



# Rwandan Maize Market Price Dynamics: Structure, Trends and Policy Implications

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## Overview

The importance of maize for Rwanda cannot be overstated. Most smallholder farmers, along the spectrum of both land size and level of commercialization, engage in both production, own consumption, and sale of maize. Unlike most other crops, maize is commonly produced by all levels of commercialized and subsistence smallholder farmers. For example, recent research revealed that even though almost half of all maize produced is sold (44%), only an average of 23 percent is marketed at the household level (Warner et al. 2024). This indicates that while maize is widely sold by most smallholders, it is disproportionately sold by those with relatively larger farms. Therefore, maize is important for both own consumption as well as commercial sales and price movements are critical for understanding potential welfare impacts on both buyers and sellers. Research presented here outlines some important maize price relationships, including multi-year trends, interrelationships between Rwandan markets and seasonality. Overall, we find strong correlation between all markets suggesting a good degree of integration but persistent individual market prices above and below national averages as well as seasonality that generally conforms to maize's main harvest period (Season A). This policy brief provides an overview of maize prices in Rwanda in order to enhance evidence-based policymaking for targeting recommendations aimed at more integrated and stable maize market prices throughout the country. For example, seasonal price changes suggest an annual average price fluctuation of approximately 30 percent and if targeted policies could reduce this seasonal price variation, smallholder welfare would likely be improved.

## Principal Findings

- Nominal maize prices have fluctuated significantly during the 2020 to 2024 period, with nominal prices more than doubling between 2021 and 2022 but recently returning to near January 2020 prices. This volatility, likely driven by global disruptions such as the Covid

pandemic and the Russia-Ukraine conflict, as well as national production variations, highlights the need for policies to monitor and stabilize prices and where necessary, to protect both farmers and consumers from market volatility. In contrast, real prices have been less volatile and have shown a slight decline over the entire period studied, partly due to increased national production. For instance, maize cultivation expanded by 10% in Season A 2024, leading to a 30% production rise from 2023, and a 15% increase in Season B 2023 led to a 7.3% rise from 2022. These production gains helped moderate real prices, suggesting that further investments in agricultural productivity could support long-term market stability and affordability.

- Maize markets appear to be highly interconnected, with an average of 85 percent of the changes in prices incorporated across time in all markets. Figure 2 visually depicts this joint price variation between all markets.
- While there is a significant correlation of price movements between markets, prices are not identical. This research reveals persistent individual market prices exhibiting above and below biweekly averages. More specifically, Kigali and western border markets typically exhibit 5 to 25 percent above average prices while markets in Nyagatare district, among others, were consistently 10 to 15 percent below average. These regional price disparities could be explained by factors such as local production levels, transportation, and marketing costs. For instance, higher prices in Kigali and western border markets likely stem from greater transportation and marketing expenses, while lower prices in Nyagatare, a major maize production hub, could be attributed to reduced transportation costs due to proximity to production centers.
- Seasonal prices vary by an average of almost 30 percent over the calendar year, with prices falling most significantly during the December – February period, coinciding with the principal maize harvest of Season A. This seasonal price drop reflects the impact of increased supply during peak harvest periods. Policymakers should consider strategies to stabilize prices throughout the year to better support both producers and consumers.

## Method

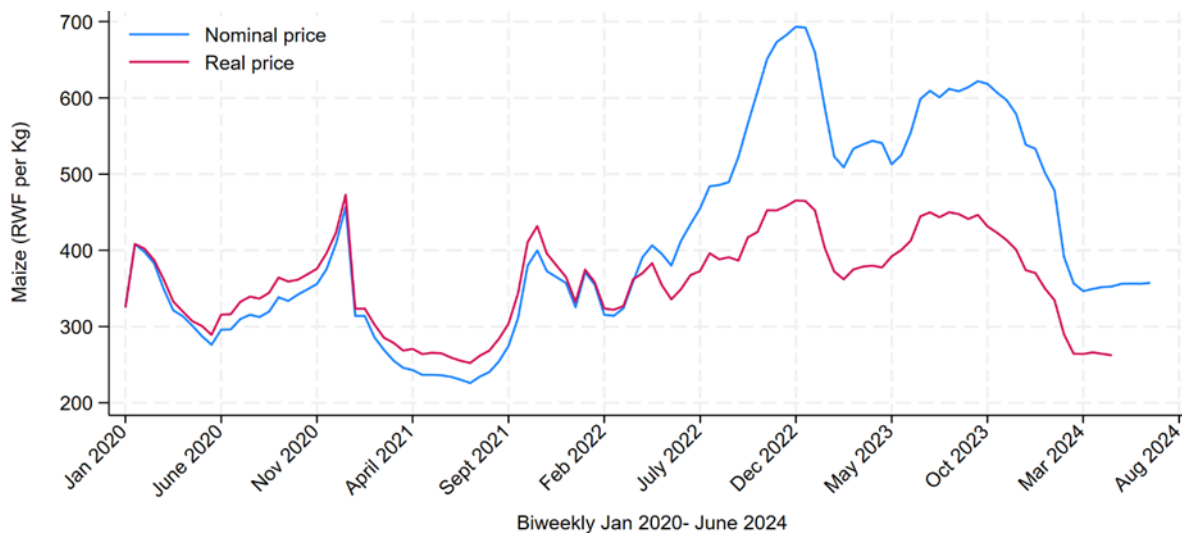
Price data, recorded in Rwandan Francs (RWF) was collected from the online platform, eSoko ([www.esoko.gov.rw](http://www.esoko.gov.rw)). The eSoko platform is administered by the Rwandan Ministry of Agriculture and Animal Resources (MINAGRI) and collates price information for more than 136 items (including food, feed, and agricultural inputs), with 106 being food items. Data are collected at 68 markets, with at least one market in each of Rwanda's 30 districts. For this analysis, we averaged dried maize prices (RWF per Kg) during the biweekly period for selected markets that reported maize price data for at least 75 percent of the study period. A total of 36 markets fit this criterion and were used. Linear interpolations were used to fill any missing data gaps between data points. The final data set used for this analysis is a balanced panel data set of 36 markets' maize price data covering the biweekly period from January 2020 to June 2024.

## Analysis

Figure 1 depicts both real and nominal biweekly average maize prices (RWF per kg) over the four-and-a-half-year study period. From a nominal price perspective, we see relatively large swings in prices from a low of about 250 RWF in July 2021 to a high of almost 700 RWF in December 2022 and a return to about 350 in April 2024. An inspection of price spikes indicates that, despite the

overall volatility, prices seem to peak in November-December of each year and fall in the next couple of months. Real maize prices diverge sharply from nominal prices beginning in June 2022 reflecting a large food inflationary price shock<sup>1</sup> experienced in mid to late 2022. Overall, real prices are less varied and demonstrate considerable price decreases beginning in October 2023 that seem to stabilize by March 2024. The volatility in nominal prices and divergence from real prices highlight the need for measures to stabilize prices and address inflation. Policymakers should improve market transparency, enhance food reserves, support farmers during price spikes, and implement strategies to reduce seasonal price fluctuations for more consistent maize pricing throughout the year.

**Figure 1. Real and nominal Rwandan maize prices (36 eSoko market average)**

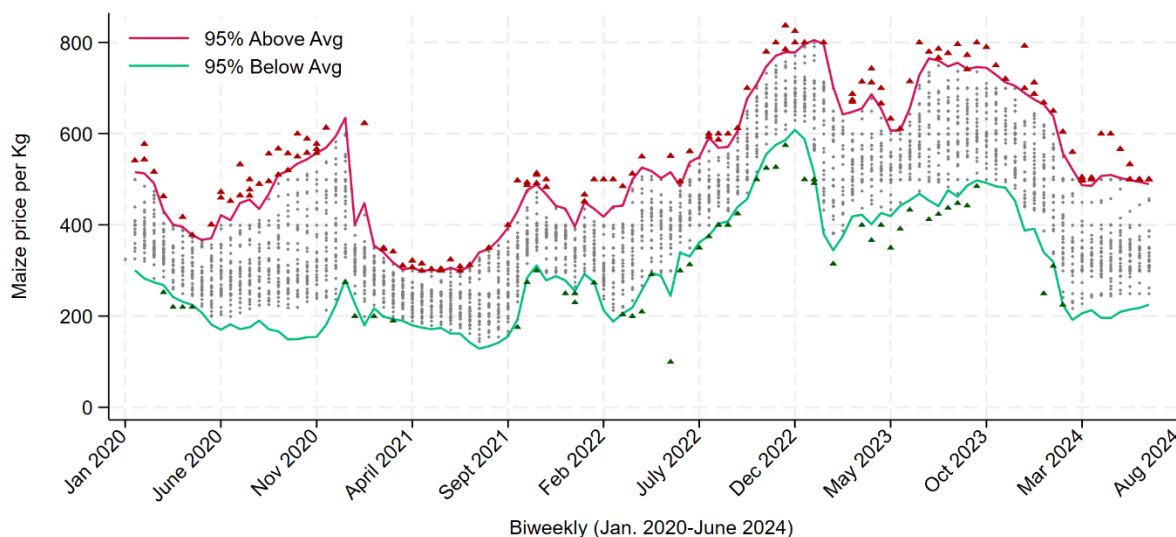


Authors' calculations

Graphing out the 36 individual market biweekly prices demonstrates the relative co-movement of individual market prices within a 95 percent level band of statistical significance. A bivariate correlation of 85 percent was determined between all markets. The Karambi market located in Nyamasheke district, exhibited the highest overall correlation at 90 percent and Kabarondo modern market in Kayonza District, was the lowest at 73 percent correlation between all other markets. These values suggest relatively high co-movement among all markets and a relatively large degree of market integration. Overall prices move together in a similar pattern with variations that likely reflect either levels of local maize marketing, import/export changes or global input or price shocks like Covid-19 and the Ukrainian/Russian conflict. The price bands are typically equidistant from each other across time with only occasional widening in late 2020, early 2023 and 2024. The red and green triangles are those reported market prices that exceed or are less than 95 percent of the biweekly national average, respectively. The high correlation among market prices indicates strong market integration, but occasional price band widening suggests vulnerabilities to global shocks and local disruptions. Policymakers should enhance market integration, improve local marketing infrastructure, and develop strategies to buffer against global shocks and stabilize price fluctuations. Future research will explore causes and consequences of increased price volatility during these periods to better inform policy responses.

<sup>1</sup> The nominal price of maize is deflated by a general CPI price index which approximates general inflation of all consumer goods and not just cereal crops. The result may be considered representative of overall consumer inflation but not specifically to maize.

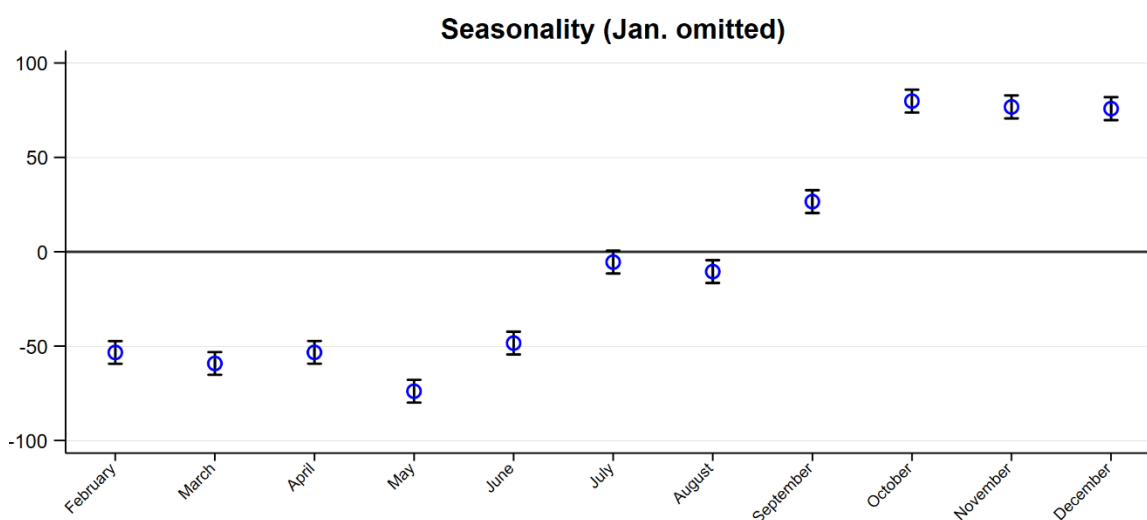
**Figure 2. Selected biweekly eSoko market prices (36 markets)**



Authors' calculations

Delineating seasonality from overall trends is important for identifying annual price variations generally associated with periods of crop harvesting and sales. Figure 3 aggregates the data to monthly observations to better capture price variations.<sup>2</sup> The diagram depicts the monthly variation relative to January (set to zero for statistical reasons). Monthly prices fall about an average of 125 RWF from December to February or about 30 percent from the predicted overall intercept (425 RWF). From February to June prices are relatively flat and then rise from June to October, despite Season B's typical maize harvest in June and July (FAO 2023). The lack of price declines that might be expected in June-July may be partly explained by the smaller Season B maize harvest which has been typically one-third the total production of Season A (SAS). Identifying seasonality is an important aspect of crop policy consideration as reducing seasonality could provide a variety of benefits to producers including improved income, income stability, food security and improved risk management.

**Figure 3. Estimated annual monthly maize price seasonality (36 markets 2020-2023)**

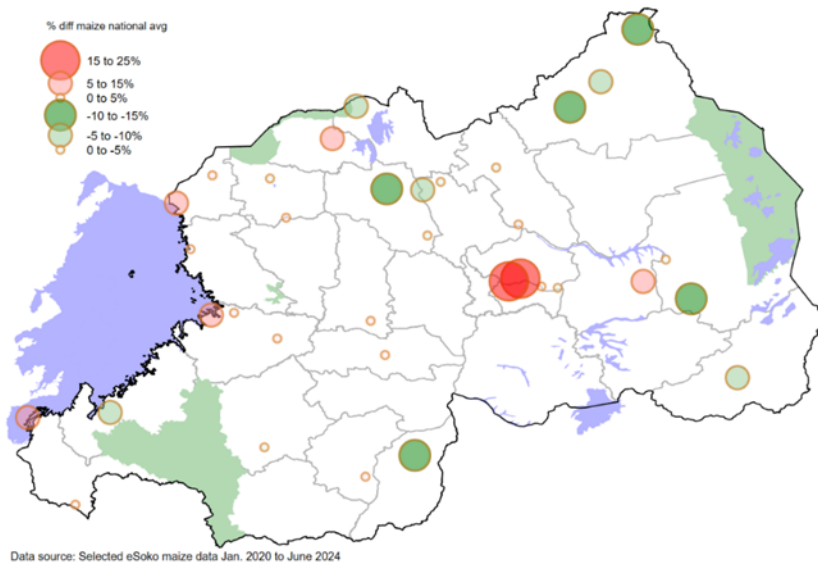


Authors' calculations

<sup>2</sup> Besides aggregating from biweekly to monthly observations, the first six months of 2024 were not included to maintain a balanced data set of all twelve months from 2020 – 2023.

Figure 4 spatially presents the individual market deviations from the overall biweekly average summed over the entire 2020-2024 period. As would be expected, the highest prices can be found in Kigali, with second higher than average prices being found along the Democratic Republic of Congo (DRC) border. Lower than average prices are spread around the country but somewhat clustered in the northeast of the country. Spatial variations are likely because of rural higher producing surplus areas and transportation and marketing costs to Kigali as well as the western borders for export. Tracking relative price movements could be useful to help better understand relative crop movements for planning purposes.

**Figure 4. Average price deviations from national average (36 markets 2020-2024)**



Authors' calculations

## Conclusion

This policy note examines Rwandan maize market prices over the period 2020-2024, utilizing eSoko price data. Maize is an indispensable crop in Rwanda, integral to both subsistence and commercial smallholder farming. The analysis presents significant fluctuations in nominal maize prices, marked by a steep increase between 2021 and 2022, followed by a return to near 2020 price levels in mid-2024. In contrast, real maize prices exhibited less volatility, displaying a slight overall decline. The study underscores strong market integration, evidenced by high inter-market price correlations, though notable disparities persist; for instance, in Kigali and western border export markets that consistently report higher prices, while markets in Nyagatare district had lower prices. Understanding price levels and price changes can help determine relative price shocks based on supply and demand changes. Seasonal price variations contribute to annual fluctuations, averaging about 30 percent of the market price, most notable during the Season A harvest period of December to February. These seasonal dynamics suggest opportunities for policy interventions to mitigate price volatility, which could enhance smallholder farmers' welfare through improved income stability, food security, and risk management.

This research seeks to provide a foundation for improved policy formulation to address identified challenges and leverage opportunities aiming to foster a more integrated, efficient, and accessible maize market for both consumers and producers. Ultimately this effort will enhance food security, support farmer livelihoods, and address economic stability challenges within Rwanda's agricultural sector.

## Policy Recommendations

Based on the findings of this research we suggest the following recommendations:

1. **Enhance market integration:** provide strategic investing in infrastructure such as roads, storage facilities and other transportation networks to improve connectivity between regional markets could reduce transportation costs and improve maize distribution. Additionally, promoting digital market platforms for real-time price data markets trend sharing will enhance market efficiency and integration for farmers and traders.
2. **Monitor international prices:** Future work in this area should incorporate international maize price data to better understand the effects of global prices on local markets. By collecting and comparing international prices, policymakers can better understand the effects and co-determination of international prices, and prospective import and export of maize for improved planning.
3. **Reduce price variations:** identifying and supporting markets with persistent price anomalies through technical support to improve prices between all markets. In addition, implementing price stabilization mechanisms like price supports and subsidies or purchasing buffer stocks to be purchased and released could help mitigate price volatility and ensure reasonable prices for both farmers and consumers. A reasonable allowance for price movements would be necessary because of fiscal realities and to encourage further private sector development.
4. **Diminish seasonality:** Using the development and promotion of storage facilities and provision of capacity-building programs for farmers on best practices in maize production, post-harvest handling, and marketing as facilitating them access to credit and insurance products tailored to maize farmers will enhance productivity, minimize post-harvest losses, extend maize shelf life and better stabilize prices during off-peak periods. Additionally, coordinating harvest and marketing strategies during peak and off-peak periods will improve maize distribution throughout the year and reduce relative market shortages and surpluses.
5. **Regulate and monitor markets:** Strengthening regulation frameworks to prevent market manipulation, ensure fair trading practices, and protect farmers and consumers from exploitative pricing. Building robust monitoring systems to track price trends and conditions in real-time will enable timely and informed policy responses. For example, eSoko monitors could provide supplemental information beyond prices and identifying unusual market anomalies that could supplement strategic planning. Reporting events could include reasons behind atypical price movements, such as larger trade volumes, significant change in the number of market participants, adherence to strategic policy interventions, or unusual infrastructure effects (local road closures, changing physical facilities, or improvements regarding market communication systems).
6. **Promote trade:** Engage in regional trade agreements for better maize market access and competitive pricing for Rwandan maize and develop export promotion strategies to expand markets, leveraging regional and international imports and exports.
7. **Encourage public-private partnerships:** Encouraging collaboration with the private sector to invest in maize marketing, storage and distribution with incentives for private agro-processing and market linkages to further enhance market efficiency and development.

## References

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