

COUNTRY BRIEF 2

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

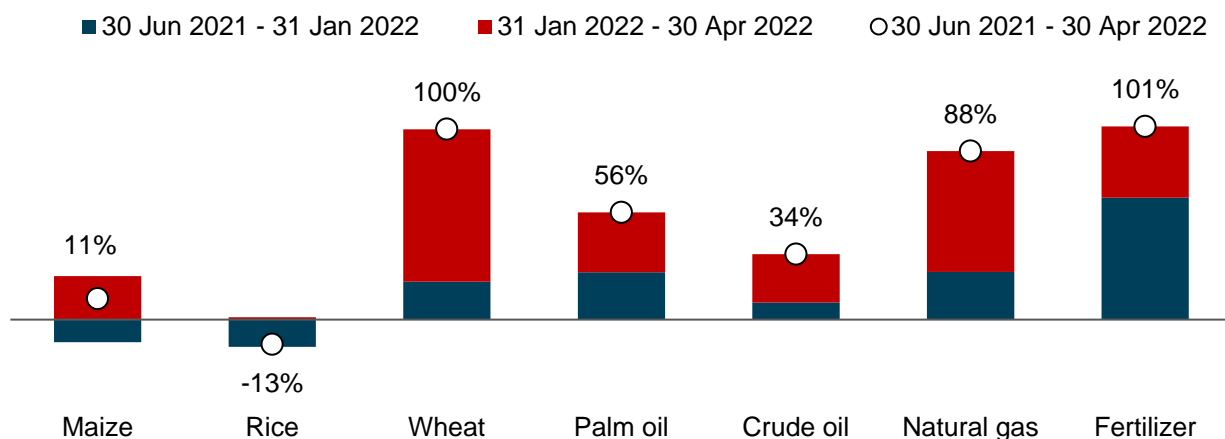
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1. World Price Shocks and Domestic Price Transmission

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>).

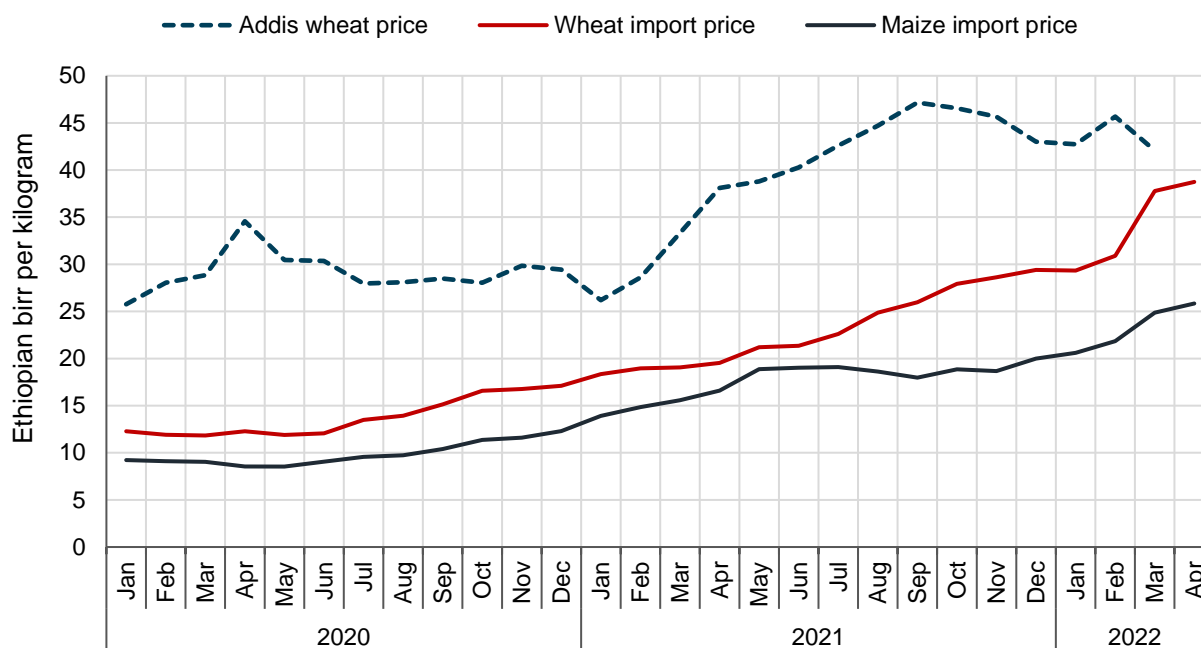
Note: Nominal prices in US dollars from World Bank Commodity Price Data (The Pink Sheet) are converted to real prices, which account for the overall increase in world prices over this period, deflated by the US consumer price index, which rose by 7.2 percent between June 2021 and April 2022.

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. The study also benefitted from working with IFPRI's Ethiopia Country Strategy Support Program and national partners. For further information, please contact Alemayehu Seyoum Taffesse (A.SeyoumTaffesse@cgiar.org), Paul Dorosh (p.dorosh@cgiar.org), and 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.

Ethiopia's domestic prices of wheat have been substantially above (import parity) international prices in recent years as the country's import restrictions have limited its total supply of wheat. Domestic wholesale wheat prices in Addis Ababa were on average about 70 percent above estimated import parity prices, including import tariffs (which were eliminated late in the year). Thus, even though in 2020/21 Ethiopia imported 1.5 million tons of wheat, of which 301,000 tons were from Ukraine and 24,000 tons from Russia, domestic prices are not expected to rise as much as international prices (Figure 2).² Likewise, world price changes may not have a major direct influence on domestic prices of most other food items, in part because many of the major food products produced and consumed in Ethiopia (including teff and sorghum) are not widely traded in international markets. Prices of vegetable oils are likely to rise substantially, however, since imports account for a high percentage of supply.

Figure 2. Nominal maize and wheat prices in Ethiopia, 2020–2022



Source: Authors' calculations using data from FEWSNET, IGC, and World Bank's Pink Sheets.
Note: Import prices include carriage, insurance, and freight (CIF).

2. Measuring Impacts on Ethiopia's Economy and Population

We use an economywide model of Ethiopia to estimate the impacts of the global price shocks on all sectors, workers, and households.³ The model allows us to capture a range of considerations that determine the overall impact of the crisis on the country. For example, the effect of higher world prices on Ethiopia'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

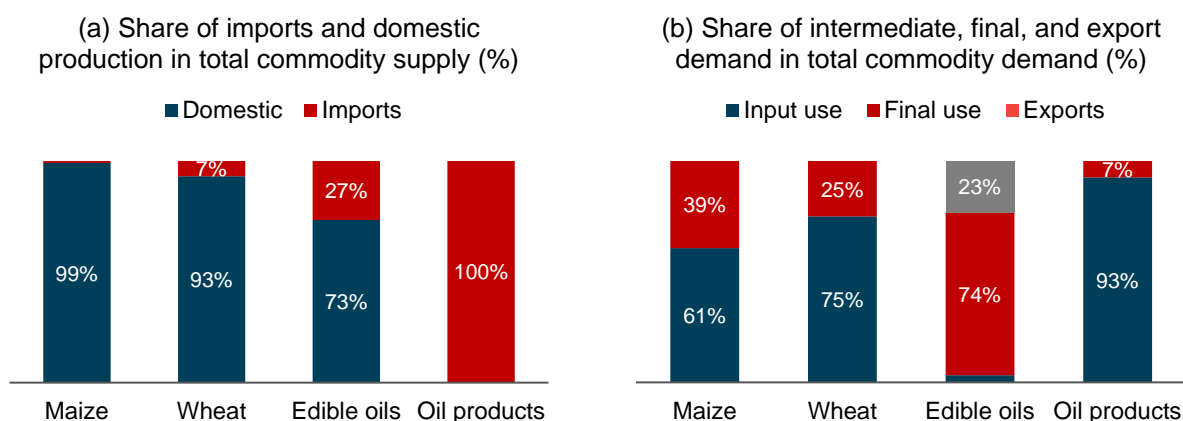
² USDA Foreign Agricultural Service, Global Agricultural Information Network, "Ethiopia: Grain and Feed Annual, April 2022) Report No. ET2022-0014." https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Grain%20and%20Feed%20Annual_Addis%20Ababa_Ethiopia_ET2022-0014.pdf.

³ Information on the Rural Investment and Policy Analysis (RIAPA) data and modeling system can be found [here](#).

higher-priced imports. Ethiopia imports very little maize (1–2 percent of supply in recent years) and relatively little wheat (7 percent of supply of total wheat grains in 2019, but nearly 20 percent of wheat grains imported in more recent years due to increased food aid (Panel A in Figure 3). Although Ethiopia exports sesame seeds, its imports of edible oils are substantial, accounting for 27 percent of total edible oil and oilseed supply. In general, however, changes in world prices of major food products (apart from export crops such as coffee) do not have a large effect on domestic prices.

Because oil products (that is, crude oil and processed petroleum) used in Ethiopia are all imported, however, changes in international prices have a direct effect on prices in Ethiopia unless offset by changes in government subsidies. The impact of higher oil prices on households is significantly greater than suggested by the share of petroleum products in households' consumption baskets. This is because oil products are primarily used as an input for the production of other goods and services, with 93 percent of total demand for oil products in Ethiopia for input use (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 Ethiopia, 2019

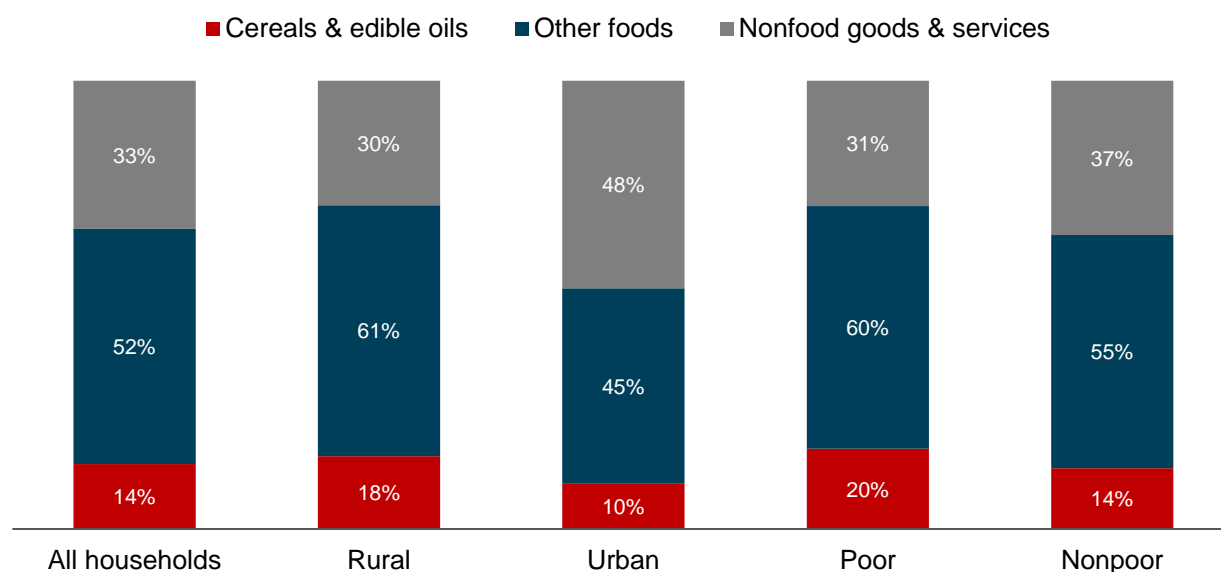


Source: Authors' calculations using social accounting matrix (SAM) data from IFPRI's Ethiopia RIAPA model.

Note: Maize and wheat include maize flour and wheat flour, and edible oils include edible oilseeds in Panel (b). Input use includes grains as intermediates in flour processing, while grain flours can also be used as intermediates in the production of other processed foods (excluding flours) and by some service sectors, such as restaurants and hotels. 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 14 percent of the total value of household consumption in Ethiopia, which is about one-fifth of total food expenditures (Figure 4).⁴ 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. Unpacking populations is crucial, because cereals and edible oils are more important for poorer rural households in Ethiopia than for other groups.

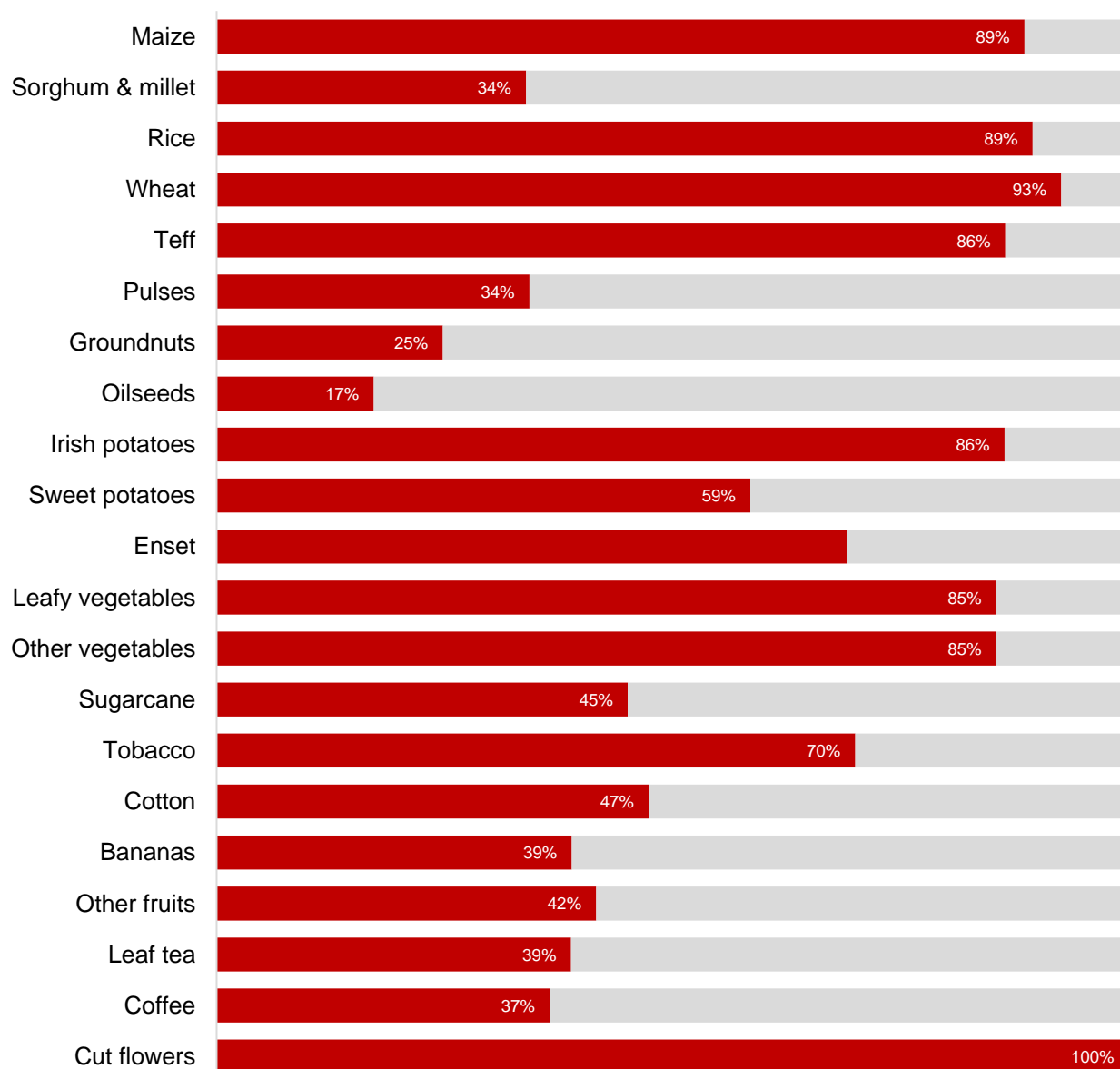
⁴ These figures include the imputed value of home consumption, which is also tracked within the RIAPA model.

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

Source: Authors' calculations using social accounting matrix (SAM) data from IFPRI's Ethiopia 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 relatively high in Ethiopia, but it still varies significantly by crop, with about 90 percent of maize, rice, wheat, and teff land cultivated using fertilizers, compared to only 34 percent for sorghum and millet (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 recent survey analysis, we assume that farmers who do not use chemical fertilizers are about 20 percent less productive than farmers who do.⁵

⁵ The final impact on crop productivity is: [Change in domestic market price] \times [Price elasticity of demand] \times [Share of cultivated land using fertilizer] \times [Productivity gain from using fertilizer per hectare].

Figure 5. Share of cropland using chemical fertilizers in Ethiopia

Source: Authors' calculation using data from Agricultural Sample Survey 2020/21 published in *Statistical bulletin, report on farm management practices (private peasant holdings, Meher season)*. Addis Ababa: Central Statistics Agency (CSA), Ethiopia.

Most of the crop production in Ethiopia's highlands takes place in the *mehrer* season, with planting at the time of the onset of rains in May and June and harvesting in November and December. The surge in world fertilizer prices may therefore have a major effect on fertilizer use and agricultural productivity for much of Ethiopia in 2022. Production of the much smaller *belg* season crops, concentrated in the eastern highlands with harvests in June and July, may be less affected this year, however. Very little crop production takes place in the pastoral regions of eastern Ethiopia, where livestock are the major source of agricultural income.

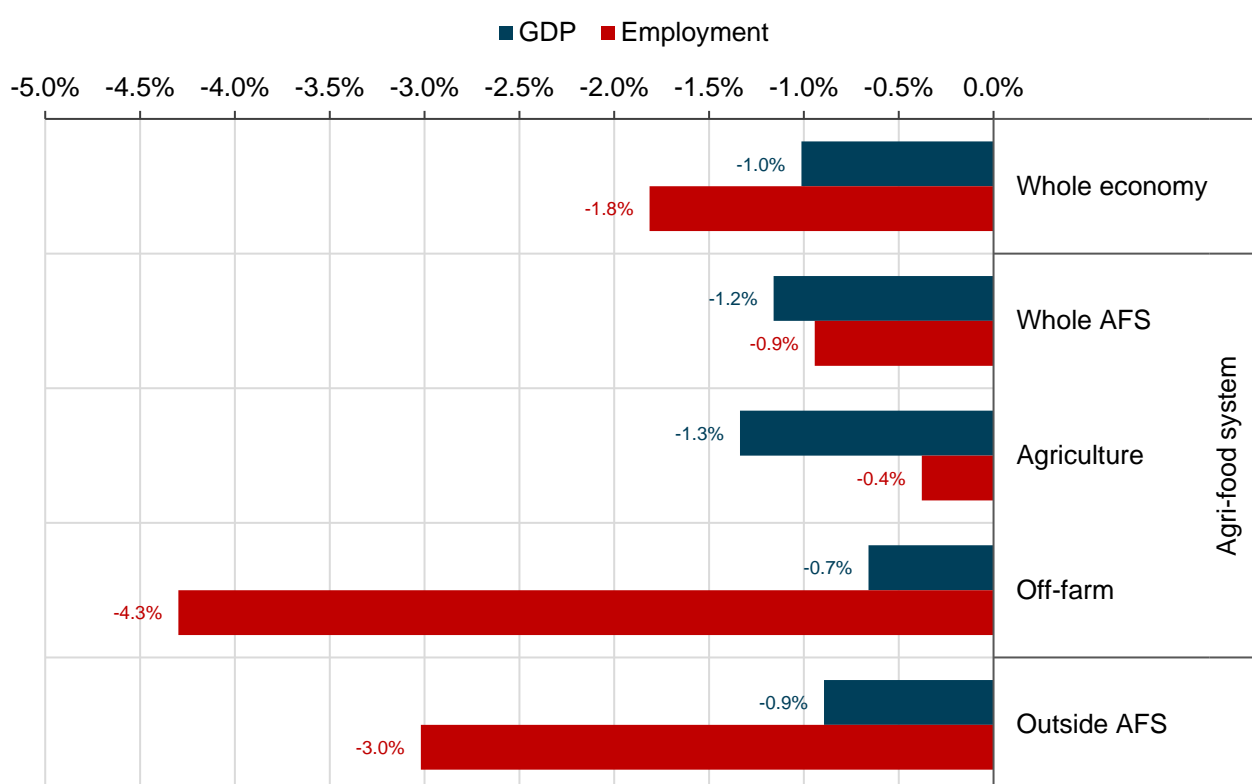
We simulate the effects of both higher world prices (recall Figure 1) and the potential productivity losses from reduced fertilizer use in the current growing season. Simulation results should be interpreted as "medium-term" impacts; that is, after the immediate spillover effects across sectors and households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

The effects of the world price and fertilizer shocks on GDP and employment are significant.

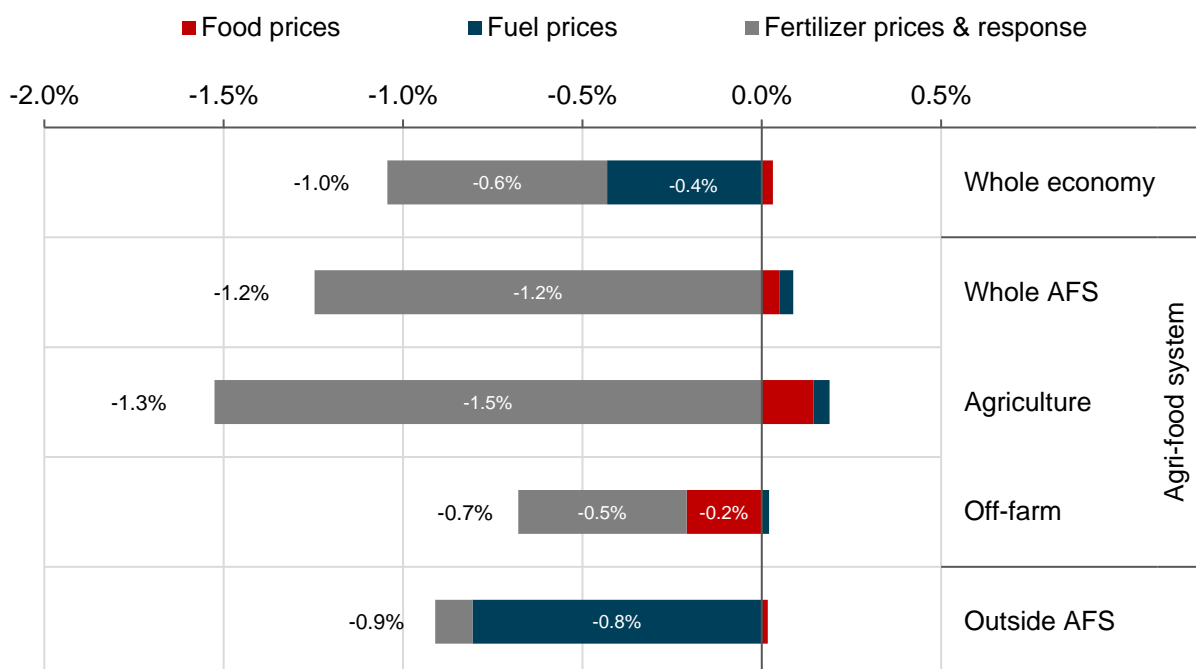
Real GDP falls by 1.0 percent due to the combined effects of the negative terms-of-trade shock (that is, the negative effect of higher import prices outweighs the positive effects of higher export prices) and rising import costs that reduce spending on domestically produced goods (Figure 6). Employment also declines by 1.8 percent, as falling production leads to job losses. The percentage decline in agricultural GDP is larger than the decline in total GDP, and given the large size of the agriculture sector, this accounts for about 50 percent of total GDP losses in the country. Employment falls mainly in the off-farm sectors of the agrifood system, with job losses concentrated in food processing and 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 Ethiopia RIAPA model.

Fertilizer and fuel shocks drive the decline in national GDP. Fertilizer shocks, including reduced fertilizer use in response to higher prices, accounts for two-thirds (or 0.6 percentage points) of the total fall in real GDP, with fuel shocks accounting for the remaining one-third (Figure 7). Agrifood GDP losses are all driven by fertilizer shocks, which directly affect primary agricultural production and cause disruptions in downstream supply chains. Off-farm GDP within the agrifood system is also affected by the higher food prices that increase costs of food processing and food-related services, while impact from the fertilizer shocks still predominates. 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.

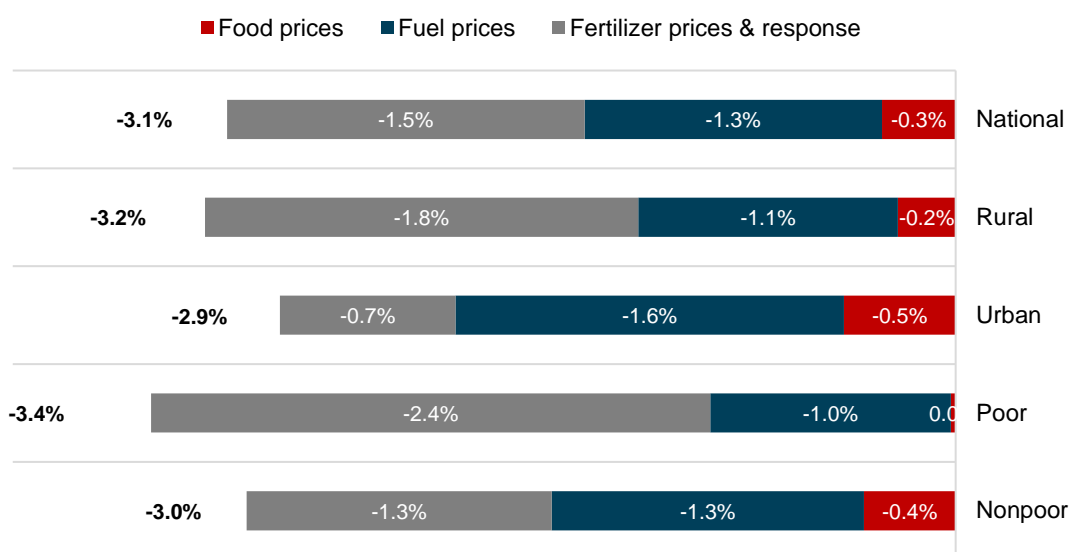
Figure 7. Percentage change in real GDP decomposed by food, fuel, and fertilizer shocks

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

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

Household consumption falls, with larger losses for poorer and rural households. National consumption spending, including the value of home consumption, falls by 3.1 percent (Figure 8). The percentage decline in consumption is much larger than that of GDP because households are hit twice, by rising prices and falling incomes. Moreover, food accounts for a much larger share of household consumption than of GDP. Most of the decline in consumption is driven by the fertilizer shock, which accounts for 50 percent of the absolute decline in household consumption. However, the impact of rising food prices on household consumption is much larger than on GDP, accounting for 10 percent (or 0.3 percentage points) of total decline in consumption. There are important differences 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 following the increase in fertilizer prices but less affected by higher food prices, as they mainly consume locally produced foods, including crops grown for their own consumption. Poor households, including those in urban areas, are also affected by the indirect effects of the fertilizer shock on food supply, as reductions in agricultural income lead to reduced income in nonfarm sectors as well. On the other hand, the impact of rising food prices on urban consumption is much larger than on rural consumption, accounting for 0.5 percentage points of decline in urban consumption because imported foods are mainly consumed by urban households.

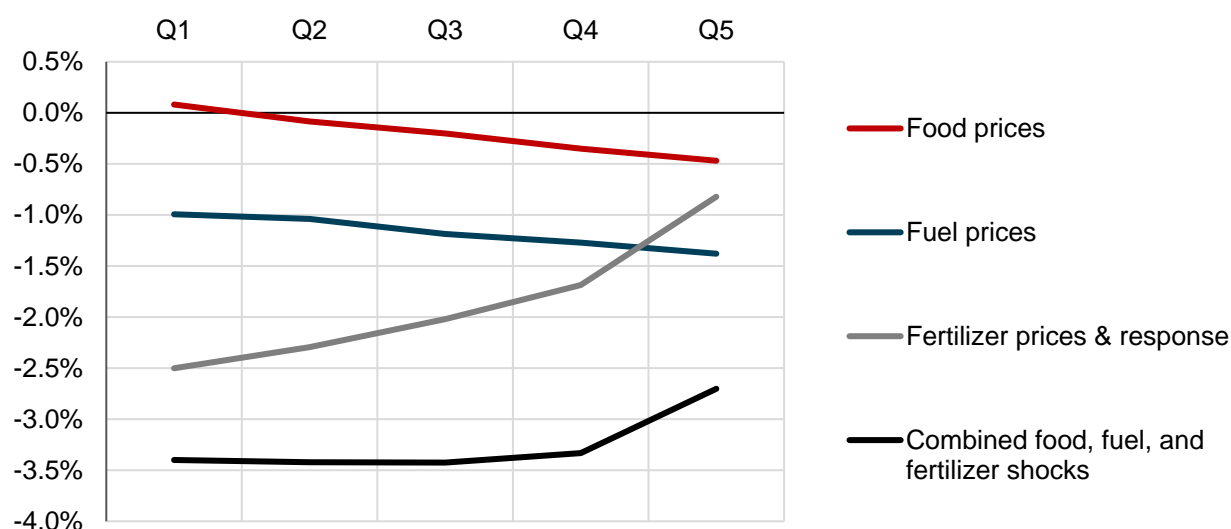
Figure 8. Percentage change in real household consumption due to food, fuel, and fertilizer shocks



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

Inequality worsens, although all households are adversely affected. The food, fuel, and fertilizer shocks have different implications for (income) inequality in Ethiopia. The increase in fuel prices leads to larger consumption losses for households in the fifth quintile, compared to poorer households in the first 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 negative impact of higher world food prices is modest across different income groups, with no impact on the first quintile households. Overall, the combined effect of the world price shocks is driven by the fertilizer shocks, leading to similar declines in consumption for households in the first four quintiles, with a smaller decline for the richest quintile. The result of the global crises is therefore an increase in inequality within Ethiopia.

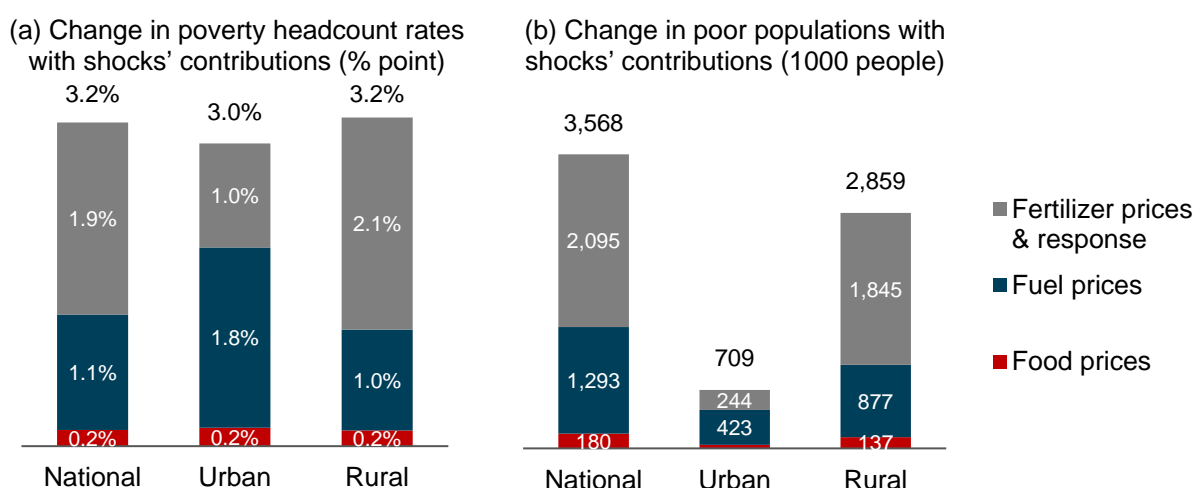
Figure 9. Percentage change in real household consumption across per capita expenditure quintiles



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

Falling household consumption leads to greater poverty, particularly in rural areas. According to the most recent household survey in Ethiopia, about 30 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 Ethiopia by 3.2 percentage points (Panel A in Figure 10), equivalent to an additional 3.6 million people falling below the poverty line (Panel B). Two-thirds of the increase in poverty is caused by the fertilizer shock. This is consistent with the consumption changes for poor households in Figure 8. Impacts on rural poverty rates are larger because of larger impacts from fertilizer shocks on rural farmers. The largest absolute increase in the poor population is in rural areas, although this partly reflects Ethiopia's smaller urban population and lower initial urban poverty rate.

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



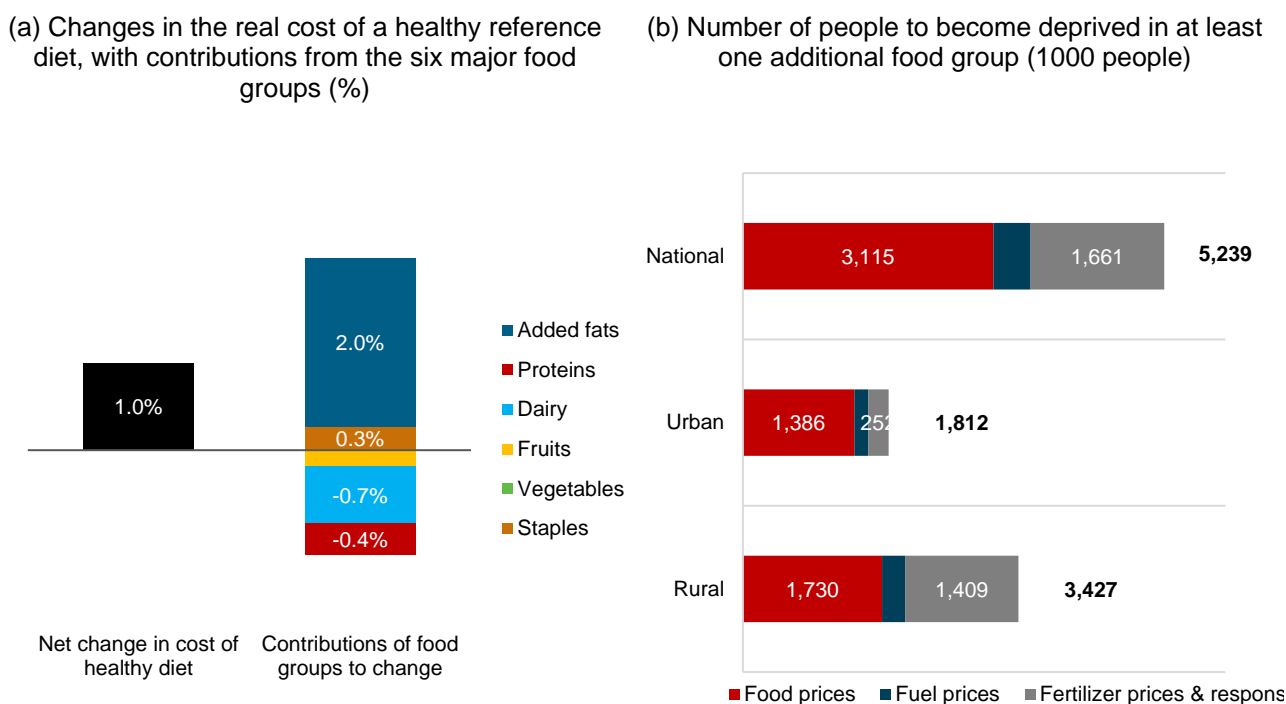
Source: Simulation results from the survey-based microsimulation module within IFPRI's Ethiopia RIAPA model.

The cost of a healthy diet increases for Ethiopian households. The model tracks changes in the cost of a “healthy” reference diet (CoRD) with six food crops as defined by the EAT-Lancet Commission.⁶ The combined food, fuel, and fertilizer shocks increase the CoRD by 1.0 percent in real terms (Panel A in Figure 11).⁷ This is mainly due to the rising cost of edible oils within the “added fats” food group and wheat within the “staples” food group, whose domestic prices are influenced by rising import prices. On the other hand, falling household income reduces demand for fruits, dairy products, and proteins (meats and fish), and thus, lowers their costs slightly. The “staples” food group is dominated by cereals other than wheat and root crops and is only modestly affected by higher wheat import prices. Moreover, staples currently dominate household consumption, mainly due to cereals, but achieving the diversity of the healthy reference diet requires a relative decline in the share of cereals in the average household diet. As such, the increase in wheat prices has only a modest contribution to the changing cost of a healthy diet. On the other hand, consumption levels of fruits, dairy products, and meats and fish are far below the required level for a healthy diet among many households in Ethiopia. The falling costs of these food groups masks households' deteriorating access to these foods due to falling income.

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

⁷ 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 a healthy diet include: staples (9.8 percent), vegetables (11.1), fruits (16.0), dairy (23.0), proteins (30.3), and added fats (9.7).

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 Ethiopia RIAPA model.

Diet quality worsens for many households. The survey-based micro-simulation tool also measures the number of people with deteriorated 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 Ethiopia. Rising food and fertilizer prices cause 5.2 million people to become deprived in at least one additional food group. The rural population accounts for more people (3.4 million) with a deterioration in their 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 Ethiopia'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 GDP and employment in Ethiopia to contract. 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 edibles oils are rising, Ethiopia is less dependent on food imports and many of its major food staples (including teff and sorghum) are not traded internationally in large volumes. 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 and fuel prices, reduced fertilizer use, and lower agricultural productivity.

Overall, national household consumption falls. Impacts are larger on poorer and rural households, leading to an increase in inequality in Ethiopia. That said, 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 Ethiopian households, and the gap between household consumption levels and what is required to achieve a healthy diet widens. While the global crises will cause a modest slowdown in Ethiopia'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 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 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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