



Assessing market price dynamics during the COVID-19 pandemic in Rwanda

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The COVID-19 pandemic and the economic policy measures taken to prevent its spread led to a global recession in 2020 that was expected to cause significant increases in poverty and food insecurity in many countries. Households were expected to experience a “double whammy” of decreased incomes and rising food prices. This policy note examines whether food prices rose in Rwanda since the COVID-19 pandemic began in early 2020. The main findings from this price analysis suggest the following.

- Food prices did not significantly rise (or fall) during the COVID-19 pandemic in Rwanda.
- Prices of staple foods (cereals and other starches) declined following the pandemic's onset in March 2020, while the prices of pulses (the second largest food consumption group in Rwanda after staple foods) experienced a seasonal spike at the end of 2021, but returned to below pre-pandemic levels throughout 2021.
- For most food groups, price trends in each province generally followed the national price trends during the pandemic, with the exception of poultry and eggs.
- Nationally, prices of poultry and eggs declined after the beginning of the pandemic, but these prices vary significantly by province, with prices in the Northern Province remaining above pre-pandemic levels and prices in all other provinces falling since the pandemic, with prices in Kigali City falling the most.

Overall, these results suggest that households in Rwanda were not hit by the “double whammy” of decreased incomes and rising food prices, since food prices remained stable. Rather, they may instead have only suffered from decreased incomes. These findings suggest that continued efforts to expand Rwanda's social protection programs are needed to boost household purchasing power and ensure that households are able to consume more – and more nutritious – foods.

Overview

The COVID-19 pandemic and its rapid spread from late-2019 sent shockwaves throughout the world and led many countries to quickly enact measures to contain the virus. The pandemic and related prevention measures led to a global recession that was predicted to cause a widespread increase in poverty and food insecurity, particularly among vulnerable households in developing countries

(FAO et al. 2021). Initial hypotheses posited that household purchasing power would decrease during the recession due to the double burden of reduced incomes and increased market prices (Laborde et al. 2020a, Laborde et al. 2020b, Béné 2020). In fact, most countries exempted agriculture from many of the economic restrictions put in place to contain the spread of COVID-19. Any supply-side shocks experienced in the agricultural sector or food system were potentially offset by a decrease in demand for food as incomes decreased and as restaurants, shops, and other food system services were placed under restrictions. As a result, global food prices remained relatively stable at the beginning of the pandemic. Only since the end of 2020 have there been signs of rapidly rising food prices (FAO 2021, World Bank 2021a). These price increases are likely driven by the disruption and reorganization of supply chains and the associated delays and increased costs of freight transport amid movement restrictions (Laborde et al. 2020a).

Rwanda took swift and early action to curb the spread of COVID-19. A series of public health measures were introduced beginning in March 2020, while national lockdowns were enforced from mid-March to May 2020, from mid-January to early February 2021, and from late July to early August 2021, accompanied by more local, district-level lockdowns where infection rates warranted them. Rwanda's international borders were closed from mid-March through early August 2020, although the movement of traded goods was exempted from the border closure, albeit with strict COVID-19 testing measures for those involved in trade. These measures significantly contributed to low rates of both infection and mortality from COVID-19 throughout the country. However, border closures affected the price of some food items that commonly are traded across borders, most notably that with the Democratic Republic of the Congo, across which large volumes of poultry, eggs, and other food items typically move through both formal and informal trade channels.

Throughout these national and localized lockdowns, farming and other primary agricultural activities were exempted from the major restrictions on movement, and agricultural traders and transporters were still able obtain movement clearances to supply food to the country. Meanwhile, key agricultural sector programs, such as the supply of subsidized seed and fertilizer to farmers, continued throughout the pandemic. Still, measures taken to curb the spread of COVID-19 were likely to have had some effect on the agriculture sector through other pathways – for example, higher transaction costs of delivering farm produce, losses to non-farm employment and enterprise revenues that are essential to financing on-farm input expenditures, remittances from urban to rural areas, and other channels.

As such, measures to contain the virus were still predicted to negatively affect household incomes (World Bank 2021b; Aragie et al. 2021; Diao et al. 2021). Household income shocks can affect household food and nutrition security. These shocks can be exacerbated by price shocks resulting from, for example, disruptions to supply chains, which may be further compounded by seasonal price fluctuations.

Taking all this into account, this policy note focuses on the dynamics of prices for key food groups in Rwanda during the COVID-19 pandemic. The note specifically investigates whether food price shocks contributed to a decline in the purchasing power of Rwandan households during the COVID-19 pandemic. Prior work on food price dynamics in Rwanda is scant. However, one recent study by Nsabimana et al. (2021) suggests a high level of market integration in Rwanda. This finding implies that shocks – in their case, positive shocks resulting from yield and output gains in food staple production – are efficiently transmitted across the country. Correspondingly, this suggests that any negative shock resulting from food production losses associated with COVID-19 would be observable in price data collected throughout Rwanda.

Data and methods

Our analysis utilizes the e-Soko market price data from August 2019 through mid-August 2021 collected by the Rwanda Ministry of Agriculture and Animal Resources (MINAGRI). The e-Soko data covers 66 markets across all 30 districts of Rwanda. Market price data are collected for approximately 90 items in these markets, including food items, agricultural inputs, cooking inputs (e.g., charcoal), and live animals. E-Soko price data are collected nearly every day. For the purposes of this study, we examined only the prices of food items and live animals (converted to the price per kg of meat). Most key food items consumed in Rwanda are included in these data. However, a few notable items are missing. Cooking oil prices are not collected, and fish prices were only added in 2020. Thus, we omit them from the analysis.

To study food price trends across the country and how they might influence household purchasing power, we analyzed the evolution of food group-specific price indices during the pandemic. To do so, we first grouped individual food items in the e-Soko data into seven food groups: Staple foods (i.e., cereals and starchy roots, tubers, and cooking bananas); pulses (i.e., beans and groundnuts); meat; poultry and eggs; dairy; vegetables; and fruits. Staple foods are the most important food group in Rwanda in terms of both household food budgets and as source of calories, followed by pulses.

We then took a weighted mean across the price observations of food items within the same food group. These weights were based on average household budget shares of each food item, calculated from the Fifth Integrated Household Living Conditions Survey (EICV5) (NISR 2017) for each province. Thus, within each food group, items that had a greater importance in household budgets in the 2016/17 survey year received a larger weight in our price index.

Next, we calculated a Laspeyres price index to estimate the changes in food group prices between August 2019 and August 2021. A Laspeyres price index measures how prices change over time for a selected basket of consumption goods. We aggregated the daily price data to the monthly level by taking the mean. At the geographical level, we took the mean price across markets at the district level and then aggregated the district-level prices to provincial and national levels by calculating population-weighted mean prices.

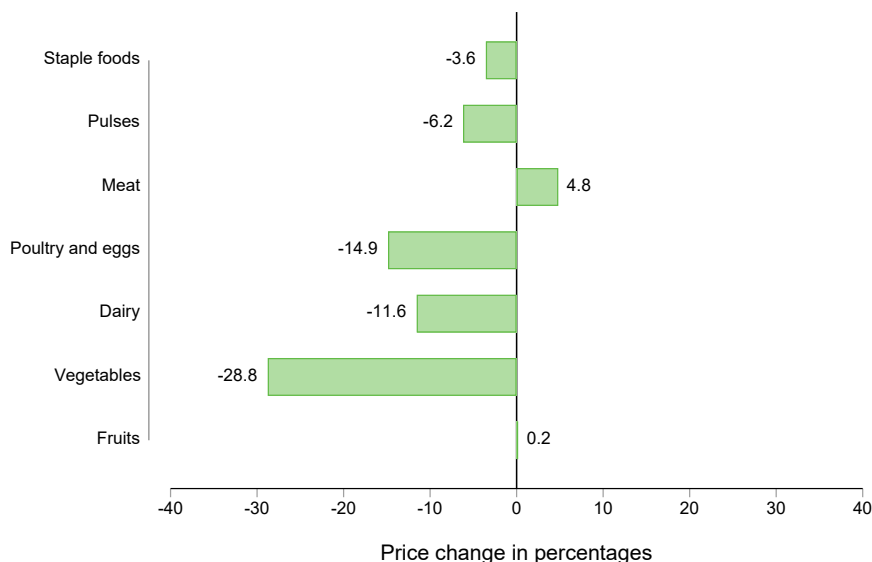
The first COVID-19 infection in Rwanda was confirmed on 14 March 2020, just three days after the World Health Organization declared the outbreak a pandemic. Considering this, we set February 2020 as the base period and expressed food group-specific price deviations in percentage terms with respect to this month.

Food prices remained relatively stable throughout the COVID-19 pandemic

We begin by assessing how food prices in Rwanda changed one year into the pandemic. To do so, we calculated the percent change in prices between February 2020 and February 2021. By focusing on the same calendar month, we control for seasonal patterns in food prices (Gilbert et al. 2017). Figure 1 shows that the prices of all food categories, except meat, declined during the 12-month period. Prices of staple foods and pulses decreased by 4 and 6 percent, respectively. Price decreases were even larger for poultry and eggs, dairy, and vegetables, ranging between -12 and -29 percent. Meat prices increased by about 5 percent during the same period.

Considering that staple foods and pulses account for more than 90 percent of the average household food consumption basket in Rwanda, we conclude that food-related living costs remained largely the same or even decreased for the average household in Rwanda during the first year of the pandemic.

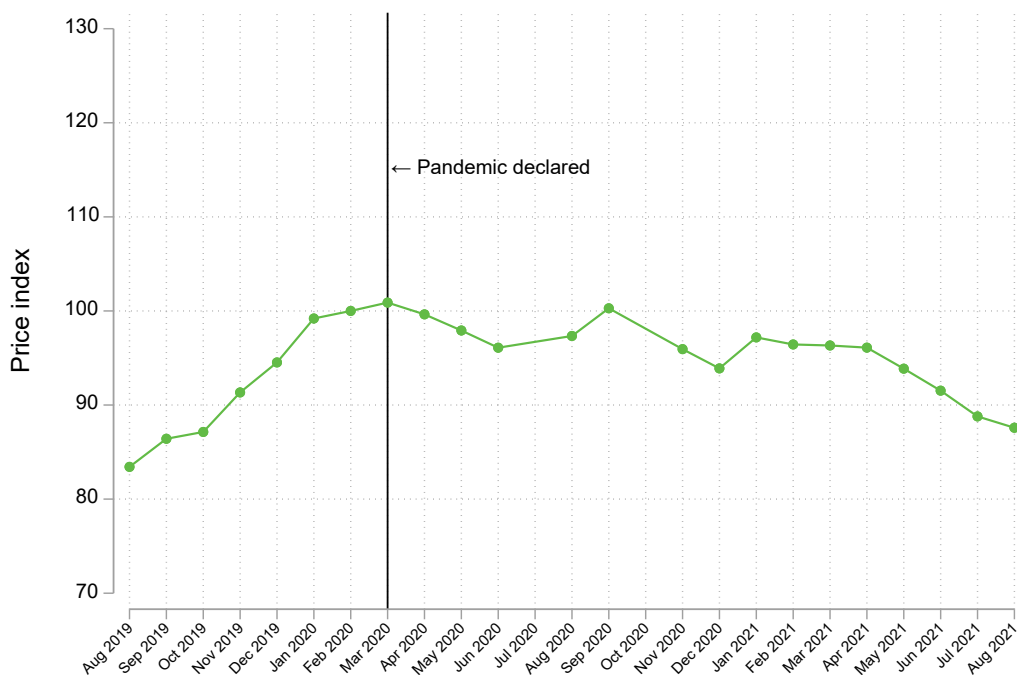
Figure 1. Percent change in price index, February 2020 to February 2021, by food group



Source: Authors' calculations using e-Soko data (MINAGRI 2021).

However, Figure 1 provides only a year-on-year snapshot of food price changes. To gain a more complete picture of food price dynamics, we assess month-by-month price changes between August 2019 and August 2021. Figure 2 illustrates how food staple prices changed during this two-year period. We see that the prices of staples foods increased considerably during the months leading up to the pandemic, i.e., August 2019 and January 2020. During the pandemic, prices of staple foods did not increase by more than one percent above the February 2020 base period and, in fact, have been continuously decreasing since October 2020. As before, these month-by-month price trends of staple foods – the most important food group – suggest that food supply chains were hardly affected by the pandemic in Rwanda.

Figure 2. Price Index (February 2020 = 100) for staple foods in Rwanda, August 2019 to August 2021

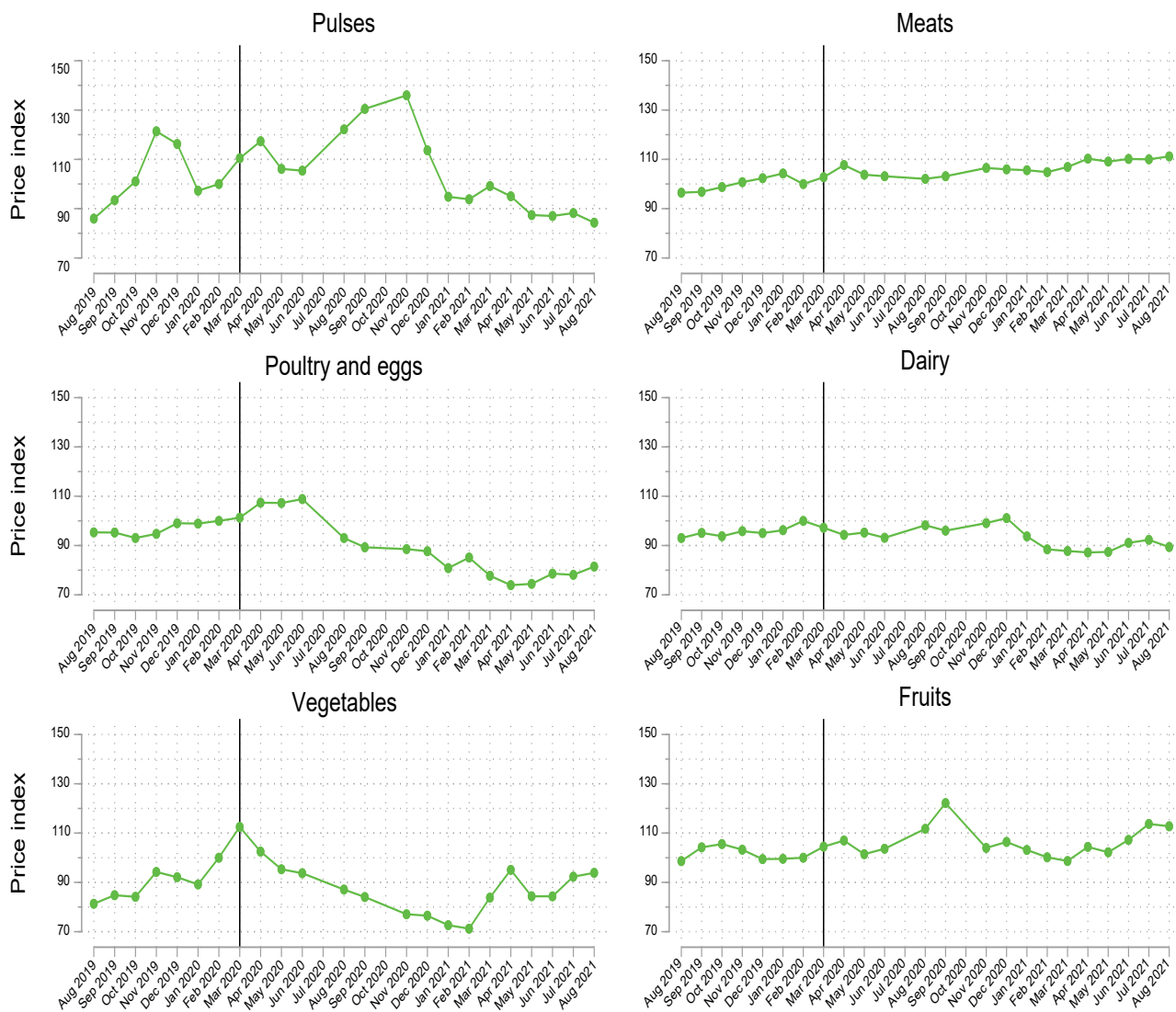


Source: Authors' calculations using e-Soko data (MINAGRI 2021).

Note: Staple foods include cereals (maize, rice, wheat, sorghum), starchy roots (Irish potatoes, sweet potatoes, cassava, taro) and cooking bananas. Price data for July 2020 and October 2020 are missing.

Figure 3 combines the results for the remaining food groups. The prices of pulses, vegetables, poultry and eggs, and fruits display relatively large amounts of volatility with their prices varying more than 20 percentage points during the 24-month period. Part of this volatility is due to the seasonal nature of their production. For example, prices of pulses and vegetables tend to rise through the end of each year and remain lower in the first half the calendar year. However, we note that prices of pulses were somewhat higher during the end of the calendar year in 2020 as compared to the same period in 2019.

Figure 3. Price Index (February 2020 = 100) for other food groups than staples in Rwanda, August 2019 to August 2021



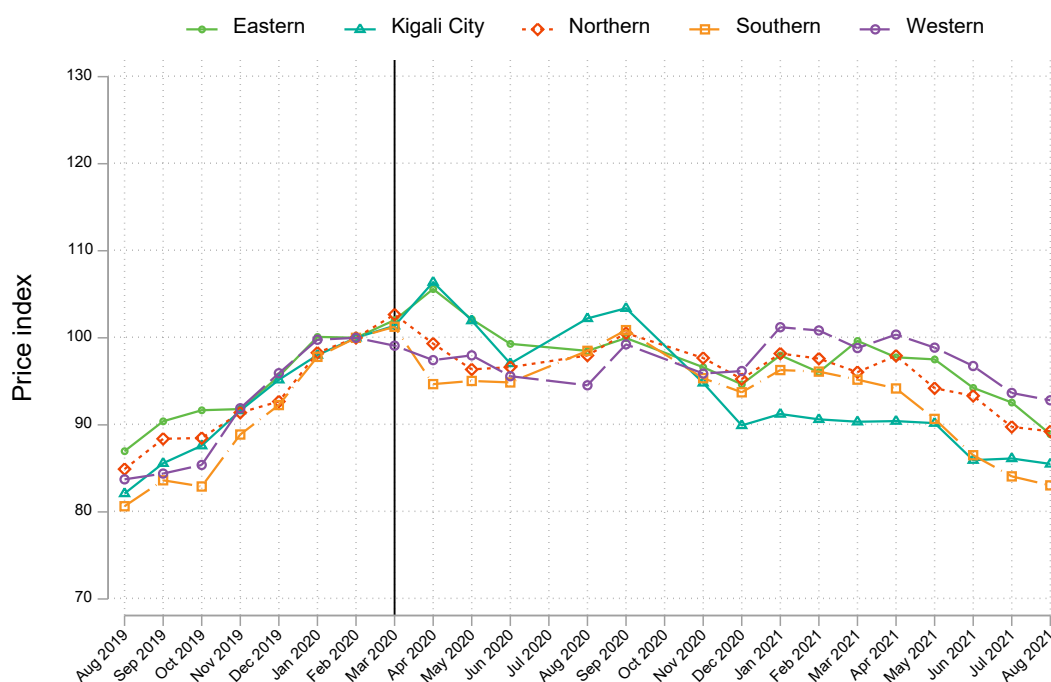
Source: Authors' calculations using e-Soko data (MINAGRI 2021)
 Note: Price data for July 2020 and October 2020 missing.

Vegetable prices peaked in February 2020, just before the pandemic began, and were at their lowest level one year later in February 2021, nearly 30 percent below the February 2020 base period. We see a slight recovery in vegetable prices later in the year, and by August 2021 the prices are about 6 percent below the base period prices. Poultry and egg prices reached their peak in July 2020, after a steady rise that started well before the pandemic began. After July 2020, poultry and egg prices began to decline and in August 2021, they were about 20 percent lower than in our base period, February 2020. Prices of meats have been on a steady increase throughout the study period.

Overall, we see no clear evidence of any structural break in food prices induced by the pandemic or the lockdown measures that followed.

Overall, these results are consistent with the CPI data collected by the National Institute of Statistics of Rwanda (NISR), even though the purpose, collection, and analysis of the two measures differ. When looking at the four main food groupings in the CPI (bread and cereals; meat; milk, cheese, and eggs; and vegetables) that correspond most closely to the food groups in our analysis, the data show that the prices of bread and cereals decreased between February 2020 and August 2021, with some seasonal variation observed within that period (NISR 2021a). The CPI data also show that the price of meat has steadily, yet slowly, increased during that same period, with a similar trajectory for milk, cheese, and eggs, although the prices of the latter leveled off in 2021. The prices of vegetables were the most volatile in this period according to the CPI, with spikes in prices in March 2020, the last quarter of 2020, and March 2021 – although when compared to the prices of vegetables in January 2020, the prices in August 2021 were nearly comparable. For the entire category of food and non-alcoholic beverages, the CPI suggests essentially no persistent change in prices, with a CPI of 144 in January 2020 compared to 143 in August 2021, though the measure fluctuated notably in between these two end points.

Figure 4. Price Index (February 2020 = 100) for staple foods in Rwanda, August 2019 to August 2021, by province

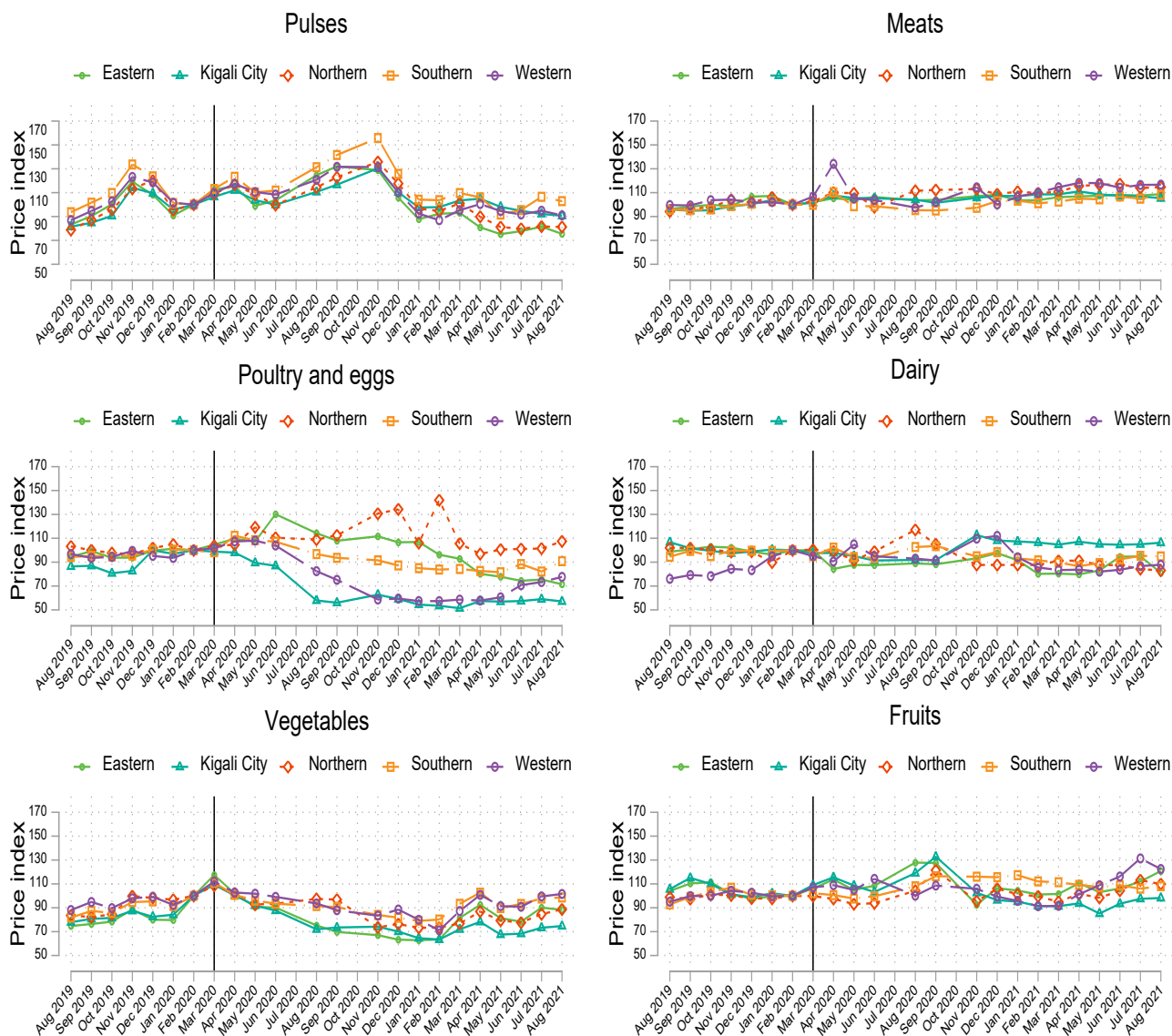


Source: Authors' calculations using e-Soko data (MINAGRI 2021).
 Note: Price data for July 2020 and October 2020 missing.

Looking at the price dynamics by province presents a similar picture. The prices of staple foods remained relatively stable from the beginning of the pandemic through August 2021 in all provinces (Figure 4), with prices in Kigali rising slightly more above the base period in 2020 and prices rising more in the Western Province in 2021. Compared to staple foods, the prices of pulses display more volatility (Figure 5, upper left). During the pandemic, the prices of pulses peaked at the end of 2020. This price spike was more pronounced in the Southern region where the prices of pulses were more than 50 percent above the base period in November 2020. However, these prices also declined relatively rapidly, and by August 2021, the prices of pulses were at or below the levels observed in the pre-pandemic base period. The prices of meats remained relatively more stable during the study period (Figure 5, upper right). Only in the Western Province do we see a short spike in April 2020

but a quick recovery back to the pre-pandemic trend line in the next month. The prices of poultry and eggs display considerable spatial variation during the pandemic, indicating limited market integration in these products (Figure 5, middle left). By August 2021, prices of poultry and eggs were about 40 percent below the pre-pandemic base period in Kigali City and nearly 10 percent above the base period in the Northern Province. Like poultry and eggs, dairy price trends also vary across provinces (Figure 5, middle right). Trade in dairy, particularly fresh milk, requires refrigeration and stringent quality testing, making longer distance trade difficult. This is likely to lead to limited market integration and, therefore, explain why prices do not move in tandem across provinces. The spatial price movements in vegetables (Figure 5, lower left) and fruits (Figure 5, lower right) are more harmonized between provinces.

Figure 5. Price Index (February 2020 = 100) for other food groups than staples in Rwanda, August 2019 to August 2021, by Province



Source: Authors' calculations using e-Soko data (MINAGRI 2021). Note: Price data for July 2020 and October 2020 missing.

Discussion

There are many reasons why food prices in Rwanda may not have spiked during the COVID-19 pandemic. The exemption granted to farming and food trade and transport activities from lockdown measures was likely a key factor. On this front, Rwanda took considerable care to minimize harm to the agriculture sector. As a result, the sector posted a *positive* growth rate of 1 percent in 2020, while

the industry and service sectors posted *negative* growth rates of 4 and 6 percent, respectively (NISR 2021b).

Another reason relates to Rwanda's relatively autarkic food system, especially in 2021 as other nations experienced rising prices (FAO 2021, World Bank 2021a). Since most of Rwanda's food is produced domestically (NISR 2021b and 2021c), its exposure to trade-related price volatility is relatively limited.¹ Consequently, Rwanda was less affected by the increased freight costs and delays that ultimately led to increasing food prices elsewhere. Meanwhile, exports of certain types of food and live animal exports declined during the first and second quarters of 2020 (the first quarters of the pandemic), thereby increasing supply to the domestic market and reducing demand.²

Of course, food system autarky and policies focused on food self-sufficiency can be a double-edged sword. If Rwanda *had* experienced a negative food production shock during the pandemic, closed borders and inward-looking policies in neighboring countries could have negatively affected Rwanda's ability to import food, thus leading to increases in food prices. Fortunately, Rwanda experienced relatively good harvests during the pandemic. The production of the main staple foods, including maize, sorghum, cassava, and cooking banana, all increased between 2019 and 2020.³ Overall, the production of all aggregate food groups increased from 2020 Season A to 2021 Season A, suggesting no declines in food availability from domestic production (NISR 2020 and 2021d).

Finally, it is likely that food prices in Rwanda remained stable during the pandemic due to significant demand-side effects. With employment and income losses alongside limits placed on restaurants and value-added food service operations during the pandemic, consumer food demand was considerably depressed. This has the effect of offsetting inflationary pressures on food items or even pushing food prices downwards. In fact, most food retail prices showed a downward trend during the pandemic.

In summary, our findings suggest that households in Rwanda were not hit by the "double whammy" of decreasing incomes and rising food prices, since food prices showed no signs of increase between February 2020 and August 2021. However, this should not imply that Rwanda is emerging from the global COVID-19 pandemic unscathed: the income losses experienced by vulnerable households are likely to remain an important concern for the economic recovery period to follow.

That recovery period will require continued efforts to improve the quantity and quality of food consumption to address persistent malnutrition. Demand-side policies focused on expanding and strengthening social protection programs are critical to this effort, especially for those households that experienced losses to their employment and enterprise incomes. At the same time, the recovery period will require renewed efforts to increase both the quantity and quality of food production in anticipation of future production and market shocks.

¹ The total value of imported food and live animals in the first quarter of 2021 was USD 107.4 million, less than one-fourth of the amount produced within Rwanda, which is valued at approximately USD 500 million (FRW 475 billion).

² The value of food and live animal exports in 2020 Quarter 1 and 2020 Quarter 2 was 59.5 and 49.8 million USD, respectively. Since then, the value increased to over 60 million per quarter, even reaching 81.7 million USD in 2021 Quarter 2.

³ Note that during this same period, the production of rice, wheat, and Irish potato actually decreased by 11, 18, and 12 percent, respectively. However, Rwanda imports significant quantities of both rice and wheat due to low domestic production levels, and Irish potato is not itself a significant staple food in most Rwandan diets.

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