

## COUNTRY BRIEF 25

# Poverty Impacts of Food Price Increases in Niger

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The prices of staple grains began rising in mid-2020, reflecting higher fertilizer prices and the supply chain bottlenecks caused by the outbreak of Covid-19, and increased sharply following the Russian invasion of Ukraine in early 2022. How have these dramatic increases in world prices of cereals affected poverty in low-income countries? This brief estimates the impact of higher world grain prices on poverty in Niger. Other briefs in this series examine the impact of higher food prices on poverty in Kenya, Ethiopia, Nigeria, Burkina Faso, and Mali (see Minot and Martin, 2023a and 2023b; Martin and Minot, 2023a, 2023b, and 2023c).

All six studies use a similar approach. First, we examine the effect of the rise in international cereal prices on the real price of key grains in the domestic markets of the country. Second, we estimate the impact of the changes in domestic grain prices on the real income of each household using nationally-representative survey data, taking into account the importance of the commodities in consumption and as a source of income for each household. Finally, we estimate the changes in head-count poverty (the share of people living below the poverty line) based on the changes in real income for each household in the sample. We focus on the prices of maize, wheat, and sorghum for reasons discussed below.

## 1. Trends in international grain prices

Following several years of relative stability, commodity prices began to rise in the wake of the Covid-19 epidemic, although the pattern and timing differed across commodities. As shown in Figure 1, the price of US soft red winter wheat fell somewhat in the first half of 2020, but then rose fairly steadily over the next 18 months. By February 2022, it was 36 percent above the pre-pandemic level (January 2020). In March, following the invasion of Ukraine by Russia, the wheat price spiked to 79 percent above the pre-pandemic level based on the fear that the war would impede exports from both countries, which together account for 25 percent of world wheat exports. Prices remained high for several months but began to decline in June 2022, as it became apparent that war-related restrictions on grain exports would be less than feared. By April 2023, the international price of wheat was just 11 percent above the pre-pandemic level.

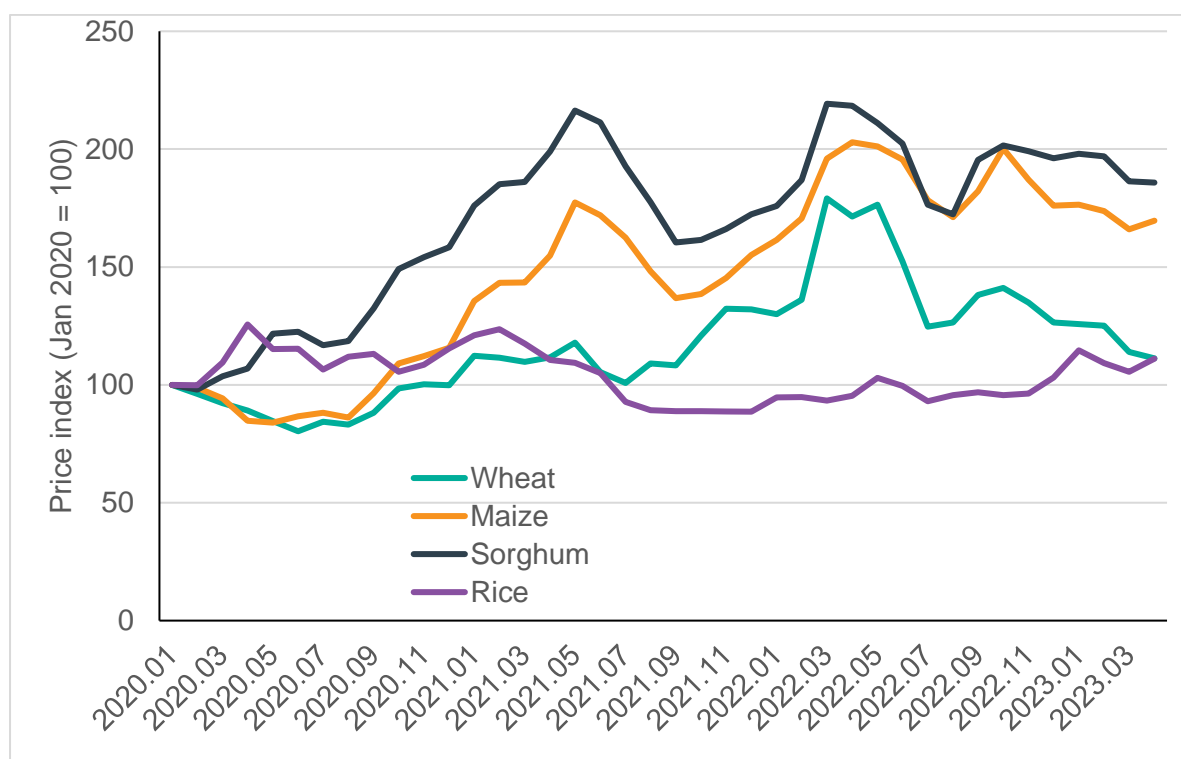
The price of US No 2 yellow maize followed a similar pattern, though the increase was greater, as shown in Figure 1. It spiked once in May 2021 at 77 percent above the pre-pandemic level, and

again after the invasion of Ukraine, when it reached double the pre-pandemic price. Unlike the wheat price, the maize price has remained high. As of April 2023, the maize price was still 70 per cent above the pre-pandemic level.

The world price of sorghum rose even more dramatically than wheat or maize, reaching 116 percent above the pre-pandemic price in May 2021 and again in March 2022 following the invasion. Although the price has declined somewhat since then, in April 2023 it was still 86 percent above the pre-pandemic price. Russia and Ukraine are not important exporters of sorghum, but sorghum prices typically follow maize prices because they are close substitutes.

Finally, Figure 1 shows that the price of Thai 5% broken rice has remained surprisingly stable throughout the Covid-19 pandemic and during the war in Ukraine. The war had little effect on the production or transport of rice in world markets. Rice prices began to creep up in early 2023 but were just 11 percent above the pre-pandemic level in April 2023.

**Figure 1. World prices of selected grains**



Source: FAO Global Information and Early Warning System. FAO (2023).

Note: Wheat prices are for US soft red winter wheat. Maize prices are for US No. 2 yellow maize. Sorghum is represented by US sorghum prices at Gulf Ports. Rice prices are for Thai 5% broken rice.

## 2. Grain prices in Niger

The impact of the increase in world grain prices on poverty in low-income countries depends on how much of the shock is transmitted to domestic grain markets in those countries. In the absence of an international price shock, we expect domestic prices to rise at the rate of inflation in the country. However, an increase in international prices should cause domestic prices to rise faster than inflation; in other words, it causes the real (inflation-adjusted) domestic price to rise. Frequently, the real price of grain in domestic markets does not rise by the full extent of the international price shock (Minot, 2011; Ceballos et al., 2017). There are several reasons for this. First, if the marketing margin between international and domestic prices is fixed in monetary terms, the (higher) domestic prices in an importing country will rise by a smaller percentage than the (lower) international price. Second, local and imported grains may be somewhat different to consumers, making them

imperfect substitutes for each other. Third, the government may reduce protection when world prices increase, thus insulating domestic consumers from the full shock (Martin and Minot, 2022). If a country has little or no trade in a commodity, domestic markets may be isolated from world markets, so that local prices respond mostly to domestic factors, such as weather-related shocks to yields.

Table 1 shows the changes in the world price (expressed in US\$), local nominal prices, and local real prices (adjusted for domestic inflation) for three commodities: wheat, maize, and sorghum. Rice is not included in the analysis because international prices have been relatively stable. Our analysis covers four time periods: February 2020 (pre-pandemic), January 2022 (pre-invasion), May 2022 (peak international prices), and July 2022 (post-peak). We do not analysis price changes since July 2022 because, as shown in Figure 1, the world prices of wheat, maize, and sorghum in the second quarter of 2023 have remained in the same broad range as they were in July 2022.

Because wheat prices are not available for Niger<sup>1</sup>, we use wheat flour prices in neighboring Cameroon, which uses essentially the same currency<sup>2</sup>. Between February 2020 and May 2022, when international prices peaked, the world price of wheat rose 76 percent, while the prices of maize and sorghum more than doubled. Over this period, the domestic nominal price of the three commodities increased between 40 and 63 percent, although these figures include increases due to general inflation. The domestic real (inflation-adjusted) prices of these commodities increased between 28 and 49 percent, reflecting the incomplete transmission of price shocks from international to domestic markets. Between May and July 2022, however, the world price of all three commodities dropped somewhat. The real domestic price of maize fell, while those of wheat and sorghum remained at their May levels. The last column shows the price transmission ratio, that is the increase in the real domestic price as a percentage of the increase in the world price between February 2020 and July 2022. In the case of wheat, the real price of wheat rose 45 percent while the world price increased 25 percent, so the price transmission ratio was 183 percent. It is unusual for the ratio to be greater than 100 percent, but this may be because domestic prices had not yet fallen in response to the lower world prices. The other price transmission ratios are in the normal range: 51 percent in the case of maize and 31 percent for sorghum.

The difference between the nominal and real prices of these commodities is modest because the inflation rate for Niger has been low: 3.8 percent in 2021 and 4.2 percent in 2022.

**Table 1. International and domestic cereal prices in Niger**

Commodity	Price type	Price index (100 = February 2020)				Price transmission ratio
		Pre-Covid (Feb 2020)	Pre-invasion (Jan 2022)	Peak (May 2022)	Post-peak (July 2022)	
Wheat	World (US\$)	100	130	176	125	--
	Local nominal	100	121	159	160	--
	Local real	100	112	145	145	183%
Maize	World (US\$)	100	161	201	178	--
	Local nominal	100	141	163	154	--
	Local real	100	130	149	140	51%
Sorghum	World (US\$)	100	205	229	190	--
	Local nominal	100	128	140	141	--
	Local real	100	119	128	128	31%

<sup>1</sup> We searched price databases maintained by the FAO, FEWSNET, and the WFP, as well as general web searches.

<sup>2</sup> Niger uses the West African CFA franc, while Cameroon uses the Central African CFA franc, but the two currencies have always been at parity with each other and are effectively interchangeable.

Source: IMF (2022) for international sorghum prices. FAO (2022) for others. The international prices are the US soft red winter wheat price, the US No 2 yellow maize price, and the US Gulf price for yellow sorghum. The local prices are the retail price of bread in Yaoundé, Cameroon, the retail price of maize in Niamey, and the retail price of sorghum in Niamey.

### 3. Income and spending patterns

The impact of domestic price changes on household income depends on the importance of the commodity as a source of income and its importance in household spending. Households that produce and sell the commodity gain from higher prices, while those that are net buyers of the grain lose. The percentage change in income will be proportional to the size of the price change and the net sales of the commodity (positive or negative) as a share of income (Deaton, 1989).

As shown in the first column of Table 2, sorghum is by far the most important commodity in the diet of households in Niger, contributing almost 18 percent of caloric intake. In comparison, wheat and maize represent just 2 percent and 1 percent, respectively, of the caloric intake. It should be noted that sorghum is second to millet, which accounts for 28 percent of the caloric intake. We do not consider millet in our analysis because there is little international trade in millet and no international reference price. Similarly, rice contributes 8 percent of caloric intake and is imported, but, as shown in Figure 1, rice prices have been stable over the period under consideration.

The second and third columns show the importance of each commodity as a source of household income and as a component in household budgets. The fourth column gives the net benefit ratio, defined as the net purchases as a proportion of household income (the income share minus the expenditure share). Maize and wheat show large net purchases among households, reflecting the fact that almost all wheat and most maize is imported. Net purchases are smaller in the case of sorghum, for which international trade is negligible, although there may be unrecorded cross-border trade.

**Table 2. Importance of selected commodities in caloric intake, income, and expenditure**

	Caloric contribution to the diet (%)	Budget shares		
		Income share (%)	Expenditure share (%)	Net benefit ratio (%)
Maize	0.9	0.2	4.3	-4.0
Wheat	2.0	0.3	1.9	-1.6
Sorghum	17.8	1.2	2.2	-1.0

Sources: Caloric contribution from FAO Food Balance Sheets, 2021 (FAO, 2023). Budget shares from the Povana database (Mamun and Laborde, 2021). Includes derived products such as flour and bread.

The impact of price changes on the incidence of poverty is particularly sensitive to the net sales position of households near the poverty line, for whom a price change may affect income enough to push them above or below the poverty line. The income and expenditure shares for household near the poverty line in Niger are similar to the shares in Table 2. The main difference is that maize represents a larger share of expenditure, resulting in a larger negative net benefit ratio. This implies that households near the poverty line are more adversely affected by increases in maize prices than other households.

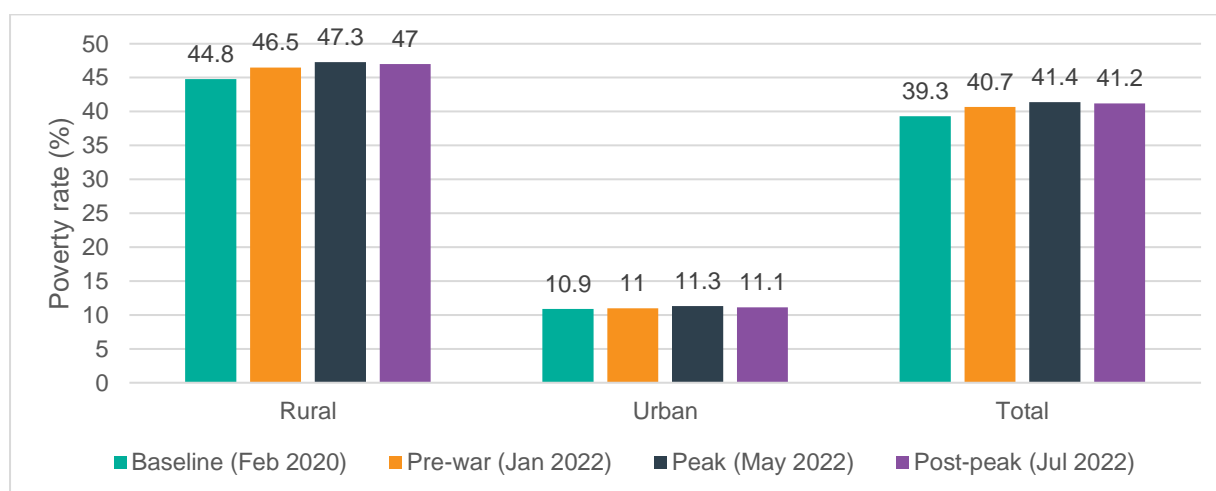
## 4. Poverty impact of grain price increases

We simulate the impact of increases in the domestic real prices of maize, wheat, and sorghum on headcount poverty in Niger, making use of data on the composition of expenditure and sources of income for each household in a nationally-representative survey. Real (inflation-adjusted) price changes are used to capture the impact of the rise in grain prices relative to the prices of other goods. The analysis does not include the welfare impact of general inflation, which is beyond the scope of this study. Such an analysis would be complicated, requiring information on which incomes and prices rise with inflation (such as agricultural prices) and which ones tend to lag behind inflation (such as formal-sector wages).

In general, the simulations indicate that higher prices for maize, wheat, and sorghum will increase the incidence of poverty. As shown in Figure 1, the national poverty rate rises from 39.3 percent in the pre-Covid period to 41.2 percent in July 2022. Although this increase may seem modest, it should be kept in mind that it represents about half a million people.

The urban-rural breakdown shows that the incidence of poverty is four times greater in rural areas (44.8 percent) than in urban areas (10.9 percent). In rural areas, the analysis suggests that poverty rises from 44.8 percent to 47.0 percent, more than 2 percentage points. In urban areas, it increases from 10.9 percent to 11.1 percent. The increase in poverty is greater in rural areas for two reasons. First, many rural households are net buyers of staple grains, which tend to be a large share of their expenditure. In addition, rural households are poorer, so a larger share of them are close to the poverty line and more vulnerable to falling below it due to food price changes.

**Figure 2. Impact of staple grain price changes on poverty in Niger**



Source: Authors' calculations based on changes in real prices of maize, wheat, and sorghum and household income and expenditure patterns.

## 5. Sensitivity of results to alternative assumptions

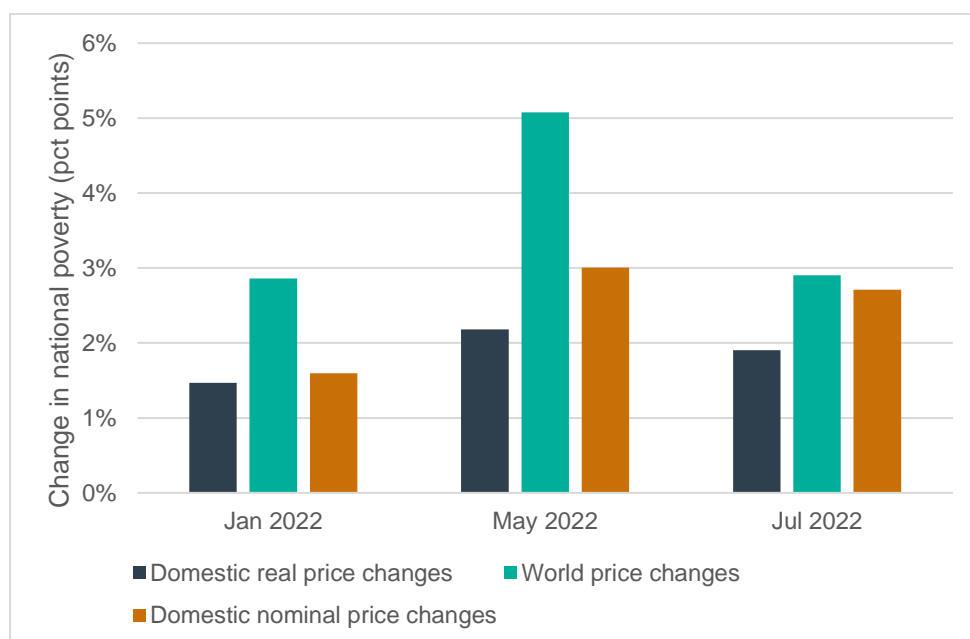
This section compares the main results from Figure 2 with the poverty impact under two alternative sets of assumptions. Specifically, we estimate the poverty impact 1) if the world price shocks for the three commodities were fully transmitted to domestic markets and 2) if we included both the domestic real price increase of the three commodities and the price increase due to general inflation, while assuming all other prices and incomes were constant over the period being considered.

As noted above, changes in international prices are usually not fully transmitted to domestic markets due to fixed marketing margins, imperfect substitutability, and policies designed to insulate domestic markets from international price volatility. In Niger, the rise in domestic real price of wheat products was actually greater than that of world wheat prices, but for maize and sorghum half or less of the international shock was transmitted to domestic markets. Here we simulate the poverty impact if international shocks had been fully transmitted, that is, if the domestic real prices had increased in the same proportions as the world prices of the three commodities.

Figure 3 compares the estimated actual change in poverty (in green) with a hypothetical change in poverty assuming full transmission of shocks (in blue). The short answer is that full transmission of the price shock from international markets to domestic markets would have resulted in larger increases in poverty. For example, if domestic prices in Niger had increased as much as world grain prices did, the poverty rate would have increased 5.1 percentage points in May 2022, compared to the estimated increase of 2.2 percentage points. This relatively large poverty impact is probably due to the fact that full price transmission would mean that the real price increase of sorghum would have been three times greater than it actually was.

The simple interpretation is to say that incomplete transmission of international price shocks to domestic markets had a positive effect because it reduced the resulting increase in poverty in Niger. However, at the global level, insulation of domestic markets from international shocks (whether due to policy or market friction) probably increases the volatility of international prices. Martin and Minot (2023) found that insulation of domestic markets following the invasion of Ukraine likely doubled the spike in international wheat prices. A few large countries (notably India and China) were responsible for much of this magnification. Thus, insulation is a double-edged sword: it protects domestic market from international shocks, while simultaneously exacerbating the size of those shocks.

**Figure 3. Sensitivity of the poverty impact to alternative assumptions**



Source: Authors calculations based on changes in real prices of maize, wheat, and sorghum and household income and expenditure patterns.

Note: Our best estimate of the poverty impact of international shocks uses domestic real price changes (in green). Full transmission of international shocks is represented by the world price changes (in blue). And the domestic nominal price increase (in red) describes the impact of both international shocks and inflation on the three commodities, while assuming other prices and income are fixed in nominal terms.

The second alternative assumption is to estimate the poverty impact using the increase in the domestic *nominal* price of the three commodities, which combines the increase in the real prices and the increase associated with domestic inflation, assuming that all other prices and income are constant in nominal terms. The results are shown in red in Figure 3. In this scenario, poverty increases more than in the main simulation (in green) but less than with full price transmission. This likely overstates the impact of the world grain price rise since it includes the effect of inflation on the three commodities and excludes the effect of inflation on incomes. The small difference from the main simulation (in green) is probably because inflation is relatively low in Niger (3.8 percent in 2021 and 4.2 percent in 2022) so the difference between nominal and real price increases was modest.

## 6. Summary

The Covid-19 epidemic and the war in Ukraine resulted in higher commodity prices, particularly for wheat and maize. These trends raise concerns that the higher prices, particularly for staple food grains, will have adverse effects on poverty and food insecurity in low-income countries. This analysis focuses on the case of Niger. We find that the real price of wheat, maize, and sorghum increased significantly during the epidemic and particularly after the invasion. When combined with information about the spending patterns and composition of income, we estimate that these price increase raised the prevalence of poverty in Niger about 2 percentage points. The proportional increase in poverty was greater in urban areas because urban households are almost always net buyers of staple food grains, thus they lose from higher prices. In rural areas, the effect is somewhat muted because some households sell grain and others are insulated because they neither purchase nor sell. In addition, the analysis finds that if world price shocks were fully transmitted to domestic markets in Niger, the increase in poverty would have been significantly larger.

*This study is part of a series of case studies that IFPRI is undertaking to assess the impact of higher commodity prices on income and poverty in developing countries. The analysis presented is an initial impact assessment designed to estimate the impact of higher food prices on poverty in selected countries. The initial set of case studies covers Ethiopia, Kenya, Nigeria, Niger, Burkina Faso, and Mali. The analysis may be extended to cover other countries in the future.*

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## REFERENCES

- Ceballos, F., Hernandez, M. A., Minot, N., & Robles, M. (2017). Grain price and volatility transmission from international to domestic markets in developing countries. *World Development* 94, 305-320. <https://doi.org/10.1016/j.worlddev.2017.01.015>
- Deaton, Angus. (1989). Rice prices and income distribution in Thailand: A non-parametric analysis. *The Economic Journal* 99 (395): 1-37. Accessed at <https://doi.org/10.2307/2234068>

- FAO (Food and Agriculture Organization). (2023a). Food Price Monitoring and Analysis Tool. Accessed at <https://fpma.fao.org/qjews/fpmat4/#/dashboard/home>
- FAO (Food and Agriculture Organization). (2023b). Food Balances. Accessed at <https://www.fao.org/fao-stat/en/#data/FBS>
- Mamun, A. and D. Laborde. (2021). Documentation of POVANA – Version 2017, 2018 and 2020. Project Note. Washington DC: International Food Policy Research Institute.
- Martin, W., and N. Minot. (2022). The impacts of price insulation on world wheat markets during the 2022 food price crisis. *Australian Journal of Agricultural and Resource Economics* 66.4 (2022): 753-774. <https://doi.org/10.1111/1467-8489.12498>
- Martin, W. and N. Minot. (2023a). Poverty impacts of food price increases in Ethiopia. Washington, DC: International Food Policy Research Institute.
- Martin, W. and N. Minot. (2023b). Poverty impacts of food price increases in Kenya. Washington, DC: International Food Policy Research Institute.
- Martin, W. and N. Minot. (2023c). Poverty impacts of food price increases in Mali. Washington, DC: International Food Policy Research Institute.
- Minot, N. (2010). Transmission of world food price changes to markets in Sub-Saharan Africa. Discussion Paper No. 01059. Washington: International Food Policy Research Institute. <https://www.ifpri.org/publication/transmission-world-food-price-changes-markets-sub-saharan-africa>
- Minot, N. and W. Martin. (2023a). Poverty impacts of food price increases in Burkina Faso. Washington, DC: International Food Policy Research Institute.
- Minot, N. and W. Martin. (2023b). Poverty impacts of food price increases in Nigeria. Washington, DC: International Food Policy Research Institute.

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