



ZEF POLICY BRIEF NO 42

The global food crisis will not be over when international prices are back to normal

Lukas Kornher and Joachim von Braun
Center for Development Research, University of Bonn

Summary:

- Since 2017, the prevalence and absolute number of undernourished people have been increasing. While much of the recent surge in global food prices can be attributed to the COVID-19 pandemic and the Russian invasion of Ukraine, the food security crisis will not be over when prices come down to pre-COVID levels.
- Domestic food price inflation is what matters for the undernourished and those at risk to become food insecure. Average food prices saw an unprecedented 15% increase toward the end of 2022 — and much higher levels in many countries. The causes are complex and influenced by macroeconomic and exchange rate factors, debts, climate stress (droughts and floods) and conflicts, and partly related to international price movements.
- The global economy has still not recovered from the economic decline during the COVID-19 pandemic. Public spending to mitigate the consequences of the pandemic increased short-term borrowing and indebtedness causing macroeconomic turbulences. The debt crisis needs to be addressed by international financial institutions at scale (i.e., by issuing and sharing Special Drawing Rights to guarantee liquidity and by implementing well designed debt relief programs).
- The increase in food, fertilizer, and energy prices began before the Russian invasion of Ukraine. Price expectations and economic sanctions on Russia and its ally Belarus have created additional shortages in global fertilizer markets. Decreased fertilizer usage in Africa by 20% and in many other countries may cause significant production shortfalls, causing further threats to food security in some low and middle income countries (LMICs). Political coordination, such as the Black Sea Initiative, to keep grain and fertilizer trade open, is needed to increase availability.
- The global food crisis also requires longer term actions. These include food security and nutrition programs and agricultural trade and development policies to reduce the suffering of people and pressure on markets. More fundamentally, a redesign of the ongoing follow-up to the UN Food Systems Summit 2021 is called for. This could provide a global response to the food crisis and ensure global food systems reform issues on the agenda, in addition to the national pathways of food systems transformations.

Problem statement

In 2015, years of encouraging progress made toward reducing the number of undernourished people globally began to stagnate and, by 2018, undernourishment numbers began to rise. This trend was reinforced by the global COVID-19 pandemic, which led to an increase in hunger by 150 million since the outbreak of the pandemic. Supply shortages in international grain and vegetable oil markets, as a direct consequence of the Russian invasion and Ukraine's inability to export, as well as **high international food prices in the first half of 2022 have worsened the global food situation and likely contributed to global hunger increases.**

International food price levels and volatility have risen significantly since the beginning of the COVID-19 pandemic. Therefore, at the beginning of 2022, global food markets were already under stress, although the supply situation appeared favorable. Global grain inventories were around 24% of the total supply at the start of 2020, as compared to 18% before the 2008 price crisis, of which China held about half.

The Russian invasion of Ukraine in March 2022 significantly exacerbated the anticipated supply shortages across the globe and has led to significant disturbances in global food markets. The importance of Ukraine and Russia for international commodity

markets is reflected by this year's movements of international wheat and maize prices (Fig. 1) that were strongly linked to changes in expectations about the future grain supply. Now, that international prices have come down. This brief re-assesses the current situation in global food markets and related impacts on food security.

Causes and consequences of a prolonged crisis

Pressure from international food markets comes down

Rising international food and energy prices have increased inflationary pressure all around the world.

For instance, the price of wheat rose from U\$214/ton to about U\$400/ton, the price of rice from U\$441/ton climbed to about U\$550/ton, and the price of maize rose from about U\$150/ton to over U\$300/ton at some point in 2021 as compared to pre-COVID levels. The food price increase was largely caused by higher production costs (i.e., fertilizer and energy prices) that were transmitted to consumer prices because both the demand for and supply of food are relatively price unresponsive. This price spike was exacerbated by panic purchases, the shift from commercial buyers to public emergency purchases, and private stockpiling.¹ In addition, market closures and other lockdown

measures as well as local market risks caused additional costs for market intermediaries, which contributed to dysfunctional markets and local price increases.²

In early March 2022, during the first days of the Russian invasion, wheat and maize prices jumped by close to 50% within just a few days. Ukraine and Russia are both major exporters of



FIGURE 1: The evolution of the global food crisis in 2022

Data source: Authors' illustration.

agricultural goods. They accounted for 30% of wheat and 15% of maize exports and more than 50% of sunflower oil exports before the crisis. Additionally, the World Food Program typically stocks half of its grain reserves from Ukraine. Russia and its ally Belarus are also the top two exporters of fertilizer products.

In the second half of 2022, international grain prices returned to the levels seen at the beginning of the year. This development was caused by the relaxation of international supply shortages through Ukrainian exports as part of the Black Sea Initiative and overland as well as the constant Russian export outflows. Overall, based on Comtrade estimates, Ukrainian maize exports in 2022 were close to the 2021 level, but wheat exports ran significantly below 2021 levels. This is because Ukrainian wheat production is concentrated in the Eastern part of the country.³ Nevertheless, military actions have and will continue to adversely affect Ukraine’s agricultural (export) capacity. On the other hand, maize and wheat prices are still significantly higher than before the COVID-19 pandemic. **The Ukrainian war has unearthed new problems and reinforced old ones in the global food system related to both the availability and distribution of food.**

Headline inflation is not coming down

Domestic food price inflation was triggered by international price movements, but the causes of inflation are complex. The direct vulnerability to international food price shocks increases with a country’s food import dependency. Specifically, higher international prices translate directly into an increasing food import bill. Therefore, international food price shocks, amplified by local climate and economic shocks and conflicts, have led to significant increases in domestic food price inflation across local markets in LMICs and High Income Countries (HICs). Domestic food price inflation usually responds to international price spikes with a time lag, dependent on a country’s integration into international supply chains. This is also indicative in the development of domestic food price inflation levels over the last 24 months (Figure 2). Domestic food price inflation

started to increase globally before March 2022 but has reached unprecedented levels since then without having a slowdown in view.

The global food system is a web of trade relations between food-exporting and food-importing countries. Trade linkages reduce the dependence of importing countries on local weather patterns and increase consumption options for consumers. However, the connection between international and domestic markets also creates vulnerabilities to global food price dynamics because numerous global actors are involved in the food market and exchange. Many of the world’s food insecure countries are highly import dependent, particularly small states and islands and several Middle Eastern and African economies. These countries have been most affected by the Russian invasion of Ukraine.⁴ Food import dependency is not equivalent to food insecurity. Rather, food import dependency is the direct outcome of a country’s productive capacity and natural endowment with agricultural resources.



FIGURE 2: Median values of domestic price inflation since 2020
Data source: IMF 2022.

Climate change and conflicts are the two other main drivers of domestic inflation. In 2022, extreme weather events destroyed harvests and livelihoods in several LMICs. Most notably in terms of the number of affected people and casualties were floods in Pakistan, Guatemala, Bangladesh, and Nigeria, as well as droughts in Ethiopia, Niger, and China.⁵ Conflicts,

which are strongly linked to climate change and economic opportunities, break supply chains and reduce the availability of inputs and income. Additionally, migration flows stress receiving countries that are often themselves food insecure and constrained. Therefore, stable international food prices will reduce the pressure for import dependent countries, but bringing down domestic inflation requires a more comprehensive food systems approach.

Fertilizer prices are at record highs

Global fertilizer prices reached record levels in 2022, which reduced availability for farmers in LMICs. Since January 2021, prices of NPK (nitrogen, phosphorus, and potassium), potassium, and phosphate rock have more than doubled, whereas prices of DAP (di-ammonium phosphate) and TSP (triple super-phosphate) have increased by 58% and 74%, respectively. The significant part of the price increase of DAP, TSP, and NPK occurred after the second quarter of 2021. This was caused by a rise in freight rates and natural gas prices. Besides, trade restrictions, for instance by China, triggered price increases before March 2022.

The natural resources of all chemical fertilizer products are geographically concentrated. Russia, its ally Belarus, and China account for a significant share of global fertilizer exports (i.e., 50% of potassium and 30% of nitrogen). The potassium market is the most concentrated with over 60% of the reserve located in three countries in the northern hemisphere (Russia, Belarus, and Canada). Therefore, the Russian invasion of Ukraine and the economic sanctions imposed on Russia and Belarus have put additional pressure on global fertilizer markets. Phosphate rock mainly exists in China, West Sahara, the US, and Russia. The leading nitrogen fertilizers (i.e., urea and ammonium nitrate), are produced from and with natural gas. Natural gas resources are more evenly spread across different countries, but high energy prices increase the competition for fertilizer production.

The distribution of natural resources needed for chemical fertilizer makes local production difficult and increases import dependency. Limited local production is partly responsible for high fertilizer prices and low rates of adoption in many LMICs, particularly in Africa where the green revolution has been halted.⁶ Due to the high level of fertilizer import dependency, domestic fertilizer prices also move

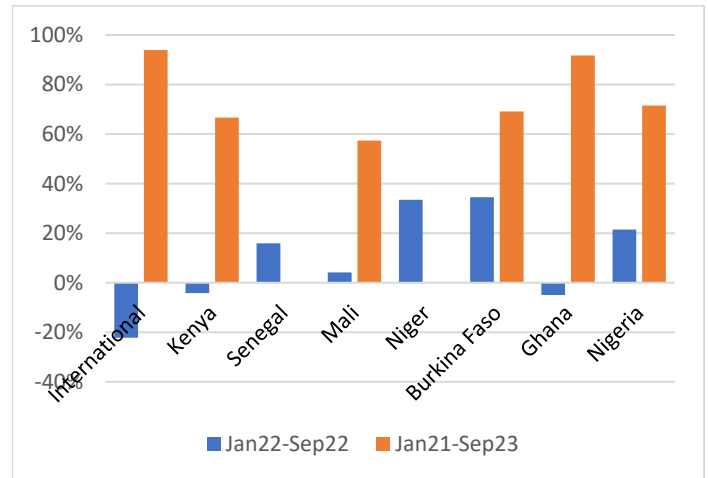


FIGURE 3: Urea price change in selected African countries
Data source: *Africafertilizer 2022.*

alongside international prices, which also caused a significant increase in local fertilizer prices in Africa (Figure 3).

The consequence of increasing fertilizer prices on LMICs, especially in African countries, is not immediate, but reduced fertilizer use leads to lower yields and production in the coming years. For most countries and crops, it is estimated that fertilizer use could reduce by about 20%.⁷ Reduced fertilizer use has two important effects. Production effects of reduced fertilizer use are accompanied by general equilibrium/macro-economic effects and subsequent lower agricultural output. This could lead to reductions in agricultural output by 3%-8% and overall GDP by 1%-3% annually for several African countries.⁸

Agricultural productivity and food supply in Africa are much more responsive to fertilizer application rates than in other regions. Fertilizer use and crop yields have grown in parallel over the past decades, but application rates in Africa have remained distinctly low, at about 20 kg per hectare, whereas Europe is at about 90 kg and Asia at about 180 kg.⁹ The overuse of fertilizer in North America, Europe, and South Asia has created large nutrient surpluses associated with environmental pollution contrasted with soil nutrient depletion in Africa.¹⁰ Due to these differences, agricultural yields and food production are much more responsive to fertilizer use in Africa than in other regions of the world (Figure 4). As a result, a 20% reduction in fertilizer use would have significant consequences for local food production and hunger in these countries.

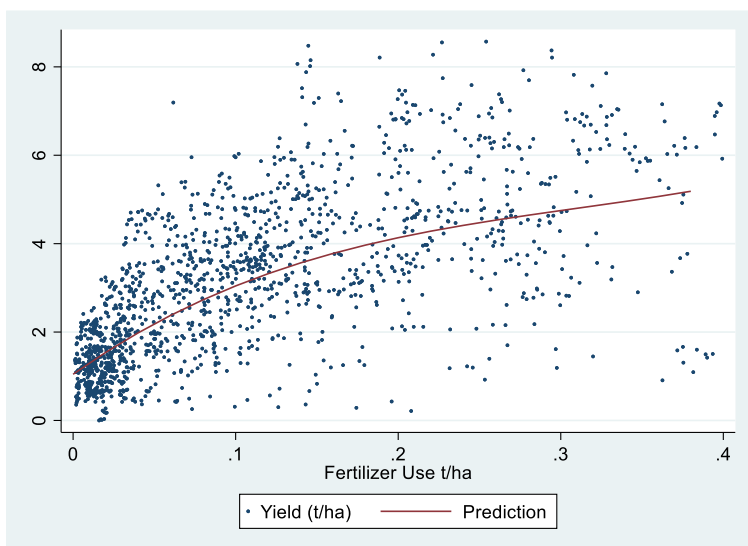


FIGURE 4: Global fertilizer response function.

Data source: Authors' illustration based on USDA and FAOSTAT 2022..

Macroeconomic instability exacerbates the crisis

The economic consequences of the COVID-19 pandemic on LMICs are unprecedented and many countries have not recovered. Global GDP declined by more than 3.7% in 2020. Employment in many LMICs, especially in the informal sector, dramatically decreased and remittances — an important factor for livelihoods and economic stability — sharply dropped by 25% in sub-Saharan Africa.¹¹ The global food crisis will create significant additional fiscal and economic

costs. The international community, particularly the international financial institutions, is asked to provide a supporting role in this, incl. humanitarian and financial assistance, as well as policy advice and capacity building.¹²

These effects are mostly the result of domestic demand reductions as well as global spillovers through tourism and export losses. Data also suggests a strong decline in (foreign direct) investment by more than 50% in 2020.¹³ For Africa, economic growth was more than 8% lower than it would have been without COVID-19.¹⁴ Increased investments in social protection programs also added pressure to African economies and contributed to an overall fiscal deficit expansion to about 6.5%. However, in many LMICs the economic recovery from the COVID crisis is slow. In almost half of the global economies, growth rates lag behind pre-COVID levels.¹⁵

These macroeconomic turbulences increase inflationary pressure, particularly when expansive monetary policy is the response. This, in turn, can cause domestic economic crises that further reduce incomes and endanger progress in the fight against global hunger, and render mitigation policies (i.e., social protection responses) difficult.

What has been done and what needs to be done?

The international community and governments around the world were alarmed by the Russian invasion of Ukraine in February 2022. The G7 has emphasized its commitment to the achievement of the SDGs, including food security, and launched the Global Alliance for Food Security in May 2022 to coordinate the fight against global hunger in face of a looming crisis. This initiative has made additional emergency support available. Its longer-term effectiveness to make the international agri-food system more resilient needs to be seen.

The G7 and EU urged the international community to keep food markets open have engaged in finding solutions to enable Ukraine grain exports via land and

alternative sea routes, after Ukraine's Black Sea ports were blocked, and later through the Black Sea Grain Initiative. On the other hand, the G7 and several allies, have imposed economic sanctions on Russia and Belarus. But while these sanctions did carve out food and fertilizer products, sanctions on the banking and insurance industry and individual firms made trade more difficult and expensive.¹⁶ Furthermore, blocking Belarus from using Baltic Sea ports and the difficulty in insure Black Sea shipments from Russia had, at times, adverse side effects of economic sanctions.

A broader engagement, including the G20 and UN is needed, to tackle the international food crisis. Unlike the G7, G20 countries include major exporting and importing countries, such as Argentina, Australia, Brazil, India, China, and Russia, and, therefore, is likely the more appropriate forum to discuss the global food situation. For instance, Argentina and India implemented restrictions on wheat export in 2022 despite the international community's appeal not to do so. On the other hand, China's import policy and public stockholding also have a major influence on international food markets. The Black Sea Grain Initiative, which has shipped 12 million tons of grain — about half to developing countries — since July 2022, came to an agreement between Russia and Ukraine facilitated by Turkey and the UN. In addition, however, the global food system needs governance reforms. This should be considered as part of the agenda of the ongoing follow up to the UN Food Systems Summit that took place in 2021.¹⁷ It did not sufficiently address food crises issues and global system reform opportunities. Crisis mitigation could be helped by closer alignment among the Rome-based UN food agencies — the Food and Agriculture Organization (FAO), the World Food Programme (WFP), and the International Fund for Agricultural Development (IFAD) — and the World Trade Organization (WTO), supported by the Agricultural Market Information System (AMIS). AMIS provides regular information to the public and biannually among key countries at the Global Food Market Information Group, which has proven to be essential to avoid market over-reactions and keep markets open.

EU policy responses have provided short-term support to production and exports of Ukraine grain but need to address broader food system issues in the long-run. The EU supported the transport of Ukraine grain export by railway and alternative sea routes, and the supply of Ukrainian farmers with agricultural inputs, such as seeds, fertilizer, and machinery for the next marketing season. In addition, the EU has agreed to financially contribute to the Grain from Ukraine program to support food-deficient countries. The EU's temporary short-term derogation of agricultural policy rules that allow European farmers to cultivate on unproductive fallow land is expected to have only modest effects on global markets.¹⁸ Greater effects can be expected by the reduction of land use for energy crops and feed, which are in direct land competition with food crops. EU biofuel consumption already accounts for 5-9 million ha of cropland, and EU plans could increase bioenergy land use to a fifth of EU crop land.¹⁹ Meat and dairy production claim more than half of the EU's agricultural land.²⁰ EU Policy must provide instruments to incentivize demand changes in the EU to reduce the pressure on the global food system.

Conclusions and recommendations

The current situation requires immediate policy responses as well as long-term changes and transformation of the global food system.

Immediate responses include:

- Improve the short-run functioning of the global food market through political coordination at the G20 and UN levels (i.e., keep food and fertilizer markets open to avoid the direct or indirect impact of economic sanctions on the food security of third countries).
- Rome-based food agencies, the WTO, and the AMIS should be strengthened to increase market transparency, trade functioning, and policy coordination.
- Emergency programs should be established to increase fertilizer availability in LMICs.
- Increase debt relief, food aid, and budget support to expand social protection, including scaling humanitarian actions in and around hunger-prone zones impacted by climate crises and conflicts.

Long-term responses include:

- Strengthening sustainable productivity growth, and sustainable land use, especially in low-income countries, with technologies and innovations.
- Improve the allocative efficiency of fertilizer usage by increasing fertilizer availability in Africa through local production, increasing nutrient efficiency worldwide, and the expansion of sustainable soil and land use. The latter is called for from a climate policy perspective in any case.
- Restructure the global food system (without counteracting environmental and climate goals) by disincentivizing the demand for bioenergy and meat in high income countries to expand food production and availability.
- Redesign the ongoing follow-up to the UN Food Systems Summit 2021 to add global food crises response and global food systems reform issues to the UN agenda, in addition to national pathways of food systems transformations.

Endnotes

¹ Kornher and von Braun 2022. Higher and more volatile food prices – complex implications of the Ukraine war and the Covid-19 pandemic. ZEF Policy Brief 38.

² Kornher, Raijkhwa, Usman 2022. The association between the Covid-19 pandemic and food price increases: how important is market integration? IAMO Forum 2022. Conference Paper.

³ IGC 2023. Databank: Ukraine. Summary of grains and oilseeds production and exports in Ukraine. Available at: <https://www.igc.int/en/downloads/2022/gen2122misc1.pdf>

⁴ Gay, Frezal, Adenauer 2022. The impacts and policy implications of Russia's aggression against Ukraine on agricultural markets. OECD Ukraine-hub. Available at: <https://www.oecd.org/ukraine-hub/policy-responses/the-impacts-and-policy-implications-of-russia-s-aggression-against-ukraine-on-agricultural-markets-0030a4cd/>

⁵ Guha-Sapir, Below, Hoyois - EM-DAT: The CRED/OFDA International Disaster Database – www.emdat.be – Université Catholique de Louvain – Brussels – Belgium.

⁶ See ZEF research on From Potentials to Reality: Transforming Africa's food production (Baumüller et al. 2020)

⁷ Badiane, Fofana, Sall, Tefera 2022. Agricultural Productivity and Growth Effects of Fertilizer Sector Disruptions. AKADEMIYA2063 Ukraine Crisis Brief Series, No. 003., AKADEMIYA2063, Kigali, Rwanda.

⁸ Badiane, Fofana, Sall, Tefera 2022. Agricultural Productivity and Growth Effects of Fertilizer Sector Disruptions. AKADEMIYA2063 Ukraine Crisis Brief Series, No. 003., AKADEMIYA2063, Kigali, Rwanda.

⁹ FAOSTAT 2023. Land, Inputs, Sustainability.

¹⁰ Doberman et al. 2021. A new paradigm for plant nutrition. Food Systems Summit Brief prepared by Research Partners of the Scientific Group for the Food Systems Summit February 10, 2021. Available at: https://sc-fss2021.org/wp-content/uploads/2021/03/FSS_Brief_New_Paradigm_for_Plant_Nutrition.pdf

¹¹ Usman et al. 2022. The Effect of COVID-19 and Associated Lockdown Measures on Household Consumption, Income, and Employment: Evidence from sub-Saharan African Countries, ZEF Working Paper 218 and Ratha, Dilip K.; De, Supriyo; Kim, Eung Ju; Plaza, Sonia; Seshan, Ganesh Kumar; Yameogo, Nadege Desiree. COVID-19 Crisis Through a

Migration Lens (English). Migration and Development Brief, no. 32 Washington, D.C. : World Bank Group. <http://documents.worldbank.org/curated/en/989721587512418006/COVID-19-Crisis-Through-a-Migration-Lens>.

¹² Rother et al. 2022. Tackling the Global Food Crisis: Impact, Policy Response, and the Role of the IMF.

¹³ Lakemann, Lay, Tafesse 2020. Africa after the Covid-19 lockdowns: Economic impacts and prospects. GIGA Fokus Africa No. 6.

¹⁴ UNECA 2020. Macroeconomic impact of COVID-19 on Africa. Evidence from an Africa-wide aggregate macroeconometric model. UNECA Working Paper Series.

¹⁵ IMF 2023. IMF Global Debt Database.

¹⁶ Glauber and Laborde 2022. How sanctions on Russia and Belarus are impacting exports of agricultural products and fertilizer. IFPRI Blog Post. Available at: <https://www.ifpri.org/blog/how-sanctions-russia-and-belarus-are-impacting-exports-agricultural-products-and-fertilizer>

¹⁷ Von Braun, Afsana, Fresco, Hassan (Ed.) 2023. Science and innovations for food system transformation. Springer, Berlin.

¹⁸ Luckmann, Chemnitz, Luckmann 2022. Effects of a change to fallow land in the EU on the global grain market. Policy Paper, Heinrich Böll Stiftung.

¹⁹ Searchinger, James, Dumas, Kastner, Wirsenius 2022. EU climate plan sacrifices carbon storage and biodiversity for bioenergy. Nature 612.

²⁰ USDA 2023. PDS Online. USDA Foreign Agricultural Service.

This Policy Brief was developed with the financial support of the German Federal Ministry for Economic Cooperation and Development (BMZ) in the context of the research program “Volatility of Food Markets” <https://www.zef.de/volatility.html>.

IMPRINT:

Center for Development Research (ZEF)
Genscherallee 3 | 53113 Bonn | Germany
E-Mail: presse.zef@uni-bonn.de
Phone: +49-(0)228 - 73 18 46

January 2023



 zefbonn
 zefunibonn
 zefbonn
 zefbonn
www.zef.de