

Factors influencing carrot production among smallholder carrot growers in Songoro Ward, Meru district council, Tanzania

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ABSTRACT

The study aims to examine the socioeconomic determinants of carrot production among smallholder carrot farmers. The present study is grounded in the Sustainable Livelihood Framework (SLF). The study adopted a cross-sectional research design with an exploratory sequential and mixed-method approach, whereby qualitative data were first collected, followed by quantitative data. A sample of 286 smallholder carrot farmers was selected using simple random sampling techniques. The qualitative data were analyzed using thematic content analysis with a constant comparison. Quantitative data were entered into the IBM Statistical Package for Social Sciences (SPSS), where descriptive statistics and inferential statistics were employed. A multiple regression model was used to assess the socioeconomic determinants of carrot yield in Meru District Council. The sample size selected is adequate for preliminary findings, but the results may not be very generalizable to other countries due to context-specific factors and socio-cultural differences. The results indicated that age, carrot income, education, household size, land sizes, and carrot farming experience were significant determinants of carrot yield at a $p < 0.05$ significance level. The study's practical significance lies in developing recommendations to enhance carrot production in the Meru District Council. Human capital and socioeconomic characteristics can make valuable contributions to carrot production and increase smallholder farmers' carrot yield. This work contributes by elaborating on how carrot production can be enhanced through the improvement of household income, creation of awareness among smallholder farmers about the potential of carrot production, use of family labor to increase crop yield, and the need for more land allocation for carrot production.

Keywords: Carrot Growers, Carrot Production, Carrot Yield, Meru District Council, Songoro Ward, Tanzania

I. INTRODUCTION

Worldwide, carrot farming represents one among the valuable vegetable (Yigezu *et al.*, 2025). The crop plays a significant role in the improving household income and improving nutrition of the household, due to its economic and dietary importance (Simon, 2021). In recent years there has been increasing demand for carrot worldwide due to its potential as it is used as a vegetable and for preparing soups, salads, stew curries and other dishes (Mall and Pate, 2024). The carrot seed also contain essential oil which is used for flavouring and perfumery (Yigezu *et al.*, 2025). According to Sewando *et al* (2022), the crop offers health benefits such as; strengthening the immune system, regulating metabolism, promoting urination, improving menstruation cycle, maintaining a healthy skin, improving vision, reducing the risk of; high blood pressure, stroke, heart disease, and some types of cancer.

In Tanzania carrot is being cultivated in various areas of rural Tanzania and serves as an important crop for food and commercial purposes among the smallholder farmers. Among others, Arusha region has the potential of supporting and accommodating the farming that is predominant in Arusha and Meru districts. The farmers in the districts have close proximity to local community markets in Arusha region. Many of the markets are predominantly found in Meru district council where farmers can access for commercial production of the crop. Further, the existence of commercial markets in regions such as Dar es Salaam, Kilimanjaro, Dodoma, and Morogoro provide incentives for farmers to improve their production which can directly affect their livelihood (Sewando *et al.*, 2022).

While carrot farming is recognized to be the engine of growth of the economy, most smallholder farmers continue to register low carrot yield (Sewando *et al.*, 2022). Likewise, despite its potential contribution to the market, it is not clearly known the factors that determine crop production by the farming households. Therefore, this study analysed the factors influencing carrot production by smallholder farmers in Meru district council, Arusha Tanzania. The findings of this study provide evidence on the carrot yield among smallholder farmers. The study contribute the efforts of the Sustainable Development Goals and Tanzania Development Vision 2025 which advocate commercialized smallholder farming to sustain and improve livelihoods.

1.1 Statement of the Problem

Recent studies have explored the challenges and opportunities, breeding, Determinants of profitability, determinants of commercialization, post-harvest losses, cost-benefit analysis and market supply determinants (Simon, 2021; Sewando et al. 2022; Djoufack *et al.*, 2024). Studies have also assessed the production efficiency and market performance of carrot and price dynamics (Osmani & Hossain, 2015). However, only few studies directly assessed factors influencing carrot production among smallholder carrot farmers, particularly employing empirical approaches that consider institutional factors, demographic and socio-economic characteristics factors, market factors and technological factors (Sultan, 2016; Kyaw *et al.*, 2018; Rugebe *et al.*, 2019; Dube, 2020; Hltshwago *et al.*, 2021). Also a few empirical studies have been conducted on the determinants of smallholder farmers carrot production. Most of the previous studies focused on staple crops and other vegetable crops, leaving a gap in understanding the determinants of smallholder farmers carrot production unexplored.

1.2 Research Objectives

The objective of this study was to examine the factors influencing carrot production among smallholder carrot farmers

II. LITERATURE REVIEW

2.1 Theoretical Review

The present study is grounded in the Sustainable Livelihood Framework (SLF) which conceptualize the interaction of socio-economic characteristics influencing vulnerability, opportunities, livelihood characteristics, assets and adaptive capacity (Natarajan *et al.*, 2022; Dabla-Norris *et al.*, 2015). Sustainable Livelihood Framework (SLF) as developed by DFID also focuses on how the resources are used as an asset to improve human well-being and promoting development by considering livelihood assets, processes and structures and livelihood strategies to achieve livelihood outcomes (Wendimu *et al.*, 2016). Grounded in the Sustainable Livelihood Framework, this study characterizes determinants of carrot yield among carrot smallholder farmers in Meru district council.

2.2 Empirical Review

Previous empirical studies have examined the determinants of crop yield. Socio-economic characteristics of smallholder, such as education level, age, and sex, are assumed to have some effects on the crop yields (Kubwimana 2020). A higher education level of farmers could possibly increase knowledge and ability, making them more reasonable and open-minded, and better evaluate the gains of the improved technology (Sennuga *et al.*, 2020). This is the basis that stimulates an individual's rational thinking, integrated with other social and economic capacities for increased crop production. As a result, farmers' education level usually has a positive impact on the decision to adopt new technology hence increase crop productivity. Gender issues have also been investigated in many studies related to the crop productivity, and different results on the roles of men and women have been found. Farm structure, including farm size, labour force, and household income, is also part of the determinants (Rugube *et al.*, 2019; Djoufack *et al.*, 2024).

In many studies, farm size or land holding of the farm household is considered an important determinant of crop yield (Panga & Lyaro, 2023). The availability of the agricultural labour force within the household may facilitate the application of technology due to liquidity constraints; the majority of households cannot easily acquire hired labour (Rugube *et al.*, 2019). The impact of the farm household income on increase in production per hectares has also been investigated, and it is usually reported that farms with higher income tend to adopt new agricultural technology more than those with lower income (Kubwimana, 2020). The studies also revealed that sex is important and positive in the improvement of crop yield due to more access to agricultural technologies because male-headed households have more interactions with extension officer when compared to female-headed households. Social and cultural norms and values give men more access and control over land and production resources.

III. METHODOLOGY

3.1 Study Area

The study was conducted in Meru District Council where four villages namely Sura, Ushili, Urisho and Songoro from Songoro Ward were purposively selected. The area was selected due to having higher number of smallholder carrot farmers (Sewando *et al.*, 2022).

3.2 Research Design

A cross-sectional research design was adopted in order to assess the factors influencing carrot production. The design enables collection of data at a single point in time and allows measurements of outcomes and exposures in the study respondents at the same time (Bernard, 2017). The design was deemed appropriate due to the fact that it is cost-



effective, less time-consuming and more information could be obtained (Omolo, 2017). Exploratory sequential research strategy was adopted with the initial phase of qualitative data collection and analysis which was followed by a phase of quantitative data collection and analysis. Exploratory research approach was adopted to integrate the results from two stages so as to expand the scope and improve the quality of the results (Courtney, 2017).

3.3 Sampling Techniques and Sample Size

The sampling unit was a household engaging in carrot production. The quantitative data collection involved a household survey whereby 286 households were involved. Sample size was estimated using a simplified formula by Yamane (1973) as cited by Israel (2013).

$$n = \frac{N}{1+N(e^2)}$$

Where

- n is sample size;
- N = Size of population of carrot farmers.
- e is the error margin.

Thus,

$$n = \frac{1000}{1+1000(0.05^2)}$$

n= 286 respondents

To obtain an eligible sample from each of the four villages, a proportionate sampling method was used to calculate a sub-sample from each village, as proposed by Kothari (2004). The smallholder farmers participating in the study included 285 households in Sura village, 266 in Songoro, 234 in Ushili, and 215 households in Urisho village. Hence, the total sample frame for the study was 1,000 registered carrot-farming households across the four selected villages. The researcher employed proportionate sampling to determine the eligible sub-sample for each village using the following formula:

$$\text{Proportion} = \frac{\text{Cluster Sample (Location)} \times \text{Desired Sample Size}}{\text{Total population}}$$

For this study, this becomes:

Proportional Sample by using the Formula

$$\text{Proportion} = \frac{\text{Cluster Sample (Location)} \times \text{Desired Sample Size}}{\text{Total population}}$$

For this study, this becomes:

$$\begin{aligned} \text{Sura} &= \frac{285 \times 286}{1000} = 82 \text{ respondents} \\ \text{Ushili} &= \frac{234 \times 286}{1000} = 67 \text{ respondents} \\ \text{Urisho} &= \frac{215 \times 286}{1000} = 61 \text{ respondents} \\ \text{Songoro} &= \frac{266 \times 286}{1000} = 76 \text{ respondents} \end{aligned}$$

The purposive sampling was employed to get eligible participants in qualitative study in Focus Group Discussions (FGDs) and Key Informants Interviews (KIIs). Participants in FGDs and KIIs were selected based on their position, knowledge and participation in carrot value chain.

3.4 Research Instruments

The total sample frame for the study was 286 households were involved in household survey while Checklist of questions was used to collect data from four FGDs in Sura, Ushili, Songoro and Urisho vilages with participants ranging from 8-10 and 6 KIIs Ward Executive Officer (WEO), four Village Executive Officers (VEOs) and Meru District Agricultural, Irrigation and Cooperative Officer (DAICO). FGDs and KIIs were conducted to get participants



views and opinion on profitability of carrot farming, distribution of land for carrot farming to different sex and age categories and land size allocated for carrot farming.

3.5 Data Analysis

Qualitative data were analyzed using content analysis whereby words were transcribed and organized into different themes based on the study objectives. On the other hands, quantitative data were entered in Statistical Package for Social Sciences (SPSS) Statistics, version 25 whereby descriptive statistics was used to determine socio-economic characteristic of smallholder carrot. Multiple Regression Model was used to assess factors influencing carrot production in Songoro ward. The dependent variable Carrot production was measured by using carrot yield in kilograms. Multiple regression model was suitable to determine the factors influencing carrot production among smallholder farmers since the dependent variable (Carrot yield) was measured as a continuous variable and it was predicted by multiple explanatory independent variables. The model had the following form:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + e$$

Where:

Y = Carrot Yield in kg (Outcome variable).

$\beta_1 \dots \beta_{11}$ = estimation parameters

X_1, \dots, X_{10} = explanatory variables as indicated in table

β_0 = the intercept

e = Regression error term

The variable under examination, carrot production, was assessed through a carrot yield designed to gauge the extent to which socio-economic factors influenced carrot production in terms of carrot yield. The Independent variables entered in the multiple regression model were those captured during theoretical and empirical literature review.

Table 1

Measurement of Variable entered in Multiple Regression Model

Variable Definition	Unit of Measurement	Assumed Influence
X ₁ = Age of the carrot farmers	Years	+
X ₂ = Sex of household head	1 if male headed household, 0 if otherwise	+
X ₃ = Education of the household head	Years of schooling (measured in years)	+
X ₄ = Land Size allocated for carrot	Land size (measured in acres)	+
X ₅ = Household size	Number of active people in the household	+
X ₆ = Market participation	1 = participation and 0 = no access	+
X ₇ = Carrot farming experience	Number of years in carrot farming	+
X ₈ = Access to extension services	Frequency of visit by extension officer),	+
X ₉ = Income from carrot	Total income from carrot production in TZS	+
X ₁₀ = Marital status	1 if married 0 if otherwise	+
X ₁₁ = Access to credit status	1 if access 0 if otherwise	+

IV. FINDINGS & DISCUSSION

4.1 Findings

4.1.1 Socio-economic Characteristics of Smallholder Carrot Farmers

The findings on smallholder carrot farmers socio-economic characteristics in Table 2 depict that mean age was 42 years. This suggest that most of carrot farmers were young. The results suggest that carrot production is intensive activity that requires people with active age. As observed by Paparella *et al.* (2024), the level of production in carrot farming tend to increase with the optimum age group and starts to drop with an increase in Age. The Mean years of schooling was 7.2 years. The results suggest that most carrot farmers were likely to adopt new carrot varieties which fetch higher yield. This results correspond to the previous studies as reported by Sewando *et al.* (2022) who found that education had great contribution in production by smallholder farmers.



Table 2
Household's Socio-Economic Characteristics (n=286)

Variable	Standard Deviation of the Means and Means
Age	42 (15.4)
Education	7.2 (2.4)
Household Size	5 (2.3)
Land Size	3.8 (3.7)
Frequency of extension officer visit	2.7(1.5)
Experience in carrot-farming	9.6 (7.8)
Total carrot produced in (bags)	15 (4.9)

*The number in brackets are standard deviations of the means and the number out of brackets are the means

The mean household size as presented in Table 2 was 5 household members. This implies that participating household in carrot production had enough family members to supply labour to enable them to improve carrot agronomic practices. Similar result were reported by Masere and Worth (2022) who reported that higher number of active family members were one of the predictors for crop yield among smallholder farmers. The mean land size as depicted in Table 2, was 3.8 ha. This suggest that smallholder farmer had enough land and hence they are likely to adopt new innovation introduced by extension officers hence increase their carrot production. The mean frequency of extension visit was 2.7 visits. This findings suggests that smallholder carrot farmers had at least one contact with extension officers. Studies by Pariasa and Hardana; 2023; Sultan 2016; Sennuga al., 2020) reported that households with more frequent contact with extension officers had more chances of increasing crop production due to access to market information channeled by extension officers. The mean years in carrot farming was 9.6 years. Experience in carrot farming is very important to smallholder farmers as this implies that they have wealth of experience in testing different carrot agronomic practices brought by extension officer. Previous studies by Hlatshwayo et al. 2021; Dube, 2020; Okurut et al.(2014) reported that most of farmers who adopted innovation were those who had long experience in farming of respective crop.

Table 3
Demographic Characteristics of Respondents (n=286)

Characteristics		Frequency	Percent
Sex	Male	214	75
	Female	71	25
Access to market information	Access	180	63
	No access	105	37
Marital status	Married	205	72
	Single, Window, Separate	80	28

The results indicate that 75% of head of the household were male. This implies that most farmers who were engaging in carrot production were male as in most cases cash crops like carrot are in most cases male crop. Most of respondents were members in carrot farming association. The reasons for this is that most innovation brought by extension officers are channeled to farmers through their association. Similar results were reported in previous study by Rugube *et al.* (2019). The results further indicate that, 63% of smallholder carrot farmers had access to market information. This implies that majority of carrot farming community had access to market information which is crucial in making decision on number of acres to cultivate and type of crop to grow. This findings is consistence with previous study reported by Sennuga *et al.*(2020). On the other hands, most of the carrot farmer (72%) were married while only few (28%) were single,widow and separated.

4.1.2 Factors Influencing Carrot Production

Before conducting the multiple regression analysis, several assumptions were assessed. The Durbin-Watson's test resulted in a value of 2.023, falling within the recommended range of $0.5 < d < 2.5$, as suggested by Kutner et al. (2005). This indicates the absence of auto-correlation in the multiple regression analysis. Moreover, the model testing results indicated that the correlation coefficient (R) was 0.698, indicating that the independent variables collectively shared an association with the dependent variable, accounting for 69.8% of the variance. Additionally, the coefficient of determination (R²) was 0.589, implying that the model could explain 58.9% of the variation in the dependent variable. These findings are in line with cross-sectional data patterns as reported by Okurut et al. (2014). The Normality assumption was evaluated using the Shapiro-Wilk test, and since the dependent variable did not follow a normal distribution, it was transformed using natural logarithms. To check for collinearity or multicollinearity among the independent variables, diagnostic tests were performed. As outlined by Pallant (2011), multicollinearity occurs when

there is a linear or near-linear relationship among the explanatory variables. Tolerance and Variance Inflation Factor (VIF) tests were employed to detect multi-col-linearity. Following Pallant's (2011) guidelines, no variable had a VIF value exceeding 10, indicating that there was no evidence of multicollinearity in the study. Furthermore, the results indicated that age, education, household size, income from carrot farming, carrot farming experience, frequency of extension visit and land size were significant determinants of household carrot production, as presented in Table 4.

Table 4
Determinants of Smallholder Farmers Carrot Production (n=286)

Model	Unstandardized Coefficients	Standard Coefficients	T	Sig.	Collinearity Statistics		
	B	Std. Error			Beta	Tolerance	VIF
(Constant)	15.185	0.651	26.668	0.000			
Age	0.012*	0.006	0.167	3.124	0.002	0.529	1.891
Marital status	-0.180	0.142	-0.073	-1.411	0.181	0.789	1.268
Sex	0.087	0.132	0.024	0.565	0.587	0.832	1.215
Education	0.067*	0.022	0.151	3.051	0.002	0.687	1.545
Household size	0.108*	0.032	0.164	3.375	0.001	0.710	1.480
Carrot income	0.350*	0.118	0.132	2.880	0.004	0.804	1.423
Extension services	0.158*	0.066	0.116	2.405	0.017	0.727	1.367
Land size	0.118*	0.019	0.291	6.117	0.000	0.739	1.335
Carrot farming experience	0.655*	0.170	0.213	3.848	0.000	0.548	1.862
Market Participation	0.264	0.138	0.099	1.914	0.056	0.632	1.538
Access to credit	0.117	0.132	0.046	0.886	0.376	0.635	1.547

$R = 0.698$, $R^2 = 0.589$, Adjusted $R^2 = 0.537$, $t = 26.865$, Durbin-Watson = 2.023, $F = 22.063$, ($p=0.000$). Dependent Variable: Carrot Yield. * Significant at 5% level

The findings demonstrated that carrot farming experience had a positive and statistically significant influence on carrot production at a 5% level of significance (as indicated in Table 4). This suggests that increased experience by smallholder in carrot farming is associated with higher carrot yield. One contributing factor to this phenomenon is experience guide farmers on decision on when to plant their carrot to fetch higher price which in turn, boosts their income from carrot sales and consequently enhances their overall livelihood. This finding is in line with what was reported in FGDs in Ushili village that:

“... Carrot farming is *paying at all since we have grown it for number of years. Experience help us to make decision on when to plant carrot and when to harvest to fetch higher price...*” (FGDs in Ushili Village held on 17th May 2025).

The aforementioned findings imply that experience in carrot farming has played a significant role in improving carrot production. Key Informant Interviews (KIIs) corroborated this observation, noting that carrot farmers with more experience get higher yield since they know carrot agronomic practices which improve their carrot yield. In fact, during the KIIs, it was reported that some households actively sought additional land in neighbouring villages to expand their carrot cultivation area, with the aim of boosting household income from carrot sales. Similar studies conducted by Rugube *et al.* (2019) and Djoufack *et al.* (2024) have supported these observations. Furthermore, the age of the household head exhibited a positive and statistically significant effect on carrot yield of smallholder carrot at a 5% level of significance, as illustrated in Table 4. These findings indicate that, while keeping all other variables constant, the carrot yield increase by a one-unit increase in age leads to a $(\exp(0.012)-1)*100\%$ change in yield. In essence, older household heads tend to achieve higher yield among smallholder carrot farmers. This phenomenon can be attributed to the fact that older households typically have greater access to land and possess extensive experience in carrot farming, which, if effectively utilized, can lead to improved carrot yield. During FGDs in Urisho village, it was reported that:

“... *Most of young household heads lack land that can be used to grow different crops and therefore they are forced to rent land because it is not possible to inherit land before marriage as per Meru tradition...*” (FGDs in Urisho Village held on 12th May 2025).

These findings imply that land ownership for youth is still a challenge in Meru District Council. These results are consistent with earlier studies by Kubwimana (2020); Sennuga *et al.* (2022) and Panga and Lyaro (2023) whose study emphasized the importance of age in improving household crop yield. Additionally, household size was found to have a positive and significant influence on carrot yield at a 5% level of significance (as demonstrated in Table 4). The positive coefficient suggests that as household size increases, carrot yield also increase. The coefficient of 0.108 for household size indicates that, with all other factors held constant, carrot yield increase by 0.108 for each additional unit increase in household size. Larger household sizes contribute to family labor supply and, consequently, to improved carrot yield. A larger household size serves as a valuable asset for engaging in various economic activities within the

household. This means that smallholder carrot farmers with larger household size have more labor for both carrot farming and other income-generating activities Hlatshwayo *et al.*, (2021); (Pariasa & Hardana, 2023) and Djaoufack *et al.* (2024) also reported that households with larger family sizes are more likely to achieve higher crop yield because they can rely on a greater pool of labor for farming activities.

Furthermore, access to extension services by smallholder carrot farmers was found to be positively statistically significant at 5%, indicating a positive relationship between the farmer's access to extension services and their carrot yield. This implies that frequent visit by extension officers enable farmers to get access to carrot production support services that significantly increase carrot productivity. The results are in line with previous findings as reported by Dube (2020); Hlatshwayo *et al.* (2021); Djoufack *et al.* (2024) who found a positively and statistically significant relationship between access to extension services and agricultural productivity.

Similarly, education was identified as a positive and significant factor influencing the carrot yield of smallholder carrot farmers at a 5% level of significance (as outlined in Table 4). This is attributed to the fact that education equips households with valuable skills, better access to information, and the ability to process and apply knowledge effectively. Educated households are more likely to be aware of carrot farming agronomic practices that can lead to increased yields. Highly educated households also tend to fare better in terms of crop yields compared to those with lower levels of formal education. Low levels of education can hinder households from actively seeking ways to improve their crop yield. These findings are consistent with prior studies, as reported by Dube (2020) and Hlatshwayo *et al.* (2021) which emphasized the positive impact of education on household crop yield. Land size was identified as a positive and significant factor influencing carrot yield of smallholder carrot households at a 5% level of significance (as shown in Table 4). This suggests that larger land sizes lead to increased carrot yields. Previous studies, such as Djoufack *et al.*, (2024) have indicated that household crop yield are heavily dependent on the size of cultivated land. These results are in line with the qualitative results quoted as follows:

"...Most of carrot farmers who get better yield are those who cultivate large piece of land and due to higher carrot yield they attract buyers from different part of the region..." (FGDs in Songoro Village held on 20th May 2025).

These findings suggest that large land size aids smallholder carrot farmers in enhancing their carrot, ultimately leading to improved carrot income. These results align with earlier research conducted by Osmani and Hossaini (2015) which emphasized the pivotal role of land size in bolstering household crop yield. Furthermore, Carrot income emerged as a significant and positively influencing factor on carrot yield at a 5% significance level (as depicted in Table 4). The positive coefficient implies that larger carrot incomes are associated with improved carrot yield. With a coefficient of 0.350 for carrot income, it indicates that, while holding all other variables constant, an increase in carrot by one unit results in a carrot yield increase of 0.350 units. Larger carrot income make substantial contributions to family ability to afford carrot inputs and cater for labour charges in carrot agronomic practices and, consequently, higher carrot yield. Having a larger carrot income becomes a valuable asset when it comes to engaging in carrot production in the next farming season. This suggests that smallholder carrot farmers with larger carrot income have a more income to finance carrot production. As highlighted by Kyaw *et al.* (2018); Hlatshwayo *et al.*, (2021), households with larger incomes have a greater likelihood of achieving improved crop yield, as they can easily finance their farming activities such as labour.

Other variables like sex, marital status, and access to credit were not significant. Studies of agricultural production have indicated sex, marital status and access to credit are often found to be non-significant determinants of carrot production or farm productivity because of the prevalence of community family labor, reliance on informal financing, and the technical input-intensive nature of the crop (Yigezu *et al.*, 2025). While these factors are crucial for accessing credit or starting a farm, they may not dictate the actual output volume as much as technical factors like seed quality, fertilizer application and land size allocated for carrot production.

V. CONCLUSIONS & RECOMMENDATIONS

5.1 Conclusions

The results demonstrated that carrot production is influenced by carrot smallholder farming households socio-economic characteristics such as carrot farming experience, age, education, household size, income, land size and extension services. This factors are significant in influencing carrot yields. The implication of these factor is that household with resources endowment, human capital and institutional support are more likely to engage in production of highly marketable crops.

5.2 Recommendations

The study recommend that farmers should work together with District agricultural extension workers in order to ensure adherence to carrot agronomic practices which will increase the output per acre, hence raise their carrot yield. The other stakeholders including TAHA, TARI, MVIWATA and other vegetable production promotion NGO's should



invest efforts in promoting carrot farming which is evidenced to improve people's livelihood. More, financial institutions such as Banks and SACCOs should ensure that financial services are accessible and reliable smallholder carrot farming community to facilitate the farming processes.

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