

## COUNTRY BRIEF 6

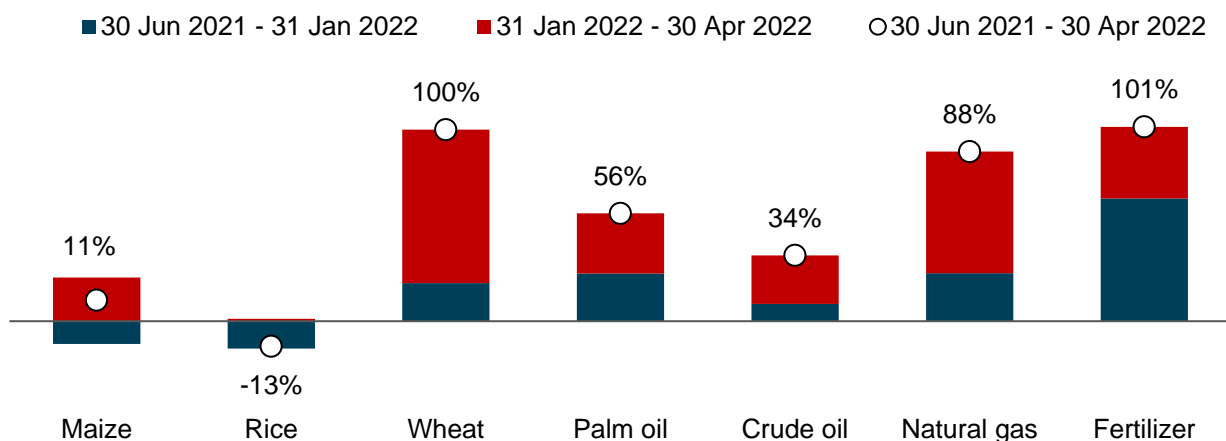
# Niger: Impacts of the Ukraine and Global Crises on Poverty and Food Security

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## 1. World Price Shocks and Domestic Price Transmission

Global food, fuel, and fertilizer prices have risen rapidly in recent months, driven in large part by the fallout from the ongoing war in Ukraine and the sanctions imposed on Russia. Other factors, such as export bans, have also contributed to rising prices. Palm oil and wheat prices increased by 56 and 100 percent in real terms, respectively, between June 2021 and April 2022, with most of the increase occurring since February (Figure 1). Wide variation exists across products, with real maize prices increasing by only 11 percent and rice prices declining by 13 percent. The price of crude oil and natural gas has also risen substantially, while the weighted average price of fertilizer has doubled. With these changes in global prices, many developing countries and their development partners are concerned about the implications for economic stability, food security, and poverty.

**Figure 1. Changes in global real commodity prices since mid-2021 (US dollars)**



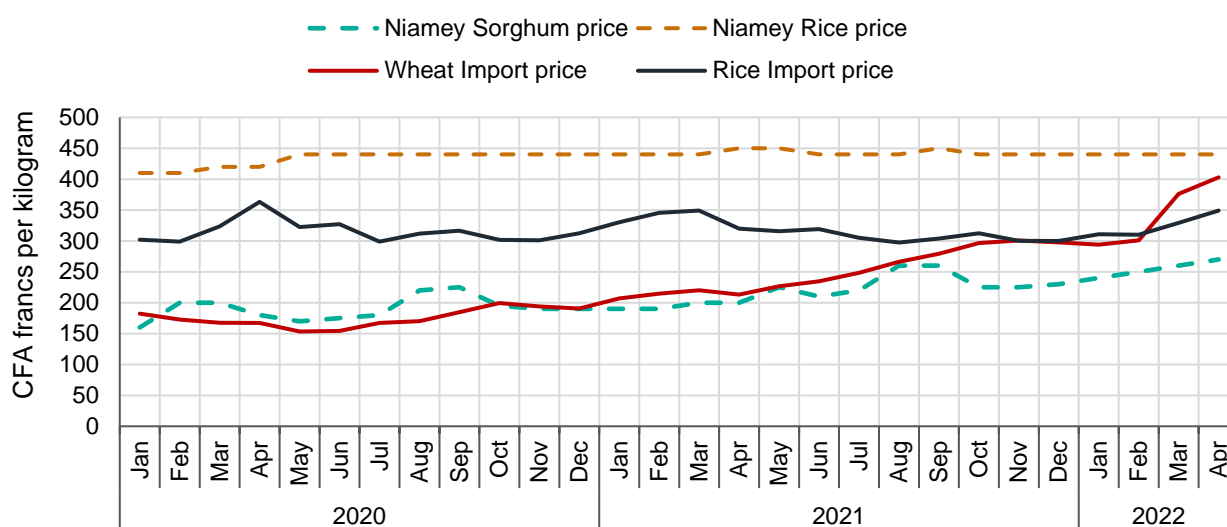
Source: Authors' calculations using data from World Bank Commodity Price Data (The Pink Sheet, <https://www.worldbank.org/en/research/commodity-markets>).

Note: Nominal prices in US dollars from World Bank Commodity Price Data (The Pink Sheet) are converted to real prices, which account for the overall increase in world prices over this period deflated by the US consumer price index, which rose by 7.2 percent between June 2021 and April 2022.

<sup>1</sup> This study was conducted by IFPRI with financial support from BMGF, FCDO, and USAID. The study uses models developed with ongoing support from BMGF, USAID, and the CGIAR's "Foresight and Metrics" initiative. For further information, please contact Paul Dorosh ([p.dorosh@cgiar.org](mailto:p.dorosh@cgiar.org)) and James Thurlow ([j.thurlow@cgiar.org](mailto:j.thurlow@cgiar.org)).

Wheat and wheat products are not consumed in large quantities in Niger and the sharp rise in world wheat prices and more moderate increases in world rice prices have not had a major effect on domestic prices. Wholesale prices of imported rice, which is widely consumed in urban areas, remained essentially unchanged over the last year (Figure 2). Wholesale prices of sorghum, the major staple in Niger, rose steadily through most of 2020 and 2021, and increased 8 percent more from February to April 2022. Thus, it is likely that changes in world prices of agricultural goods will not have a major direct influence on domestic prices, since many of the major food products produced and consumed in Niger are not widely traded in international markets, though substantial cross-border trade takes place with Nigeria. Vegetable oils are an exception, however. Their prices are likely to rise substantially because imports account for a high percentage of supply.

**Figure 2. Nominal rice, sorghum, and wheat prices in Niger, 2020–2022**



Source: Authors' calculations using data from WFP, IGC, and World Bank Commodity Price Data (The Pink Sheet).

Note: Import prices include carriage, insurance, and freight (CIF).

## 2. Measuring Impacts on Niger's Economy and Population

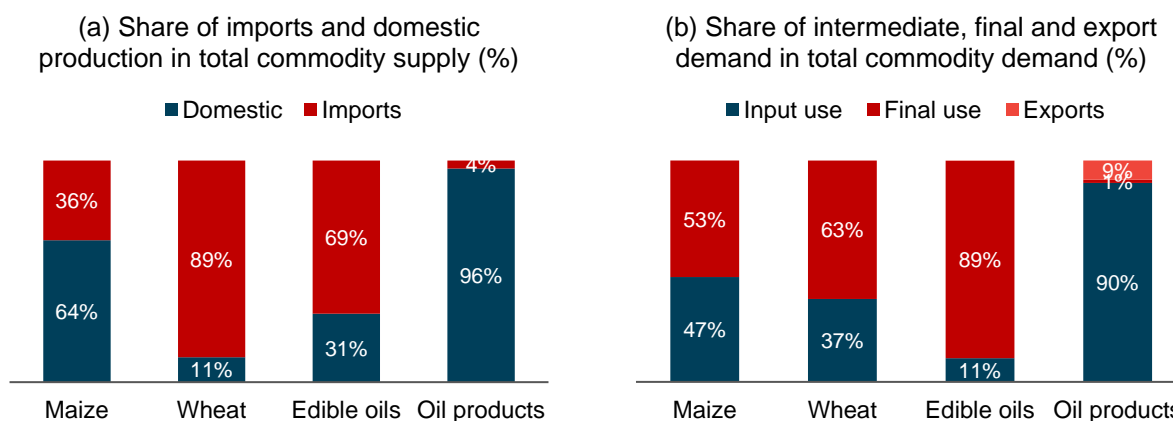
We use an economywide model of Niger to estimate the impacts of the global price shocks on all sectors, workers, and households.<sup>2</sup> The model allows us to capture a range of considerations that will determine the overall impact of the crisis on the country. For example, the magnitude of the effects of higher world prices on Niger's economy depends on: the share of imports or exports of the product in the total supply of the product; whether local producers and consumers can readily switch to substitute goods when prices increase; and how important the item is in total household food consumption. Thus, although four-fifths of the wheat consumed in Niger is imported, increases in world prices have a relatively small impact, since the shares of sorghum, millet, and rice in total food consumption are each significantly higher than the share of wheat (see Panel A in Figure 3).

Increases in the prices of petroleum and related products have significant effects throughout the economy. Niger is nearly self-sufficient in petroleum products: the country exports only 9 percent of production and imports account for only 4 percent of total utilization (Figure 3). Changes in international fuel prices thus have a mixed effect in Niger. Higher oil prices benefit petroleum producers and create additional revenues for the government. But because 90 percent of oil products are used as inputs into the production of other goods and services (particularly transport services), higher oil

<sup>2</sup> Information on the Rural Investment and Policy Analysis (RIAPA) data and modeling system can be found [here](#).

prices affect the price of all marketed goods and services in the economy. IFPRI's model captures these effects by tracking the flow of domestic and imported petroleum products and other inputs between sectors and estimating the net effect on final product prices.

**Figure 3. Breakdown of commodity supply and demand in Niger, 2019**

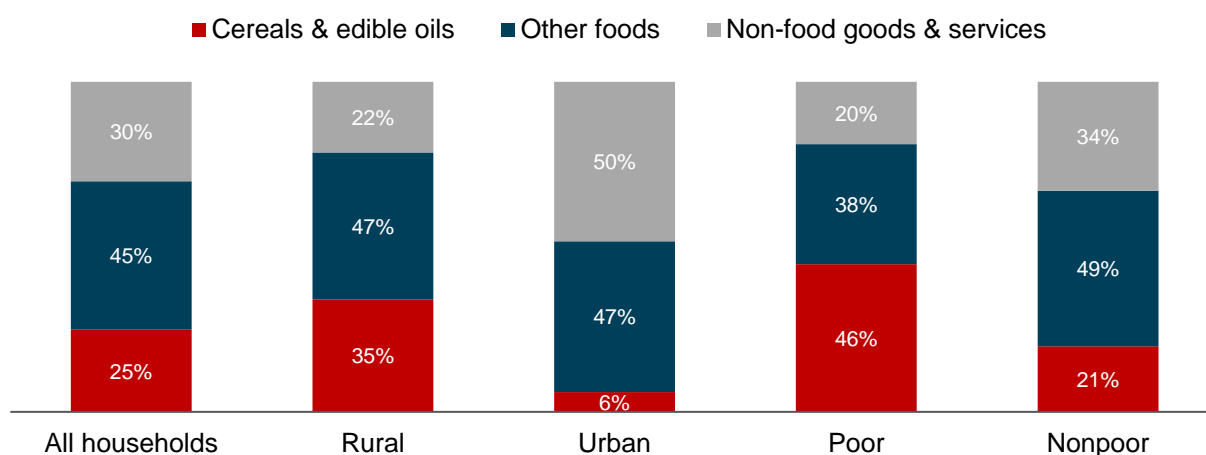


Source: Authors' calculations using social accounting matrix (SAM) data from IFPRI's Niger RIAPA model.

Note: Intermediates are products used as inputs in the production of other goods and services; final use includes private and public consumption and gross capital formation.

Impacts on households also depend on the importance of individual commodities in household consumption baskets. Cereals and edible oils make up 25 percent of the total value of household consumption and about one-third of total food expenditures (Figure 4). However, sorghum is a much more important cereal staple than maize and wheat, which account for only about 0.3 percent of total use of all food and nonfood together.<sup>3</sup> IFPRI's model also tracks incomes and expenditures for different population groups and is linked to a survey-based micro-simulation tool that tracks the consumption patterns of individual households. Unpacking populations is crucial, because cereals and edible oils are more important for poorer rural households in Niger than for other groups. Still, among cereals, the poor consume more local staples such as sorghum and millet than imported wheat, and the model tracks such individual cereal consumption in households' food baskets in detail.

**Figure 4. Composition of household consumption spending in Niger, 2019**

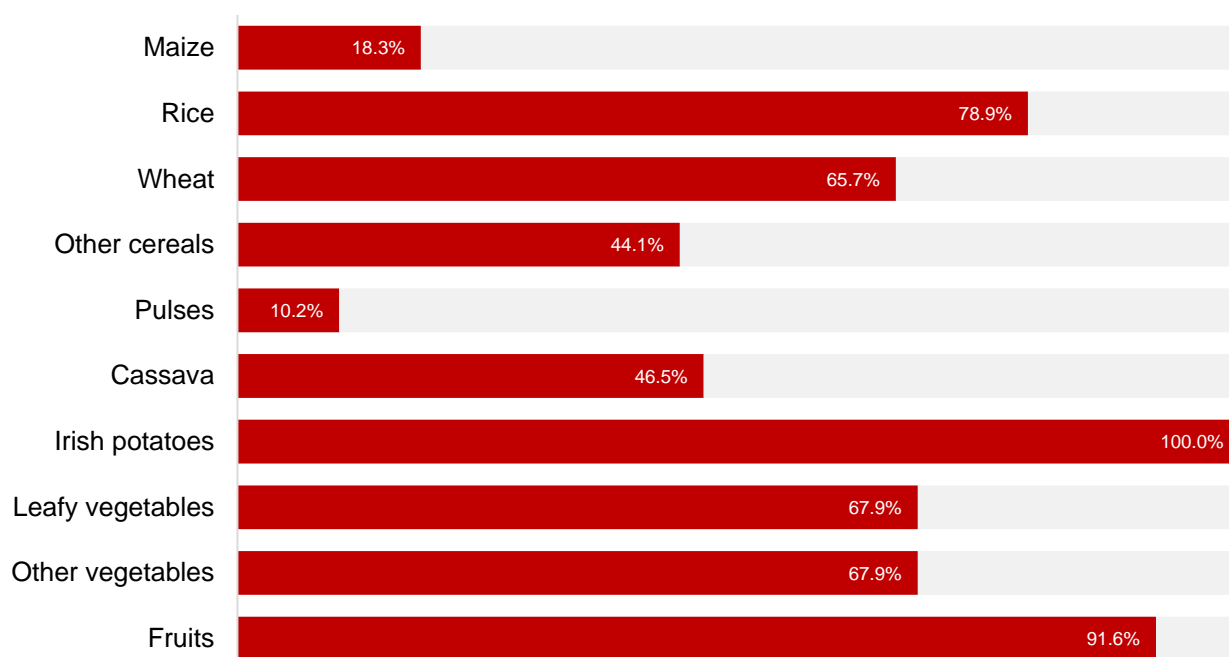


Source: Authors' calculations using social accounting matrix (SAM) data from IFPRI's Niger RIAPA model.

<sup>3</sup> These figures include the imputed value of home consumption, which is also tracked within the RIAPA model.

Rising fertilizer prices may cause some farmers to reduce their use of this input, leading to lower agricultural production and higher food prices. The magnitude of this decline depends on: (1) the responsiveness of fertilizer demand to changes in prices; (2) the amount of fertilizer currently used to grow crops; and (3) the expected productivity losses for farmers who reduce their use of fertilizers. Compared with other African countries, the fertilizer adoption rate is low in Niger, but it still varies significantly by crop, with almost all Irish potato production using fertilizer, versus less than 20 percent for maize (Figure 5). Variation also arises in the amount of fertilizer used on different crops. For our initial impact analysis, we adopt a conservative set of assumptions regarding farmers' responses to rising fertilizer prices. We assume an own-price elasticity of fertilizer demand of  $-0.15$ , implying that a 100 percent increase in real fertilizer prices leads to a 15 percent decline in fertilizer use. Drawing on a recent survey analysis, we assume that farmers who do not use chemical fertilizers are about 20 percent less productive than farmers who do.<sup>4</sup>

**Figure 5. Share of cultivated cropland using chemical fertilizers in Niger**



Source: Authors' estimates using data from the Harmonized Survey on Household Living Conditions (EHCVM) 2018/19, Niger (<https://microdata.worldbank.org/index.php/catalog/4296>)

Niger's crop cultivation is concentrated in the southern part of the country near the border with Nigeria and along the Niger River in the southwest. The main cropping season begins with land preparation in April and May, followed by planting in June and July with the onset of the rainy season, and harvesting from October through December. The surge in world fertilizer prices may therefore have a major effect on fertilizer use and agricultural productivity in Niger in 2022. A much smaller off-season crop, harvested from January to March, is likely to be only minimally affected by price shocks this year, however. Likewise, the direct effects of price shocks on livestock, a major source of income in pastoral systems throughout southern Niger, are likely to be small.

We simulate the effects of both higher world prices (recall Figure 1) and the potential productivity losses from reduced fertilizer use in the current growing season. Simulation results should be interpreted as "medium-term" impacts; that is, after the immediate spillover effects across sectors and

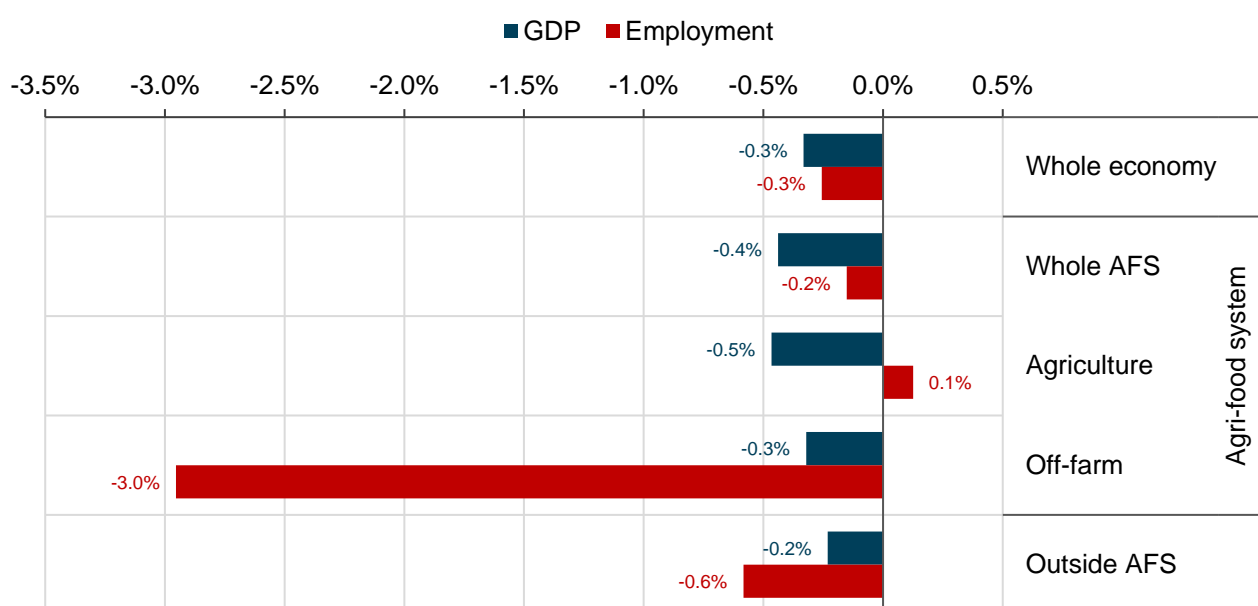
<sup>4</sup> The final impact on crop productivity is: [Change in domestic market price] × [Price elasticity of demand] × [Share of cultivated land using fertilizer] × [Productivity gain from using fertilizer per hectare].

households have occurred, but before the government and private sector make significant changes to their investments and policies in response to the crisis (see Section 5 for next steps).

### 3. Impacts on Niger's Economy and Agrifood System

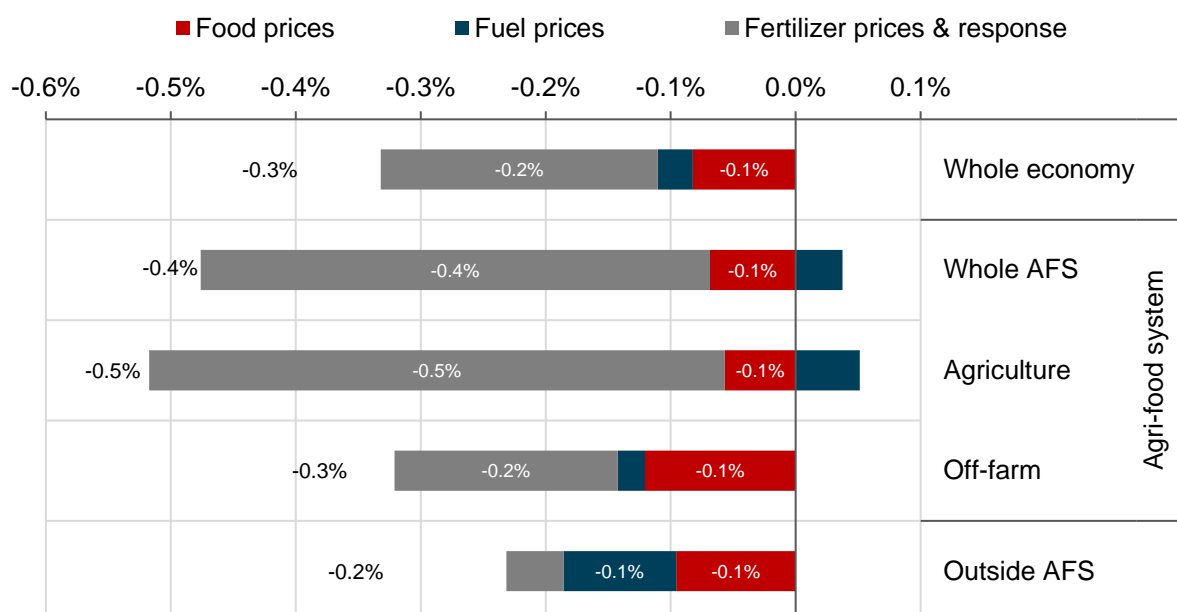
**The effects of the world price and fertilizer shocks on GDP and employment are modest, and rising fuel prices have little effect.** Real GDP falls by 0.3 percent due to the combined effects of the negative terms-of-trade shock (that is, the negative effect of higher food and fertilizer import prices outweighs the positive effect of higher oil export prices), and rising import costs that reduce spending on domestically produced goods (Figure 6). Employment also declines by a modest 0.3 percent. The percentage decline in agricultural GDP is slightly larger than the decline in total GDP. Given the large size of the agriculture sector in the economy, agricultural GDP losses account for about 55 percent of the losses in total GDP in the country. Falls in employment within the agrifood system occur mainly in the off-farm sector, with job losses concentrated in food-related services, including trade and transport. However, the off-farm agrifood system is small compared to off-farm employment outside the agrifood system. At the national level, about 80 percent of the decline in total employment occurs outside of the agrifood system.

**Figure 6. Percentage change in GDP and employment due to food, fuel, and fertilizer shocks**



Source: Simulation results from IFPRI's Niger RIAPA model.

**Fertilizer and fuel shocks drive most of the decline in national GDP.** Fertilizer shocks, including reduced fertilizer use in response to higher prices, accounts for three-quarters (or 0.2 percentage points) of the total decline in real GDP, compared to food price shocks at one-quarter and fuel shocks close to zero (Figure 7). Within the agrifood system, GDP losses are all driven by fertilizer shocks, which directly affect primary agricultural production and cause disruptions in downstream supply chains. GDP losses outside of the agrifood system, however, are modest and primarily driven by higher fuel and food prices, which not only raise transaction costs and market prices but also reduce consumer demand. Once we isolate the negative effect from fertilizer shocks, higher food prices have a small negative effect on real agricultural GDP in the near term, because of lower dependence of food consumption on imports.

**Figure 7. Percentage change in real GDP decomposed by food, fuel, and fertilizer shocks**

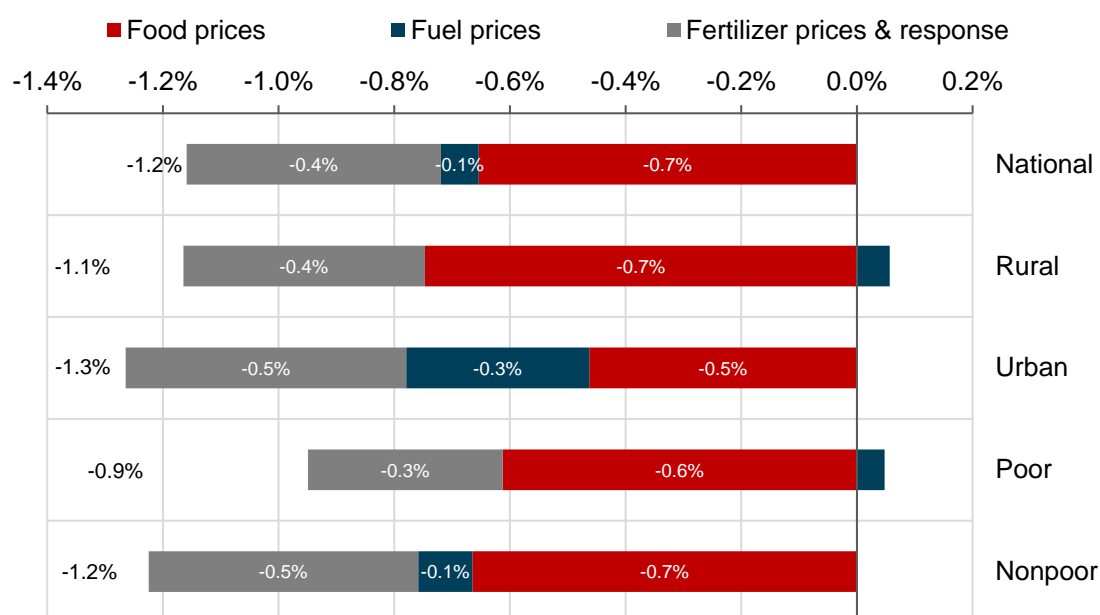
Source: Simulation results from IFPRI's Niger RIAPA model.

#### 4. Impacts on Household Poverty, Inequality, and Diets in Niger

**Household consumption falls, with larger losses for poorer and rural households.** National consumption spending, including the value of home consumption, falls by 1.2 percent (Figure 8). The percentage decline in consumption is much larger than that in GDP, mainly because households are hit twice, by rising prices and falling income. Moreover, food accounts for a much larger share of the change in household consumption than of GDP.<sup>5</sup> Similar to the decline in GDP, most of the declines in consumption are driven by the food and fertilizer shocks, which have larger negative impacts on household income and more positive impacts on the prices consumers pay. Important differences in consumption outcomes exist across population groups, however. The fall in rural household consumption is affected more by rising food and fertilizer prices. While rural households earn more of their income from farming, they are adversely affected by higher food prices, which cause the relative price of the largest nontradable crop – sorghum – to fall, lowering its production. Urban households are also affected by fuel shocks in addition to experiencing a larger effect from rising food prices and the similar indirect effect of the fertilizer shocks that reduce agricultural production, as urban households consume more fuel-intensive goods and earn more nonfarm income from service sectors using fuel as inputs (for example, transport).

<sup>5</sup> In national accounts, GDP is equal to total absorption plus the trade balance; that is,  $GDP = (C + I + G) + (X - M)$  where  $C$  is private consumption,  $I$  is investment,  $G$  is government consumption,  $X$  is exports, and  $M$  is imports. The model assumes the trade balance ( $X - M$ ) is fixed, such that, at a given level of GDP, an increase in imports costs  $M$  (caused by rising world prices) is matched by an increase in exports  $X$  and lower absorption ( $C + I + G$ ). If GDP also declines (caused by lower fertilizer use), an even larger drop in absorption occurs. Within absorption, the model assumes that government consumption  $G$  and private savings rates are fixed, implying that any absorption adjustments are concentrated on investment  $I$  and private consumption  $C$ .

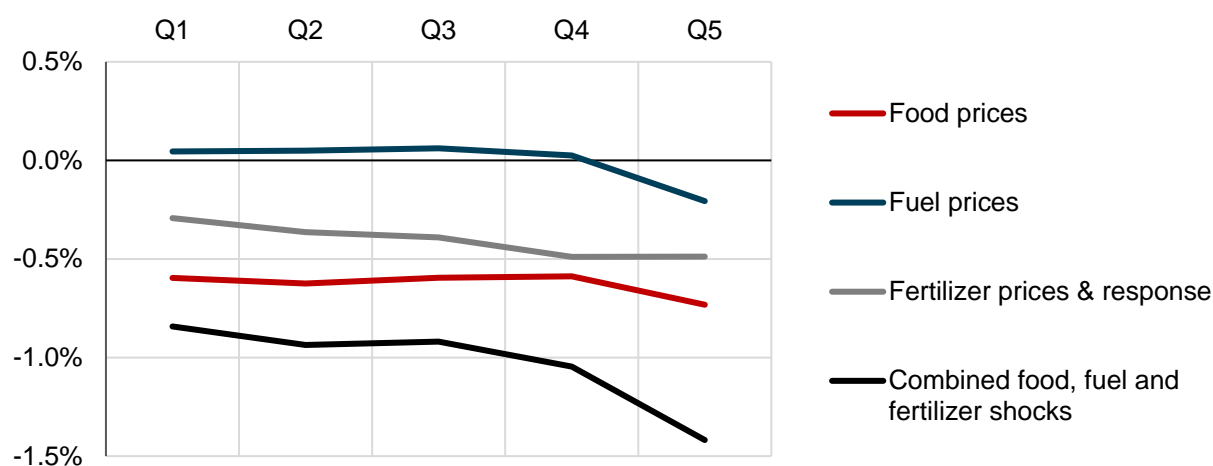
**Figure 8. Percentage change in real household consumption due to food, fuel, and fertilizer shocks**



Source: Simulation results from IFPRI's Niger RIAPA model.

**Differential effects across households will not greatly affect inequality.** The food, fuel, and fertilizer shocks have different implications for (income) inequality in Niger. The increase in fuel prices leads to larger consumption losses for households in the top expenditure quintile, with minimal impact on the poorer households in the lower four quintiles (Figure 9). Conversely, the fertilizer shock is more detrimental for poorer households, which rely more heavily on agriculture for their income and spend a larger share of their income on food. Finally, the negative impact of higher world food prices is relatively large and similar across different household groups. Overall, the combined effect of the world price shocks leads to more declines in consumption for households in the fourth and fifth quintiles. Therefore, inequality within Niger is not greatly affected by the global crises.

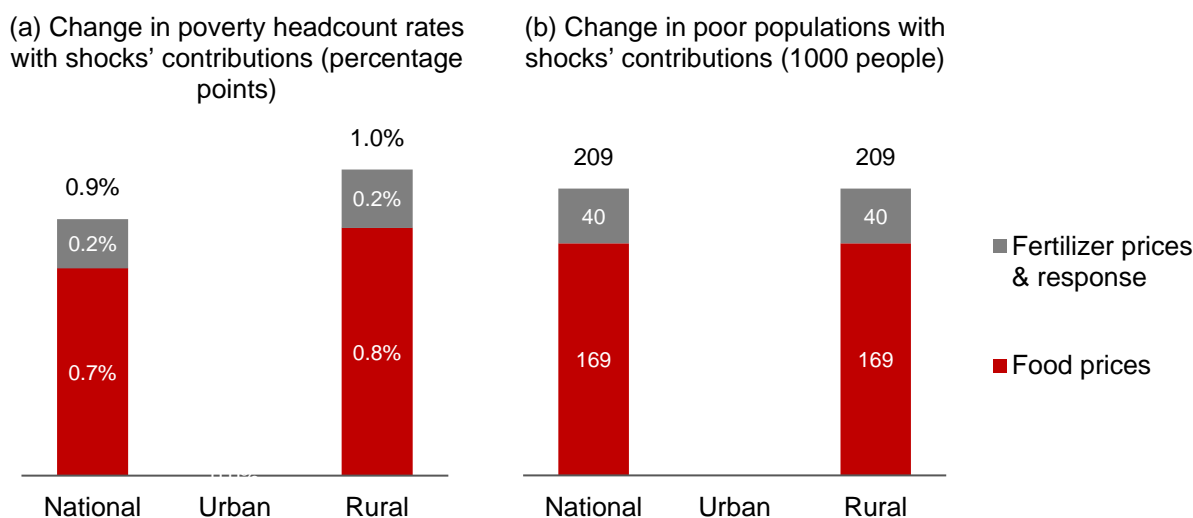
**Figure 9. Percentage change in real household consumption across per capita expenditure quintiles**



Source: Simulation results from IFPRI's Niger RIAPA model.

**Falling household consumption leads to greater poverty, particularly in rural areas.** According to the most recent household survey in Niger, 45 percent of the country's population has an adult equivalent consumption level that falls below the US\$1.90 international poverty line. The increase in world prices raises the national poverty headcount rate in Niger by a modest 0.9 percentage points (see Panel A in Figure 10), equivalent to an additional 209,000 people falling below the poverty line (see Panel B). Nearly four-fifths of the increase in poverty is caused by the food shock. Compared to the consumption changes in Figure 8, rising food prices are far more important for the poverty outcome. Almost all the increase in poverty is in rural areas, largely reflecting the extremely low urbanization level in Niger and its much lower initial urban poverty rate.

**Figure 10. Changes in poverty due to food, fuel, and fertilizer shocks**



Source: Simulation results from the survey-based microsimulation module within IFPRI's Niger RIAPA model.

Note: Poverty headcount rate is the share of the population with daily adult equivalent consumption levels below the US\$1.90 poverty line. Fuel prices have no effect in raising poverty headcount or number of poor persons

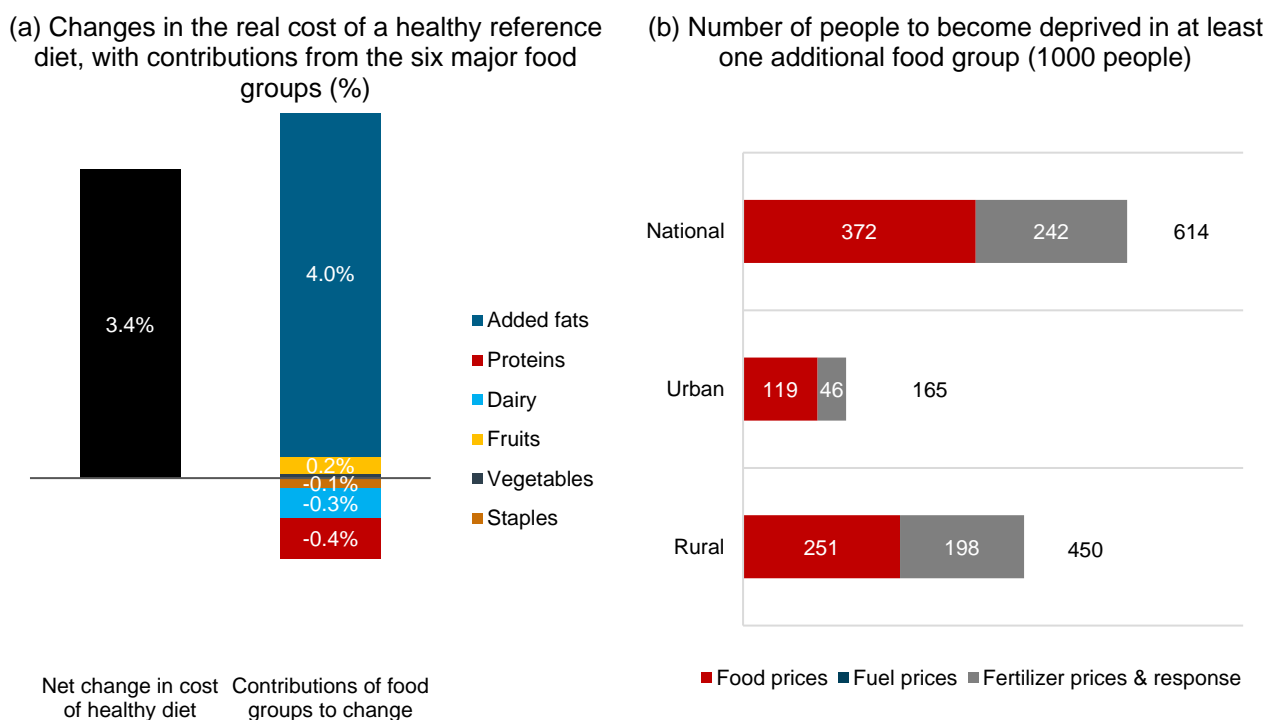
**The cost of a healthy diet increases for Niger's households.** The model tracks changes in the real cost of a "healthy" reference diet (CoRD) with six major food groups as defined by the EAT-Lancet Commission.<sup>6</sup> The combined food, fuel, and fertilizer shocks increase the CoRD by 3.4 percent in real terms (see Panel A in Figure 11).<sup>7</sup> This is mainly due to the rising cost of edible oils within the "added fats" food group, whose domestic price is heavily influenced by rising palm oil import prices. On the other hand, falling household income reduces demand for dairy and proteins (meats and fish), and thus lowers their costs slightly. The "staples" food group includes cereals and root crops, and wheat is only a small component of this group in Niger. Rising maize and wheat prices are compensated for by the falling cost of other staple foods when households reduce overall food consumption. Staples currently dominate most households' consumption baskets, and achieving the diversity of the healthy reference diet requires a relative decline in the share of staples in the average household diet. As such, the increases in maize and wheat prices have a modest contribution to the changing cost of a healthy diet. On the other hand, consumption levels of dairy and meat products are far below the level required for a healthy diet among many households in Niger. The falling costs of these food groups mask households' deteriorating access due to falling income.

<sup>6</sup> For further information on the RIAPA model's diet module and indicators, see [Pauw et al. \(2021\)](#).

<sup>7</sup> The CoRD is estimated using calorie targets from EAT-Lancet (for major food groups) and the World Bank's International Comparison of Prices (IPC) dataset. The estimated budget shares for the healthy diet include: staples (9.4 percent), vegetables (9.1), fruits (17.4), dairy (27.8), proteins (28.0), and added fats (8.3).



**Figure 11. Changes in diet costs and household diet deprivation due to food, fuel, and fertilizer shocks**



Source: Simulation results from the survey-based microsimulation module within IFPRI's Niger RIAPA model.

**Diet quality worsens for many households.** The survey-based micro-simulation tool also measures the change in the number of people who experience a decline in diet quality. People are considered deprived in a food group if they obtain fewer calories from that food group than recommended by the healthy reference diet. Prior to the crisis, few households had the consumption level and diversity needed for a healthy diet in Niger. Rising food and fertilizer prices cause 614,000 people to become deprived in at least one additional food group. The rural population accounts for 450,000 of them (see Panel B in Figure 11).

## 5. Summary and Next Steps in the Analysis

Global food, fuel, and fertilizer prices have risen rapidly in recent months, raising concerns about how this will affect economic stability, food security, and poverty in developing countries. We used IFPRI's economywide model – known as RIAPA – to simulate the impacts of the global crises on Niger's economy and population. The model allows us to track the direct and indirect effects of rising world prices, taking account of key considerations that will determine the overall impact. These include, for example: the share of imports in total product supply; the importance of different sectors and products for household employment, income, and consumption levels; and farmers' responses to rising fertilizer prices and the knock-on effect this could have on next season's agricultural production.

Our analysis indicates that the global crises have a modest impact in causing Niger's national GDP and employment to contract, because its major staples are mainly produced domestically, and with a modest amount of oil production, the country relies less on fuel imports than other countries. While more than 50 percent of losses in GDP are from agriculture, which was mainly affected by rising fertilizer prices, the overall losses in agriculture are also modest, given the low fertilizer adoption

rate for many large crops. To some extent, rural farmers also benefit from higher prices for agricultural products, although the net effect on their welfare is negative once we account for the effects of higher fertilizer prices, reduced fertilizer use, and lower agricultural productivity.

Overall, households do not benefit from rising fuel export prices and their consumption falls because of higher prices and lower income. All households are adversely affected by the crises, while higher food and fertilizer prices are the driver of falling household consumption in rural areas. Falling household consumption also leads to greater poverty in rural areas. Finally, the cost of a healthy diet increases for Niger's households, which further worsens household diet quality and leads to more people deprived of the required healthy diet in both rural and urban areas.

*This study is part of a series of country case studies that IFPRI is undertaking using economywide models to capture current world market shocks on developing countries. The analysis presented above is an initial impact assessment designed to gauge the vulnerability of countries and key population groups. Subsequent analyses will simulate the mitigating effects of different policy and investment options, including the potential roles of cash transfers, food aid, and subsidies for food, fuel, and fertilizers. Particular attention will be paid to possible synergies and trade-offs between these policy responses, including their implications for government budgets and longer-term development goals.*

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