

# The Role of the Invasion of Ukraine in the 2022 Food Supply Crisis

Record high 2022 food prices have led to a food security crisis which has left vulnerable people struggling to pay for sustenance. The Russian invasion of Ukraine has exacerbated shocks to supply and demand that occurred during and after the Covid-19 pandemic. Global demand for food is booming, but global supply is unable to keep up, resulting in price rises which most affect those least able to afford them. This policy brief assesses the role of the invasion of Ukraine in the food crisis and examines three key commodities most affected by the invasion and subsequent sanctions – wheat, sunflower oil and fertilizer.

## Brief Points

- There was record high trade in food during 2021. However, soaring consumption led to rising prices.
- The blockade by Russia has prevented Ukraine from exporting crops by sea, and it lacks the capacity to export most of its harvest by rail.
- Global consumption of wheat in 2022 is projected to exceed production, with the difference being made up from stocks. Global stockpiles are about 30 times larger than the 2022 shortfall, half of which are held by China.
- Vegetable oil supply has been hit hard by both the invasion and extreme weather.
- Record prices for fertilizer have been due to the effects of sanctions as well as extreme weather and high prices for natural gas and coal.

Nicholas Marsh *Peace Research Institute Oslo (PRIO)*

Ida Rudolfson *Peace Research Institute Oslo (PRIO)*

## Decreased Agricultural Production and Exports from Ukraine

Russia's invasion of Ukraine has led to a loss of agricultural production. Approximately 40 per cent of Ukraine's 2021 harvest of winter wheat was located in provinces affected by the fighting in spring 2022, which affected planted areas in the south and east of the country. Spring planted wheat has a different distribution and about 28 per cent of 2021 production was located in provinces where fighting has taken place during 2022. Many areas of some of these provinces are, in June 2022, still occupied by Russian troops. In areas that aren't currently occupied, the fighting has caused the death, injury or displacement of people who worked on the land, the destruction of buildings and agricultural equipment, and interruption of supplies of electricity and water. The presence of mines and explosive remnants of war prevents access to the fields, as do the risks of being targeted by Russian air or artillery strikes, and the destruction of roads and bridges. Indirect effects of the invasion include shortages of fuel, crop protection products and fertilizers.

Official Ukrainian statistics and estimates published on 20 May 2022 indicate that the area of land planted with spring crops would be about 25 per cent lower than pre-war forecasts, with the planted area of spring wheat being 90% of the 2021 level, but sunflower being only 60 per cent. In the war-affected regions of Chernihiv, Sumy and Kyiv it was estimated that 60–70 per cent of the pre-war forecasted land area would be planted with spring crops, whereas in the

Luhansk, Donetsk, Zaporizhzhya, Mykolaiv and Kherson regions, which were more affected by fighting, only 30–40 per cent would be planted. These government assessments are in accord with an independent analysis of satellite images which suggests that production of spring planted wheat would be 23 per cent below the average of the previous five years.

In May 2022, it was reported that nearly 25 million tonnes of grain and 4 million tonnes of sunflower seed stocks were stuck in Ukraine. This is due to the Russian blockade or capture of Ukrainian ports on the Black Sea and a lack of capacity in infrastructure needed to export grain via road, rail or ports on the Danube river. Prior to Russia's invasion, over 90 per cent of Ukraine's commodity exports were transported by sea. Ukraine has attempted to increase exports by rail, road and river, but these means of transport lack the capacity to replace exports via seaports. During February 2022 (prior to the invasion), Ukraine exported about five million tonnes of grain. Official statistics state that, in April 2022, 921,000 tonnes were transported out of Ukraine, almost all by rail, which constitutes less than a fifth of the February 2022 total.

Ukraine's railway infrastructure has been damaged by the fighting and by deliberate Russian air strikes. Another bottleneck occurs at Ukraine's borders, as its railways use a different gauge than its neighbours to the west. Cargoes have to be unloaded and reloaded into new wagons, or wagons need to be fitted with new wheels. Road transport also lacks

sufficient capacity. One specific problem is that military mobilization has left a shortage of Ukrainian drivers and trucks. Prior to the war, about one third of Ukrainian exports of grain were to the European Union. Germany, Lithuania and Poland have stated that they wish to develop infrastructure for Ukraine to export grain by rail.

The Ukrainian Ministry for Food and Agrarian Policy has stated that it is attempting to increase exports to 1.5 million tonnes per month. Even if that were possible, total exports would only be a third of their pre-war total, and exports to markets beyond Europe would likely be far fewer. Exports are also much more vulnerable to Russian military strikes than production. There are only a handful of land crossings and rail lines with the capacity to handle such large quantities of bulk cargo. Russia has attacked bridges and other parts of the rail infrastructure, and continued attacks upon Ukraine's economy may further affect exports.

## The Role of Russia's Invasion of Ukraine in Global Food Insecurity

### Background: Supply pressure as the world emerged from the Covid-19 pandemic

Food price indexes published by the Food and Agriculture Organization of the United Nations (FAO) and the World Bank show that, after adjusting for inflation, global food prices in the first four months of 2022 were at higher levels than annual averages seen since data

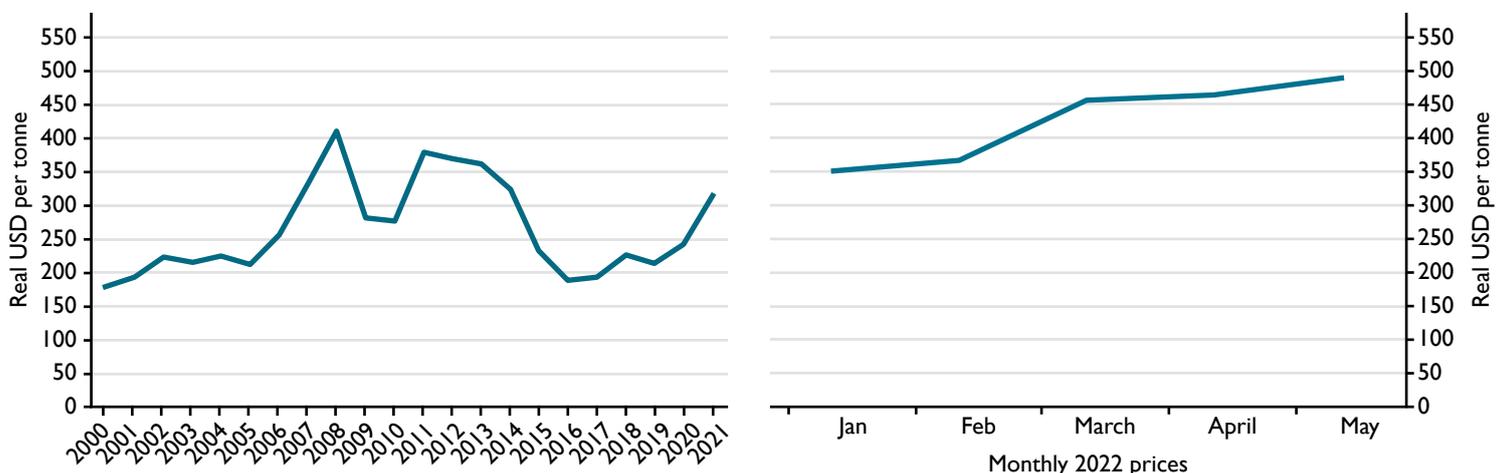


Figure 1: Real global wheat prices per tonne. Source: Authors' analysis of commodity prices collated by the World Bank expressed as 2021 prices

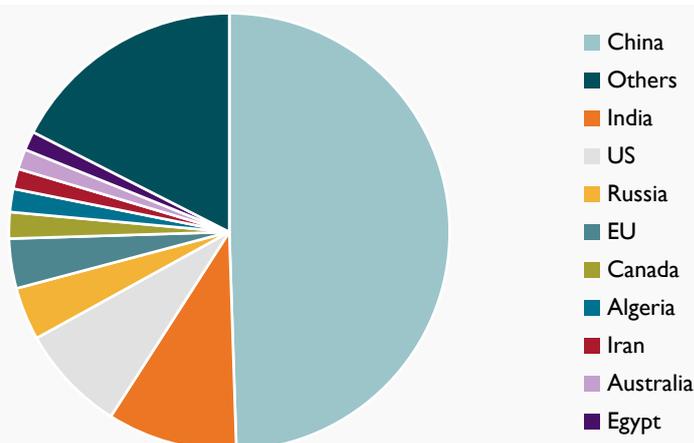


Figure 2: Global wheat stocks at the start of the 2021/2022 season. Source: Authors' analysis of data compiled by the USDA

collection started in 1960. The 2022 food supply crisis has its origins in the Covid-19 pandemic, which led to volatile production and consumption across the global economy. The pandemic had a negative effect upon global consumption during 2020, but global GDP rebounded in 2021 and 2022. In early 2022 the United Nations Conference on Trade and Development (UNCTAD) noted that in 2021 global trade was at record levels, including the trade in food and agricultural products which was 30 per cent higher in the last three months of 2021 compared to the equivalent period prior to the pandemic in 2019. The fundamental problem facing food supplies is that global demand for food and many other products has rebounded and is booming, but global supply is unable to keep up, resulting in shortages and subsequent price rises which most affect those least able to afford them.

High food prices are partly due to trade factors. The increase in the volume of trade was accompanied by significantly higher shipping prices, which in turn had an effect on the price of food and fertilizer (along with many other goods). One response to higher domestic prices for food and fertilizer is for some countries to impose export restrictions (for example, bans, quotas, export tariffs, or export licenses). As of 6 June 2022, twenty-four states had active restrictions on food exports, and six had restrictions on fertilizer exports. Food insecurity among the most vulnerable has been exacerbated by droughts in regions such as the Sahel, Horn of Africa and South Asia, extreme weather which may be caused by climate change.

The remainder of this section looks in detail at global trade in wheat, vegetable oil and fertilizer. It assesses the role of Russia's invasion of Ukraine and subsequent sanctions in explaining the current high prices.

#### Global trade in wheat

Figure 1 shows that 2022 wheat prices are at record high levels. The FAO's index for cereals similarly shows that prices paid during April–May 2022 are higher than in any year since 2004 (the first year of the index).

In 2020, Ukraine accounted for 9 per cent of global wheat exports, and Russia for 19.5 per cent. Data on global wheat production and trade compiled by the International Grains Council (IGC) and US Department of Agriculture (USDA) show that global wheat consumption has exceeded, or is expected to exceed, production during the three growing seasons of 2020/2021, 2021/2022 and 2022/2023. These periods of a shortfall in production feature high prices, with the gap being covered by the release of wheat from stocks. In addition, the USDA predicts that during the 2021/2022 season production of rice and corn will also be lower than consumption (though the IGC is more optimistic and predicts that total production of grains will be almost equal to consumption). Both estimates point to a lack of surplus production of other grains that could be substituted for wheat.

Nevertheless, it is important to note that both the USDA and IGC estimate that 2022 will

feature the highest level of wheat production ever recorded, and the second highest level of exports (eclipsed only by 2021). The USDA similarly estimates that total global supply (a combination of domestic production, stocks and imports) in 2022 will be the second highest year on record, second only to 2021. These estimates were produced after the invasion and take into account its effects. Furthermore, the estimates of the shortfall between global production and consumption for the 2021/2022 season are 9 million tonnes (USDA) or 8.1 million tonnes (IGC). These shortfalls are a small proportion of global estimated wheat stocks at the start of the 2021/2022 season, which are 291.2 million tonnes (USDA) or 278.5 million tonnes (IGC). China has almost half of those stocks, and the ten largest holders of wheat stocks control 83 per cent of the global total (see Figure 2).

#### Global trade in sunflower oil and vegetable oil

Data collected by the World Bank shows that between June 2020 and April 2022 global prices for sunflower oil almost tripled. Using a slightly different timeframe, the FAO's price index shows that global vegetable oil prices increased by 2.75 times from their average during 2019 to the price reported in May 2021, and by that month vegetable oil prices were at their highest level since the index began in 2004.

Similar to wheat, the war in Ukraine has exacerbated pre-existing supply problems with sunflower and vegetable oil. In 2020, Ukraine accounted for 39.2 per cent of global sunflower seed oil, and this trade has been profoundly disrupted by the Russian blockade of Ukraine's ports. Consumers can often substitute between different vegetable oils, and during the 2020/2021 season, sunflower oil comprised just nine per cent of the global market in vegetable oils (other oils being palm oil, soybean oil and rapeseed oil). Supply problems have affected palm oil, globally the most widely used, as the Covid-19 pandemic led to a drop in migrant labour on plantations across Southeast Asia. Extreme heatwaves and droughts have cut production of rapeseed oil in North America and soybean oil in South America. Combined, soaring demand and these production shortfalls have led to record prices.

## Global trade in fertilizer

The World Bank's commodity price index shows that fertilizers almost doubled in price between 2020 and 2021. Further increases occurred after Russia's invasion, with the following price rises occurring between January and April 2022: phosphate rock 44 per cent; diammonium phosphate 36 per cent; triple superphosphate 27 per cent; urea 9 per cent; and potassium chloride 155 per cent. Prices were similar to an earlier spike that occurred in 2008.

As with wheat and vegetable oil, Russia's invasion of Ukraine has exacerbated already rising prices in fertilizer. The trends that started in mid-2020 are as follows. First, natural gas and coal are the main inputs for the production of ammonia-based fertilizers, and in two significant areas for production, natural gas in Europe and coal in China, prices have risen dramatically since mid-2020. Second, export restrictions have been imposed by leading suppliers to control domestic prices, most notably by China and Russia. The restrictions by Russia predate the invasion and were extended in May 2022. Third, higher prices paid for food also increased the demand for fertilizer (as farmers wished to increase production). Fourth, during 2021 a series of hurricanes led to nitrogen and phosphate producers in the United States closing production for several weeks. In addition, there are the consequences of the invasion of Ukraine and economic sanctions directed at Russia and Belarus in 2022 and in previous years. EU sanctions on Belarus restricted exports by the landlocked country via Lithuania and total exports of potash fertilizer in 2021 were about half their 2020 level. Safety concerns have inhibited shipping from Russia's Black Sea ports, and as an indirect result of sanctions international banks and traders have been unwilling to provide services to Russian entities involved in export trade.

## Conclusion

The Russian invasion of Ukraine has exacerbated pressures on the global food supply that have been apparent since the global shocks to supply and demand caused by the Covid-19 pandemic. The 2022 food crisis is as much caused by surging demand as by supply problems such as extreme weather, export restrictions and the invasion. Sufficient stocks of wheat in particular are available globally to meet the 2022 shortfall between demand and supply, though reliance upon stores is not a viable long-term strategy.

There have been high-level discussions of diplomatic or military means to reopen trade from Ukraine's remaining ports. Doing so would help the global food supply crisis. However, such moves should not be expected to solve the world's food supply problems. Russia controls many of Ukraine's ports, and it has attacked the rail infrastructure needed to transport wheat to the ports Ukraine still controls. It may be difficult to find shipping companies and insurers willing to take the risks. It is important that the governments of the world keep international trade flowing as much as possible and resist protectionism. Concerned governments and international organizations should monitor where there are acute shortages or price spikes and target aid to those areas. In order for such monitoring to work, market transparency should be enhanced. If global production cannot be increased in subsequent years, the most effective way to alleviate food insecurity amongst the most vulnerable would be to curb consumption in richer countries. ■

## Sources

The section 'Decreased Agricultural Production and Exports from Ukraine' is based upon information published by: the State Statistics Service of Ukraine; the APK Inform news agency; the geoanalytics company Kayrros; the FAO; Reuters; and the *Financial Times*.

The section 'The Role of Russia's Invasion of Ukraine in Global Food Insecurity' is based upon information published by: the World Bank and FAO on commodity prices (the FAO index dates back to 2004); the USDA and IGC on production consumption and stocks; and the Observatory of Economic Complexity for trade data.

The sub-section 'Background: Supply pressure as the world emerged from the Covid-19 pandemic' is based upon additional information published by: UNCTAD; the International Food Policy Research Institute (IFPRI).

The sub-section 'Global trade in sunflower oil and vegetable oil' is based upon additional information published by Reuters.

The sub-section 'Global trade in fertilizer' is based upon additional information published by: the International Fertilizer Association; the Food Security Portal; Reuters; Interfax; Independent Commodity Intelligence Services.

Further details on all the sources used can be provided by the authors.

## THE AUTHORS

Nicholas Marsh is a Senior Researcher at PRIO. He has worked on many fields, including: trade in strategic goods, security assistance, armed conflict, illicit trafficking, governance and conflict resolution. Ida Rudolfson is a Senior Researcher at PRIO. Her research interests include food insecurity and social conflict, civil society, state repression and autocratization.

## THE PROJECT

The project 'Consequences of the Invasion of Ukraine for the Global South' was set up to provide rapid analysis of the wider effects of the invasion. It is led by PRIO Senior Researcher Nicholas Marsh. The project is funded by Norad and the Ministry of Foreign Affairs of Norway.

## PRIO

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