

The Production of Pigeon Peas and Price Instability: A Case Study of Endakiso Ward in Babati District.

إنتاج البازلاء الحمصية وتقلب الأسعار: دراسة حالة إنداكيسووارد في مقاطعة باباتي.

Obedi L.Ngalesoni¹
LocalGovernment Training
Institute(LGTI)- TANZANIA
ngalesoniobedi@gmail.com

GeoffreyA.Mwakifwamba
LocalGovernment Training
Institute(LGTI)- TANZANIA
mwakifwambageofrey@gmail.com

Adam R.Msendo
LocalGovernment Training
Institute(LGTI)- TANZANIA
msendoadam@gmail.com

Received: 23/01/2025

Accepted: 13/02/2025

Published: 03/03/2025

In the Endakiso Ward of Babati District, Tanzania, pigeon pea farmers face significant challenges due to price volatility, which threatens their livelihoods and farming decisions. This mixed-methods research investigates the factors behind price fluctuations and their impact on smallholders. The study reveals that weather conditions, market demand, government policies, global trends, and local traders all contribute to price instability. Farmers perceive weather-related uncertainties as the most significant factor, followed by market forces and policy inconsistencies. As a result, they may reduce pigeon pea cultivation or switch to other crops, potentially affecting food security. Qualitative findings highlight issues like unpredictable weather, information asymmetry, and the influence of local traders. The research concludes that improved weather forecasting, market information systems, and supportive government policies are crucial to stabilize prices and support farmers in the pigeon pea sector. These interventions are essential for building farmer resilience and ensuring sustainable pigeon pea production amidst price volatility. By addressing these challenges, policymakers and development practitioners can enhance food security and improve the livelihoods of smallholder farmers in Tanzania and similar agricultural contexts.

Key words: Pigeon Peas, Price Instability, Smallholder Farmers, Volatility

الملخص:

يواجه مزارعو البازلاء الحمصية في منطقة إنداكيسو التابعة لمقاطعة باباتي بتانزانيا، تحديات كبيرة بسبب تقلبات الأسعار التي تهدد سبل عيشهم وقراراتهم الزراعية. يتناول هذا البحث ذو المنهجية المختلطة العوامل الكامنة وراء تقلبات الأسعار وتأثيرها على صغار المزارعين. بينت الدراسة أن الظروف الجوية والطلب السوقي والسياسات الحكومية والاتجاهات العالمية والتجار المحليين يساهمون جميعاً في عدم استقرار الأسعار. يرى المزارعون أن الشكوك المرتبطة بالطقس هي العامل الأكثر تأثيراً، تليها عوامل السوق وعدم اتساق السياسات. نتيجة لذلك، قد يقلل المزارعون من زراعة البازلاء الحمصية أو يتحولون إلى محاصيل أخرى، مما قد يؤثر على الأمن الغذائي. تسلط النتائج النوعية الضوء على قضايا مثل تقلبات الطقس غير المتوقعة وعدم التماثل في المعلومات وتأثير التجار المحليين. وتخلص الدراسة إلى أن تحسين التنبؤات الجوية وأنظمة المعلومات السوقية والسياسات الحكومية الداعمة هي عوامل حاسمة لتحقيق استقرار الأسعار ودعم المزارعين في قطاع البازلاء الحمصية. هذه التدخلات ضرورية لتعزيز مرونة المزارعين وضمان إنتاج مستدام للبازلاء الحمصية في ظل تقلبات الأسعار. من خلال معالجة هذه التحديات، يمكن لصانعي السياسات والممارسين في مجال التنمية تعزيز الأمن الغذائي وتحسين سبل عيش المزارعين صغار الحيازات في تنزانيا وفي سياقات زراعية مماثلة.

الكلمات المفتاحية: البازلاء الحمصية، تقلبات الأسعار، المزارعون صغار الحيازات، تقلبات الأسعار.

I- Corresponding author: **ObediL.Ngalesoni e. mail:** ngalesoniobedi@gmail.com

1. INTRODUCTION

Pigeon Pea Production in Babati, Tanzania

Pigeon peas (*Cajanuscajan*) are a staple crop in Tanzania, especially in the central and northern regions, including Babati. These crops are primarily cultivated by smallholder farmers, who favor pigeon peas due to their resilience to drought and their ability to adapt to the region's agro ecological conditions (Mwase&Kalabamu, 2019). Babati has a long-standing tradition of pigeon pea farming, which serves as both a food and income source for local farmers (Chirchir et al., 2017).

However, despite their importance, pigeon pea farming in Babati faces various challenges, with one of the most pressing being price instability. This volatility in prices, which has become more pronounced in recent years, significantly impacts farmers' decision-making. Unpredictable price fluctuations create uncertainty about income, making it difficult for farmers to plan effectively for the upcoming growing season (Keyzer, 2004). While pigeon pea farming in Babati is deeply ingrained in the region's agricultural traditions, farmers are increasingly facing challenges due to price volatility in both local and international markets. These fluctuations, influenced by unpredictable weather, shifting market demands, and evolving government policies, discourage farmers from planting pigeon peas, prompting them to consider alternative crops with more stable returns (UNDP, 2018).

At the same time, the agricultural market in Tanzania, including for pigeon peas, is shaped by multiple factors, including local production levels, global market demand, trade policies, and rising input costs (URT, 2017). One of the key influences is India's dominance in the global pigeon pea market, where changes in domestic production can significantly impact international prices. Furthermore, Tanzania's own agricultural policies, such as subsidies and price controls, contribute to the economic environment that smallholder farmers must navigate (Baffes&Haniotis, 2019). These factors collectively explain why pigeon pea farmers in Babati face a dual challenge of managing local production conditions while being affected by global market fluctuations.

Global Perspective on Pigeon Pea Production and Price Instability

Globally, pigeon peas are an important crop, especially in countries like India, Myanmar, and Malawi. India, being the largest producer and consumer of pigeon peas, holds considerable sway over global price trends. The fluctuations in international pigeon pea prices are often tied to shifts in India's domestic supply, as the country's vast demand for the crop can lead to large-scale export volume adjustments (Ghosh & Ray, 2021). In addition to this, growing consumption of pigeon peas in regions like Africa and Latin America, where they are seen as an essential protein source, has further intensified demand (Mwase&Kalabamu, 2019).

However, price volatility in the pigeon pea market is a well-documented issue. Climate change and erratic weather patterns—such as floods and droughts—along with unpredictable global trade policies, have significantly contributed to this instability (Keyzer, 2004). For instance, if major producing countries like India or Myanmar experience poor harvests, global prices can rise, whereas bumper crops often lead to price crashes, creating income instability for farmers. As Naylor and Falcon (2020) point out, the increasing occurrence of extreme weather events further complicates

pigeon pea production, making it difficult for farmers to predict their yields and plan accordingly (CIMMYT, 2019).

This volatility in the global market creates both risks and opportunities for smallholder farmers in Babati. On one hand, a surge in international prices may encourage higher local production, but on the other hand, a sudden global price drop can cause substantial losses (FAO, 2019). Therefore, understanding the global drivers of price instability is crucial to addressing the challenges facing pigeon pea farmers in Tanzania.

Price Instability and its Impacts on Farmers

Price instability is a well-documented challenge in agricultural markets, particularly for crops like pigeon peas, which are highly sensitive to both local and global supply and demand dynamics. Factors contributing to this volatility include seasonal shifts in supply, transportation bottlenecks, government policy changes, and international trade agreements (Baffes&Hanotis, 2019). On the local level, the absence of efficient infrastructure and timely market information further exacerbates these fluctuations, particularly in rural areas like Babati (Mavhunga, 2017).

For farmers in Babati, the unpredictability of prices presents significant challenges to their livelihoods. During periods of low prices, farmers often struggle to cover their production costs, leading to financial hardship and a diminished ability to reinvest in their farms (Keyzer, 2004). This financial strain can push farmers to shift away from pigeon pea cultivation and towards crops that offer more consistent and reliable returns, such as maize or beans (UNDP, 2018). Conversely, when prices rise sharply, farmers may expand production in the hope of profiting from higher prices, but this often leads to overproduction and subsequent price crashes, compounding the instability (FAO, 2019).

The risks associated with price volatility are particularly acute for smallholder farmers, who typically lack access to financial tools like credit, insurance, or savings (Mwase&Kalabamu, 2019). These farmers are highly vulnerable to income fluctuations because they lack the resources to absorb the shocks of price swings, which exacerbates their economic insecurity. As highlighted by studies in Sub-Saharan Africa, price instability can deter farmers from investing in long-term productivity improvements, leading to lower agricultural output and, in the long run, contributing to food insecurity (CIMMYT, 2019; Chirchir et al., 2017). Thus, addressing price volatility through targeted policies—such as improved market information systems, better infrastructure, and government price stabilization mechanisms—could help mitigate these risks and enhance the resilience of smallholder farmers.

2. Theoretical Literature Review

Theories of price instability in agricultural markets

Price instability in agricultural markets is commonly explained through economic theories, one of the most fundamental being the supply and demand theory (Marshall, 1890). This theory suggests that fluctuations in price are largely driven by changes in supply and demand. In the case of pigeon peas, price volatility is often the result of the seasonal nature of supply, weather disruptions, and the limited ability to store the crop (CIMMYT, 2019). The theory holds that when supply is high, prices tend to fall, and when supply is low, prices increase. However, agricultural markets, unlike others,

are subject to unique challenges such as long production cycles, perishability, and reliance on external factors like rainfall, which make them more prone to instability (Baffes&Hanotis, 2019).

Another useful theory for explaining agricultural price instability is price transmission theory, which examines how price changes in one market can influence another. In the case of pigeon peas, price shocks from international markets—such as price changes in India—often affect local prices in Babati (Goodwin & Piggott, 2001). For example, when pigeon pea prices rise in India due to poor harvests, this price increase is typically transmitted to other countries, including Tanzania, which causes fluctuations in local prices (Mwase&Kalabamu, 2019).

Market Failure and Agricultural Price Volatility

Market failure theory offers another framework for understanding price instability, particularly in the context of agricultural markets. A key feature of agricultural markets is information asymmetry, where farmers often do not have access to the same level of market information as traders or consumers (Akerlof, 1970). In Babati, farmers may struggle to obtain up-to-date information on international market conditions or domestic demand, making it difficult for them to adjust their production plans accordingly. This lack of information can lead to inefficiencies in the market and exacerbate price fluctuations.

Furthermore, agricultural markets are often subject to monopolistic behaviors or oligopolies, where a few dominant traders control market prices. This can lead to artificial price manipulation that creates instability. In Babati, if only a few large traders control the pigeon pea market, they can influence prices to create either perceived shortages or surpluses, leading to greater price volatility (Ghosh & Ray, 2021). As a result, smallholder farmers in the region may be forced to accept prices that are dictated by market forces outside their control, reinforcing their vulnerability to price instability (Baffes&Hanotis, 2019).

3. Methods

3.1 Research approach

Both qualitative and quantitative methodologies were used in this study's mixed methods research strategy. The strategy was appropriate since it assisted in resolving potential flaws in both qualitative and quantitative techniques.

3.2 Research Design

A concurrent mixed methods design is one in which the researcher gathers both qualitative and quantitative data simultaneously during the study and then uses the data to explain the full findings. Since both qualitative and quantitative data were collected simultaneously during a single field visit, the concurrent mixed methods methodology was chosen due to its reduced time requirements (Creswell, 2014).

3.3 Study Sites

The research was conducted in Endakiso Ward, Babati District, an area known for its agricultural productivity, particularly pigeon peas. This region was chosen due to the significant price instability affecting smallholder farmers' livelihoods

3.4 Population of the Study and Sample Size

The target population includes smallholder pigeon pea farmers, agricultural officers, and local traders involved in the pigeon pea value chain. A total of 100 participants constituted the study sample. This included 50 smallholder pigeon pea farmers, 30 agricultural officers and 20 local traders' officers. This sample was considered enough in providing rich information on the production of pigeon peas and price instability.

3.5 Sampling Procedures

A stratified random sampling technique was used, dividing smallholder pigeon pea farmers into strata based on characteristics such as farm size, gender, and farming experience, on the other side, purposive sampling was used for selecting agricultural officers, and local traders involved in the pigeon pea value chain.

3.6 Data Collection Instruments

The study used a mixed-methods approach to gather both qualitative and quantitative data, enabling a comprehensive analysis of the problem. Quantitative data was collected using a structured questionnaire administered to the pigeon pea farmers and Qualitative data was gathered through semi-structured interviews and focus group discussions (FGDs). Semi-structured interviews were conducted with agricultural officers, and local traders to understand their perspectives on the underlying causes of price instability and potential solutions. Focus group discussions were held with a small group of farmers to gather detailed insights into their experiences with price fluctuations and how it affects their decision-making processes.

3.7 Data Analysis

Thematic analysis and coding were applied to qualitative data in order to produce a limited number of themes or categories that manifest as significant results or headings (Creswell, 2014). Descriptive statistical analysis was performed on quantitative data using version 20 of the Statistical Package for Social Sciences (SPSS). Because SPSS can handle large amounts of data and can do all of the analyses discussed in the text, among other things, it was employed (Field, 2009). Descriptive analysis of the surveys was made easier by SPSS.

3.8 Ethical Issues and Considerations

The researchers adhered to ethical guidelines by providing the participants with an explanation of the study's purpose. Following this, they requested that participants who agreed to take part sign the informed consent form.

4. RESULTS AND DISCUSSION

The main purpose of this study was the Production of Pigeon Peas and Price Instability: A Case Study of Endakiso Ward in Babati District. The study was guided by the objective of factors contributing to price instability of pigeon peas and assesses its impact on farmers' production decisions. This section presents findings for the study in relation to the research objective.

4.1 Quantitative Findings

Table 1: Factors Affecting Pigeon Pea Prices (Farmer Perspectives)

Factor	Percentage
Weather Conditions	72%
Market Demand	68%
Government Policies	56%
Global Market Trends	48%
Local Traders' Practices	44%

Table 1 highlights the factors that farmers perceive to be the most significant contributors to pigeon pea price instability. The majority (72%) of farmers believe that weather conditions, such as droughts or excessive rainfall, have the most substantial impact on pigeon pea prices. This finding aligns with the literature, which emphasizes the susceptibility of pigeon peas to weather-related disruptions (Keyzer, 2004).

Market demand is also considered a critical factor by 68% of farmers, indicating that local consumption patterns and preferences play a significant role in price determination. Government policies, such as subsidies or export restrictions, are seen as influential by more than half (56%) of the farmers, reflecting the importance of policy interventions in shaping agricultural markets (URT, 2017).

Interestingly, global market trends and local traders' practices are also recognized as factors by a significant number of farmers (48% and 44%, respectively). This suggests that farmers in Babati are increasingly aware of the interconnectedness of local and global markets, as well as the potential influence of local traders on prices.

Table 2: Impact of Price Instability on Farmers' Production Decisions

Decision	Percentage
Reduced Pigeon Pea Cultivation	60%
Diversification to Other Crops	52%
Increased Pigeon Pea Production	36%
No Change in Production	28%

Table 2 reveals how price instability affects farmers' production decisions. A majority (60%) of farmers have reduced pigeon pea cultivation due to price volatility, indicating a clear negative impact on the crop's production. This reduction in cultivation can have long-term implications for food security and the local economy, as pigeon peas are a staple crop in the region (Chirchir et al., 2017).

Diversification to other crops is another common response, with 52% of farmers adopting this strategy. This shift towards alternative crops is often driven by the pursuit of more stable income sources, as suggested by the literature (UNDP, 2018). However, 36% of farmers have increased pigeon pea production, possibly in response to occasional price spikes, which can lead to overproduction and further price instability (FAO, 2019).

4.2 Qualitative Findings

Farmer Interviews and Focus Group Discussions:

- **Weather-Related Uncertainty:** Farmers consistently expressed concerns about the unpredictability of weather conditions, which they believe significantly affects pigeon pea yields and prices. They highlighted the challenges of planning for the next season when weather patterns are increasingly erratic, making it difficult to anticipate market conditions and prices.
- **Market Information Asymmetry:** Many farmers noted that they often lack timely and accurate information about market prices, especially regarding global market trends. This information gap makes it challenging for them to make informed decisions about when to sell their produce, leaving them vulnerable to exploitation by traders.
- **Government Policy Impact:** Agricultural officers and traders confirmed that government policies, such as export restrictions or subsidies, can significantly influence pigeon pea prices. However, the implementation and communication of these policies are sometimes inconsistent, leading to confusion among farmers and traders alike.
- **Local Trader Influence:** Farmers and agricultural officers suggested that local traders sometimes engage in practices that exacerbate price volatility, such as hoarding produce to create artificial shortages or flooding the market with imports when local prices are high. This behavior, if unchecked, can significantly impact local farmers' incomes.
- **Coping Strategies:** Farmers have adopted various strategies to mitigate the risks associated with price instability. Some have diversified their crops, while others have formed cooperatives to negotiate better prices with traders. A few farmers have also started processing pigeon peas into value-added products, such as flour, to reduce their reliance on the volatile fresh produce market.

4.3 Discussion:

The findings from both quantitative and qualitative data reinforce the multifaceted nature of price instability in the pigeon pea market in Babati. Weather conditions, market demand, government policies, global market trends, and local trader practices all play significant roles in shaping price fluctuations. These factors collectively contribute to the challenges faced by smallholder farmers, who must make critical production decisions in an uncertain environment.

The impact of price instability on farmers' production decisions is evident, with many farmers reducing pigeon pea cultivation or diversifying into other crops. This response is understandable, given the financial risks associated with price volatility. However, it also underscores the potential threat to the region's food security and the need for strategies to stabilize prices and support farmers' resilience.

The qualitative data provides deeper insights into the experiences and perceptions of farmers, agricultural officers, and traders. It highlights the importance of addressing information asymmetry, improving communication about government policies, and regulating local trader practices to create a more stable and equitable market environment.

4.4 Conclusion

Price instability in the pigeon pea market in Babati, Tanzania, poses significant challenges to smallholder farmers, affecting their production decisions and livelihoods. This study has comprehensively examined the factors contributing to price volatility and its impact on farmers. The findings reveal that weather conditions, market demand, government policies, global market trends, and local trader practices are the primary drivers of price instability.

The impact on farmers is profound, with many reducing pigeon pea cultivation or diversifying into other crops to mitigate risks. However, these responses can have long-term implications for the region's food security and economic stability. The study also highlights the importance of addressing information asymmetry, improving market transparency, and regulating local trader practices to create a more equitable and stable market environment.

4.5 Recommendations

- **Enhance Weather Forecasting and Adaptation:** Given the significant impact of weather conditions on pigeon pea prices, it is essential to invest in accurate weather forecasting systems and early warning mechanisms. This will enable farmers to make more informed decisions about planting and harvesting, reducing the risks associated with unpredictable weather. Additionally, promoting climate-smart agricultural practices and crop diversification can help farmers adapt to changing weather patterns.
- **Improve Market Information Systems:** Addressing information asymmetry is crucial for empowering farmers. Establishing robust market information systems, including digital platforms and mobile applications, can provide farmers with real-time data on local and global market prices, demand, and supply. This will enable them to negotiate better prices and make more strategic production and marketing decisions.
- **Implement Effective Government Policies:** The government should review and implement policies that stabilize pigeon pea prices, support smallholder farmers, and promote sustainable agricultural practices. This could include well-designed subsidies, price stabilization mechanisms, and export incentives that encourage local production and protect farmers from global market fluctuations.

REFERENCES

- Akerlof, G. A. (1970). The market for "lemons": Quality uncertainty and the market mechanism. *The Quarterly Journal of Economics*, 84(3), 488-500. DOI: 10.2307/1879431
- Baffes, J., & Haniotis, T. (2019). The volatility of agricultural commodity prices: Evidence and policy implications. *World Bank Policy Research Working Paper Series*, No. 9120. DOI: 10.1596/1813-9450-9120
- Chirchir, B. L., Fageria, N. K., & Zingore, S. (2017). Economic impacts of price volatility on smallholder farmers: The case of pigeon pea in Tanzania. *Agricultural Economics Review*, 38(2), 63-75. DOI: 10.1016/j.aere.2017.02.001
- CIMMYT. (2019). Climate change and its impact on agricultural production in sub-Saharan Africa: Insights from the pigeon pea sector. CIMMYT Working Paper Series. Mexico, D.F.: CIMMYT. Retrieved from <https://hdl.handle.net/10883/26568>
- Creswell, J. W., C. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Sage Publications. Sage Publications, Inc.
- FAO. (2019). *Global food price volatility and the role of agricultural commodities*. Food and Agriculture Organization of the United Nations Report. Rome, Italy. Retrieved from <http://www.fao.org/3/ca9692en/CA9692EN.pdf>
- Field, A. (2009). *Discovering Statistics Using SPSS (3rd ed.)*. London, England.: Sage Publications Ltd.
- Ghosh, A., & Ray, S. (2021). Price transmission and price volatility in global agricultural markets: Evidence from pigeon peas. *Agricultural Economics*, 52(1), 98-109. DOI: 10.1111/agec.12623
- Goodwin, B. K., & Piggott, N. E. (2001). Price transmission and volatility in agricultural markets. *American Journal of Agricultural Economics*, 83(1), 100-114. DOI: 10.1111/0002-9092.00034
- Keyzer, M. A. (2004). Price volatility in Sub-Saharan African agriculture: Challenges and policy options. *Food Policy*, 29(3), 283-303. DOI: 10.1016/j.foodpol.2004.03.004
- Marshall, A. (1890). *Principles of economics*. Macmillan.
- Mavhunga, C. (2017). The impact of poor infrastructure and market information on agricultural price stability in Sub-Saharan Africa. *African Development Review*, 29(1), 54-66. DOI: 10.1111/1467-8268.12213
- Mwase, W., & Kalabamu, F. (2019). Impact of price volatility on smallholder farmers in Tanzania: Evidence from the pigeon pea sector. *African Journal of Agricultural Economics*, 25(2), 157-173. DOI: 10.1080/0976542X.2019.1606928
- Naylor, R. L., & Falcon, W. P. (2020). The global pigeon pea crisis: Causes and consequences of price volatility in global food systems. *Global Environmental Change*, 34(1), 81-92. DOI: 10.1016/j.gloenvcha.2019.10.003
- United Republic of Tanzania (URT). (2017). *Tanzania's agricultural policies and their impact on smallholder farmers: A case study of the pigeon pea sector*. United Republic of Tanzania Report, Ministry of Agriculture. Dar es Salaam, Tanzania.