

COUNTRY BRIEF 3

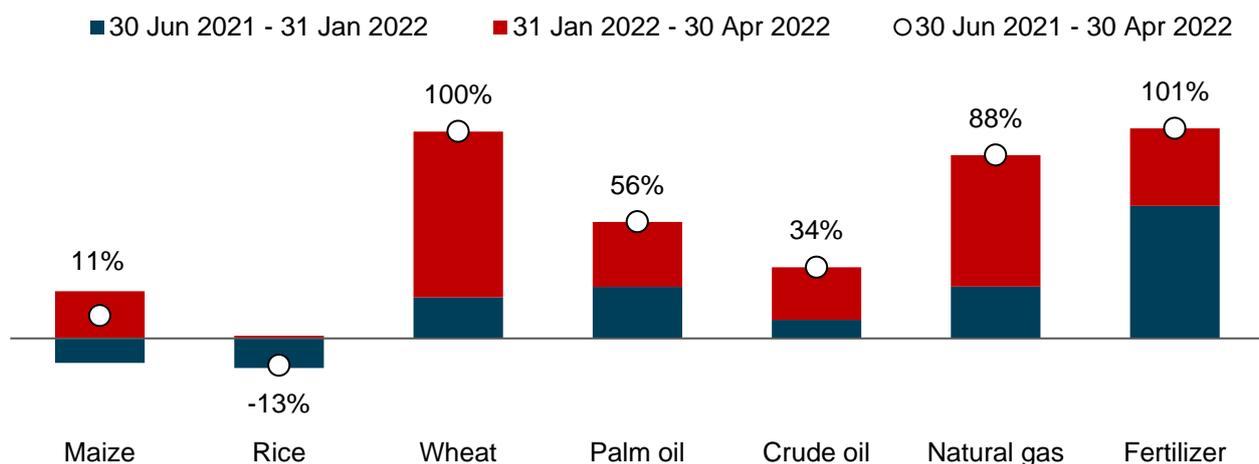
Bangladesh: Impacts of the Ukraine and Global Crises on Poverty and Food Security

Xinshen Diao, Paul Dorosh, Jenny Smart, and James Thurlow¹
International Food Policy Research Institute, Washington, DC

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>).

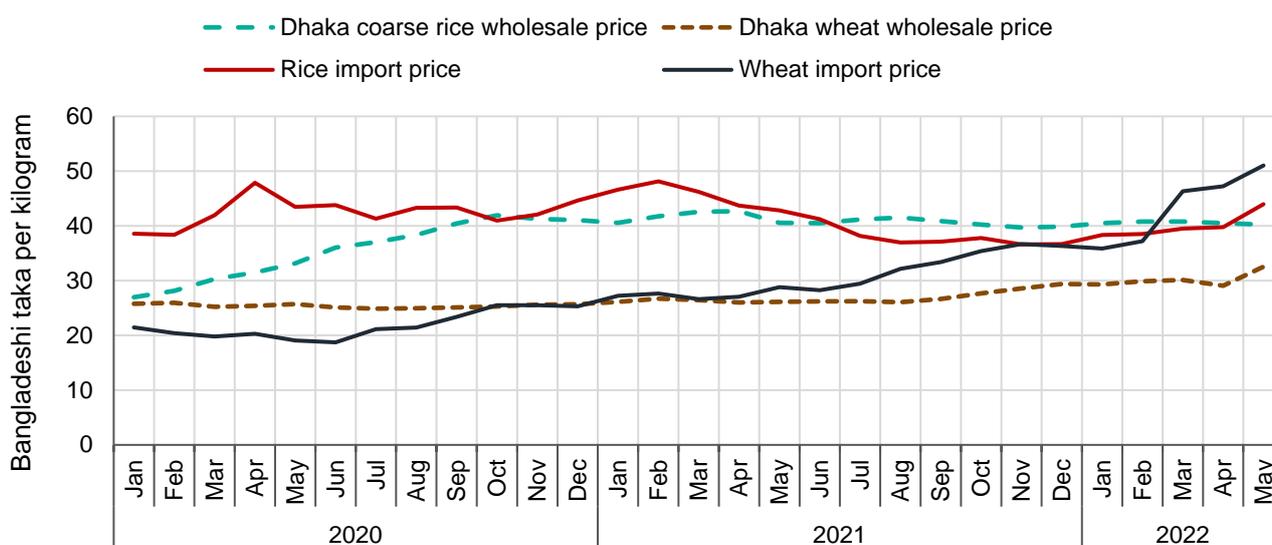
Note: Nominal prices in US dollars from World Bank Commodity Price Data (The Pink Sheet) are converted to real prices, which account for the overall increase in world prices over this period, deflated by the US consumer price index, which rose by 7.2 percent between June 2021 and April 2022.

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 the CGIAR's "Foresight and Metrics" initiative. The study also benefits from working with IFPRI's South Asia Region office in New Delhi, India, and 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 in Bangladesh with national average prices suggests that world price changes have not yet been transmitted to local markets. Wholesale rice prices fell by 1.4 percent between February and May 2022, while wholesale wheat prices rose by only 8.9 percent (Figure 2), likely because of good harvests of rice and wheat in March/April and high import tariffs that severely limit imports of lower-quality rice.

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

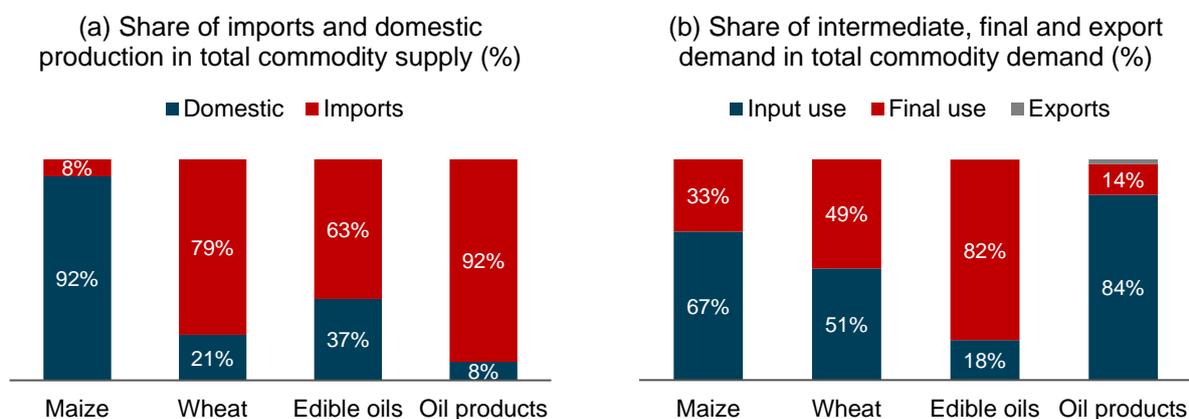
We use an economywide model of Bangladesh to estimate the impacts of the global price shocks on all sectors, workers, and households.² The model allows us to capture a range of considerations that will determine the overall impact of the crisis on the country. For example, the effect of higher world prices on Bangladesh'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. About 80 percent of Bangladesh's wheat grain supply comes from imports (Panel A in Figure 3). Since the wheat grain supply is highly dependent on imports, we expect changes in world prices to have a relatively large effect on domestic prices of wheat. Public sector imports and subsequent sales of both rice and wheat at official prices may reduce the transmission of international prices to the domestic market, however. Import shares are also high for edible oils (for example, palm oil) and these imported products are close substitutes for domestically produced and consumed edible oils.

Almost all oil products (crude oil and processed petroleum) used in Bangladesh 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 households' consumption baskets. This is because oil products are primarily used as inputs into the production of other goods and services, with 84 percent of total demand for oil products in Bangladesh for input use (see 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 Bangladesh, 2019

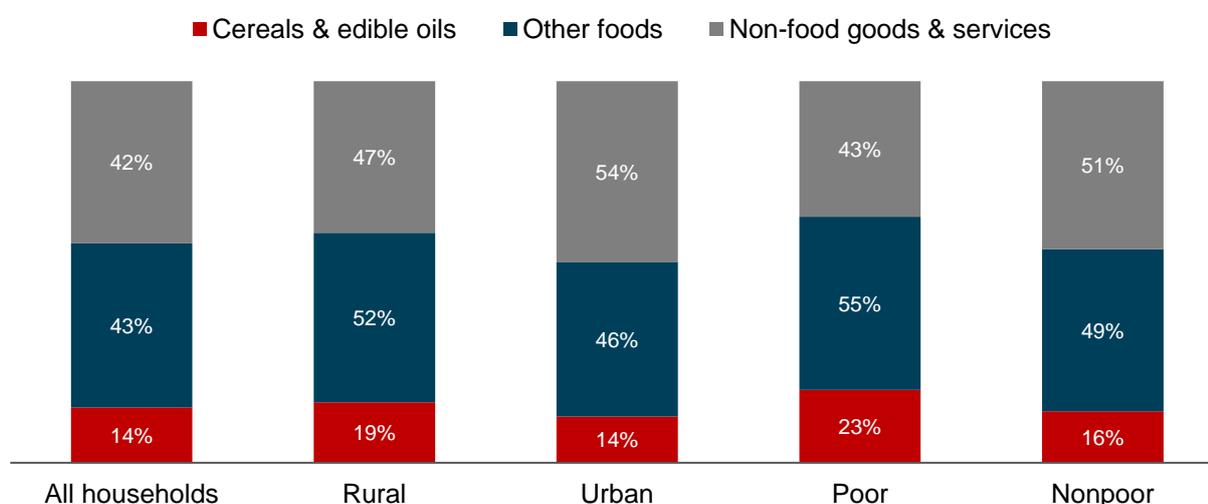


Source: Authors' calculations using social accounting matrix (SAM) data from IFPRI's Bangladesh RIAPA model.

Notes: Wheat includes wheat flour, and edible oils include edible oilseeds in Panel (b).

Impacts on households also depend on the importance of commodities in their consumption baskets. Cereals and edible oils make up 14 percent of the total value of household consumption in Bangladesh, and about one-fourth of total food expenditures (Figure 4). However, rice is much more important than wheat among cereal staples, and world rice prices did not increase in recent months. The shares of cereals and edible oils in total food expenditures are even higher for rural households (19 percent) and poor households (23 percent).³ IFPRI's model 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.

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

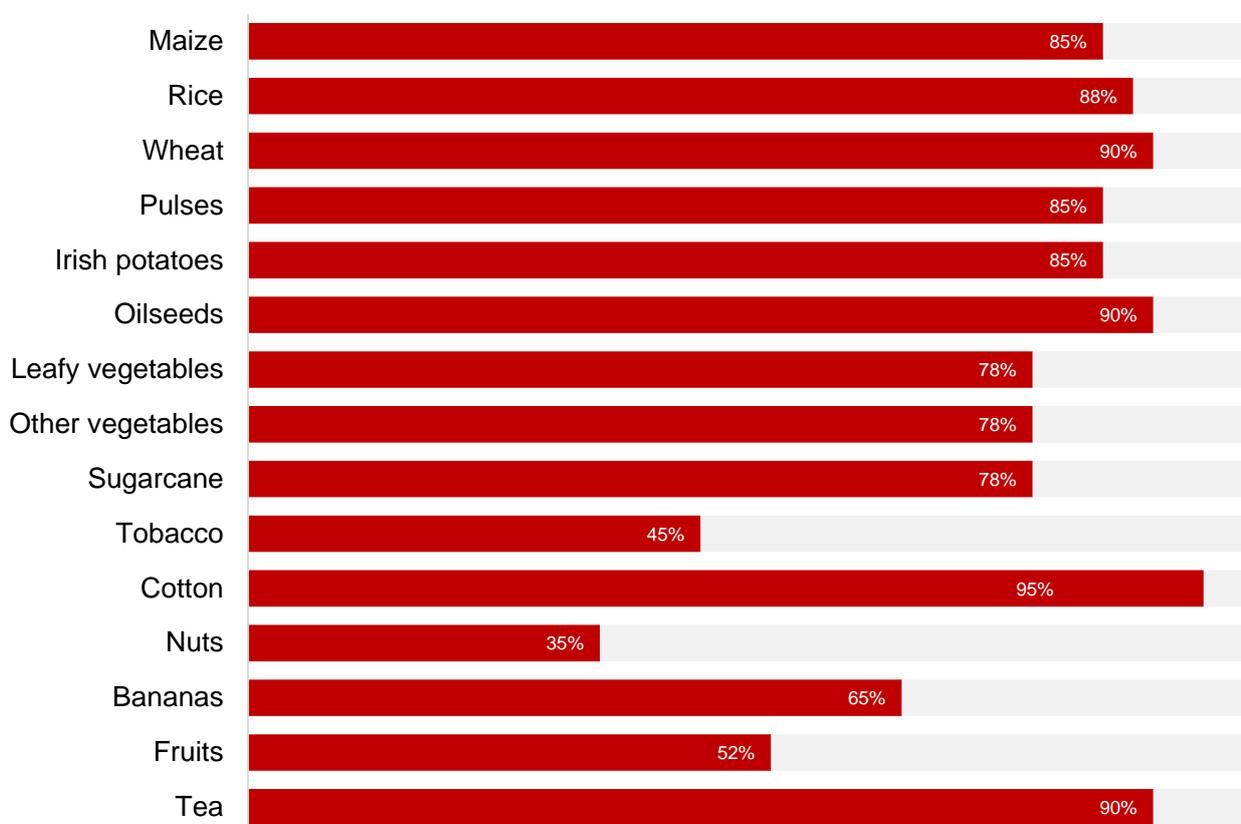


Source: Authors' calculations using social accounting matrix (SAM) data from IFPRI's Bangladesh RIAPA model.

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. The fertilizer adoption rate in Bangladesh is much higher than in many other Asian and African developing countries, but it still varies significantly by crop, with an estimated 95 percent of rice area cultivated using fertilizers versus less than 30 percent for pulses. 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 Bangladesh



Source: Authors' estimates based on information from the country's experts.

In Bangladesh, planting for the monsoon season takes place from mid-June to mid-August, with harvesting from mid-October through mid-December. The irrigated *boro* season rice crop is planted from January through mid-February and harvested from mid-April through mid-May. Wheat is grown mainly on nonirrigated land from November/December through March/April. The surge in fertilizer prices may therefore have already led to some reduction in fertilizer use for wheat and the irrigated (*boro* season) rice crops. The link between world fertilizer prices, local fertilizer use, and agricultural productivity is therefore an important impact channel for the current crises.

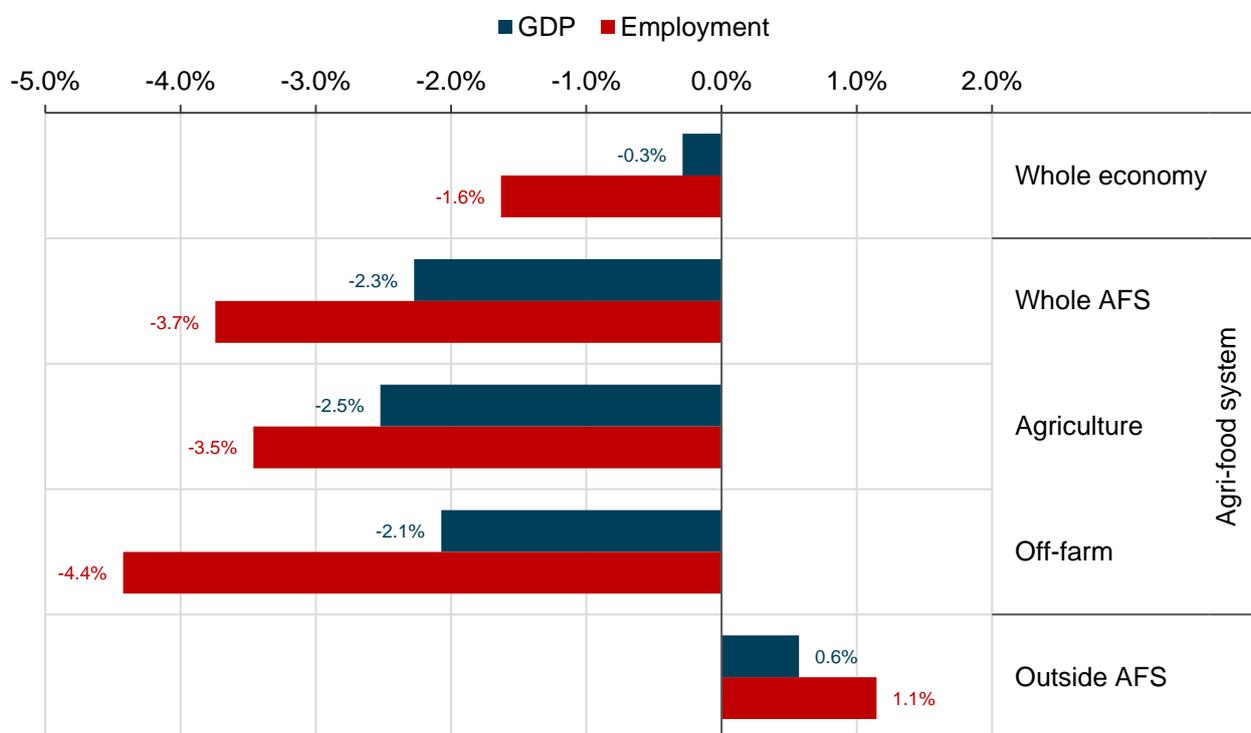
⁴ The final impact on crop productivity is: [Change in domestic market price] × [Price elasticity of demand] × [Share of cultivated land using fertilizer] × [Productivity gain from using fertilizer per hectare].

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 crises (see Section 5 for next steps).

3. Impacts on Bangladesh’s Economy and Agrifood System

The effects of the world price and fertilizer demand shocks on total GDP are modest. 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 import prices outweighs the positive effect of higher export prices), and rising import costs that reduce spending on domestically produced goods (Figure 6). Falls in employment are larger than those in GDP at 1.6 percent. The percentage declines in agrifood system GDP and employment are much larger than the declines in total GDP and employment. In fact, the declines in total GDP and employment come entirely from the decline in the agrifood system, as GDP and employment increase slightly outside of the agrifood system. Within the agrifood system, agricultural GDP falls more than off-farm GDP, while employment falls more in the off-farm sector in percentage points. However, labor productivity is much higher off-farm than on-farm. Thus, more agrifood GDP losses are in the off-farm sector, while the agriculture sector incurs more job losses in absolute numbers. Gains in GDP and employment outside of the agrifood system are due to the increase in Bangladesh’s major exports – garments – which benefit from the depreciation of real exchange rates.

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

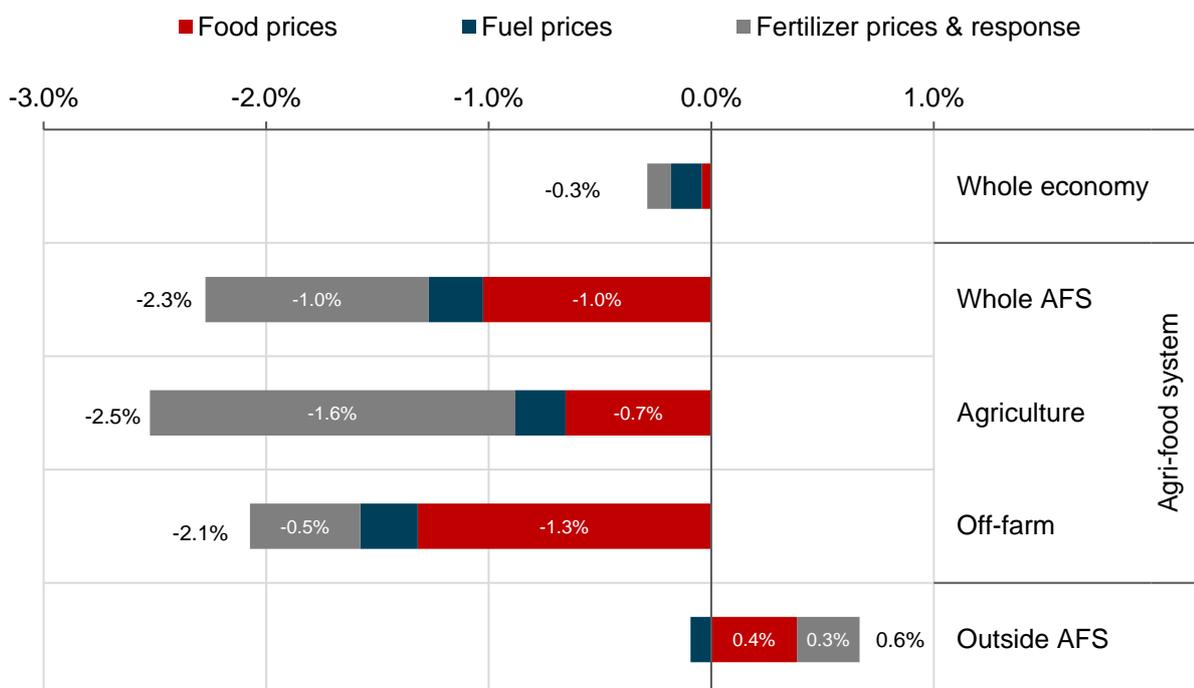


Source: Simulation results from IFPRI’s Bangladesh RIAPA model.

Fertilizer and food shocks drive most of the decline in total and agrifood system GDP. Fertilizer shocks directly affect primary agricultural production, while rising food prices increase the cost

of food processing and food-related services and become a dominant driver of losses in off-farm agrifood GDP (Figure 7). Together, fertilizer and food shocks have a similar effect on the losses of total GDP within the agrifood system, while fuel prices have a minimal effect. Outside of the agrifood system, fuel shocks have a modestly negative effect that is offset by the positive effects from fertilizer and food shocks, which lead to depreciation in the real exchange rate, benefiting garment exports.

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



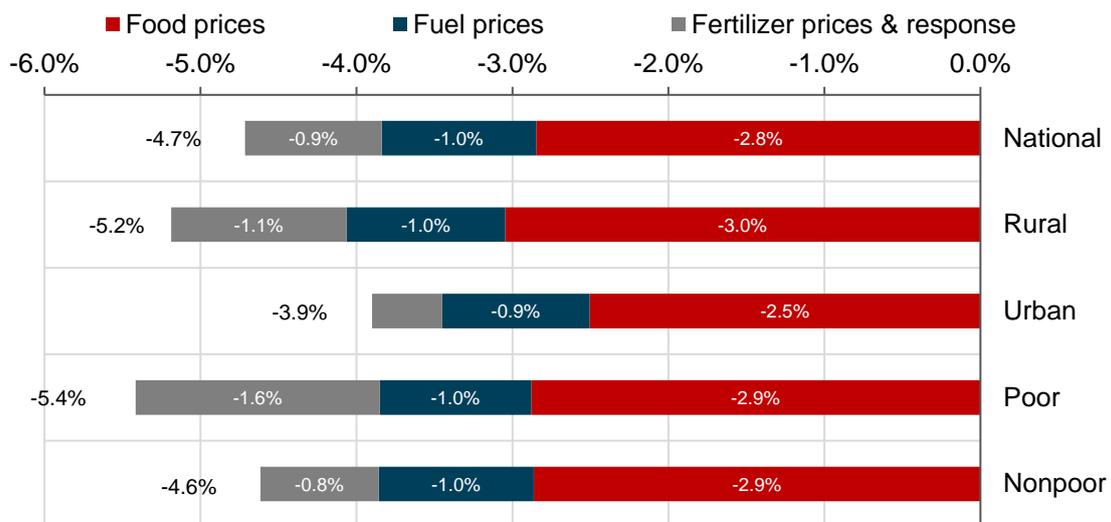
Source: Simulation results from IFPRI's Bangladesh RIAPA model.

Note: More than 60 percent of the effect on agricultural GDP under "fertilizer prices and response" is directly from rising fertilizer prices, while the remaining 40 percent is from the productivity shock caused by lower fertilizer use.

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

Household consumption falls in both rural and urban households. National consumption spending, including the value of home consumption, falls by 4.7 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. Rural households are hit twice, by rising prices and falling income, while the dominant effect for urban households is higher food and fuel prices. Moreover, food accounts for a much larger share of household consumption than of GDP, and a much larger portion of the decline in consumption is driven by higher food prices (the 2.8 percentage point decline in national consumption is due to rising food prices). The fall in consumption is much larger for poorer and rural households. Rural households earn more of their income from farming, so they are adversely affected by the decline in agricultural production following the increase in fertilizer prices. Poor households, including those in urban areas, are also affected by the indirect effects of the fertilizer shock on food supply, while they are more affected by higher food prices, since food makes up a larger share of poor households' consumption baskets (recall Figure 4).

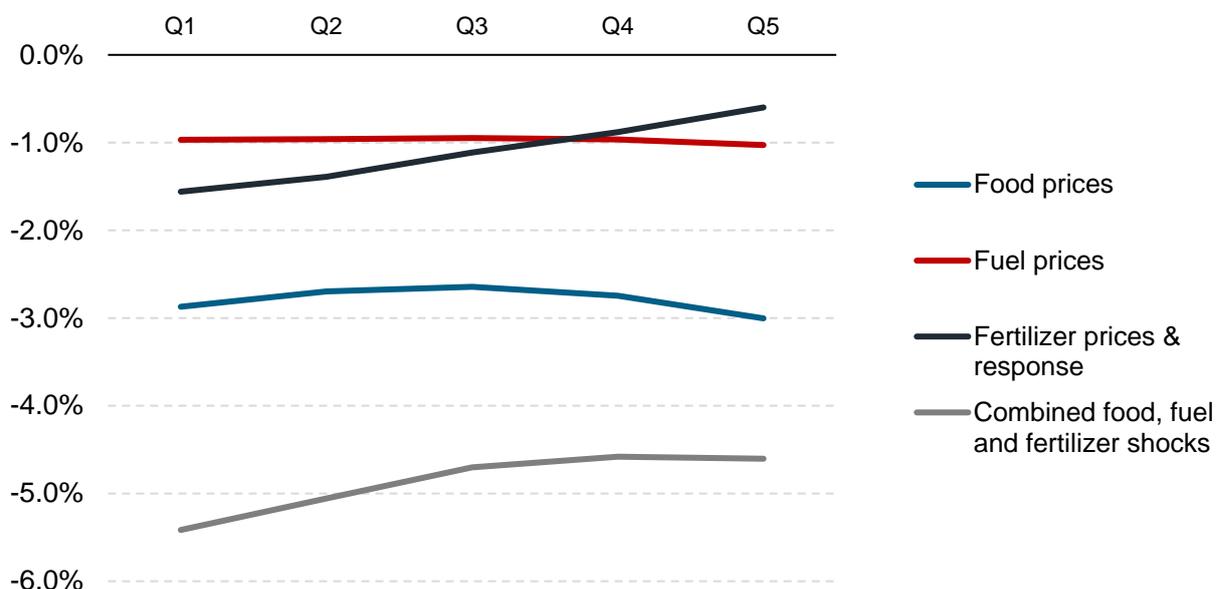
Figure 8. Percentage change in real household consumption due to food, fuel, and fertilizer shocks



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

Inequality worsens, although all households are adversely affected. The food, fuel, and fertilizer shocks have different implications for (income) inequality in Bangladesh. The increase in fuel prices leads to larger consumption losses for households in the top quintile than for poorer households in the lowest quintile (Figure 9). Conversely, the fertilizer shock is most 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 largest negative impact comes from higher world food prices, 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 lower end of the income distribution. The result of the global crises is therefore an increase in inequality within Bangladesh.

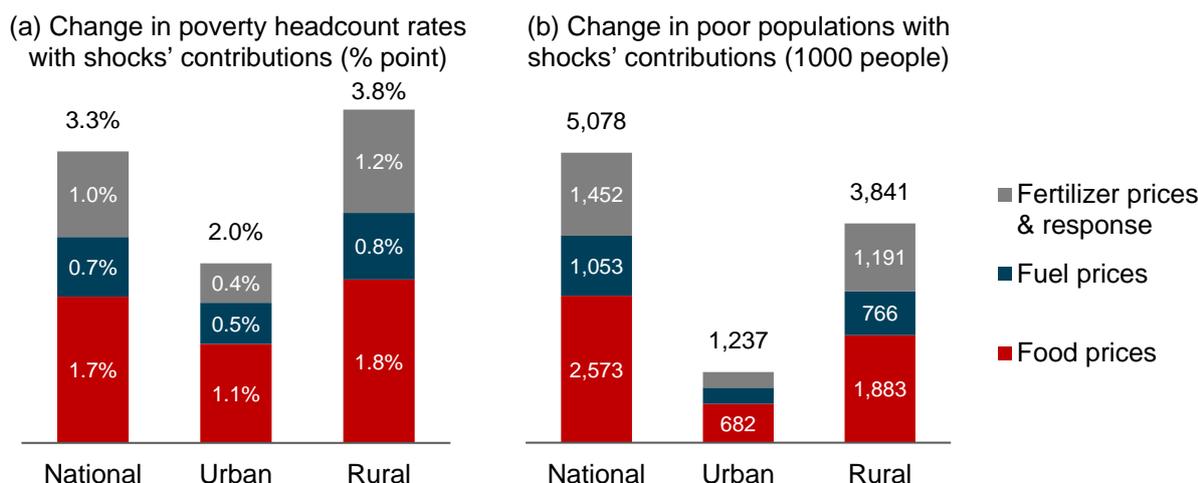
Figure 9. Percentage change in real household consumption across per capita expenditure quintiles



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

Falling household consumption leads to greater poverty, particularly in rural areas. According to the most recent household survey in Bangladesh, 14 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 Bangladesh by 3.3 percentage points (Panel A in Figure 10), equivalent to an additional 5 million people falling below the poverty line (Panel B). Most of the increase in poverty is caused by the food and fertilizer shocks. The impacts on rural poverty rates are significantly larger, with both food and fertilizer impacts larger than on total national poverty. 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 Bangladesh 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.

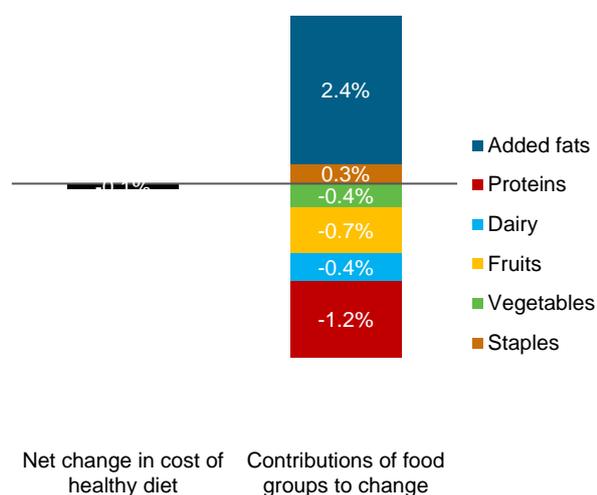
The cost of a healthy diet is not greatly affected for Bangladeshi households. The model tracks changes in the cost of a “healthy” reference diet (CoRD) with six major food groups as defined by the EAT-Lancet Commission.⁵ The combined food, fuel, and fertilizer shocks did not increase the CoRD much (the first bar in Panel A in Figure 11).⁶ This is because the rising cost of edible oils within the “added fats” food group and wheat (in the staples group) affects the real cost of these two food crops positively, while falling household income reduces demand for vegetables, fruits, dairy, and proteins (meats and fish), and thus lowers their costs. The “staples” food group includes cereals and root crops, and wheat is only a small component of this group in Bangladesh. 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 structure of a healthy diet. On the other hand, consumption levels of vegetables, fruits, dairy products, meats, and fish are far below the level required for a healthy diet among many households in Bangladesh. Thus, the falling costs of these food groups mask households' deteriorating access to these foods due to lower income.

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

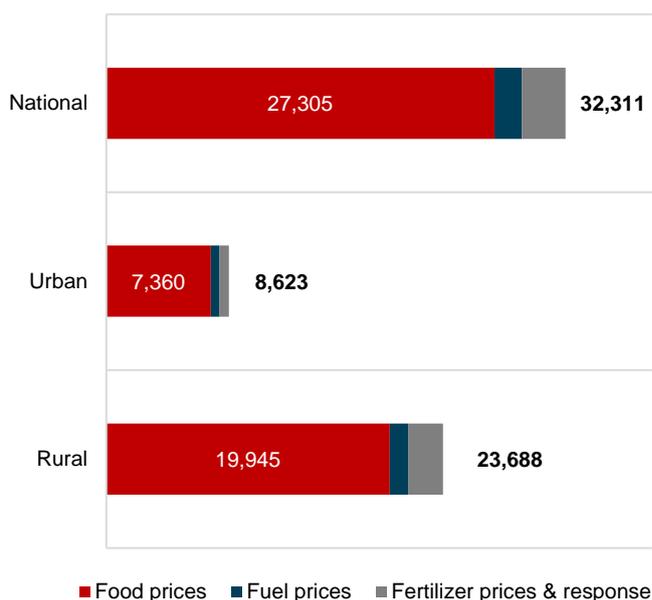
⁶ The CoRD is estimated using calorie targets from EAT-Lancet (for major food groups) and the World Bank's International Comparison of Prices (IPC) dataset. The estimated budget shares for the healthy diet include: staples (9.2 percent), vegetables (11.2), fruits (19.6), dairy (20.1), proteins (33.9), and added fats (6.0).

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 Bangladesh 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 Bangladesh. Rising food prices are the dominant driver of deteriorated diet quality. With higher food prices, more than 32 million people become deprived in at least one additional food group for a healthy diet. The rural population accounts for more people (23.7 million) with a deterioration in diet quality, but the number for additional urban residents is also alarmingly large, at 8.6 million (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 Bangladesh'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 agrifood GDP and employment in Bangladesh to contract, while the impact on GDP and employment outside of the agrifood system is slightly positive. Most agricultural GDP losses are driven by rising fertilizer prices, while most losses in off-farm agrifood GDP are driven by higher food prices that increase the cost of food processing and food services. To some extent, rural farmers 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.

All households are adversely affected by the crises, and both rural and urban household consumption fall, led by falling income among rural households and rising prices for consumer goods faced by both rural and urban households. Such impacts are larger on poorer and rural households, leading to an increase in inequality in Bangladesh. 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 widens for a large number of rural and urban people. While the global crises will cause a modest slowdown in Bangladesh's economic growth, their adverse impacts on poverty, food insecurity, and deteriorated diet quality 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 on 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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1201 Eye Street, NW, Washington, DC 20005 USA | T. +1-202-862-5600 | F. +1-202-862-5606 | Email: ifpri@cgiar.org | www.ifpri.org | www.ifpri.info