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Real-time market price monitoring: Current dynamics in southern Rwanda

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Recent collaborative CGIAR research has developed a prototype for tracking district-level costs of a healthy diet using monthly eSoko data.[1] High frequency monitoring of diets allows for near real-time generation of insights on price impacts on diet costs. The temporal richness of this data allows for immediate analytics of current food system events. This research provides an analysis of district-level price movements of healthy diet compositions, as well as food prices that compose the diet. We use this prototype to demonstrate how eSoko data could be used for monitoring an economic shock and how to evaluate the effects in near real time. The general goal is to demonstrate a potential early warning system that could improve the menu of policy choices for enhanced resilience.

For this brief we begin with tracking affordable district-level diets near the Burundi border right after the unexpected border closing on January 12th, 2024.[1] The purpose of this exercise is to measure the immediate impact of a cessation of trade between Rwanda and Burundi, via price movements in local markets. We would expect relatively large downward price movements in commodities that are generally exported from Rwanda to Burundi as exporters are forced to sell excess goods in local markets to reduce the potential surplus. Conversely, typically imported items from Burundi to Rwanda would be expected to see increasing prices due to a supply

[1] https://www.aljazeera.com/news/2024/1/12/burundi-closes-border-with-rwanda-in-latest-east-africa-row

shortage because of the lack of imports. However, this research finds almost no atypical price fluctuations, suggesting relative Rwandan price resilience to a lack of trade flows with Burundi. While restoring trade would be beneficial to trade and incomes, we find that significant price shocks have not occurred in the early months of this event.

Principal findings

- There are no unusual price category movements in either the affordable diet index or the five food crop categories that comprise the index. All price fluctuations are attributable to either seasonality or typical fluctuations experienced over the several years of collected data.
- At the individual commodity level there appears to be some local unusual price movements of mangoes, pineapples and salted fish. Despite this, there is no national price impact on pineapple, a modest effect on mango prices, and some effect on the limited number of markets that report salted fish.
- Our principal conclusion is, from an agricultural commodity price perspective, the overall effect of the border closure is negligible and has not yet been disruptive to national prices. While price analysis is only indicative of quantities, additional research would be needed to track commodity flows to confirm that the amounts have not significantly changed.

Method

Price data, recorded in Rwandan Francs (RWF) was collected from the online platform, eSoko (www.esoko.gov.rw). The eSoko platform is maintained 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. We spatially aggregated market prices to district prices, taking a mean average price if multiple prices were available for the same food item from different markets in the same district. The data was then aggregated into similar item groups (e.g. varieties into a single food item), taking the median price from this aggregation. As data collection was not performed simultaneously across markets, we aggregated to a monthly mean per district, generating monthly price data for the period April 2019 to April 2024. We use October 2023 to April 2024 for purposes of this research, as this captures the three months before and after the border closing.

The map (Figure 1) identifies the location of eSoko markets and are designated in blue, with major roads in red. Districts bordering Burundi, including a major road to the border, are framed in black and include Bugesera, Gisagara, Nyaruguru and Rusizi. These four districts, along with a national average that does not include these districts, serve as the price variables used for relative comparisons.

Figure 1: Rwanda eSoko markets and neighboring countries.

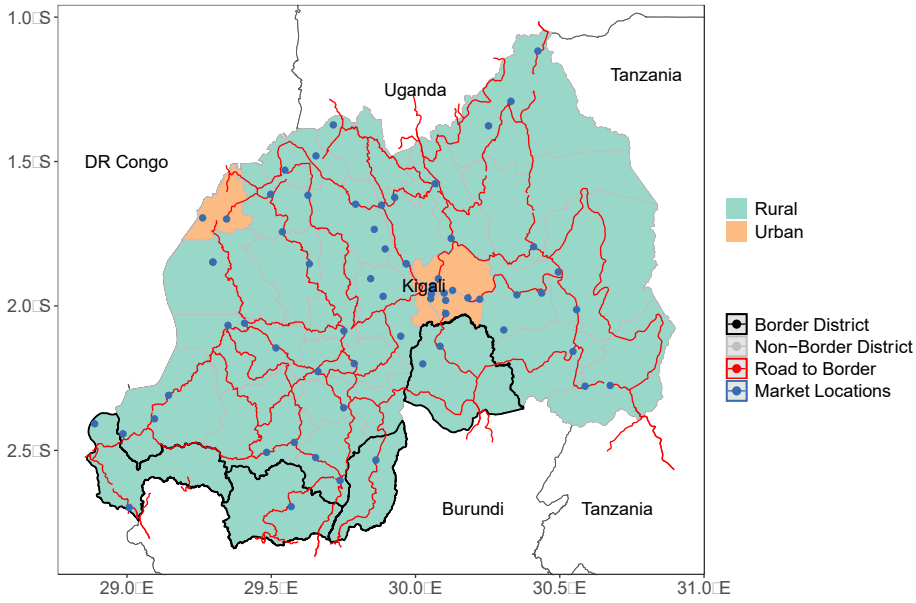
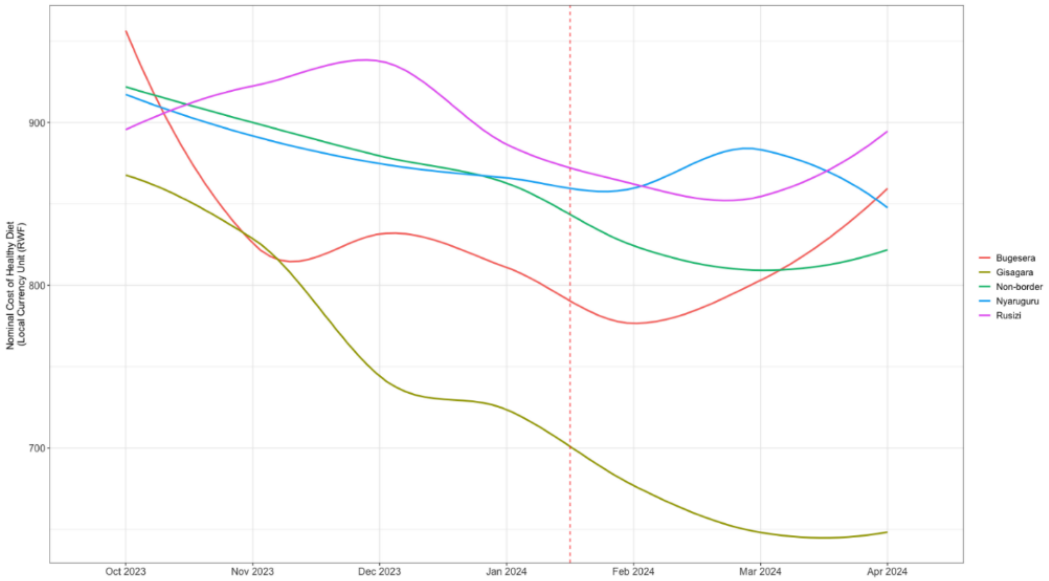


Figure 2 tracks monthly mean price movements of the four districts bordering Burundi and a national average (exclusive of these districts). Date of border closure is overlayed with a dashed red line. Tracking monthly costs of affordable diets[2] reveals some potentially unique price movements after the January 12th closure of the Burundi border. Specifically, from October to January there are mostly downward costs on all district averages. Placing these data into context, these values could be considered the expected result of typical seasonality price movements. However, at the point of closure some divergences between districts can be observed. While the overall national average continues to fall and then stabilizes between March and April, Bugesera and Rusizi show relatively large increases by April and Nyaruguru with an initial increase in March stabilized in April. When contrasted to the national average, relative price movements were 10.6% higher for Bugesera and 6% greater in Rusizi. Somewhat surprising was a 10.5% relative reduction in Gisagara costs, although it is part of a six-month decline in the Affordable Diet indicator. However, these price movements are important to place into overall variability that has occurred during the five-year study period. Typical average monthly price fluctuations are as high as 10% in Bugesera, suggesting that these observed price movements are within expectations of variation. In general, these price movements appear to be captured within anticipated levels of variation and do not seem to deviate greatly from trend analysis.

[2] To calculate the monthly costs of a recommended diet across the districts of Rwanda, the methodology developed by Herforth et al. (2022) was adopted. This method computes the least-cost diet that fulfils minimum food group serving and diversity requirements for a healthy diet basket.

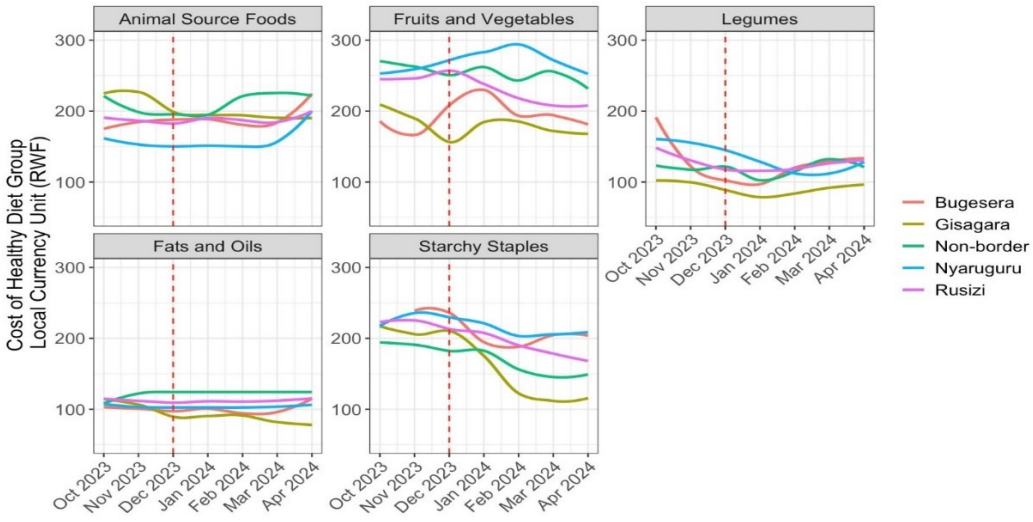
While tracking the Cost of a Healthy Diet can serve as a near real-time indication of local or national shocks to prices, the aggregated value could obscure more disaggregated price movements. We next look at the five categories that comprise the index and then present selected individual crops.

Figure 1: Costs of a Healthy Diet for selected districts and national average



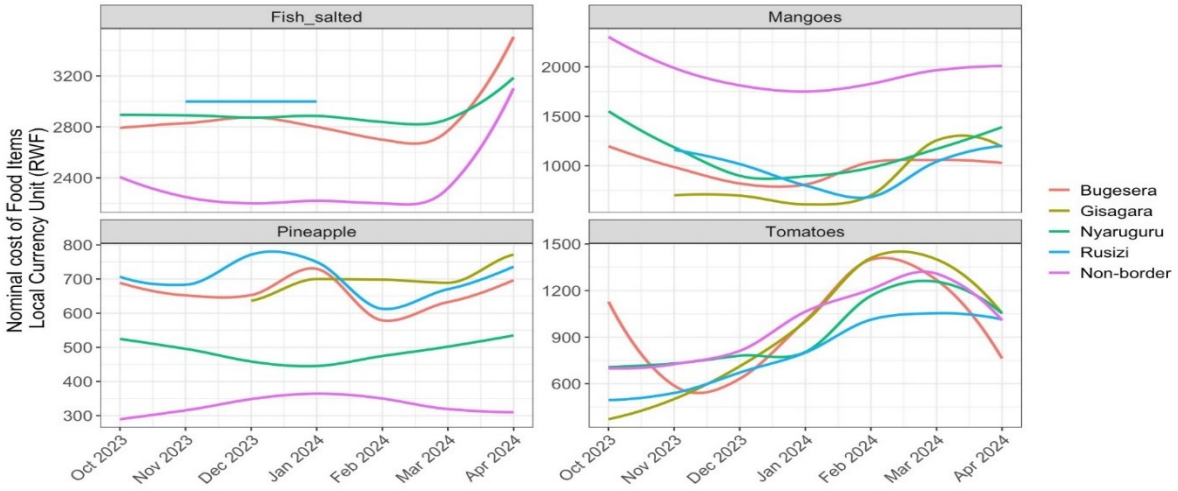
A breakdown of the individual components that comprise the Cost of a Healthy Diet does not show much variation among the border districts nor any variation between districts and the national average (Figure 3). Moving from this analysis, we present selected individual price items that at least appear to demonstrate significant movement.

Figure 3: Cost of a Healthy Diet components in districts bordering Burundi



The selected commodities, presented in Figure 4, were chosen because they appear to reflect large price movements after mid-January. While seasonality factors into this analysis, a review suggests that even these few commodities do not appear to be impacted to any real degree. Perhaps the most significant potential impact is salted fish which saw a 30% increase in March and April. As indicated by the graph, fish may not be a commonly traded item and thinly traded items are not as essential for the diet indicator variable. Mango prices have risen in all the border districts since January. Clearly, these are lower cost areas where prices are well below the national average. However, eSoko mango prices are very volatile, even averaged monthly at the national level, making it difficult to capture specific impacts of any events. Additionally, a recent Rwandan mealybug infestation has lowered domestic supply. Conversely, pineapple prices are well above national averages in the districts and are moving in the opposite direction of the national average. While tomato prices rose significantly after January, it seems clear that this is part of a seasonal affect, captured by the national variation that mirrors the district prices.

Figure 4: Selected commodity prices in districts bordering Burundi.



Conclusion

By tracking district-level Costs of a Healthy Diet, this brief seeks to track local price movements potentially caused by the recent border closure between Rwanda and Burundi. Monitoring eSoko aggregate indexes, as well as individual commodities, provides the policymaker with near real time feedback for potential swift decision making. Having access to economic information as early as possible creates a larger window to take action to avert the most negative consequences of an economic shock. Even though no immediate action is recommended in this case, we believe this example demonstrates the value of monitoring continuously collected data for improved evidence-based decision-making.

Despite expectations of significant price movements in certain food items due to the trade disruption, the research findings indicate little to no atypical price movements. The data analysis suggests that the overall effect of the border closure on agricultural commodity prices is minimal, with most price fluctuations likely attributed to normal seasonal variations or typical market dynamics. We believe the study highlights the importance of monitoring local price movements

to assess potential shocks to food prices and emphasizes the potential need for further research to confirm the stability of commodity flows amidst trade disruptions.

Reference

Herforth, Anna, et al. 2022. "Methods and options to monitor the cost and affordability of a healthy diet globally Background paper for The State of Food Security and Nutrition in the World.

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