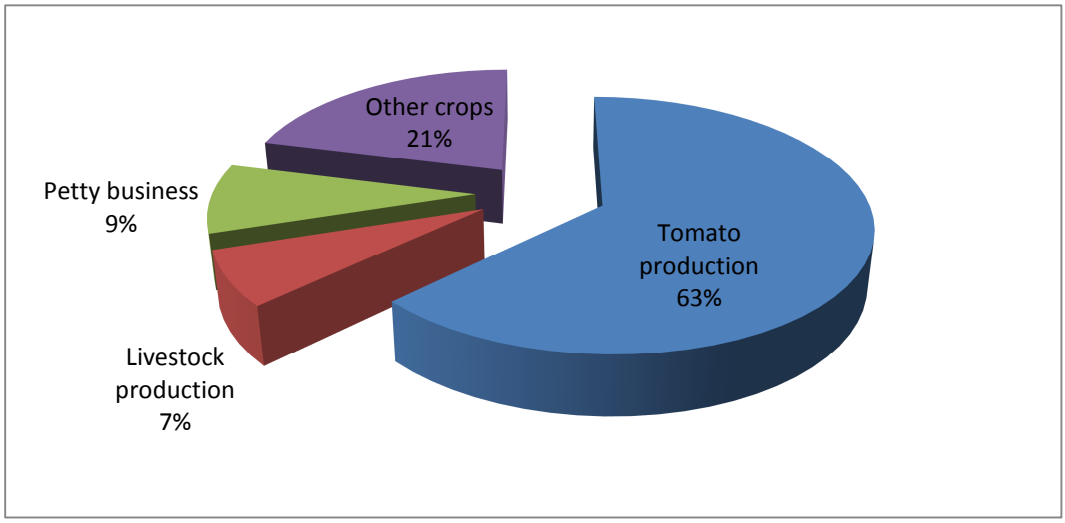

Figure 1: Contributions of Tomato Production and other Income Sources to the Total Annual Household Income (in percentages)

3.5 The contribution of Earnings from Tomato Production to Household Expenditures

In order to determine the contribution of earnings from tomato production to household expenditures, a descriptive statistics used to comprehend the extent to which tomato production helps farmer's to acquire basic needs such as access to decent housing, helping children education, access to clothes, access to health care and access to food. Results in Table 5 revealed that contribution of earnings from tomato production to household expenditure is very high for food (66.4%), housing improvement (73.2%), clothes (63.6%), healthcare (54.1%) and children's education (54.5%). Therefore, this implies that tomato production contributes substantially to household income poverty reduction among farmers in the study area. Similarly, a study by Mlelwa (2013) [28] revealed that the majority (70.5% and 76.4%) of vegetable grower reported improvement in food availability and accessibility respectively, at household level after a household decided to participate in the production of vegetables. Moreover, according to United Nations (1997) [29], poverty had diverse dimensions; nevertheless, that of food is mainly fundamental since food accounts for 80 percent of all human basic needs. Consequently, people who survive chronically lacking access to sufficient food considered to be poor. The number of poor usually, defined in terms of those people

with an income level which does not allow them to access sufficient food.

Table 5: Contributions of Earnings from Tomato Production to Household Expenditures

Expenditures	Very high	High	Average	Low	Very low
Access to food	146(66.4)	46(20.9)	14(6.4)	3(1.4)	11(5)
Housing improvement	161(73.2)	16(7.3)	22(10)	16(7.3)	5(2.3)
Access to clothes	140(63)	7(3.2)	10(4.5)	54(24.5)	9(4.1)
Healthcare	119(54.1)	13(5.9)	21(9.5)	41(18.6)	26(11.8)
Children's education	120(54.5)	16(7.3)	22(10)	18(8.2)	44(20)

Note: Number in the parenthesis are respective percentages

IV. Conclusion And Recommendations

According to the findings from the current study, tomato production is dominated by males and the majority of farmers have a basic level of education to cope with farming activities. Also, most of them are inactive age group. In addition, findings revealed that the contribution of tomato to the total annual household income is greater than other income sources. This subsequently assisted tomato producers in reducing substantially income poverty in the study area. This, in turn, enhanced the capabilities of the farmers in meeting the household needs such as access to food, access to health care, fees for children's education, access to clothes and improvement of housing conditions.

Since tomato production contributes substantially to the total annual household income, it is recommended that the conducive agricultural environment is enhanced by local government authorities and other stakeholders by ensuring the availability of all necessary farm inputs and creating readily available markets (since tomato is highly perishable) such that farmers can realize maximum output and hence earn more profit. The marketing aspects can be through improving infrastructures such as storage facilities and value addition. Also, the establishment of agro-processing industries in the study area will create a readily available market for tomato.

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