The impacts and policy implications of Russia's aggression against Ukraine on agricultural markets

Updated 5 August 2022

Figure 4 has been updated with data up to and including 18 July 2022 and Figure 6 has been updated with June 2022 data. The section on International Trade (page 9) has been updated to include information on the 22 July 2022 UN-backed deal signed by Ukraine and Russia to allow grain exports from Ukraine's Black Sea ports.

Key messages

- Russia's aggression against Ukraine has been since February 2022 undermining the latter's capacity to harvest and export crops. Ukraine is the world's largest producer of sunflower seed, as well as a key exporter of wheat, rapeseed, barley, vegetable oil, and maize.
- No major disruption to crop production is anticipated in Russia, but uncertainties exist over its capacity to export, although international sanctions have so far exempted both food and fertilisers. Russia is the world's largest exporter of wheat, and an important exporter of barley and sunflower seed. Russia is also a leading exporter of energy and fertilisers.
- A reduction in export capacity from Ukraine and Russia, and rising energy and fertiliser prices are pushing up international food prices, thereby threatening global food security. Findings presented in this brief suggest that the full loss of Ukraine's capacity to export together with a 50% reduction in Russian wheat export could lead to a 34% increase in international wheat prices in the marketing year 2022/23.
- In the short-term, efforts should focus on providing logistical support to Ukraine to enable agricultural exports. Moreover, international trade in food and fertiliser should remain open to enable the necessary trade adjustments and to prevent the war from amplifying global food insecurity.
- Measures that aim to increase the supply of or reduce the demand for agricultural products should also be considered, but these are more effective in the medium term.

The importance of Ukraine and Russia for global agricultural and input markets

Ukraine and Russia are among the most important producers and exporters of arable crops in the world, particularly of cereals and oilseeds. Production of animal products, however, mainly supplies their domestic markets.

Russia and Ukraine accounted for 10% and 3% of global wheat production on average over the past five years, respectively. Russia and Ukraine are the first and fifth largest wheat exporters, accounting for 20% and 10% of global exports, respectively. Both countries play a critical role in supplying wheat to global markets, including to the Middle East and North Africa region, where wheat is the main staple food (Figure 1).

Ukraine and Russia together account for less than 5% of global maize production, with Ukraine having the largest share. As domestic consumption is limited, most of their production is exported; Ukraine is the third leading exporter of maize to global markets (Figure 1).

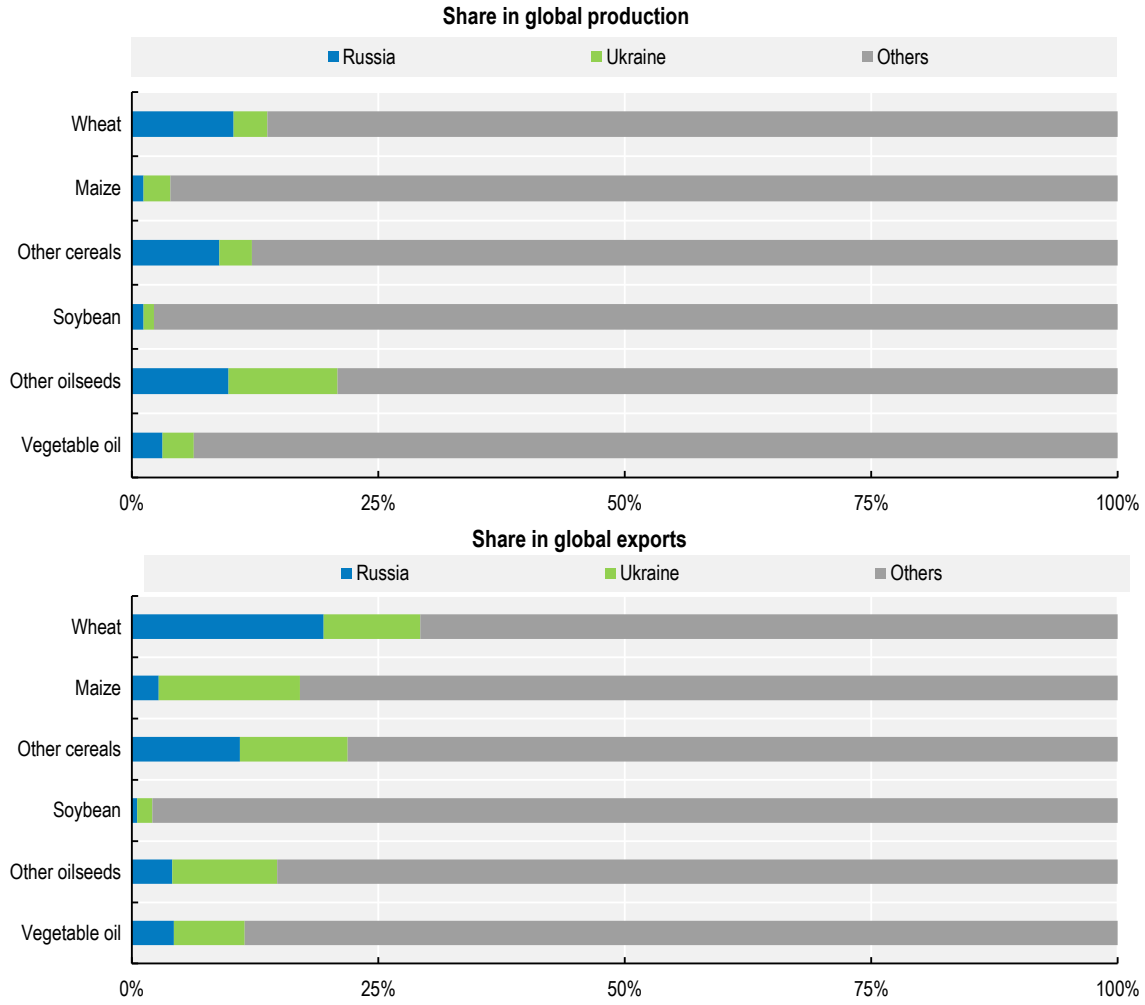
Russia and Ukraine are also large producers and exporters of other cereals, particularly of barley. Together, Russia and Ukraine account for 20% of global barley production, and are the third and fourth largest exporters, respectively (Figure 1). A large share of the barley produced in both countries is used as feed in domestic animal husbandry.

Russia and Ukraine are also key producers and exporters of oilseeds, particularly of sunflower seeds (Figure 1). Ukraine is the world's largest producer of sunflower seed, followed by Russia. Together, they account for more than 50% of the global production on average in the marketing years 2016/17 to 2020/21. Most of the production is crushed domestically into sunflower oil and meal. Sunflower oil is also exported to the global market, Ukraine and Russia accounting for 50% and 25% of global sunflower oil exports, respectively (OIL WORLD, 2022[1]). Russian and Ukrainian production of rapeseed and soybean represent less than 5% of global production. Yet, given limited domestic demand, Ukraine is the third largest exporter of rapeseed globally. Ukraine is also the largest exporter of soybean outside the Americas and plays a specific role in global markets, as it is the largest non-GMO exporter.

Russia also plays an important role in global energy and fertiliser markets. It is the world's top natural gas exporter, second-largest oil exporter, and the third largest coal exporter; accounting for 20%, 11% and 15% of global exports, respectively, in 2019 (IEA, 2022[2]). Russia is also the world's top exporter of nitrogen fertilisers, and the second and third leading supplier of potassic and phosphorous fertilisers (FAO, 2022[3]), respectively, accounting for over 15% of global fertiliser exports in 2020 (UNCTAD, 2022[4]).

Given the importance of Russia and Ukraine for global agricultural and input markets, Russia's aggression against Ukraine and political responses have significant and potentially longer-lasting implications for producers and consumers. Reduced cereals and oilseeds export availability from Ukraine is pushing up international food and feed prices. Moreover, global energy and fertiliser prices have increased from their already high levels due to Russia's aggression and the resulting uncertainty related to the availability of Russian energy and fertiliser globally. As the agri-food sector is highly-energy intensive, rising energy and fertiliser prices are translating into higher production costs and contributing to food price increases (see section on Food security impacts).

Figure 1. Shares of Russia and Ukraine in global production and exports of selected crops (2016/17-2020/21 Avg.)



Note: Other cereals include all grains except for wheat, maize and rice (i.e. mainly barley, sorghum, oat, and rye). Other oilseeds include rapeseeds, sunflower seeds, and groundnuts. Vegetable oil include palm oil, soybean oil, rapeseed oil, sunflower oil, cottonseed oil, groundnut oil, palm kernel oil and coconut oil.
Source: OECD/FAO (2022), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

Impact on Ukrainian production and exports of agricultural commodities

Russia's aggression against Ukraine is mainly affecting the production and export capacity of Ukraine. The current war is raising concerns over whether crops will be harvested. Moreover, the war has led to the closures of ports and oilseed crushing operations, affecting exports.

Ukrainian farmers are showing high resilience to the disruptions caused by the war and are continuing to produce crops and livestock products when the security of agricultural fields allows. As of May 2022, production prospects for 2022/23 winter crops were favourable but remained subject to uncertainty, including due to farmers' ability to apply fertilisers and perform other maintenance task before the June 2022 harvest. The sowing of the 2022 spring crops is nearing completion, but the areas where major spring crops are sown (i.e. sunflower seed, maize and spring barley) are expected to be 20% below last

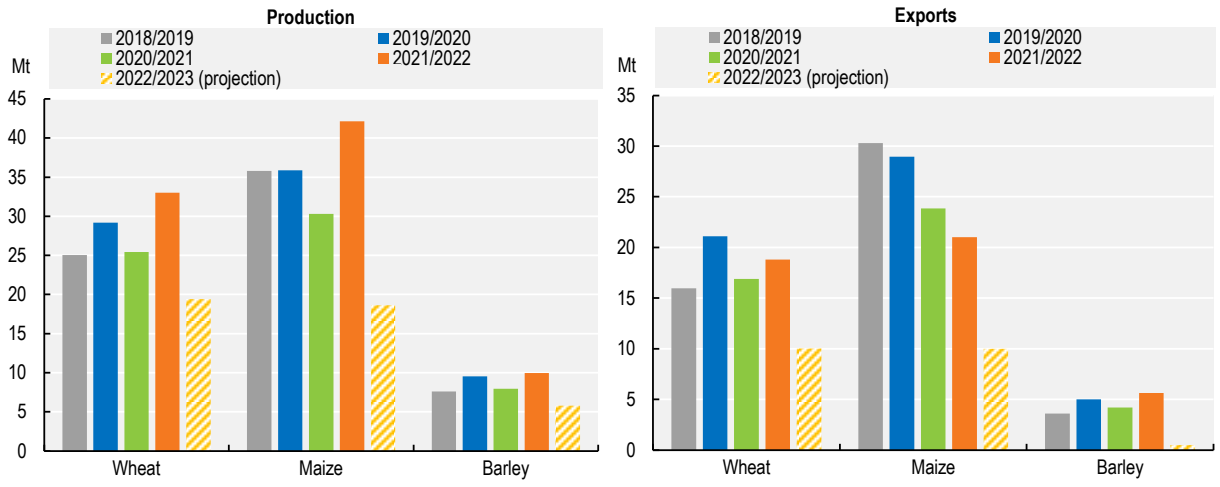
year. Overall, a smaller harvest is expected in 2022 (Figure 2) due to direct damages on winter crops caused by active fighting, remnants of the war preventing planting of the spring crops, and high input costs. Preliminary forecasts suggest reductions of more than 30% compared to the 2021 harvest (FAO, 2022[3]; USDA, 2022[5]) but production is still expected to exceed domestic requirements.

Russia's aggression is also likely to affect Ukraine's ability to control pest and animal diseases, notably the African swine fever (ASF), significantly increasing the risk of disease proliferation within Ukraine and in neighbouring countries.

As more than half of Ukraine's crop production is exported, logistics of the export supply chain play a vital role. Prior to Russia's aggression, over 90% of Ukraine crop exports were channelled through ports at the Azov and Black Seas. These ports are currently inaccessible due to the ongoing war or Russian occupation. Other export channels - road, rail and river ports - do not have the capacity to handle the same quantities as maritime ports. Therefore, industry estimates suggest that current exports only represent about 20% of normal export quantities. National and global efforts are under way to increase the capacities of alternative export channels, and to find other outlets. Yet larger-than-usual quantities remaining in storage and the upcoming harvest in June-September 2022 will rapidly produce large quantities that will also need to be stored to avoid significant losses. In addition, some storage and processing facilities have been damaged, further delaying and constraining agricultural exports from Ukraine (Figure 2).

Indirect losses to Ukrainian agriculture due to production decrease, higher production costs, logistics disruption and lower prices for export-oriented commodities have been estimated at USD 23.3 billion as of June 2022 (Kyiv School of Economics, 2022[6]).

Figure 2. Ukraine's production and exports of main cereals



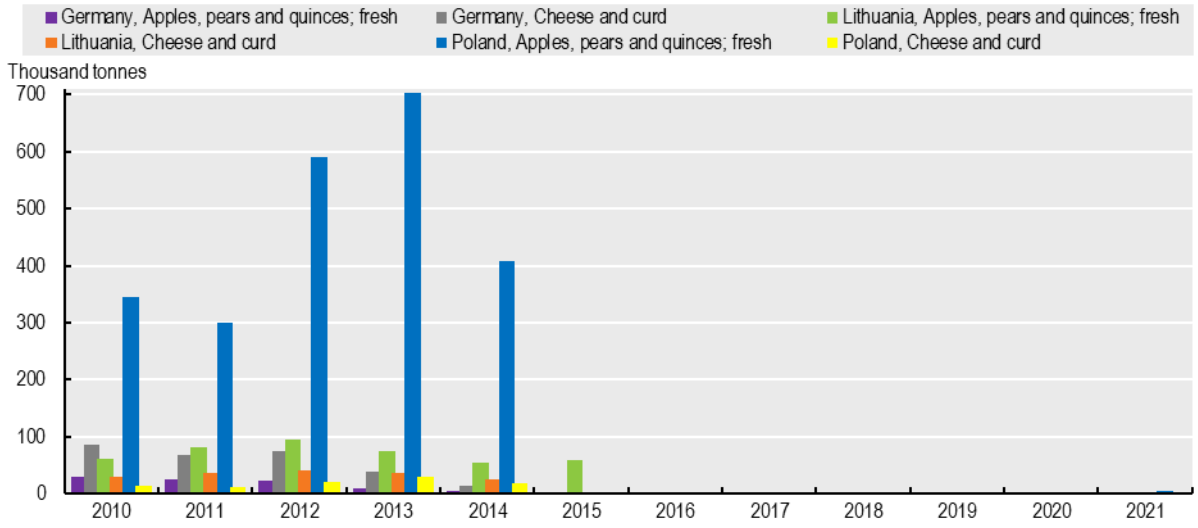
Source: IGC, 2022

Impact on Russian agricultural trade

In Russia, no major disruption to agricultural production is anticipated. Uncertainties exist over its capacity to export, although international sanctions are currently exempting both food and fertilisers (FAO, 2022[7]).

Agricultural trade has already been affected by the 2014 Russian aggression against Ukraine, including the annexation of Crimea. The economic consequences of policy responses have shaped global agricultural markets since then. Previously significant levels of Russian imports of meat, dairy products, as well as fruits and vegetables from the European Union, North America and several other countries opposing the 2014 aggression virtually ceased as a result of an import ban (Figure 3).

Figure 3. Germany, Lithuania and Poland fruit and cheese exports to Russia, 2010-21



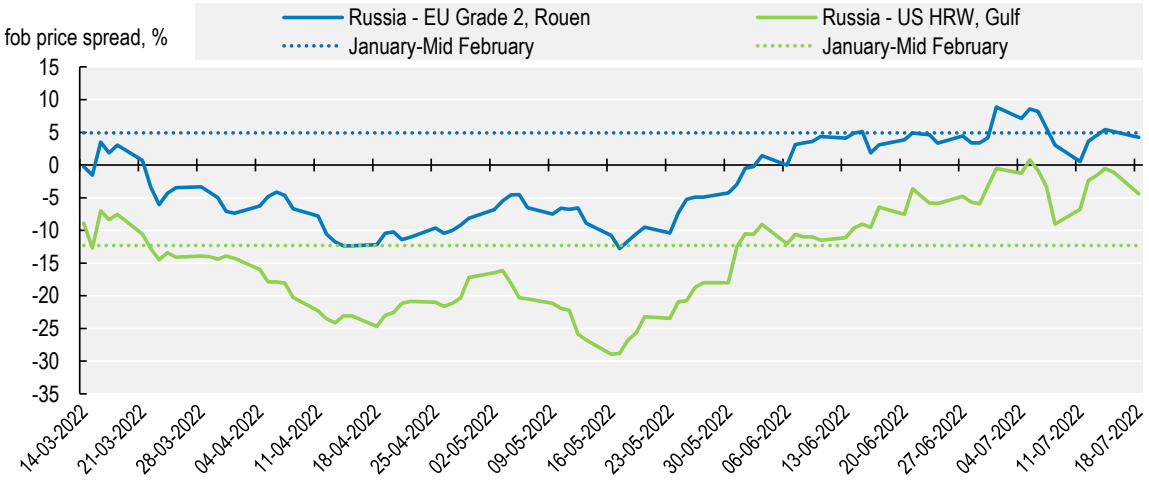
Source: UN COMTRADE.

Russia's invasion of Ukraine is further affecting Russia's agricultural trade. Russia already imposed export restrictions on wheat before the start of the war as its 2021 harvest had been affected by adverse weather conditions. The war led to reduced access to ports, especially at the Sea of Azov, and an increase in export restrictions for key agricultural products, including cereals and sugar, and for certain nitrogen fertilisers. However, some export flows from Russia have continued.

Sanctions imposed on Russia have so far not targeted agricultural and fertiliser trade but many international companies, including those active in the agribusiness sector, have reduced their engagement in Russia. Financial sanction, insurance classification, and other economic uncertainties have led to a price discount for Russian wheat compared to other origins. The gap in the export price between Russian and US wheat, and Russian and EU wheat, peaked at -30% and -12%, respectively, mid-May 2022, but has since then resumed to normal level (Figure 4). Moreover, any loss of export markets for agricultural commodities could depress farmer incomes, thereby negatively affecting future planting decisions.

Economic sanctions imposed on Russia could also disrupt its imports of agricultural inputs, on which it is highly dependent, especially pesticides, seeds, veterinary medicines and agricultural technology (e.g. machinery and software). Reduced access to these inputs could affect the future production potential of Russian agriculture.

Figure 4. Export price gap between Russian wheat and international references



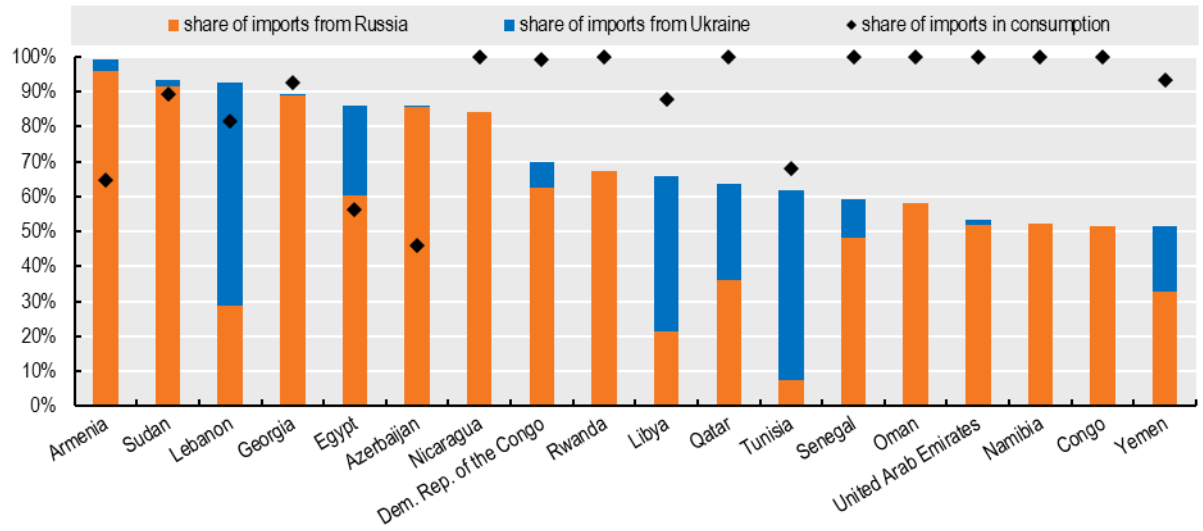
Note: fob stands for free on board price.
Source: UN COMTRADE.

Food security impacts

The large number of displaced Ukrainian people is raising significant food security concerns inside the country. As of May 2022, 8 million people were internally displaced in Ukraine, 6.3 million people fled Ukraine following Russia's aggression, while 1.9 million Ukrainians have returned to Ukraine during the same period (UNHCR, 2022[8]). For internally displaced people, in particular, domestic logistics channels have to be maintained to provide food and other essential goods and services, including in the areas where a large number of people sought refuge from active fighting. Many initiatives are focusing on addressing these food security needs, both through the direct supply of food and through efforts to ensure distribution channels remain open.

Russia's aggression against Ukraine is also threatening global food security (UN Global Crises Response Group on Food, Energy and Finance, 2022[9]). A large number of food-importing countries, many of which fall into the Low-Income Food-Deficit Countries (LIFDCs) category, rely on Russian and Ukrainian food supplies to meet their consumption needs (FAO, 2022[3]; UNCTAD, 2022[4]). Several countries, for instance, receive over half, and up to 100%, of their wheat imports from Russia and Ukraine (Figure 5). This includes a few countries already struggling with internal conflicts and precarious food security situations. These countries need to find alternative sources of supply to meet their consumption needs.

Figure 5. Dependency on wheat imports from Russia and Ukraine (2018-20 Avg.)

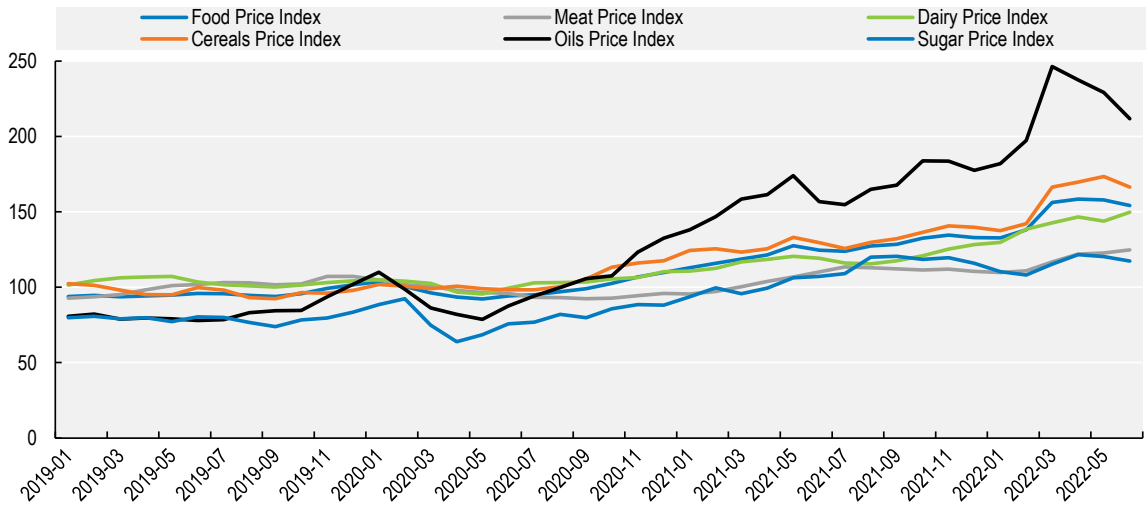


Note: Only countries importing more than 40% of total wheat consumption and more than 50% of total wheat imports coming from Ukraine and Russia.
Source: UN COMTRADE.

Although market balances as of June 2022 suggest globally sufficient supplies of wheat and other monitored commodities, markets remain tight (AMIS, 2022[10]). Moreover, adjustments in trade flows and rising energy costs are leading to increases in international agricultural commodity prices.

In March 2022, the FAO Food Price Index (FFPI) reached its highest level on record since 1990, at 159.7 points. The FFPI retreated slightly in April and May 2022, though still 30% above its value in the corresponding months in the previous year. Price increases have been particularly significant for vegetable oils and cereals. While the vegetable oil index started to decline from March 2022, the cereal price index is continuing its upward trend (FAO, 2022[11]). Vulnerable populations in Low-Income Food-Deficit Countries, who spend a large share of their income on food, are particularly exposed to these price hikes.

Figure 6. Evolution of the FAO Food Price Indexes



Source: FAO, 2022.

Given current uncertainty, it is challenging to anticipate the impact of Russia's aggression on agricultural markets in the future. This will mainly depend on how Ukrainian supplies evolve and which restrictions Russia imposes on its exports. Several scenarios have been conducted with the Aglink-Cosimo model[1] that assume different impacts on the harvest and export levels of all crops in Ukraine, as well as on the export levels of wheat in Russia in the next marketing season (2022/23). Figure 7 shows the impact of these scenarios on the international wheat price. The full loss of Ukraine capacity to export, which corresponds to a situation where Ukraine can only harvest 25% of its land, is expected to lead to a 19% increase in the global wheat price. In the extreme scenario, where Russian exports are also 50% lower than usual, wheat prices would be 34% higher than in a situation without Russia's aggression. In this scenario, Russia and Ukraine jointly export 36 million tonnes less wheat, but other countries increase their exports by 16 million tonnes due to the higher international price, partly by increasing their production, but also by selling from their stocks.

Further increases in the price of wheat and other agricultural commodities would negatively impact global food security and could lead to additional increase in the number of undernourished people (FAO, 2022[3]), adding to the recent rise in global undernourishment following the COVID-19 pandemic (FAO et al., 2021[12]).

Figure 7. Relative change in global wheat prices: Scenarios with Aglink-Cosimo

		Restriction of wheat exports by Russia			
		0%	**-10%**	**-25%**	**-50%**
Reduction of Ukraine exports	**0%**	0	2%	5%	11%
	-25%	4%	6%	10%	16%
	-50%	9%	11%	15%	21%
	-100%	19%	22%	26%	34%

Note: The upper left cell in the table refers to the hypothetical situation where exports from both countries are at the same levels as in the past years. Vertically, the production and export of cereals in Ukraine are reduced. Horizontally, the wheat exports of Russia are restricted.
Source: OECD (2022), Scenario calculation with Aglink-Cosimo.

Policy recommendations

A rapid end to the war would be the best outcome for the many households who depend on affordable and healthy food, and will suffer the most from sharp price increases.

International Trade

- *Facilitate exports from Ukraine*: In the short run, the focus should be on enabling (agricultural) exports from Ukraine. Domestic infrastructure also needs to be maintained and repaired from the war damages, which is a long-term challenge that will persist after the end of the war.

[1] Aglink-Cosimo is a comprehensive partial equilibrium model for global agriculture. It underlies the baseline projections of the *OECD-FAO Agricultural Outlook 2022-2031* (OECD/FAO, 2022[15]). A detailed documentation on the Aglink-Cosimo model is available at http://www.agri-outlook.org/about/.

- *Enable the use of Black Sea ports*: Ukraine's ports at the Black Sea (e.g. Odessa, Mykolaiv, Mariupol, and Kherson) are the main exports channels for grains and oilseeds. However, these ports are currently affected by military activities or are mined. Industry estimates Ukrainian export capacity without sea ports at 1.5 million tonnes per month compared to 6 million tonnes per month in recent years. Negotiations are underway to open a safe shipping corridor in the Black Sea to ship Ukrainian grains. On 22 July 2022, Ukraine and Russia each signed a UN-backed deal with Turkey to allow grain exports from Ukraine's Black Sea ports, including the estimated 22 million tonnes of last year's grain sitting in silos in Ukraine. However, it remains uncertain how large the monthly shipped quantities will be given challenges in implementation, including due continued Russian military activity, damaged port logistics, and high insurance costs.
- *Facilitate exports via alternative routes*: by: a) stream-lining administrative procedures at the land borders of Ukraine, b) improving road and railway connections, c) increase capacity of river ports on the Danube and d) providing access to ports in other countries (e.g. Constanta in Romania, or Gdansk in Poland) for Ukrainian products brought by rail or road.

- *Keep trade in food and agricultural inputs open*: Policies implemented in response to the market implications of Russia's large scale aggression against Ukraine focus on different areas, with trade policies dominating in the short term. Most of these aim to insulate domestic markets from the significant increases in the international prices of agricultural commodities and inputs (OECD, 2022[13]). Although export bans and other trade restrictions can temper domestic price increases, they further accelerate price spikes on international markets and undermine the trust that countries have in the reliability of the international trading system as a source of supply. For this reason, export restrictions should be avoided and, where already implemented, should be dismantled as soon as possible. By contrast, reductions of import barriers and simplification of trade procedures can facilitate trade and the functioning of international markets and should be made permanent to the extent possible.
- *Strengthen market transparency*: Market transparency and policy dialogue should be strengthened, as they play key roles when agricultural markets are under uncertainty and need to adjust to shocks affecting supply and demand. G20 initiatives such as the Agricultural Market Information System (AMIS) play a critical role in improving market transparency

Supply

- *Prepare recovery plan for Ukraine*: Direct damages to Ukraine's agricultural sector, including damages to land, infrastructure and machinery have been estimated at USD 4.3 billion as of June 2022 (Kyiv School of Economics, 2022[6]). Without the restoration of lost assets, Ukraine will not be able to return to its place in global agricultural markets. Several discussions are already taking place to help Ukraine recover from the war damages, including within the OECD. The OECD is supporting the Ukrainian Government in the development and implementation of a recovery plan for the agribusiness sector. In parallel, the OECD is preparing an action plan to support Ukraine.
- *Increase cereal and oilseed production from other countries*: Crop production can be increased by: a) putting more arable land into production, and b) increasing production on existing arable land by increasing yields or cropping intensity. Increasing arable area requires the reduction of other land uses, e.g. grazing, forests, natural vegetation, which is often limited by environmental constraints. In addition, new arable land has to be prepared for crop production, which takes at least one growing season. Increasing cropping intensity is only possible in a few areas of the world, as the overall growing period needs to be sufficient to grow two or more crops during a year. Generally, the overall output is larger than a single crop but each crop is less productive. Increasing yields can be achieved by the use of more inputs but current high input prices constrain this option. The more promising way is thus to increase productivity sustainably through improved

management practices and genetics. Although the speed of adoption of these technologies and practices has increased, it still requires some time, especially at the global level.

- *Avoid relaxing environmental constraints*: There are new calls to relax environmental constraints to deal with immediate concerns about the shortfall in global food supplies and potential consequences for food security. Countries envisaging such measures on an exceptional basis need to consider other available measures for addressing food security concerns. These include the release of stocks, direct assistance to help consumers cope with higher food prices, and specific support for countries facing burdensome food import bills. They also need to take into account that these measures may be difficult to rescind, and may provide limited or marginal assistance with the current pressures, while carrying important longer term environmental costs, in particular for biodiversity. The balance may be particularly unfavourable if the agricultural land concerned has low productivity but high environmental value (OECD, 2022[13]).
- *Control animal diseases*: the spread of African Swine Fever (ASF) and other animal diseases must be contained by improving biosecurity and husbandry practices, taking steps to facilitate early detection (e.g. surveillance schemes and targeted sampling of animals), timely reporting and rapid disease containment.

Demand

- *Reduce demand for non-food uses of agricultural commodities*: cereals, oilseeds and other agricultural commodities are also used for non-food purposes, including as feed and fuel. Reducing demand for these non-food uses could help free up cereals and oilseed for human consumption.
  - Total feed use can be reduced through: a) improvement in feed conversion ratios (i.e. in the quantity of feed needed to produce a given output of animal product), b) a shift between different feed products or, in case of ruminants, from compound feed to grazing, c) a reduction in the size of animal production. All three elements are reactive to price changes but no rapid adjustment in feed demand can be expected.
  - Demand for agricultural commodities as biofuel feedstock, on the other hand, can adjust quickly as biofuel demand is mainly determined by policies such as blending mandates. Nevertheless, there are several limitations to restricting biofuel use. First, biofuels are fossil fuels replacements so any short-term reduction to biofuel demand will be almost entirely replaced by fossil fuels. However, Russia's aggression is raising concerns about fossil fuel shortages. Second, most agricultural products used as biofuel feedstock are not of the same quality as those used for human consumption. Therefore, agricultural commodities not used as biofuel feedstock will most likely be used as feed which could free other products, for example, lower quality wheat for food use. Finally, biofuel production and distribution require high investments, which rely on policy commitments towards biofuels. Any *ad hoc* policy adjustment could negatively affect long-term investments into biofuel infrastructure.
  - *Reduce food loss and waste*: It is estimated that the current amounts of food loss and waste could feed around 1.26 billion people per year (FAO, 2022[3]).[2] Reducing food loss and waste is an attractive option to lower the overall demand for agricultural commodities and alleviate environmental pressure. Nevertheless, attempts to reduce food loss and waste appear to only be effective in the long-term. The current high prices of agricultural commodities create a large incentive to reduce food loss and waste.

[2] The FAO estimates that globally about 14% of food produced is lost before reaching the retail level. An important share of food that is available to consumers is also wasted, estimated at 17% in 2019 (FAO, 2022[14]).

- *Foster dietary changes*: Reducing the consumption of animal-based foods in countries with high level of per capita consumption could contribute to lower feed demand. However, change in diets is a long-term development and statistics of food consumption do not show strong movements between major foods from one year to another. Although, policies can support dietary changes, given the pace of change this will not address the current market shortages.

Further reading

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