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Vegetable marketing and smallholder farmers' wellbeing performance; A case of Moshi District Council

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Abstract

Effective Vegetable marketing are remarkable for contributing to economic growth, development, poverty reduction and the wellbeing of the agricultural actors. This study aimed at assessing the effect of vegetable marketing on smallholder farmers' wellbeing in Tanzania. Specifically, the study examined the influence of vegetable marketing on smallholders' farmers wellbeing performance, examined the effect of Contractual farming on smallholders' wellbeing performance and determined the effect of Vegetable marketing survey and marketing knowledge on vegetable farming towards smallholders' farmers wellbeing performance. The study employed a cross-sectional research design on 200 agribusiness smallholder farmers. Data collection methods included survey, key informants' interview (KIIs) and focus group discussions. The study collected and analysed both qualitative and quantitative data from primary and secondary sources. Quantitative data were analyzed using a multiple regression model while the qualitative data were analysed using thematic analysis. The findings revealed that vegetable marketing and wellbeing performance were slightly positive with a more variables indicating absence of relationship whereby, vegetable products marketing has a narrow relationship with smallholders' farmers' wellbeing since contract farming show a positive significant relationship but vegetable marketing and marketing knowledge have no relationship. Therefore, vegetable product marketing has a slight influence on smallholder farmers' wellbeing performance in the study area. The study concludes that vegetable marketing studied components negatively influencing wellbeing performance by increasing the ability of the smallholders' farmers to have good wellbeing performance. The study recommends to the Moshi District Council must establish competition among traders to prevent farmers being locked into unequal relationships with particular traders. Farmers through the ministry of agriculture should be provided with marketing information and extension services so to improve production and their wellbeing.

Keywords: Vegetable; Marketing; Smallholder; Farmers and Wellbeing

1. Introduction

Vegetables play vital roles in human health. The production of vegetables also gives an opportunity for intensive production. It allows intensive use of land, utilizes more labour resources, increases smallholder farmers' market participation and reduces risk of crop failure (Sharma et al., 2021). In addition, small-scale vegetables production also plays an important role in employment and income generation, poverty alleviation and livelihood security of the rural population thereby reinforcing the overall development and poverty reduction goals (Zhang et al., 2021). Tanzania has favorable agro-climatic conditions for the production of a number of vegetable crops. Surprisingly, production and consumption of vegetables in Tanzania have been very low. For example, the food consumption survey done by Mesele (2019) pointed out that Moshi District have high number of smallholder vegetable farmers, amounting 35% of smallholder

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farmers in the District but their wellbeing performance is questionable, since have limited access to health services as well as inadequate housing conditions.

While low wellbeing performance of smallholder vegetable farmers is linked to various factors such as subsistence oriented, low input/low output, and rain-fed farming (Amede et al., 2023; de Bont et al., 2019; Maleko et al., 2018). Nevertheless, other scholars have associated low wellbeing performance of smallholder vegetable farmers with marketing factors (Mwinyiheri et al. 2023; Huka et al. 2024). Studies on marketing and smallholder vegetable wellbeing performance, have largely paid attention to contractual farming that cannot adequately capture general vegetable farming context and wellbeing performance among smallholder vegetable farmers. Hence, this study attempted to address problems associated with vegetable marketing through examining the influence of vegetable marketing on smallholder farmers' wellbeing performance in Moshi District Council. The result of the study can provide policy options, which would change variables that lead to improvement in market performance which in turn facilitate welfare performance among smallholder vegetable farmers

2. Theoretical Literature Review

2.1 Random Utility Theory by Marschak (1960)

As proposed by Marschak (1960). Random Utility Theory (RUT) is an owner's preference on choices determined by drawing a real-value score on each alternative from a parameterized distribution. According to the hypothesis, "usually a person's choice is based on the highest benefit acquired." Farmers are assumed will always choose the alternative that appears to maximize their utility and therefore, they will automatically increase their profit by doing so. The degrees of utility will be assessed by examining the farmer's utility by observing the choices of agribusiness techniques. A farmer's choice, on the other hand, is influenced by a variety of factors that change from one farmer to the next. Vegetable product marketing is examples of the characteristics. As a result, farmers will select agribusiness to obtain economic effect which includes per capita increase and economic shock adoption.

The theory assumes that people generally choose what they prefer and where they do not prefer can be explained by the random factors. Further, it assumes that, the internal value or strength of each alternative in the choice context of the experiment is modeled by random factors. The theory is based on stochastic preference in that an individual is assumed to draw his or her utility from a list of alternatives. Random utility theory has some limitations, the main one being strict assumptions made about the error term. Further, the capability of an individual to make choice pertaining a certain utility is sometimes questionable. However, the theory appeared so good and appropriate in discussing about the effect of vegetable marketing on smallholder farmers wellbeing in this context.

3. Study methodology

3.1 Research design

A cross-sectional research design was used for this study because it permits data collecting for numerous variables from a representative sample with diverse features analysed at a single moment in time in order to detect variable patterns of relationship. The essence of applying the cross-sectional research design was that it enabled data collection from different groups of respondents at a time. It also gave room to make comparisons among different groups of respondents to see how independent variables relate to dependent variables. It further ensured a high degree of validity and reliability on the data collected and at the same time it saved time and other resources required to accomplish the task as recommended by Hickman *et al.* (2022).

3.2 Study Area Description

The research was carried out in the Kilimanjaro Region specifically Moshi District Council. The site was carefully chosen because it has a favorable climate, which is critical for vegetable farmers (Chepkoech *et al.*, 2020). Moshi is the top district in vegetable production and the main provider of various vegetables in the region (Mayala and Bamanyisa, 2018). Furthermore, despite having a sizable number of vegetable growers, Moshi District has a sizable number of smallholder farmers that rely on agricultural labor and subsistence farming to contribute to their household's well-being compared to other regions such as Singinda and Dodoma. As a result, the chosen region and district, in particular is an appropriate environment for researching the extent to which agribusiness methods lead to well-being performance among smallholder vegetable growers.

3.3 Study population, Sample and Sampling strategy

3.3.1 Study population

Population is set of people, services and elements, group of things or households that are being investigated. It is the entire group of individuals, events or objects having common observable characteristics. As the area of interest in this study the impact of agribusiness practices among smallholders' vegetable farmers, the unit of the study was smallholders' women farmers at Kahe Mashariki and Makuyuni wards since they have more agribusiness participants compared to other wards in Moshi District. The sampling frame for this study comprised of a list of smallholders women farmers in the two wards. There are a total of 400 women firms in the study area (MDC, 2021).

3.3.2 Sample Size

The sample size was determined by Yamane (1967) formula in equation (1). as adopted by Umar and Wachiko (2021). The formula was used because the study population is known. Proportion allocation was done for each selected ward. Apart from greater economy in terms of time and money, involving few women farmers resulted into reliable and high-quality findings.

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

Where:

N = Total number of women farmers

n = Estimated individual sample size

e = standard error. In this study a standard error of 0.05(5%) will be used to obtain a manageable sample size of respondents

The level of confidence is 95%

$$n = \frac{400}{1 + 400(0.05)^2}$$

Table 1 Sample size distribution n= 200

Regions	Kilimanjaro			
Districts	Moshi District Council			
Wards	Kahe Mashariki		Makuyuni	
Villages	Ghona	Kyomo	Makuyuni	Lotima
Population	112	68	168	52
Proportion	0.28	0.17	0.42	0.13
Sample Size	56	34	84	26

3.3.3 Sampling techniques

Multistage sampling technique was adopted. The population was divided into two strata according to wards to reduce sampling error, that is, Kahe Mashariki and Makuyuni in first and in second stage; two villages were selected from each ward. A systematic random sampling technique was used to select smallholder vegetable women farmers participating in agribusiness and simple random sampling technique were used to obtain a comparative sample of smallholder vegetable farmers who are not practicing agribusiness; these were obtained from a list of households in each study village. The sample was drawn from two villages per wards namely Ghona and Kyomo from Kahe Mashariki ward Makuyuni and Lotima from Makuyuni ward.

3.4 Data Collection

The intended data were collected through survey method where survey using questionnaire, focus group discussion (FGDs) using focus group discussion guide and key informant interview (KIIs) using KII guide were applied in data collection

3.4.1 Survey

Primary data were collected through a survey from 200 vegetable smallholders' farmers. The study used interviewer-administered, structured questionnaire with close-ended questions designed to meet the study's objectives. The questionnaire was divided into sections that covered vegetable products marketing, improved inputs usage and effects of extension services towards wellbeing performance of smallholder vegetable farmers on farmers wellbeing. Each segment was made up of quick, simple and positive questions designed to produce the most needed responses.

3.4.2 Key Informant Interview

The key informants' interview guide was used to collect data from 2 wards agricultural extension officers as the key informants. The key informants selected were those with knowledge and experience in agribusiness practices at their jurisdictions. This method was useful in obtaining detailed information, perception and opinion and allows more questions to be asked which could not be captured otherwise.

3.4.3 Scales Development

The initial method employed was analysis to delve into and gain a better understanding of the characteristics influencing the overall well being performance of small scale farmers – an essential element, for ensuring accurate quantitative assessments of the concept (Shrestha 2020). The subsequent phase focused on creating and validating scales to quantify constructs that may not be directly quantifiable. The main scaling method used a five point Likert scale where 1 meant disagree and 5 meant strongly agree for factors like contractual farming and marketing knowledge in the vegetable marketing survey study were assessed using this scale followed by principal component analysis to condense and measure all qualitative data, in the research.

3.5 Multicollinearity

Multicollinearity is the degree of correlation between independent variables (Shrestha, 2020). The rule under regression is that independent variables should not be highly correlated with each other. Multicollinearity in the data occurs when the independent variables are highly correlated with each other. If VIFs are equal to one, it indicates no or little multicollinearity; when VIFs range between one to five, it indicates moderate; VIFs range from five to ten indicates high correlation; and lastly, if VIFs are greater than ten and the tolerance is less than 0.2, it implies that coefficients are poorly estimated and there is a multicollinearity problem that should be fixed accordingly. Therefore, the Multicollinearity under this study was equal to one and the tolerance levels were found to be greater than 0.2, which implies that a Multicollinearity problem did not exist.

3.6 Data Analysis

3.6.1 Qualitative analysis

Thematic analysis was used to analyze qualitative data from key informant interviews. First, interviews were transcribed into word documents. From these transcriptions, key themes, concepts, and phrases related to marketing practice and the well-being of smallholder farmers were extracted. This was done to organize the data into recurring themes that emerged after addressing specific items. The topics were organized into logical groups and presented an overview of the primary findings. Qualitative and quantitative findings were triangulated to provide accurate and important conclusions.

3.6.2 Quantitative analysis

A multiple linear regression was used to analyze quantitative data to determine the effects of each variable on the wellbeing performance of vegetable smallholders' farmers. The study had 55 items, and factor analysis was used to identify which items formed coherent subsets that were relatively independent of one another. Factor analysis was used to produce small sets of variables which were uncorrelated with 55 variables. Factor analysis was adopted to establish the number of dimensions available in a set of variables. The ten (5) variables include: contractual farming, pre-market survey, marketing knowledge, per capita income, and economic shock adoption. The suitability of data for factor analysis is tested by using the Kaiser-Meyer-Olkin (KMO) and Bartlett tests. The test results are presented in Table 2. It

was revealed that all ten (10) variables were suitable for factor analysis as KMO tests for all variables are greater than 0.5 (0.729) and p values for Bartlett tests are significant ($p = 0.000$).

Table 2 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.729
Bartlett's Test of Sphericity	Approx. Chi-Square	402.175
	df	28
	Sig.	0.000

3.7 Reliability

Pre-testing of the questionnaire was done to measure validity and thereafter suggestions and recommendations from pre-testing were incorporated in the final questionnaire before final data collection. Data collected were subjected to a reliability test and Cronbach's Alpha coefficient test was done. Cronbach's alpha on all of the Likert-type scale questions revealed good consistency, as shown in Table 3, because they were all greater than the acceptable Cronbach's Alpha of (> 0.7).

Table 3 Reliability test for Likert-type scale

Variable	Cronbach's Alpha	N of Items
Contractual farming	.851	5
Pre-marketing survey	.825	5
Marketing knowledge	.701	6
Per capital income	.844	5
Economic shock adoption	.835	6

3.8 Validity

For validation purposes, experts' interviews were conducted to gather the opinion regarding the instruments used which helped the researcher to make the necessary adjustment for the tools used under this study. This study determined the content validity by examine how the research tools for data collection were able to collect the required information. In order to ensure the validity for the data collected, a pre-test of the questionnaire was done one month before data collection in two villages one from each ward. The pre-testing of the questionnaire (data collection instrument) was done in order to determine the validity of the information collected, check the time required for data collection. See how research team work together to accomplish the task and also check if other resources were adequate for the intended activity as well as see whether there was any need to adjust or rectify the data collection tools.

4. Findings and Discussion

4.1 The influence of vegetable products marketing on smallholder farmers' wellbeing performance

A multiple regression model was employed to assess the influence of marketing of vegetable products on smallholder farmers' wellbeing performance. Specifically, the study under this objective looked at contractual farming, pre-marketing survey, and marketing knowledge on farmers' wellbeing performance. The R-squared was 0.585 and is above the required R-squared of greater than 50 as presented in Table 4, indicating the significance of the model for measuring the relationship between marketing of vegetable products and the wellbeing performance of vegetable smallholder farmers in Moshi District Council. This implies that the combined effect of the three variables used was able to explain smallholders' vegetable farmers' wellbeing performance in terms of per capita income and economic shock adoption.

Table 4 The influence of vegetable products marketing on smallholder farmers' wellbeing performance

Farmers wellbeing performance	Coef.	Std. Err.	t	P> t	(95% Conf. Interval)	
Contractual farming	0.1940386	0.578503	3.35	0.001	0.079953	0.308124
Vegetable marketing survey	-0.0799963	0.052872	-1.51	0.132	-0.18426	0.024271
Marketing knowledge	-0.1000347	0.597565	-1.67	0.096	-0.21788	0.01781
_cons	3.82575	0.408067	9.38	0.000	3.021009	4.630491

R Square = 0.660, adjusted R Square = 0.585 Number of observation (N) = 200, **statistically significant at P < 0.0001,

4.1.1 Contractual Farming

As a result, this study used multiple regression to determine whether farmers' happiness is affected by the amount of contractual farming in their vegetable farming routine. Table 4 presents the results. From Table 4 presents the estimated coefficient $\beta = 0.1940386$, $p = 0.001$ indicates that contractual farming had a positive significant relationship with farmers' wellbeing performance in the study area. The findings harmonized with dependent theory, which states that farmers' wellbeing performance depends on the extent of agribusiness element practices (Azevedo *et al.*, 2018). The findings were found to be contrary to those of Alulu, (2020), which showed significant positive impacts from participation in contract farming for the performance of vegetable farmers. The more those farmers participate in contract farming, the higher the welfare. Contract farming is, therefore, a reasonable policy instrument that can help farmers increase their income and improve their wellbeing in the Department of Alibori. Moreover, key informants (KI, 2022) confirmed that:

"In my ward, I observed that farmers engaged in contractual farming are less likely to suffer postharvest losses than those who have not contracted for their farming....." Another (KI, 2022) added that "I think this is very important since it allows farmers to top up their revenue and increase their income toward well-being performance....." (KII, Makuyuni, 13 August, 2022).

The findings imply that contract farming reduces the burden on farmers after harvest since vegetable farming is perishable in nature. According to Addisu (2018), contract farming is critical to reducing harvest losses and eventually increasing per capita income. The contract farming scheme, which has been identified as a driver of smallholder commercialization, exemplifies firm farmer integration and agricultural transformation in the country. This is due to the fact that contract farming is an emerging institutional innovation in Tanzania, linking farmers to reliable markets, open access to inputs, technology and advisory services that lead to improved productivity, production and income. Specifically, the malt barley contract farming scheme is an innovative platform harboring public-private partnerships.

The malting industry managed to secure 55% of the requirement from local sources. Contracted farmers take a 10% higher price for malt barley than their non-contracted food barley producer counterparts due to the high yielding varieties' productivity advantage from the same parcel of land. Similarly, malt factories are integrated and benefit from processing local raw material. Also, the study by Khanal *et al.* (2020) revealed that farmers engage in contractual farming (CF) because they can obtain higher incomes and higher profits. CF also provides them with access to inputs, credit, and technical assistance. Finally, contracts give them (guaranteed) access to markets. But a number of smallholder farmers are more limited with marketing through contract farming since they are matched with only one trader, which reduces farmers' ability to negotiate price. According to the findings and discussion above, smallholder farmers should be well informed about the impact of agribusiness component adoption, particularly chemical applications, because they have been observed to have a high impact on social and economic aspects of their lives due to their ability to reduce soil fertility in the long run, as well as the emergence of human non-communicable diseases such as skin cancer. During focus group discussion at Makuyuni ward one of the discussants pointed out that:

"Contract farming is a world-wide farming practice particularly among the developing countries where individual smallholder farmers cannot afford the farming expenses.....the practice is associated with providing smallholder farmers with the required farming inputs under a clearly agreement.....but of course, there is a need of providing the smallholder farmers with skills and trainings which can enable them to increase their productivity..." (Discussants, FGDs, Makuyuni, 12th August, 2022).

4.1.2 Vegetable Marketing Survey

A pre-market survey is a core part of equal resource distribution in farming processes based on the prospected income as per production as well as a method for equal and sustainable income generation. The pre-market survey questions in this survey are designed to determine whether the wellbeing performance of vegetable smallholder farmers is related to the pre-market survey. The results of the pre-market survey, (Table 4). The estimated coefficient $\beta = -0.0799963$, $p = 0.132$ indicates that the pre-market survey has no relationship with farmers' wellbeing performance in the study area.

The study findings were contrary to the Random Utility Theory (RUT) by Marschak (1960), which believed that a farmer's choice is usually based on the highest benefit acquired but it seems farmers are not benefiting from vegetable marketing which is one of the agribusiness components. The study findings concurred with the study by Slater, (2021), who reveals that pre-market survey does not well support the wellbeing of smallholders' farmers since it depends on the characteristics of each producer who benefits differently from the global market. Also, he added that vegetable producers in developing countries are not conducting pre-marketing surveys due to their limits to external markets. He also added that farmers would be forced to sell their products even at low prices to meet their financial requirements. Also supported by key informants (KI, 2022) that

"The sale of vegetables is done on farms, roadsides, and conventional markets, Markets are organized spontaneously according to the actors (producers, traders, and exporters), They take place outside the formal market places and days. Home selling is the dominant mode. The advantage of this sales mode is that it allows producers to limit the transport costs linked to the marketing of the product...." Another key informant added that "Almost every family in our village used to have tomatoes every season. Although it was mainly for home consumption, a surplus was always taken to the market for selling. Upon reaching the market, it would be flooded with tomatoes of every color and size. Now the trend is changing as farmers are seeking to know what is in demand and what fetches more money before embarking on cultivation....." KIIs, Kahe Mashariki, 15th August, 2022.

From the findings, it was concluded that the negative relationship between pre-market survey and wellbeing performance among vegetable smallholder farmers might be attributed to the limited connection between vegetable smallholder farmers and vegetable external stakeholders.

4.1.3 Marketing Knowledge

Effective advanced vegetable farming for sustainable income generation and good wellbeing performance for the vegetable farming industry among smallholder farmers is no longer correlated with marketing, but rather as an inclusive element particularly, knowledge is viewed as a key element for smallholder farmers' welfare results. Smallholder farmers in developed countries are sharing marketing knowledge through constructed village demonstration farms (Fofana et al., 2020). Also, this study assessed if vegetable smallholder farmers' wellbeing has a relation to marketing knowledge usage in the farming processes. Results are presented in Table 4. The estimated coefficient $\beta = -0.1000347$, $p = 0.096$ indicates that marketing knowledge has no relationship with farmers' wellbeing performance in the study area. The marketing knowledge, attitude and behavior of farmers regarding their produce are important for designing strategies and action plans to reduce post-harvest losses and improve the amount of income earned. In addition, it is vital to determine the income outcome among farmers. He also added that most of the farmers have not been trained on pesticide use. They mainly have incorrect knowledge about pesticides and their risks, and used incorrect and high-risk methods for handling and application of pesticides and relevant wastes. Also, the study by Slater (2021) reveals that farmers' knowledge can control the amount of released pesticides and a critical step could be holding training programmes for the farmers. In addition to a training programme for farmers, simultaneous implementation of farm implements should be based on technical marketing. Also supported by key informant (KI, 2022) who argued that

"... a good number of farmers have limited marketing knowledge which results in inadequate performance of their wellbeing. Also, he added that the absence of demonstration-based farms in the ward whereby farmers are helping each other with very limited knowledge on marketing..." (KIIs, Kahe Mashariki, 16th August, 2022).

The vegetable industry is vulnerable since it doesn't have special government support on marketing as other farming industries such as cereal crops such as coffee which are assisted by the government to secure markets for their produce and sometimes get information on price before harvest. The study findings are consistent with the study by Bronson (2022), who revealed that smallholder farmers in developed countries such as China and Canada have highly performing marketing knowledge due to the animation agribusiness training as well as enjoy high value-added mechanisms for their produce. From the discussion above, it can be argued that smallholders farming with their limited

marketing knowledge are discriminating against their wellbeing performance particularly, vegetable engaged farmers in developing countries including Tanzania.

5. Conclusion and Recommendations

The study assessed the effect of vegetable marketing on smallholder farmers' wellbeing by taking a case of vegetable farming women in Moshi District Council, specifically in Kahe Mashariki and Makuyuni wards. Specifically, the study assessed the effects of vegetable marketing survey, marketing knowledge and contract farming on the wellbeing performance of smallholder vegetable farmers. From the findings discussed above, it can be concluded that vegetable product marketing has a slight influence on smallholder farmers' wellbeing performance in the study area. The study concludes that vegetable marketing studied components negatively influencing wellbeing performance by increasing the ability of the smallholders' farmers to have good wellbeing performance. The study recommends to the Moshi District Council must establish competition among traders to prevent farmers being locked into unequal relationships with particular traders. Farmers through the ministry of agriculture should be provided with marketing information and extension services so to improve production and their wellbeing.

6 Compliance with ethical standards

6.1 *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

6.2 *Statement of ethical approval*

Permission for data collection was requested from the Kilimanjaro Regional Administrative Secretary to obtain a research permit for this study.

6.3 *Statement of informed consent*

The respondents consented to participate in filling out the provided questionnaires and were consulted before the interviews. The researcher informed the respondents that the study was academic in nature and assured them that their anonymity would be protected.

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