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Seasonality and Profitability: The Case of Smallholder Tomato Farmers in Thyolo District, Malawi

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Abstract

This study examines the impact of seasonality on the profitability of smallholder tomato farmers in rural areas of Malawi. The Malawian government has implemented initiatives to promote horticultural crop production, including tomatoes, to reduce reliance on tobacco as the primary source of foreign exchange earnings. Using a mixed-methods approach, data from 75 participants in the Thyolo District of Malawi was collected and analysed. The study evaluates profits in different seasons, comparing average earnings in winter and summer, and investigates price variations in markets. Findings show that tomato prices are higher in summer, reflecting the inverse relationship between prices and production cycles. Tomato production remains financially viable in both seasons, but the dry season is more economically rewarding with higher gross profits. The study recommends empowering farmers to increase year-round tomato cultivation. Further research could explore factors contributing to profitability disparities between seasons and investigate the impact of weather conditions and climate change on tomato production. The findings have important implications for policymakers, researchers, and stakeholders interested in sustainable agriculture and rural development in Malawi.

Keywords:
Seasonality, Profitability, Smallholder, Tomato Farmers

1. Introduction

In rural regions of Malawi, the cultivation of agri-food commodities, including tomatoes and various vegetables, is predominantly carried out by smallholder farmers. These farmers play a crucial role in supplying local and urban markets with fresh produce (Nyamba *et al*., 2020). However, their ability to access lucrative markets, particularly supermarkets, is often hindered by inconsistencies in both the quality and quantity of their products (Barton *et al*., 2022). To address this challenge and other associated difficulties, the government has recently implemented initiatives aimed at promoting the production and marketing of horticultural crops, including tomatoes, to reduce reliance on tobacco as the principal source of foreign exchange earnings (Malawi Government, 2020). Tomato cultivation in Malawi is influenced by fluctuations in weather and climatic conditions, leading to variations in yields and deliveries by smallholder farmers during the dry and rainy seasons (Nyalugwe *et al*., 2022). The dry season is typically more favourable for tomato production, requiring fewer applications of fungicides and pesticides compared to the rainy season (Mwangi *et al*., 2021). Consequently, the supply of tomatoes is more abundant during the dry season compared to the rainy season, which contributes to annual fluctuations and cyclical tendencies in tomato prices (Moranga, 2016). These seasonal variations in tomato prices directly impact the profitability of tomato production and marketing throughout the year.

Previous studies (Abera *et al*., 2020; Siam and Abdelhakim, 2018) have acknowledged the challenges of seasonal fluctuations in tomato prices and supplies, limited research exists on the specific impact of seasonality on profits for smallholder tomato farmers in Malawi. Therefore, this study aims to address this knowledge gap by evaluating the

direct influence of seasonality on the profits of smallholder tomato farmers. By assessing the profits made by farmers in different seasons, comparing average profits earned during winter and summer, and investigating price variations in markets during these seasons, the study provides a comprehensive analysis of the economic implications of seasonality for smallholder tomato farmers. In addition to examining profitability, the study also considers the stability of the tomato market in relation to seasonality. The study also analyses how fluctuations in tomato supply and prices during different seasons affect the ability of smallholder farmers to venture into tomato production. This broader perspective on market dynamics differentiates the study from previous research that may have focused solely on production or price aspects.

2. Materials and Methods

This research employed a mixed-methods approach, encompassing both qualitative and quantitative methodologies, and was conducted in the Thyolo District of Malawi. A sample size of 75 participants was randomly selected to ensure representativeness in the study. The researchers collected primary and secondary data to effectively address the study's objectives. The collected data was analyzed using the Statistical Package for Social Scientist, employing various statistical measures such as means, percentages, graphs, and tables to compare tomato production, prices, and profits across different seasons. The T-test of two independent samples was utilized to examine the mean profit difference between the seasons. Furthermore, gross margin analysis was conducted to estimate the average profits obtained from tomato production during the rainy and dry seasons. The profitability of tomato production was determined using gross profit margin analysis, which calculated the gross profit as a percentage of sales. These analytical methods and formulas were employed to provide comprehensive insights into the objectives of the study.

3. Results and Discussion

3.1 Tomato Seasonal Index

Tomato prices exhibit predictable fluctuations over time as a result of seasonal changes in the availability of supply, as noted by Naseer (2022). The harvest periods for tomatoes typically extend for durations of one, two, or three months, while consumption remains stable throughout the year (Viškelis *et al*., 2022). The variation in supply is influenced by weather conditions, climate, and the inherent biological characteristics of the commodity, leading to diverse price patterns across different seasons. The findings indicate that tomato prices generally tend to be higher during the summer season compared to winter, as discussed by Maureira *et al*. (2022), which is consistent with the study conducted by Naika *et al*. (2019). Naika *et al*. (2019) utilized the average percentage method to calculate the seasonal index of monthly average prices between 2005 and 2010.

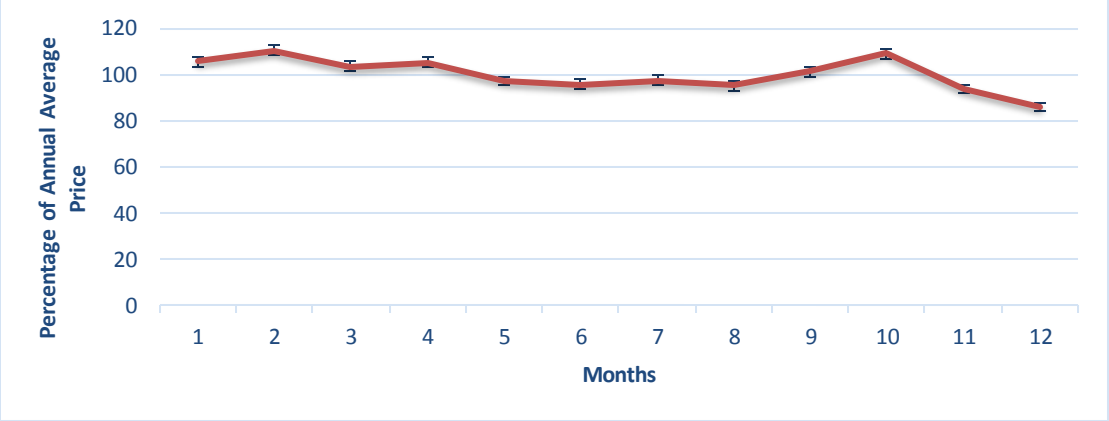

Figure 1. Seasonal Index of Monthly Average Tomato Prices from 2020-2023
Source: Malawi Government, 2022

3.2 Tomato Price Cycles

According to Deepak *et al*. (2018), a price cycle represents a recurring pattern that corresponds to a production cycle, which is further supported by Barton *et al*. (2022). Their study reveals that the average duration of the tomato price cycle aligns with the length of the production cycle, spanning five months. Figure 2 visually illustrates the inverse relationship between tomato prices and production, wherein prices peak and subsequently decline every five months, coinciding with periods of low or high production. The price cycles are influenced by production cycles, as higher

prices act as an incentive for producers to expand their production, as noted by Nyalugwe *et al*. (2022). However, the duration of the cycle is determined by the time required to cultivate a new generation of tomatoes, resulting in delayed responses to changes in prices and other factors. These factors play a pivotal role in elucidating the cyclical behavior observed in tomato prices, as highlighted by Usman and Bakari (2013).

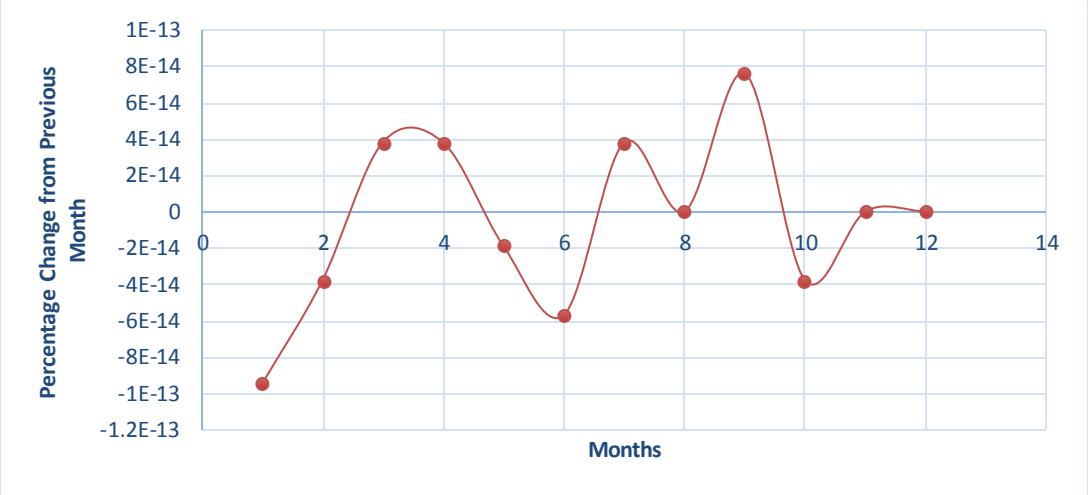

Figure 2. Tomato Price Percentage Changes From 2020-2022
Source: Malawi Government, 2022

3.3 Profitability of Tomato Production

Gross Profit Analysis

Table 1 displays the average gross profit per hectare, which amounts to MK 1,668,001 during the rainy season and MK 3,156,000 during the dry season. These findings indicate that tomato production remains financially viable in both seasons; however, it is more economically rewarding during the dry season, as evidenced by higher gross profits. The profitability of tomato farming has also been discussed by Aliyu and Ja'afar-Furo (2020), further emphasizing its economic potential. This observation is consistent with the findings reported by Sanneh (2022), who also recognized the seasonal variability in tomato production and its impact on profitability. Several factors contribute to lower production during the summer, including competition for labor with staple crops like maize and a higher prevalence of pest and fungal diseases (Nyalugwe et al., 2022). As a result, tomato prices are higher in the summer compared to winter, leading to increased profitability during the summer season. The study's findings establish a substantial disparity in gross profits between the summer and winter seasons, with winter profits surpassing those achieved in summer.

Gross Profit Margin Analysis

Table 2 reveals the average gross profit margin achieved by smallholder tomato farmers in Thyolo, amounting to 40% during the rainy season and 51% during the dry season. This indicates that, on average, farmers retain MK 40 and MK 51 for every MK 100 in sales during the rainy and dry seasons, respectively. Furthermore, the study demonstrates a significant disparity between the gross profit margins in summer and winter. This finding is supported by a T-test of two independent samples, which indicates that the profit margins in winter are significantly higher than those in summer at a significance level of 0.05. This finding is also discussed by Sanneh (2022), who explores the farmers' perception of climate impacts on their agricultural practices.

Table 1. Average Gross Profits per hectare for Tomato in summer

Parameters	Summer	Winter	P-value
Yield (Number of 50 Kg baskets)	160	240	
Price (MK per 50Kg basket)	26,050	25,650	0.01
TVC	2,499,999	3,000,000	
TR	4,168,000	6,156,000	
GP	1,668,001	3,156,000	

Table 2. Average Net Profit Margin per hectare in summer

Parameters	Summer	Winter	P-value
Yield (Number of 50 Kg baskets)	160	240	
Price (MK per 50Kg basket)	26,050	25,650	
TVC	2,499,999	3,000,000	
TR	4,168,000	6,156,000	
GM	MK1,668,001	MK3,156,000	0.01
NP (%)	40.019%	51.267%	

4. Conclusion and Recommendation

The study concludes that smallholder tomato farmers experience higher profits during the winter season and lower profits during summer due to seasonality in tomato production. This conclusion is supported by the T-test, which revealed a significant *p-value* of 0.00. Tomato prices exhibit a seasonal pattern, with high prices corresponding to low production in summer and low prices associated with high production in winter. However, agricultural commodity prices, including tomatoes, play a crucial role in determining farm income and profits for participants in the marketing chain. The study recommends empowering smallholder farmers to increase tomato cultivation during in all the seasons to maximize profits. This calls for interventions by all stakeholders to promote rain-fed tomato production. Further studies in this area could explore the specific factors contributing to the profitability disparities between the rainy and dry seasons for smallholder tomato farmers in Malawi. Research could delve into the underlying reasons behind the observed variations in yields, such as the impact of weather conditions and climate change on tomato production.

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