

COUNTRY BRIEF 16

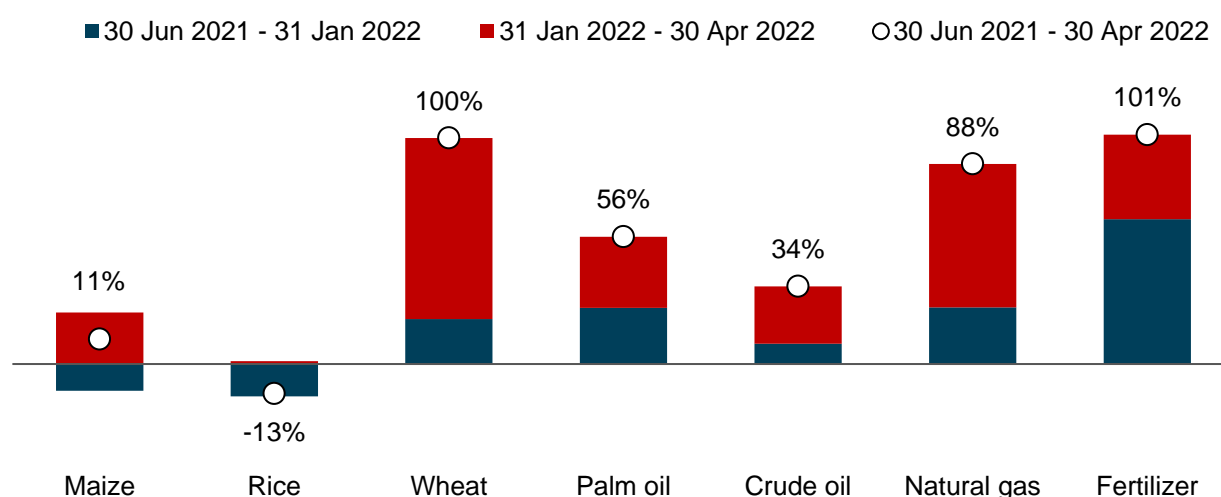
Cambodia: Impacts of the Ukraine and Global Crises on Poverty and Food Security

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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>).

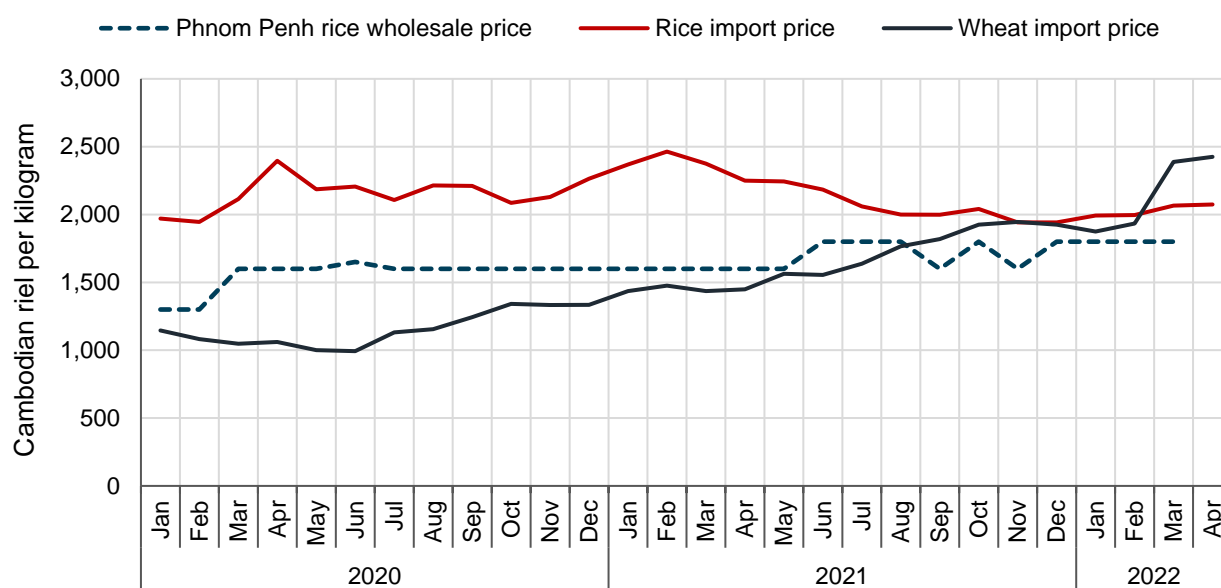
Note: Nominal prices in US dollars from World Bank Commodity Price Data (The Pink Sheet) are converted to real prices, which account for the overall increase in world prices over this period, deflated by the US consumer price index, which rose by 7.2 percent between June 2021 and April 2022.

¹ 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 CGIAR's Foresight and Metrics initiative. 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.

Domestic prices of rice in Cambodia were generally very stable between early 2020 and early 2022. However, international prices of rice in local currency terms declined by about 20 percent from a peak of about 2,500 Cambodian riel/kg in February 2021 to about 2,000 Cambodian riel/kg in February 2022, narrowing the gap between domestic and estimated import parity prices of rice (Figure 2). (Domestic prices for April and May 2022 are not yet available.)

Figure 2. Nominal rice and wheat prices in Cambodia, 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 Cambodia's Economy and Population

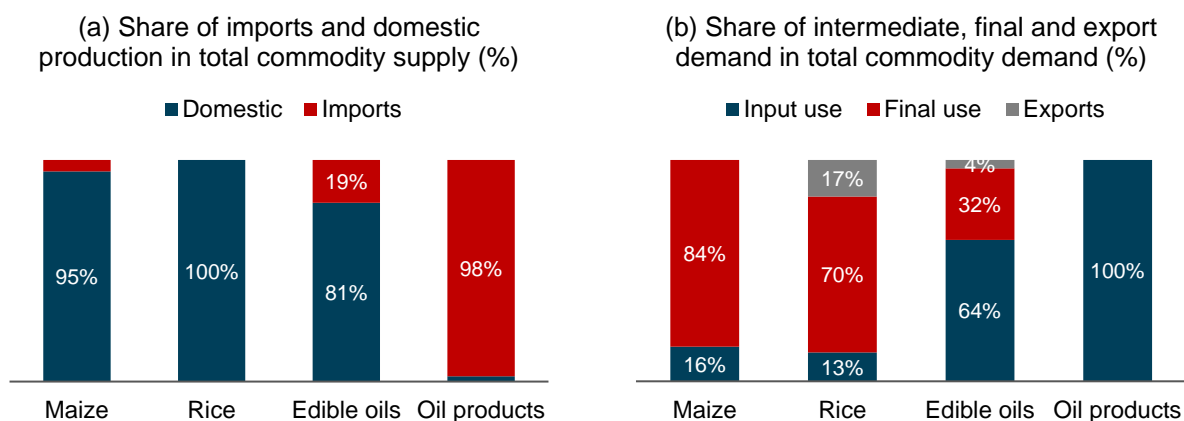
We use an economywide model of Cambodia to estimate the impacts of the global price shocks on all sectors, workers, and households.² The model allows us to capture a range of considerations that will determine the overall impact of the crisis on the country. For example, the effect of higher world prices on Cambodia'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. Rice is Cambodia's main staple and a major agricultural export, and imports of maize are a small part of the maize supply. (Panel A in Figure 3). Local rice producers are thus likely to be affected negatively by lower world prices. Edible oils (such as palm oil) are the only food commodity with a relatively large import share, at nearly 20 percent of total supply. Moreover, imported edible oil products are close substitutes for domestically produced and consumed edible oils.

Almost all oil products (crude oil and processed petroleum) used in Cambodia are imported. The impact of higher oil prices on households cannot be directly assessed by looking at the share of

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

petroleum products in household consumption baskets, however, because close to 100 percent of the supply of oil products is used as inputs into the production of other goods and services (Panel B in Figure 3). Most petroleum products, for example, are used by the transport sector to produce transport services, 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 Cambodia, 2019

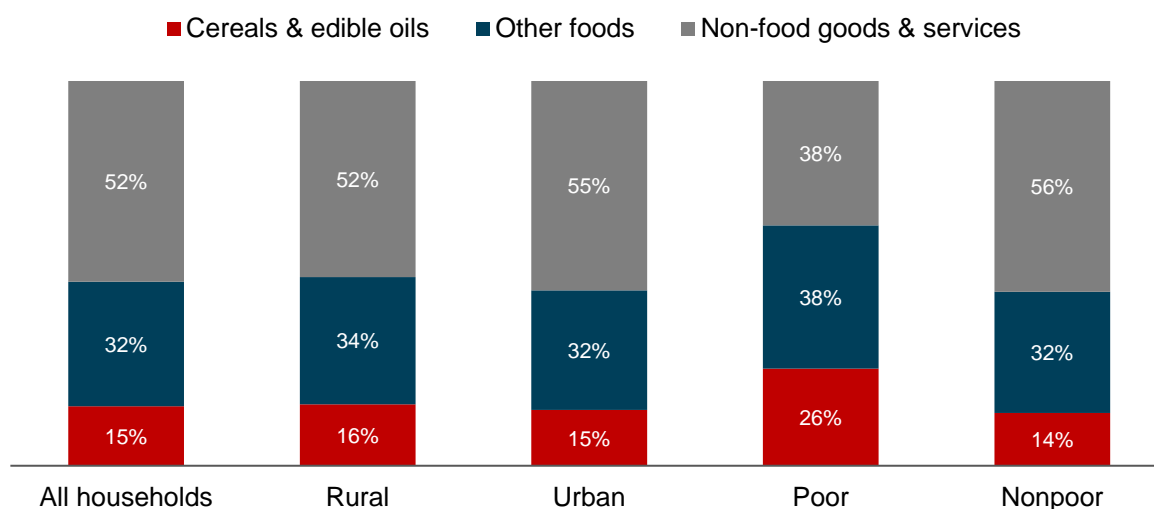


Source: Authors' calculations using social accounting matrix (SAM) data from IFPRI's Cambodia RIAPA model.

Note: Input use includes these products used in the production of other products. 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 (primarily rice) and edible oils make up 15 percent of the total value of household consumption in Cambodia and about one-third of total food expenditures (Figure 4). The share of cereals and edible oils is even higher for poor households (26 percent of total food expenditures) compared with nonpoor households (14 percent).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.

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

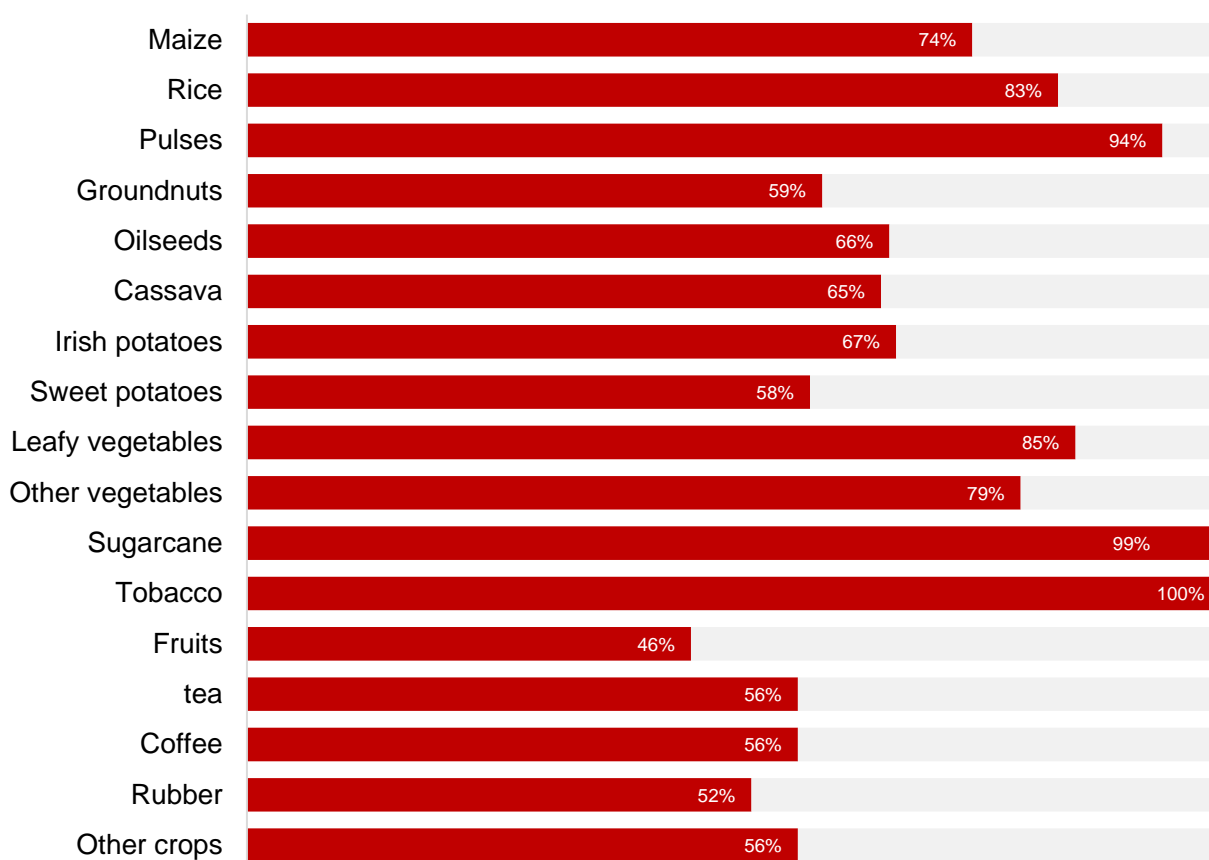


Source: Authors' calculations using social accounting matrix (SAM) data from IFPRI's Cambodia RIAPA model.

³ 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. The fertilizer adoption rate in Cambodia varies by crop, with an estimated 83 percent of rice area cultivated using fertilizers and 94 percent of pulse area, versus 65 percent for cassava. 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.⁴

Figure 5. Share of cropland using chemical fertilizers in Cambodia



Source: Authors' estimates using the data of 2014 Cambodia Socio-Economic Survey (<http://nada.nis.gov.kh/index.php/catalog/20>)

Rice is produced throughout Cambodia, which has two agricultural seasons each year. The monsoon crop is the primary season, and rice is planted in late May through July when the first rains of begin and harvested from December through February. The monsoon season is also the main season for the maize crop, with sowing in July–August and the harvest in October. The surge in fertilizer prices is expected to impact fertilizer use for both rice and maize crops. The link between world

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].

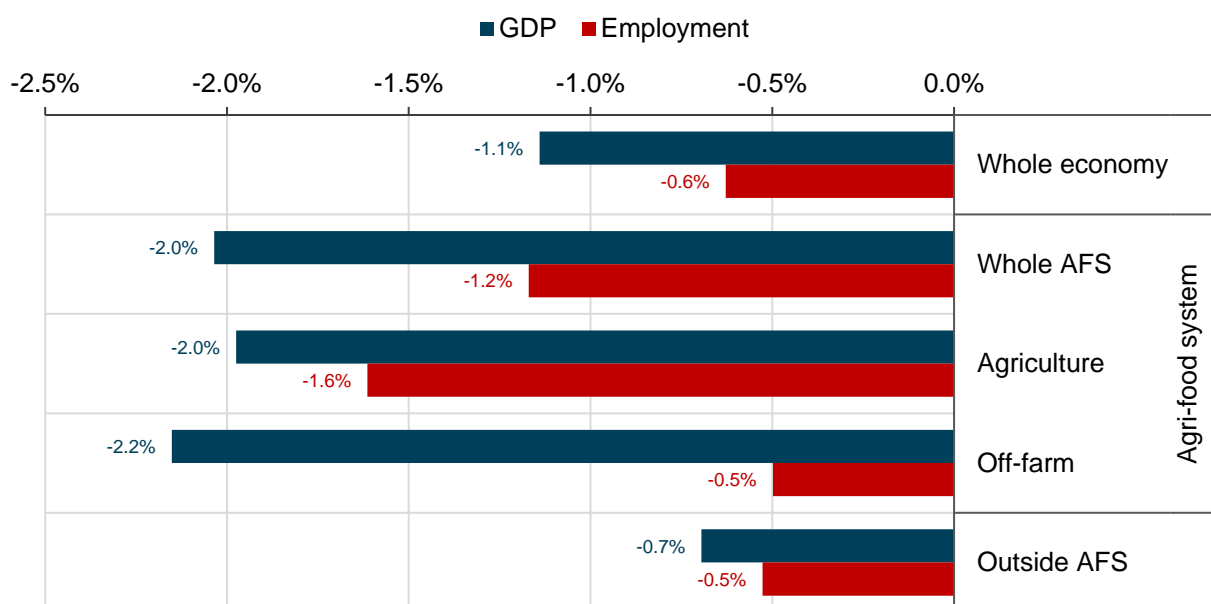
fertilizer, fuel, and other commodity prices, local fertilizer use, and agricultural productivity is therefore an important impact channel for the current crises.

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 crises (see Section 5 for next steps).

3. Impacts on Cambodia’s Economy and Agrifood System

The effects of the world price and fertilizer shocks on total GDP are significant. Real GDP falls by 1.1 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 0.6 percent, as falling production leads to job losses. The percentage declines in agrifood system GDP and employment are larger than the declines in total GDP and employment and, given the large size of the agriculture sector, the agrifood system losses account for 60 percent of total GDP losses and 30 percent of the total employment decline in the country. Within the agrifood system, off-farm GDP falls slightly more than agricultural GDP, while on-farm employment falls more than off-farm. GDP and employment also decline outside of the agrifood system. The fall in employment is smaller outside of the agrifood system than within in percentage point terms because of service sectors that are negatively affected by the global shocks. However, in absolute numbers, 70 percent of total job losses occur outside of the agrifood system.

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

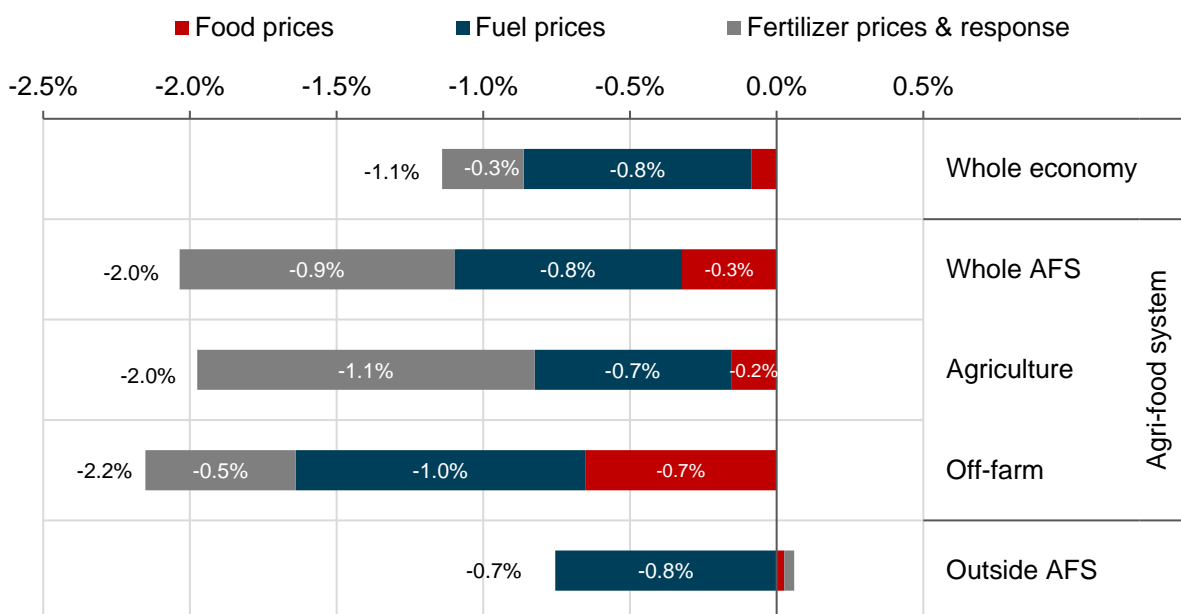


Source: Simulation results from IFPRI’s Cambodia RIAPA model.

Fuel and fertilizer shocks drive most of the decline in total GDP. Fuel shocks account for the largest share (0.8 percentage points) of the total decline in real GDP, followed by fertilizer shocks, including reduced fertilizer use in response to higher prices, which accounts for 0.3 percentage

points, while impact from the food price shocks is modest (Figure 7). Within the agrifood system, GDP losses are also mostly driven by fuel and fertilizer shocks. For agricultural GDP, the fertilizer shocks account for more of the losses, as fertilizer shocks directly affect primary agricultural production and also disrupt downstream supply chains. However, for GDP losses off-farm within the agrifood system, rising food prices have a larger impact than fertilizer shocks, as higher food prices increase the cost of food processing and food-related services and lower demand for them. Outside of the agrifood system, GDP losses are primarily driven by higher fuel prices, which raise transaction costs and market prices and reduce consumer demand.

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



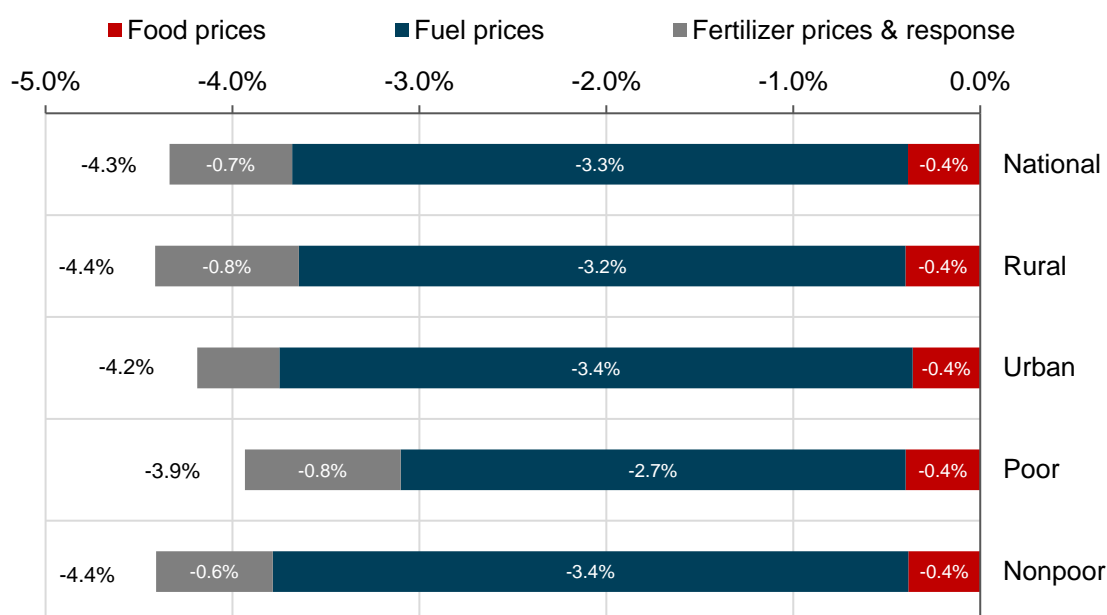
Source: Simulation results from IFPRI's Cambodia RIAPA model.

Note: About one-third of the effect on agricultural GDP under "fertilizer prices and response" is directly from rising fertilizer prices, while the remaining two-thirds from the productivity shock caused by lower fertilizer use.

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

Household consumption declines in both rural and urban households. National consumption spending, including the value of home consumption, falls by 4.3 percent and consumption falls for both rural and urban households (Figure 8). Moreover, 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 three-quarters of the absolute decline in household consumption (or -3.3 percentage points), followed by the fertilizer shocks at -0.7 percentage points, while the impact of food shock is small, at -0.4 percentage points.

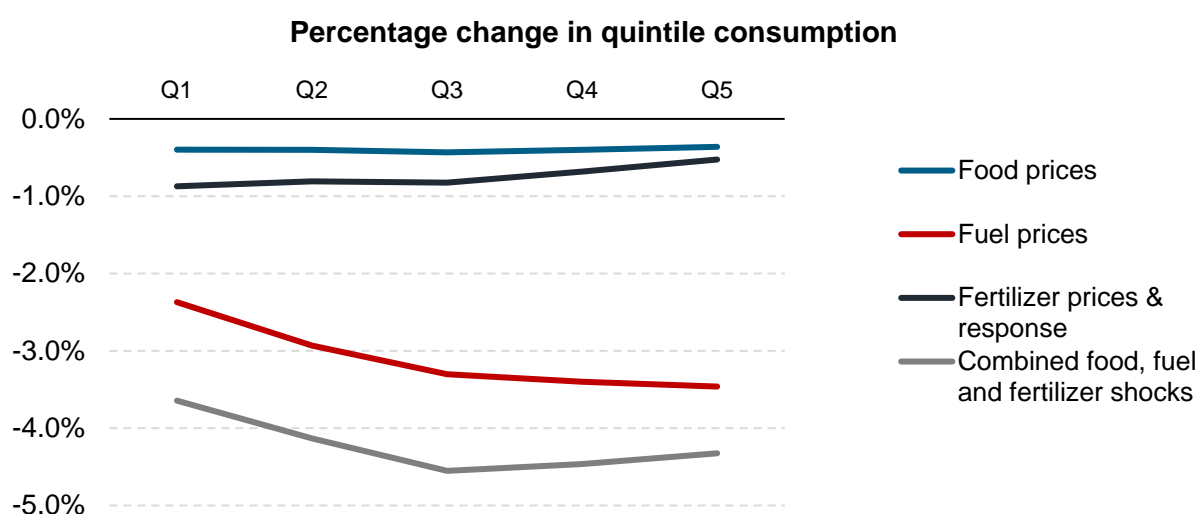
Figure 8. Percentage change in real household consumption due to food, fuel, and fertilizer shocks



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

Inequality is not greatly affected, but all households are adversely affected. The food, fuel, and fertilizer shocks have different implications for (income) inequality in Cambodia. The increase in fuel prices negatively affects consumption of all household groups, while it leads to larger consumption losses for households in the higher quintiles than for poorer households in the two lowest quintiles (Figure 9). Conversely, the fertilizer shock is slightly more detrimental for poorer households, which rely more heavily on agriculture for income and spend a larger share of their income on food. Finally, the negative impact of higher world food prices is felt similarly across all household quintiles. Overall, the combined effect of the world price shocks is a decline in consumption for all households, with larger declines for households toward the higher end of the income distribution.

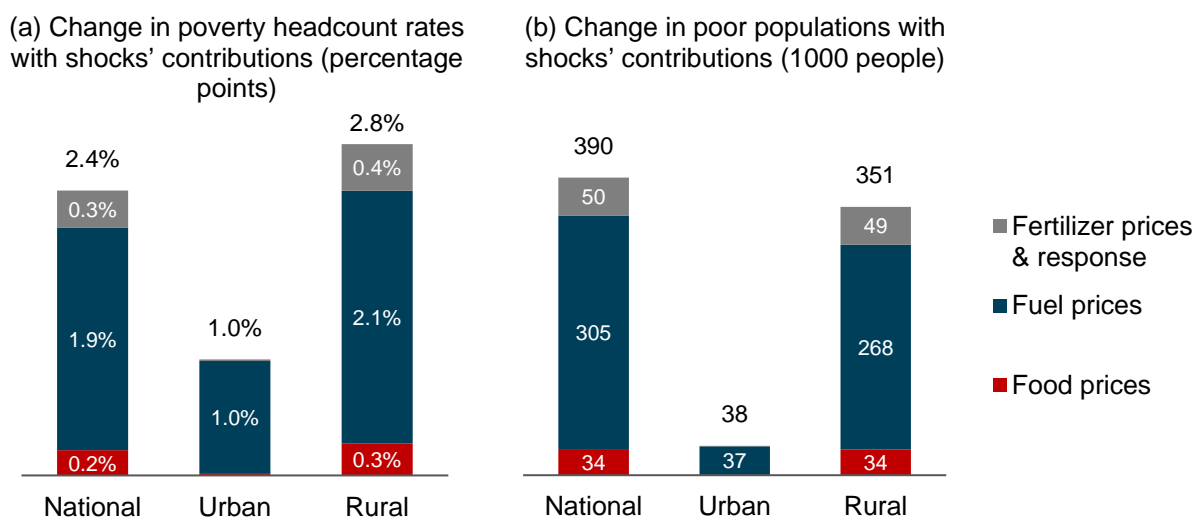
Figure 9. Percentage change in real household consumption across per capita expenditure quintiles



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

Falling household consumption leads to greater poverty, particularly in rural areas. According to the most recent household survey in Cambodia, 18 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 Cambodia by 2.4 percentage points (Panel A in Figure 10), which is equivalent to an additional 390,000 people falling below the poverty line (Panel B). Most of the increase in poverty is caused by the fuel shocks. The impacts on rural poverty rates are significantly larger, with both food and fertilizer impacts larger than on total national poverty, although the fuel shock impact is still dominant. With a much higher increase in the poverty rate among rural households, the largest absolute increase in the poor population is in rural areas, where the poverty rate was already higher than in urban areas prior to the shocks.

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



Source: Simulation results from the survey-based microsimulation module within IFPRI's Cambodia 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 rises for Cambodian households. The model tracks changes in the 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 increase the CoRD by 1.4 percent in real terms (the first bar in Panel A in Figure 11).⁶ This is because the rising cost of edible oils within the “added fats” food group affects not only the real cost of this food crop positively, but also increases the real cost of the other food groups, including dairy products and fruits. On the other hand, falling household income reduces demand for vegetables and protein foods (meats and fish), and thus lowers their costs slightly. The “staples” food group includes cereals, mainly rice, and root crops, and wheat is only a very small component of this group in Cambodia. Rising maize and wheat prices are compensated for by the falling cost of rice and 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 no contribution to the changing cost of a healthy diet. Moreover, consumption levels of vegetables, fruits, dairy products, meats, and fish are far below the level required for a healthy diet among

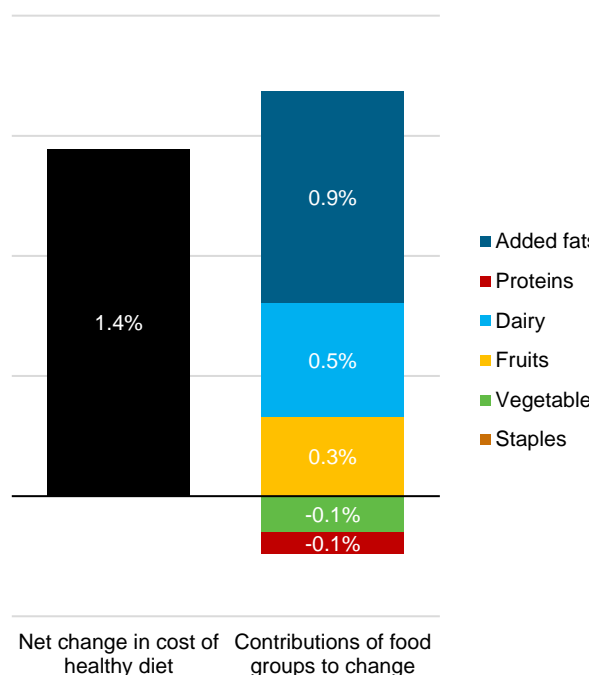
⁵ For further information on the RIAPA model's diet module and indicators, see [Pauw et al. \(2021\)](#).

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 (10.6 percent), vegetables (13.2), fruits (13.3), dairy (21.7), proteins (35.1), and added fats (6.0).

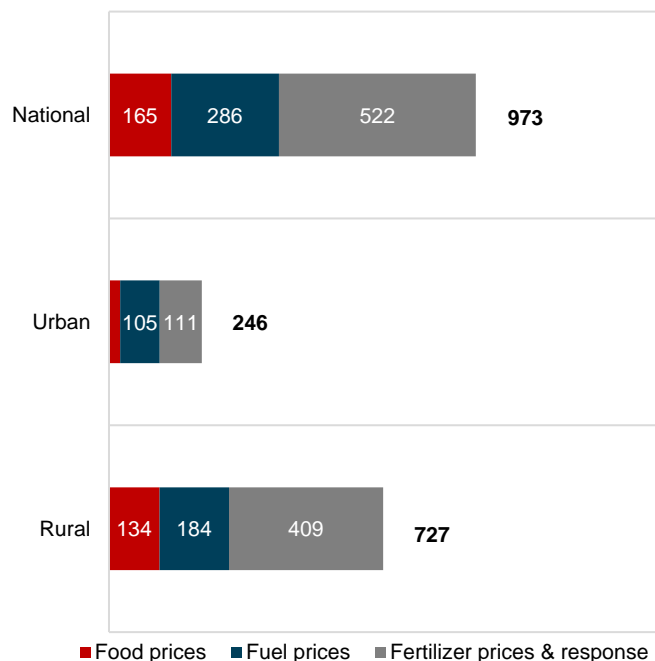
many households in Cambodia, and the higher costs of some of these food groups lead to households' deteriorating access to these foods.

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 to become deprived in at least one additional food group (1000 people)



Source: Simulation results from the survey-based microsimulation module within IFPRI's Cambodia 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 Cambodia. Rising fuel, food, and fertilizer prices cause almost 1 million people to become deprived in at least one additional food group for a healthy diet. The rural population accounts for the majority of people (727,000) with a deterioration in diet quality (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 Cambodia'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 cause contractions in Cambodia's GDP and employment, but these declines are not large compared to the total size of the economy. Most of the GDP losses are driven by rising fuel and fertilizer prices, rather than higher food prices. This is because, although the import prices of wheat and edible oils are rising, these products, particularly, wheat, are not typically large items within households' consumption baskets. 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, national household consumption falls, and impacts are larger on rural households, leading to an increase in inequality in Cambodia, though all households are adversely affected by the crises. Falling household consumption also leads to greater poverty, particularly in rural areas. Finally, the cost of a healthy diet increases for Cambodian households, and there is a widening gap between household consumption levels and what is required to achieve a healthy diet. While the global crises will cause a modest slowdown in Cambodia'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.

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