

COUNTRY BRIEF 13

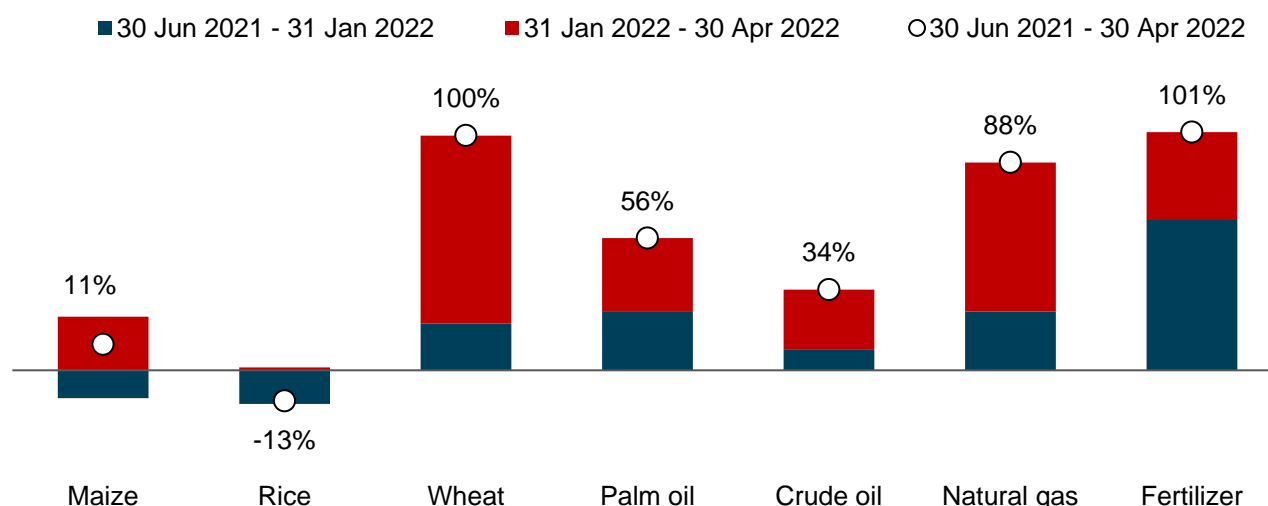
Nepal: Impacts of the Ukraine and Global Crises on Poverty and Food Security

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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).

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>).

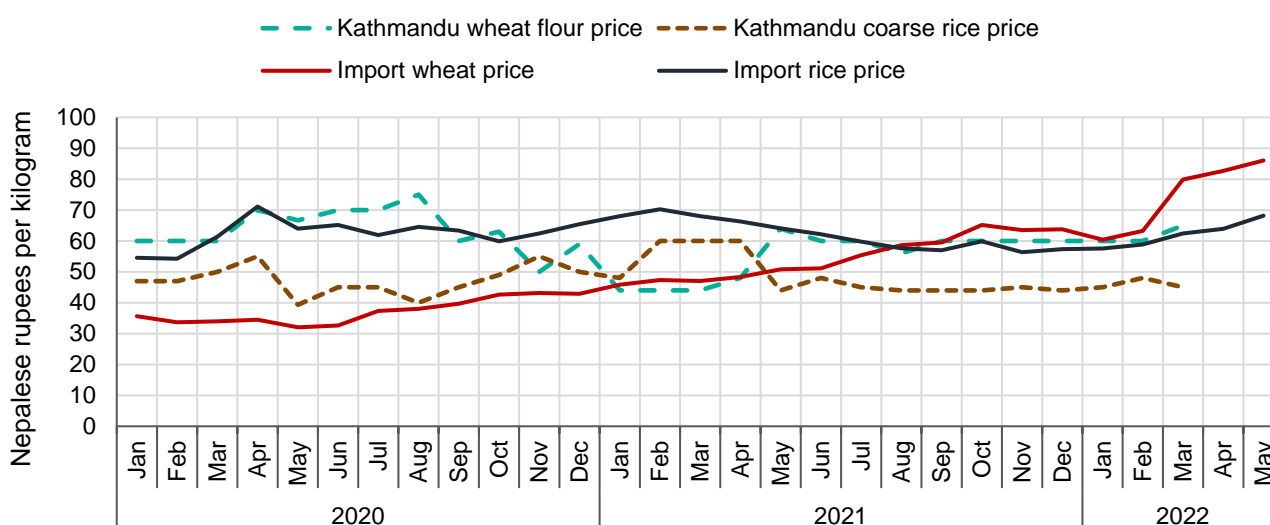
Notes: Nominal prices in US dollars from World Bank Commodity Price Data (The Pink Sheet) are converted to real prices, which account for the overall increase in world prices over this period, deflated by the US consumer price index, which rose by 7.2 percent between June 2021 and April 2022.

¹ These country studies are conducted by IFPRI with financial support from BMGF, FCDO, and USAID. All studies use data and models developed with ongoing support from BMGF, USAID, and CGIAR's "Foresight and Metrics" initiative. The study also benefits from working with IFPRI's South Asia Region office in New Delhi, India, Institute for Integrated Development Studies (IIDS) in Nepal, and other local partners. For further information, please contact Paul Dorosh (p.dorosh@cgiar.org) or James Thurlow (j.thurlow@cgiar.org).

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.

A comparison of import prices with prices in Nepal's capital city, Kathmandu, suggests that world price changes have not been fully transmitted to local markets, likely because Nepal is a landlocked country with limited wheat imports in domestic supply. For example, nominal wheat flour prices in Kathmandu rose only by 8 percent between July 2021 and March 2022, while over the same period, the nominal price of imported wheat rose by more than 32 percent (Figure 2).

Figure 2. Nominal rice and wheat prices in Nepal, 2020-2022



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

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

2. Measuring Impacts on Nepal's Economy and Population

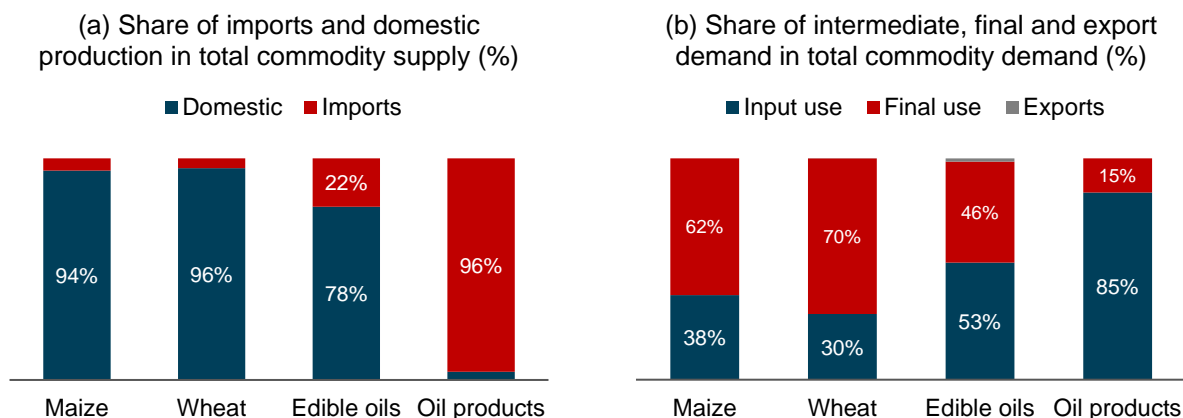
We use an economywide model of Nepal to estimate the impacts of the global price shocks on all sectors, workers, and households.² The model allows us to capture a range of considerations that will determine the overall impact of the crisis on the country. For example, the effect of higher world prices on Nepal's economy depends on the importance of the affected products in the total supply of each commodity, and whether local producers and consumers can readily substitute away from higher-priced imports. Only small portions of Nepal's total supply of maize and wheat are imported, while imports account for more than one-fifth of total edible oil and oilseed supply (Panel A in Figure 3). Since edible oils are more dependent on imports, we expect changes in world prices to have a larger effect on domestic prices for oilseeds and products, as imported products are close substitutes for domestically produced and consumed edible oils.

Almost all oil products (crude oil and processed petroleum) used in Nepal are imported. The impact of higher oil prices on households cannot be directly assessed by looking at the share of petroleum products in households' consumption baskets. This is because oil products are primarily used as an input into the production of other goods and services, with input use accounting for 85 percent of

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

total demand for oil products in Nepal (Panel B in Figure 3). Most petroleum products, for example, are used by the transport sector, the cost of which affects the price of all marketed goods and services in the economy. IFPRI's model tracks the flow of domestic and imported inputs between sectors and estimates the net effect on final product prices.

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

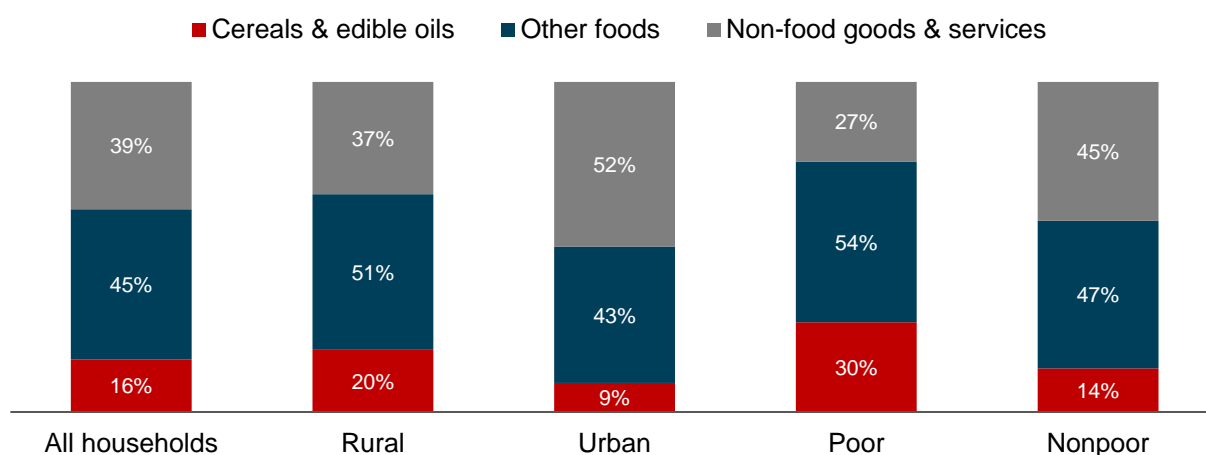


Source: Authors' calculations using social accounting matrix (SAM) data from IFPRI's Nepal RIAPA model.

Note: Edible oils include oilseeds and processed oils. Most imports are edible oils, while the supply of oilseeds is mainly from domestic production. Input use includes products used as intermediates in the production of other processed foods and nonfood products as well as used in service sectors. Final use includes private and public consumption and gross capital formation.

Impacts on households also depend on the importance of commodities in their consumption baskets. Cereals and edible oils make up 16 percent of the total value of household consumption in Nepal, which is about one-quarter of total food expenditures (Figure 4).³ IFPRI's model tracks income 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 Nepal than for other groups.

Figure 4. Composition of household consumption spending in Nepal, 2019

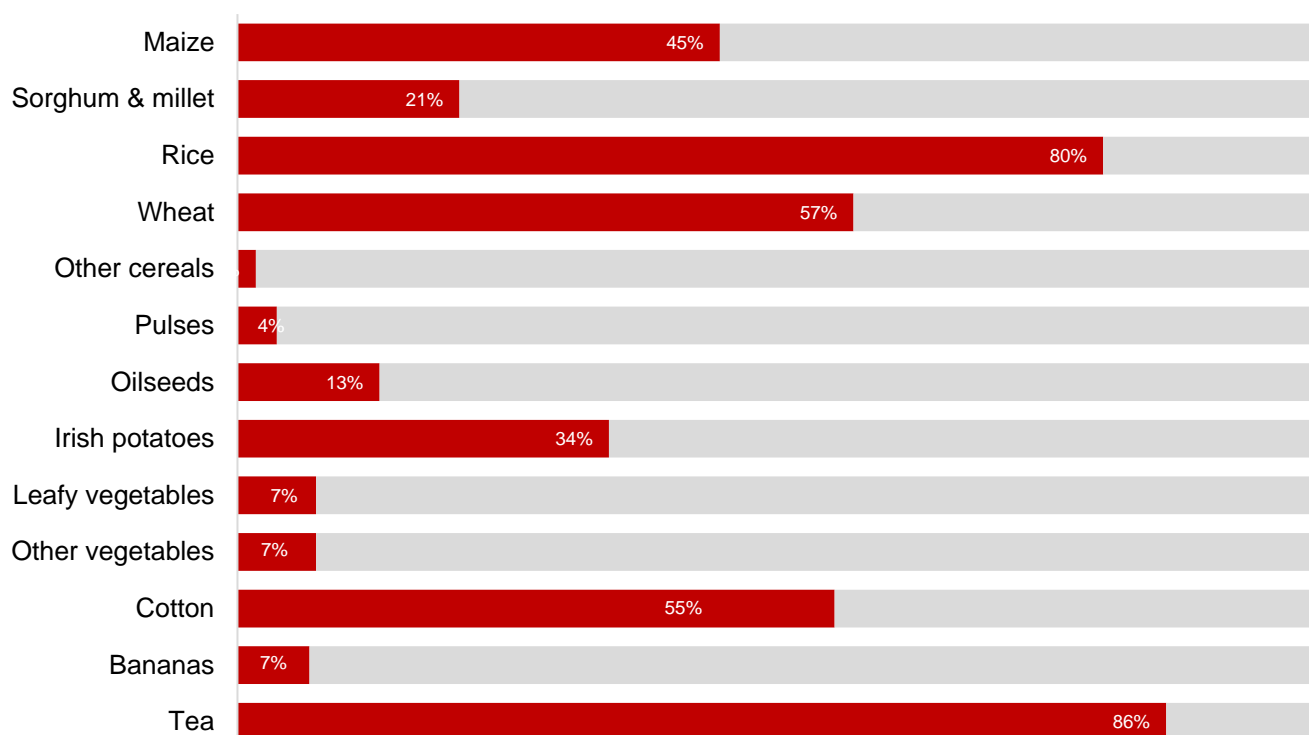


Source: Authors' calculations using social accounting matrix (SAM) data from IFPRI's Nepal RIAPA model.

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

Rising prices of fertilizer 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. Fertilizer adoption in Nepal varies significantly by crop, with 80 percent of rice land cultivated using fertilizers, compared to only 4 percent for pulses. The amount of fertilizer used on different crops also varies. For our initial impact analysis, we adopt a conservative set of assumptions regarding farmers' response 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.⁴

Figure 5. Share of cultivated cropland using chemical fertilizers in Nepal



Source: Authors' estimates from National Living Standards Survey 2010/11, Nepal (<https://microdata.cbs.gov.np/index.php/catalog/37/study-description>).

Nepal's cropping patterns vary with elevation (terai, hill, and mountain agroecologies) and irrigation status. The main crop, paddy rice, is primarily cultivated on irrigated lowland areas in the terai (low altitude plains) and hill regions, and is planted from late May to early August. Wheat is typically grown on irrigated land during the second season, from late October to June, while maize is the major crop in upland areas of all three major agroecological zones. Thus, the surge in fertilizer prices may have already led to a reduction in fertilizer use for the main maize and rice crops in much of Nepal, but likely came too late to affect the 2022 wheat harvest in most areas. The link between world fertilizer prices, local fertilizer use, and agricultural productivity is therefore an important impact channel for current crisis.

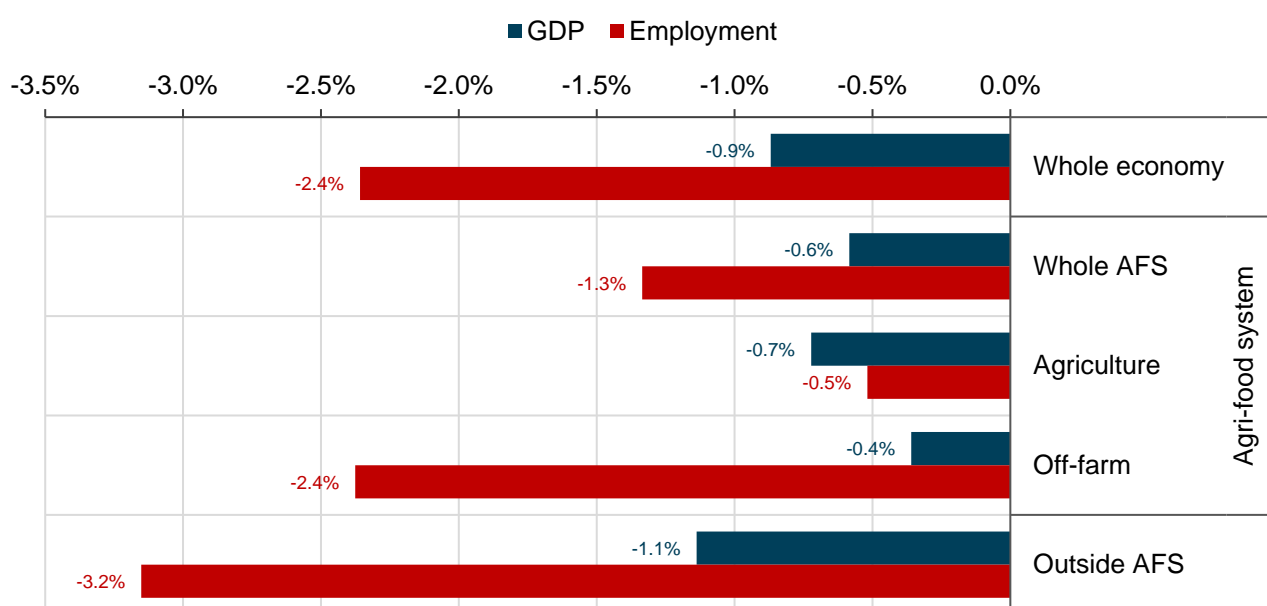
⁴ The final impact on crop productivity is: [Change in domestic market price] × [Price elasticity of demand] × [Share of cultivated land using fertilizer] × [Productivity gain from using fertilizer per hectare].

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 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 Nepal’s Economy and Agrifood System

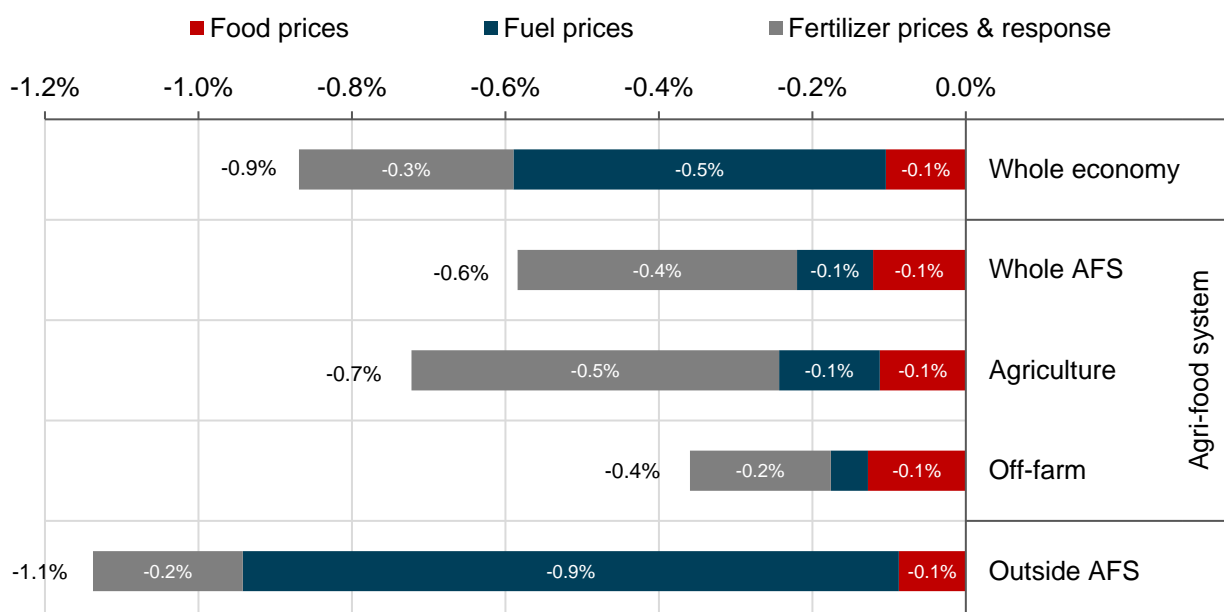
The effects of the world price and fertilizer demand shocks on GDP and employment are significant. Real GDP falls by 0.9 percent due to the combined effects of the negative terms-of-trade shock (that is, the negative effect of higher import prices outweighs the positive effect of higher export prices), and rising import costs that reduce spending on domestically produced goods (Figure 6). Employment also declines by 2.4 percent, as falling production leads to job losses. The percentage declines in both agrifood and agricultural GDP and employment are slightly smaller than the decline in total GDP and employment, and GDP and employment fall more outside of the agrifood system. At the national level, more than two-thirds of the total decline in total GDP and three-quarters of total employment occur 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 Nepal RIAPA model.

Fuel and fertilizer shocks drive most of the decline in national GDP. The fuel shock accounts for more than 50 percent (or 0.5 percentage points) of the total fall in real GDP, compared to fertilizer shocks, including reduced fertilizer use in response to higher prices, at 30 percent (or 0.3 percentage points). The food price shock accounts for only about 10 percent, or 0.1 percentage point, of the decline in total GDP (Figure 7). However, agrifood GDP losses are mostly driven by fertilizer shocks, which directly affect primary agricultural production and cause disruptions in downstream supply chains. GDP losses outside of the agrifood system are mostly driven by higher fuel prices, which raise transaction costs and market prices, and reduce consumer demand. Higher food prices have a similar modest effect on GDP within and outside of agrifood system in the near-term.

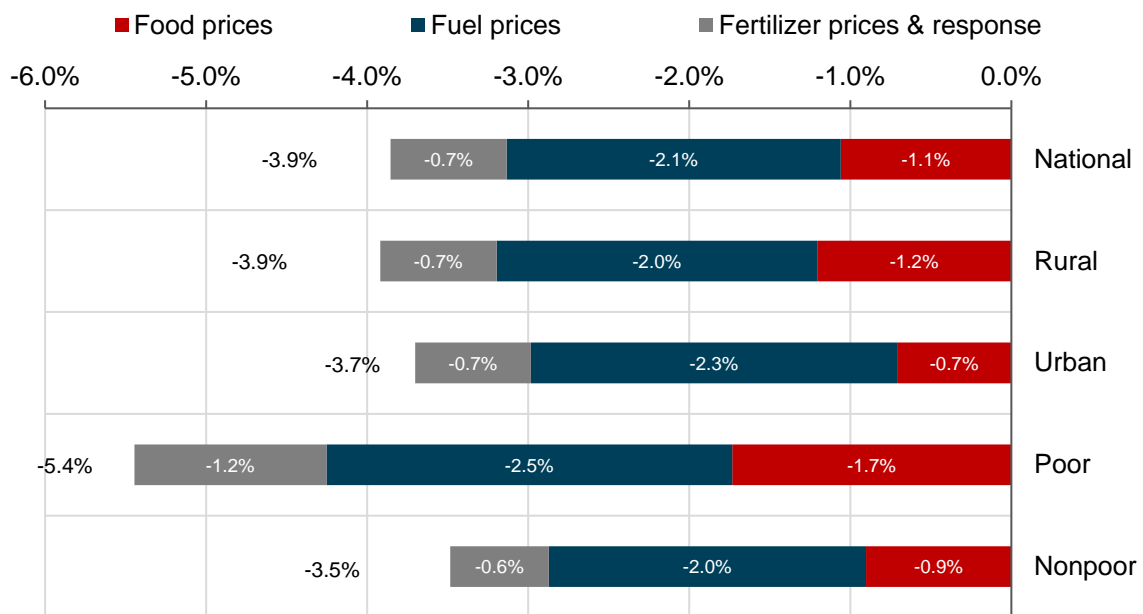
Figure 7. Percentage change in real GDP decomposed by food, fuel, and fertilizer shocks

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

4. Impacts on Household Poverty, Inequality, and Diets in Nepal

Household consumption falls significantly, with larger losses for poorer and rural households. National consumption spending, including the value of home consumption, falls by 3.9 per cent (Figure 8). The percentage decline in consumption is much larger than that in GDP because households are hit twice, by rising prices and falling income. Moreover, food accounts for a much larger share of household consumption than of GDP. Most of the decline in consumption is driven by the fuel price shock, which raises the market price of most consumer goods and services in the economy. Overall, the fuel shocks account for more than 50 percent (or 2.1 percentage points) of the absolute decline in household consumption, followed by the food price shock at close to 30 percent (or 1.1 percentage points), while the impact of the fertilizer shocks on total consumption is relatively modest at 0.7 percentage points. Important differences arise in consumption outcomes across population groups. The fall in consumption is larger for poorer and rural households. Rural households earn more of their income from farming, and so are adversely affected by the decline in agricultural production that follows the increase in fertilizer prices. For rural and poor households, including those in urban areas, food makes up a larger share of poor households' consumption baskets, and hence, they are affected more by the food price shock than urban and nonpoor households, which are more adversely affected by the fuel shock.

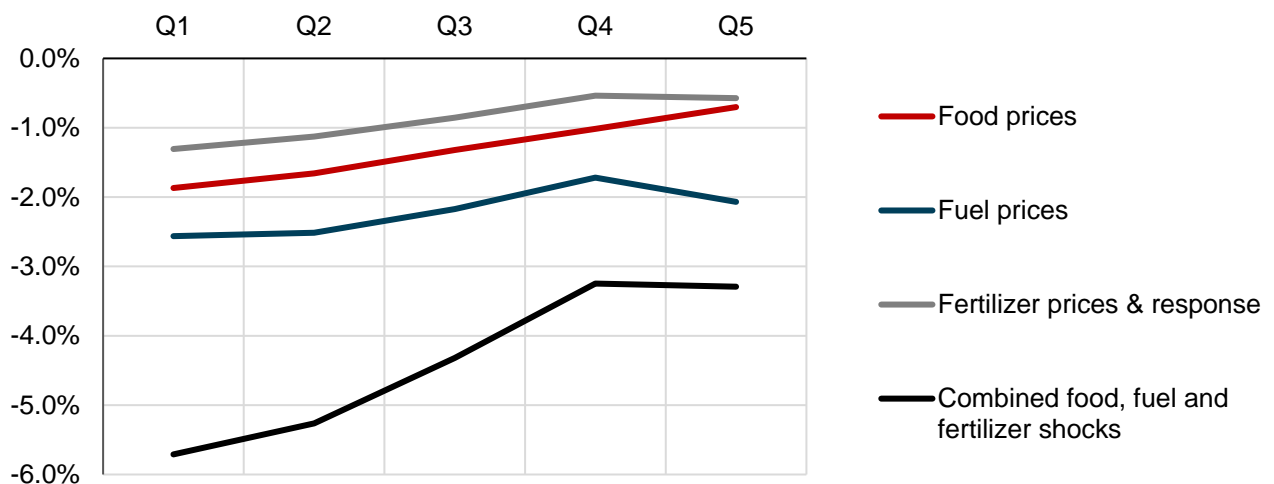
Figure 8. Percentage change in real household consumption due to food, fuel, and fertilizer shocks



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

Inequality worsens, although all households are adversely affected. The food, fuel, and fertilizer shocks have quite similar implications for (income) inequality in Nepal. The increases in fuel and food prices and fertilizer shocks lead to larger consumption losses for poorer households than households in the top quintile, which only has a relatively larger consumption loss from the fuel shock compared to the households in third and fourth quintiles (Figure 9). Overall, because all three shocks are more detrimental for poorer households, particularly those in the lowest two quintiles, the global crises cause an increase in inequality within Nepal.

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

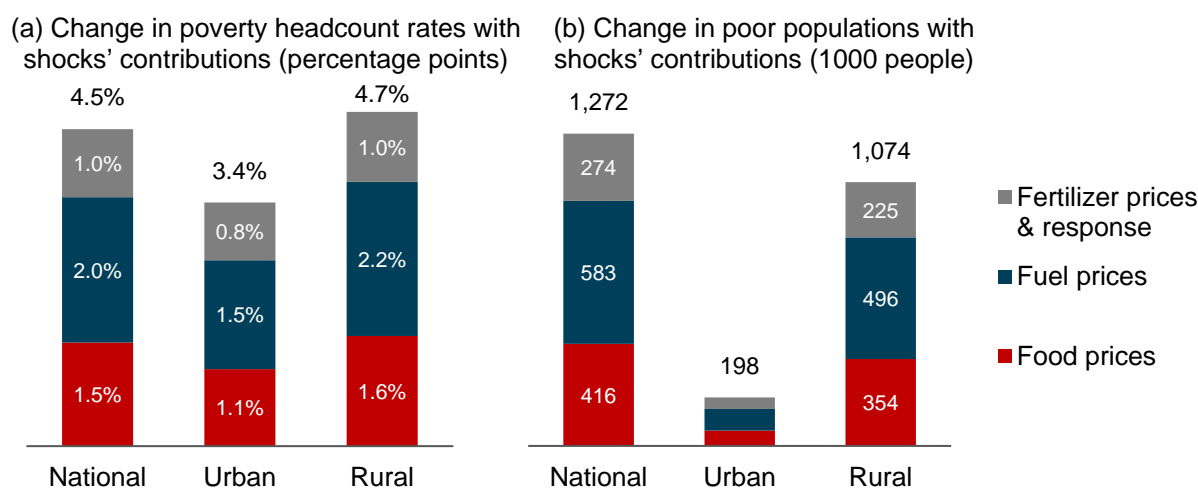


Source: Simulation results from IFPRI's Nepal RIAPA model.

Falling household consumption leads to greater poverty, particularly in rural areas. According to the most recent household survey in Nepal, 15 percent of the country's population has an adult

equivalent consumption level that falls below the US\$1.90 poverty line. The increase in world prices raises the national poverty headcount rate in Nepal significantly, by 4.5 percentage points (Panel A in Figure 10), equivalent to an additional 1.27 million people falling below the poverty line (Panel B). Most of the increase in poverty is caused by the fuel shock. This is consistent with the consumption changes in Figure 8. Impacts on rural poverty rates are significantly larger and the food price shock becomes important in addition to the fuel shock for rising rural poverty. Most of the increase in the poor population is in rural areas, at more than 1 million, although this partly reflects Nepal's smaller urban population and its 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 Nepal RIAPA model.

Notes: Poverty headcount rate is the share of the population with daily adult equivalent consumption levels below the US\$1.90 poverty line.

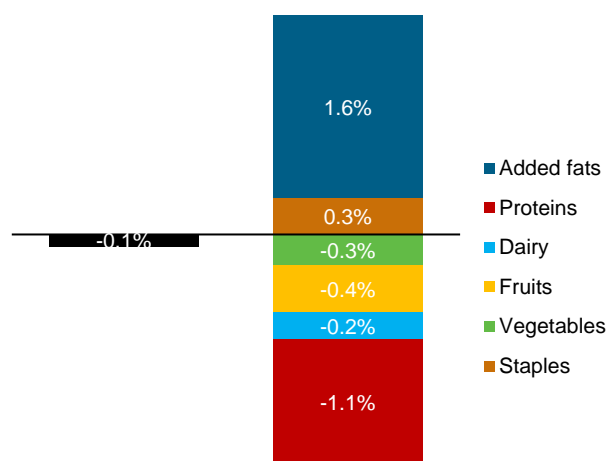
The cost of a healthy diet will not change much for Nepal's households. The model tracks changes in the real cost of a "healthy" reference diet (CoRD) with six major food groups as defined by the EAT-Lancet Commission.⁵ The combined food, fuel, and fertilizer shocks seem to have little impact on the CoRD measured in real terms (the first bar in Panel A in Figure 11).⁶ This is mainly because while the cost of edible oils within the "added fats" food group and "staples" rise as a result of rising world prices, a large decline in household incomes reduces demand for the other four major food groups, including vegetables, fruits, dairy, and protein foods (meats and fish), and thus, lower their costs (the second bar in Panel A in Figure 11). The staples food group includes cereals and root crops, and wheat is only a small component of this group in Nepal. Rising maize and wheat prices are compensated for by the falling cost of other staple foods when households reduce overall food consumption due to lowered income. 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 only a modest contribution to the changing cost of a healthy diet. On the other hand, consumption of vegetables, fruits, dairy products, and meats and fish are far below the levels required for a healthy diet among many households in Nepal. The falling costs of these food groups, therefore, mask households' deteriorating access to these foods due to falling income.

⁵ For further information on the RIAPA model's diet module and indicators, see [Pauw et al. \(2021\)](#).

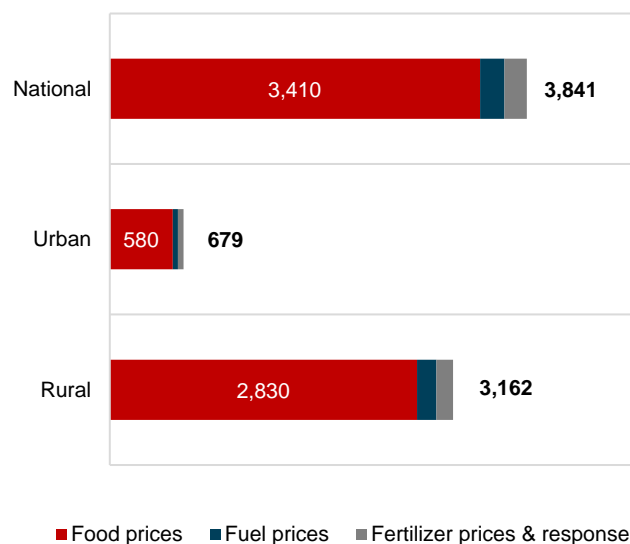
⁶ The CoRD is estimated using calorie targets from EAT-Lancet (for major food groups) and the World Bank's International Comparison of Prices (IPC) dataset. The estimated budget shares for the healthy diet include: staples (11.2 percent), vegetables (11.5), fruits (15.2), dairy (9.7), proteins (45.7), and added fats (6.7).

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

(a) Changes in the real cost of a healthy reference diet, with contributions from the six major food groups (%)



(b) Number of people with at least one additional food group deprived way from a healthy diet (1000 people)



Net change in cost of healthy diet Contributions of food groups to change

■ Food prices ■ Fuel prices ■ Fertilizer prices & response

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

Diet quality worsens for many households. The model's survey-based micro-simulation tool also measures the increased 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 levels and diversity needed for a healthy diet in Nepal. Rising food prices have much larger impact on diet quality deterioration than on income and poverty, and this shock causes almost 3.8 million people to become deprived in at least one additional food group. The rural population accounts for almost all the deterioration in diet quality in the country (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 Nepal'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 households' 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 cause GDP and employment in Nepal to contract, and the impact is larger on employment than on GDP. Most of the GDP losses are driven by rising fuel prices, while fertilizer shocks are the main driver of the fall in agricultural GDP. The impact on GDP from higher food prices is relatively modest. This is because, although the import prices of wheat

and edibles oils are rising, these products are not typically large items within household consumption baskets. To some extent, rural farmers also benefit from higher prices for agricultural products, but 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, national household consumption falls much more than GDP declines. Impacts are larger on poorer and rural households, leading to an increase in inequality in Nepal. That said, all households are adversely affected by the crises. Falling household consumption also leads to greater poverty, particularly in rural areas. Finally, the gap between household consumption levels and what is required to achieve a healthy diet is significantly widened by higher food prices. While the global crises will cause a modest slowdown in Nepal's economic growth, its adverse impacts on poverty and food insecurity are likely to be more pronounced, especially in rural areas.

This study is part of a series of 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.

ACKNOWLEDGMENTS

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