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THE IMPORTANCE OF UKRAINE AND THE RUSSIAN FEDERATION FOR GLOBAL AGRICULTURAL MARKETS AND THE RISKS ASSOCIATED WITH THE WAR IN UKRAINE

EXECUTIVE SUMMARY

1. Market structure, trade profiles and recent price trends

1.1. Market shares

- The Russian Federation and Ukraine are among the most important producers of agricultural commodities in the world. Both countries are net exporters of agricultural products and are leading suppliers of foodstuffs and fertilizers to global markets, where exportable supplies are often concentrated in a handful of countries. The high concentrations could increase the vulnerability of these markets to shocks and volatility.
- In 2021, either the Russian Federation or Ukraine, or both, ranked among the top three global exporters of wheat, barley, maize, rapeseed and rapeseed oil, sunflower seed and sunflower oil. The Russian Federation also ranked as the world's top exporter of nitrogen fertilizers, the second leading supplier of potassic fertilizers and the third largest exporter of phosphorous fertilizers.

1.2. Trade profile

- A large number of food- and fertilizer-importing countries, many of which fall into the Least Developed Country (LDC) and Low-Income Food-Deficit Country (LIFDC) groups, rely on Ukrainian and Russian food supplies to meet their consumption needs. Many of these countries were already grappling with the negative effects of high international food and fertilizer prices prior to the war.

2. Risk analysis: Assessing the risks emanating from the War in Ukraine

2.1 Trade risk

- In Ukraine, the current war raises concerns over whether crops will be harvested. It has already led to the closures of ports and oilseed crushing operations, affecting products intended for the export markets. These are taking a toll on the country's exports of grains and vegetable oils. Russian export prospects are also uncertain, given the economic and financial sanctions imposed on the country.

2.2 Price risks

- FAO's simulations assess the potential impacts of a sudden and steep reduction in grain and sunflower seed exports by the two countries. The simulations indicate that these shortfalls may only be partially compensated by alternative sources during the 2022/23 marketing season. The capacity of many exporting countries to boost output and shipments may be limited by high production and input costs. The resulting global supply gap could raise international food and feed prices by between 8 and 22 percent above already elevated baseline levels.
- If the war keeps crude oil prices high and continues to limit the two countries' exports beyond the 2022/23 season, a considerable supply gap would remain in global grain and sunflower seed markets, even as other exporting countries expand their output in response to the higher output prices. This would keep global prices elevated well above baseline levels.

2.3 Logistical risks

- In Ukraine, active fighting has damaged inland transport infrastructure and seaports, as well as storage and processing infrastructure. It has also led to the suspension of all commercial shipping operations across its ports. This raises significant concerns, given the limited means of alternative transportation, such as rail, river or road transport, to seaports and smaller processing facilities to compensate for suspended operations at modern oilseeds crushing facilities.
- The increase in insurance premium rates or the lack of war coverage in insurance contracts for vessels sailing into the Black Sea has exacerbated the already elevated costs of maritime transportation, increasing costs of food imports.

2.4 Production risks

- Production prospects for 2022/23 winter crops are favorable but uncertain in both Ukraine and the Russian Federation. In the eastern part of Ukraine where fighting has subdued, farmers resumed activities on accessible areas and sowed spring crops like maize, barley and sunflower seeds, even though war remnants hindered agricultural activities. Disruptions to essential public services and localized shortages of inputs due to supply chain bottlenecks have also negatively affected agricultural operations. It is estimated that the areas where major spring crops are sown have declined by about 20 percent across the territory controlled by Ukraine.
- The winter wheat harvest is likely to start in early July in Ukraine. Because of the war, between 20 and 30 percent of the areas where winter crops are sown are likely to remain unharvested during the 2022/23 season. The availability of fuel will determine how much of the areas can be harvested and the crop yields stored.
- The war is likely to affect the ability of Ukraine to control its animal disease burden, significantly increasing the risk of proliferation of animal diseases, notably African swine fever (ASF), within Ukraine and in neighboring countries.
- In the Russian Federation, no major disruption to crops in the ground are anticipated, but uncertainties exist over their capacity to export although international sanctions exclude both food and fertilizers. Any loss of export markets could depress farmer incomes, negatively affecting future planting decisions.
- Economic sanctions imposed on the Russian Federation could disrupt its imports of agricultural inputs it is highly dependent on, especially pesticides and seeds. This could result in less planting, lower yields and lower

qualities of crops in the future, exposing the Russian agricultural sector and global food supplies to risks for the next planting season.

2.5 Humanitarian risks

- The war is set to increase humanitarian needs in Ukraine. It will deepen the needs of millions of people who were already displaced or required assistance due to the war in the eastern part of the country that has lasted more than eight years. By directly constraining agricultural production, limiting economic activity and raising prices, the war has further undercut the purchasing power of local populations, with consequent increases in food insecurity and malnutrition.
- Humanitarian needs in Ukraine's neighboring countries where displaced populations are seeking refuge have also increased substantially.
- Projections for 2022 indicate that up to 181 million people in 41 countries could face food crisis or exacerbated levels of acute food insecurity. However, most of these analyses do not take into consideration the impacts of the war in Ukraine, and without rapid and sustained humanitarian action that strongly focuses on local food production, the global food security situation is likely to deteriorate substantially.
- If the war results in a prolonged reduction of food exports by Ukraine and the Russian Federation, it will exert additional pressure on international food prices, with detrimental effects on economically vulnerable countries. FAO's simulations suggest that under such a scenario, the number of undernourished people globally could increase by between 8 and 13 million in 2022/23, with the most pronounced increases taking place in Asia-Pacific, followed by sub-Saharan Africa and then the Near East and North Africa. If the war continues, the impacts will last well beyond 2022/23.
- Finally, a third and more extreme scenario simulating the severe export shortfall from Ukraine and the Russian Federation in 2022 and 2023, and assuming no global production response because of lack of affordability and access to fertilizers, suggests an increase in the number of undernourished by close to 19 million people in 2023.

2.6 Energy risks

- The Russian Federation is a key player in the global energy market. The sharp increase in energy prices that has accompanied the war will affect agriculture, as it is a highly energy-intensive industry, especially in developed regions.
- Agriculture requires a large amount of energy directly through the use of fuel, gas and electricity, and indirectly through agri-chemicals such as fertilizers, pesticides and lubricants.
- With prices of fertilizers and other energy-intensive products rising because of the war, overall input prices are expected to rise considerably. The higher prices of these inputs will translate into higher production costs and eventually into higher food prices. They could also lead to lower use of inputs, lowering yields and harvests in the 2022/23 season, risking further price hikes and threatening global food security in coming years.
- Higher energy prices also make agricultural feedstocks, especially maize, sugar and oilseeds/vegetable oils, more expensive for producing bioenergy. Given the large size of the energy market relative to the food market, this could push up food prices up to their energy parity equivalents.

2.7 Exchange rate, debt, and growth risks

- The Ukrainian hryvnia reached a record low against the United States dollar (USD) in early March 2022, with likely repercussions for Ukrainian agriculture, including a boost to its export competitiveness and curbs on its ability to import.
- War-induced damages to Ukraine's productive capacity and infrastructure are expected to entail very high recovery and reconstruction costs, although their extent remains unclear at this stage.
- The economic sanctions imposed on the Russian Federation have also led to significant swings in the exchange rate of the Russian ruble. An initial sharp depreciation of the ruble against major currencies was followed by a notable upsurge, mounting up to 40% against the US dollar since January, which has made Russian exports of agricultural commodities less competitive.

- The economic slowdown in the Russian Federation is expected to have detrimental effects on the countries in Central Asia through the reduction of remittance flows. For many of these countries, remittances constitute a significant part of gross domestic product (GDP).
- The current war may also have global spillovers. The most vulnerable countries and populations are expected to be hit hard by slower economic growth and increased inflation at a time when the world is still attempting to recover from the economic downturn triggered by the COVID-19 pandemic.
- Agriculture is the backbone of the economies of many developing countries, the majority of which rely on the United States dollar for their borrowing needs. A lasting appreciation of the U.S. dollar in relation to other currencies would therefore have negative effects on these countries, including their agrifood sector. Moreover, the potential reduction of GDP growth in several parts of the world will affect global demand for agrifood products with adverse consequences for global food security.

3. Policy recommendations and proposals

- It is essential to support Ukraine and its vulnerable people. FAO is staying and delivering in Ukraine, and has reinforced its team on the ground. FAO has also completed nationwide needs assessments in Ukraine, targeting local level administrations and commercial farmers, as well as an ongoing household survey in areas with a significant influx of internally displaced people. As a result, an updated [rapid response plan](#) has been developed to target specific actions within Ukraine. In addition, FAO has already developed a framework to [assess the needs in Ukraine's reconstruction and recovery](#).
- To prevent or limit the war's harmful impact on the food and agricultural sectors, every effort should be made to keep international trade in food and fertilizers open. Supply chains should be kept fully operational, including by protecting standing crops, livestock, food processing infrastructure and all logistical systems.
- Countries that depend on food imports from Ukraine and the Russian Federation must find alternative export suppliers for their food needs to absorb war-induced shocks and remain resilient. They should also use existing food stocks and enhance the diversity of their domestic production bases.
- Recognizing that at least two-thirds of people experiencing acute food insecurity are rural populations who rely on agriculture-based livelihoods, humanitarian responses both within Ukraine and globally must prioritize actions boosting production of locally grown nutritious food and making agriculture more resilient. The war's impact on food security of vulnerable groups necessitates timely and [well-targeted social protection interventions](#) to alleviate hardship and foster a fast recovery.
- To assist the internally displaced, refugees and other groups directly affected by the war, Ukraine's national social protection system should be expanded to register additional population groups with the Unified Social Information System.
- In countries hosting refugees, access to existing social protection systems and job opportunities should be eased by lifting legal access barriers and increasing the capacity of host countries' social protection systems to absorb additional caseloads.
- Countries affected by disruptions from the war must carefully consider the potentially damaging effects of trade-related measures they adopt could have on international markets, especially over long term. Particularly, export restrictions must be avoided. They exacerbate price volatility, limit the buffer capacity of global markets, and have negative impacts over the medium term.
- To address the impacts of the war in Ukraine on global food security of the most vulnerable countries, FAO has developed a detailed technical note on a global [Food Import Financing Facility](#), which aims to present a mechanism to respond to rising food import and input costs. Tapping into the Facility would allow vulnerable countries to mitigate long-lasting impacts on their agrifood systems and reduce future needs for emergency assistance.

- We have also developed a proposal on the implementation of our [Food Insecurity Experience Scale at national and sub-national level](#) in the most vulnerable countries to better target their social protection assistance.
- To increase efficiencies two policy recommendations are of great importance. First, to reduce the waste in the use of fertilizers and increase their effectiveness [detail soil maps](#) should be developed and use technology to improve fertilizer efficiency. This will support most vulnerable countries to use their fertilizers efficiently, following lessons learned from other countries.
- Second, we must [reduce food loss and waste](#). Currently the high amounts of food loss and waste could feed around 1.26 billion people per year, and results in a huge negative impact on the environment. If we reduce food loss and waste by 50%, there would be sufficient fruits and vegetables available in the food supply to cover the recommended amount of 400 grams per person per day.
- [The spread of African swine fever and other animal diseases](#) must be contained by improving biosecurity and husbandry practices at all geographical levels, taking steps to facilitate early detection, timely reporting and rapid disease containment, and implementing measures that support virus detection such as surveillance schemes and targeted sampling of animals.
- Market transparency and policy dialogue should be strengthened, as they play key roles when agricultural commodity markets are under uncertainty and disruptions need to be minimized to ensure that international markets continue to function and that trade in food and agricultural products flows smoothly.

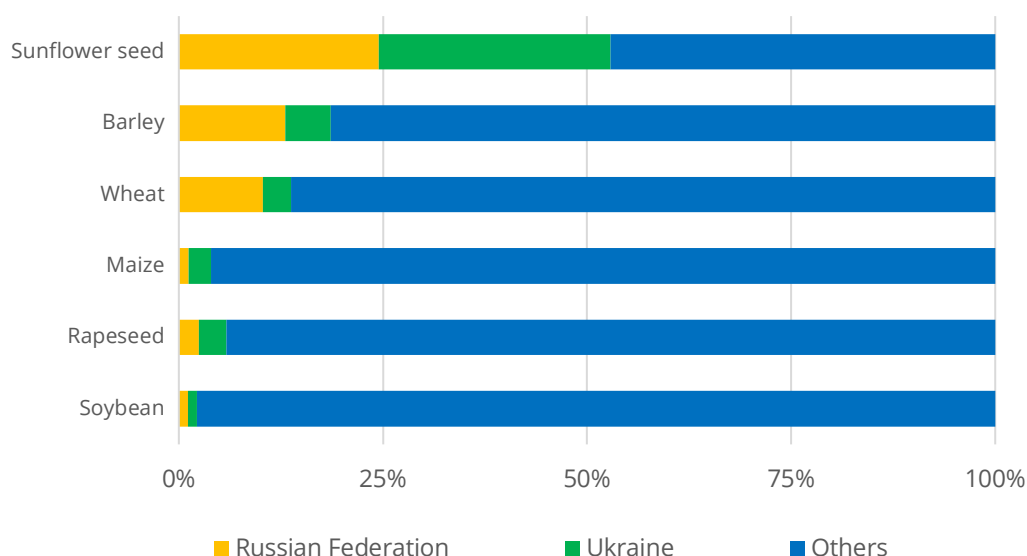
INFORMATION NOTE

1. Market structure and trade profiles¹

The Russian Federation and Ukraine are among the most important producers of agricultural commodities in the world. In the cereal sector, their contribution to global production is especially significant for barley, wheat and maize. The two countries together on average accounted for 18 percent of global output of those crops between 2016/17 and 2020/21, with the Russian Federation accounting for 14 percent and Ukraine 4 percent. In the oilseed complex, their contribution to global production was particularly important for sunflower seed, with just over half of world output originating from the two countries during this period. Their average shares in global rapeseed and soybean production are more limited, with the Russian Federation making up 6 percent of the production and Ukraine 2 percent.

FIGURE 1

Share in global production of selected crops (2016/17-2020/21 Avg.)



SOURCE: FAO XCBS system.

1.1 Market shares

The critical role that the Russian Federation and Ukraine play in global agriculture is evident from an international trade perspective (see figures 2 to 5 and tables 1 and 2). Both are net exporters of agricultural products, and they both play leading roles in supplying global markets with foodstuffs. Exportable supplies for global food markets are often concentrated in a handful of countries, making these markets vulnerable to shocks and volatility. For instance, in the

¹ The update includes information available up to 10 June 2022.

wheat and meslin sector, where the top seven exporters accounted for 89 percent of international trade in 2021, the Russian Federation stands out as the second largest wheat exporter, shipping a total of 32.9 million tonnes of wheat and meslin (in product weight), or the equivalent of 15 percent of global shipments (see figure 6). Ukraine ranked sixth largest wheat exporter in 2021, exporting 20 million tonnes of wheat and meslin, with a 10 percent global market share.

The two countries play similarly prominent roles in global markets of maize, barley and rapeseed, and even more so in the sunflower oil sector, where their combined world export market share is close to 72 percent. The high export concentrations that characterize food commodity markets are also mirrored in the fertilizer sector, where the Russian Federation plays a leading supplier role. In 2021, the Russian Federation was the top exporter of nitrogen (N) fertilizers, the second leading exporter of potassic (K) fertilizers and the third leading exporter of phosphorous (P) fertilizers, as shown in figures 12 to 14.

1.2 Trade profiles

The Russian Federation and Ukraine are key suppliers to many countries that are highly dependent on imported foodstuffs and fertilizers. Several of these countries fall into the Least Developed Country (LDC) group, while many others belong to the group of Low-Income Food-Deficit Countries (LIFDCs). As illustrated in figure 15, for instance, Eritrea sourced the entirety of its wheat imports in 2021 from both the Russian Federation (53 percent) and Ukraine (47 percent).

Figure 15 also illustrates that many countries in North Africa and Western and Central Asia import the majority of their wheat from the Russian Federation and Ukraine. Overall, more than 30 net importers of wheat are dependent on the two countries for over 30 percent of their wheat import needs.

The very high likelihood of disruptions to Ukraine's grain and oilseed harvests, combined with the threat of trade restrictions on exports of cereals and other basic foodstuffs from the Russian Federation — as reflected in record benchmark price quotations (see next section) — would jeopardise food security of many countries around the world, especially those that are economically vulnerable.

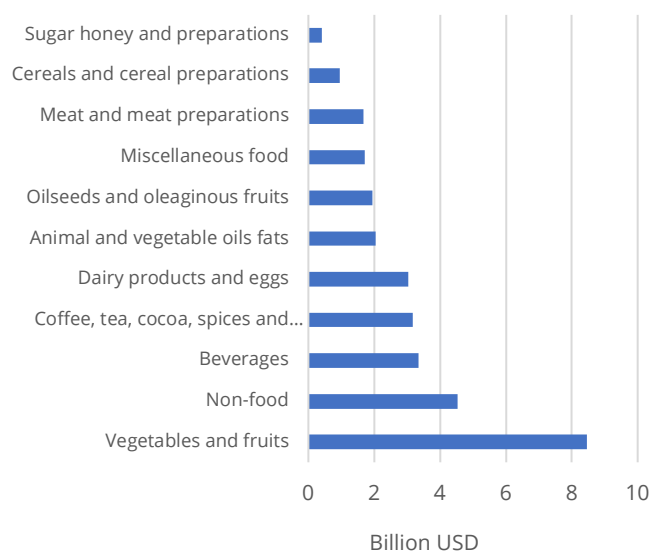
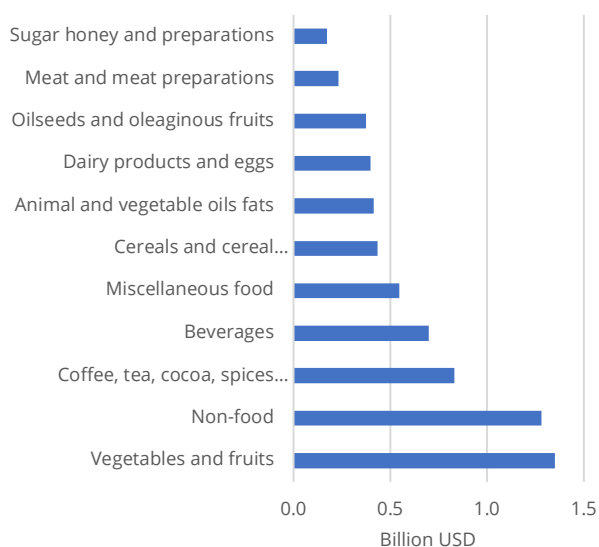
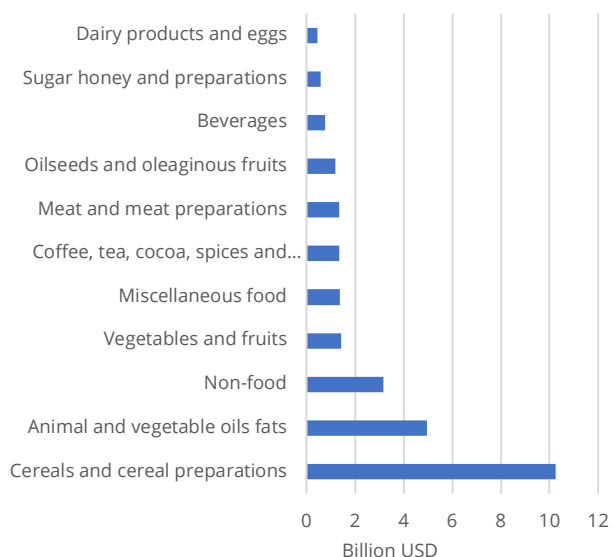
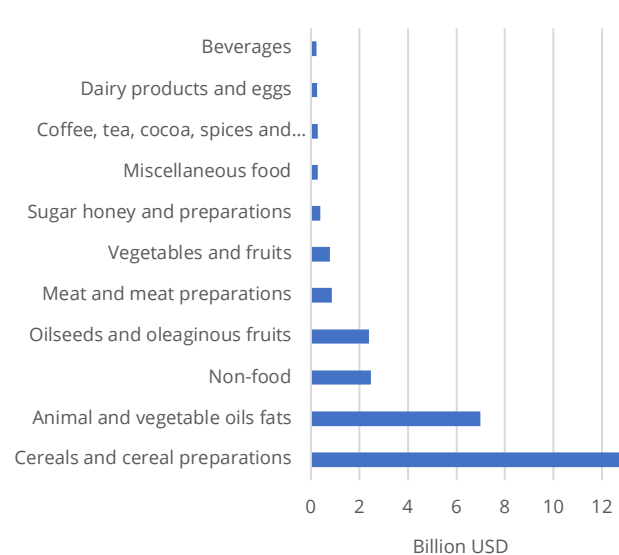
The global reliance on Russian NPK fertilizers is less pronounced, with some 25 net importing countries depending on them for 20 percent or more of their fertilizer imports. As shown in figure 16, Ukraine is not a fertilizer exporter countries heavily depend on, except for purchases by India. Many net importers of fertilizers located in Latin America, Eastern Europe and Central Asia have an import dependency of well over 30 percent on Russian NPK fertilizers. Again, with the prospect of a trade embargo on exports from the Russian Federation, or a self-imposed export restriction, the global fertilizer market would be subject to considerable disruptions. This prospect is already reflected in record urea (N) benchmark fertilizer quotations.

Record prices of natural gas, the main source of fuel for N fertilizer production, could turn unprofitable energy production methods, such as fracking installations in the United States of America, commercially viable. This would eventually ease international fertilizer prices. However, these energy production will take time, and fertilizer shortages could continue until next year.

Countries that are highly dependent on the Russian Federation and Ukraine for essential food and fertilizer supplies must prepare contingency plans to source from other countries, which could in turn accelerate energy production in other countries.

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FIGURE 2**Agricultural imports of the Russian Federation in 2021****FIGURE 3****Agricultural imports of Ukraine in 2021****FIGURE 4****Agricultural exports of the Russian Federation in 2021****FIGURE 5****Agricultural exports of Ukraine in 2021**

SOURCE: Trade Data Monitor (TDM), FAO calculations.

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TABLE 1

Russian Federation: exports of selected commodities (thousands of metric tonnes)

Commodity	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat	2020	2 101	1 576	3 361	4 765	605	214	2 337	4 671	5 015	4 643	4 290	4 867	38 445
	2021	3 083	4 537	1 150	802	458	2 228	1 882	5 221	4 581	2 834	3 190	2 951	32 917
Barley	2020	469	239	307	863	135	140	712	593	885	721	394	549	6 007
	2021	223	404	777	368	550	77	505	564	553	292	410	433	5 156
Maize	2020	352	335	548	877	248	87	250	156	88	140	333	389	3 803
	2021	374	451	982	287	551	202	134	68	79	252	351	407	4 138
Soybean	2020	93	108	210	98	76	47	138	122	100	99	123	174	1 388
	2021	674	52	31	12	18	26	27	19	14	35	36	50	994
Rape	2020	49	61	24	28	23	12	29	77	99	138	97	77	714
	2021	14	26	33	30	24	36	19	23	15	14	14	29	277
Sunflower	2020	157	201	342	72	61	10	1	2	33	204	184	106	1 373
	2021	6	3	8	3	2	2	3	1	4	10	16	35	93
Sunflower oil	2020	283	289	455	437	359	276	300	329	107	180	291	357	3 663
	2021	298	297	495	375	176	143	153	374	99	92	318	292	3 112
Rapeseed oil	2020	57	46	50	40	65	32	38	39	82	84	92	63	688
	2021	56	41	53	68	66	53	50	64	83	91	85	92	802

SOURCE: Trade Data Monitor (TDM)

TABLE 2

Ukraine: exports of selected commodities (thousands of metric tonnes)

Commodity	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat	2020	924	681	1 310	1 200	1 191	257	1 239	3 701	3 710	2 156	1 191	495	18 055
	2021	508	709	697	713	858	662	961	3 613	4 363	3 415	2 375	1 174	20 048
Barley	2020	152	141	309	339	152	190	839	1 315	750	491	296	71	5 045
	2021	120	61	131	25	23	64	1 097	1 658	1 016	737	435	244	5 611
Maize	2020	4 543	3 457	3 529	3 091	2 379	1 547	425	179	29	1 842	3 106	3 824	27 951
	2021	1 996	2 476	2 620	2 628	2 245	1 698	962	302	165	895	3 792	4 897	24 676
Soybean	2020	333	176	122	103	53	35	9	1	57	344	301	255	1 789
	2021	109	92	86	104	36	44	31	5	10	172	215	192	1 096
Rape	2020	2	2	2	5	1	4	183	880	546	316	276	164	2 381
	2021	11	3	13	3	1	0	52	772	879	635	234	57	2 660
Sunflower	2020	5	4	4	9	10	2	3	2	8	69	38	34	188
	2021	12	20	2	2	4	1	0	1	3	8	23	4	80
Sunflower oil	2020	581	627	608	717	639	588	593	329	304	525	756	594	6 861
	2021	482	484	381	391	502	325	328	202	277	434	639	690	5 135
Rapeseed oil	2020	0	33	2	0	0	0	5	35	35	19	6	2	137
	2021	0	0	0	0	0	0	4	47	61	35	15	2	164

SOURCE: Trade Data Monitor (TDM)

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FIGURE 6
Wheat

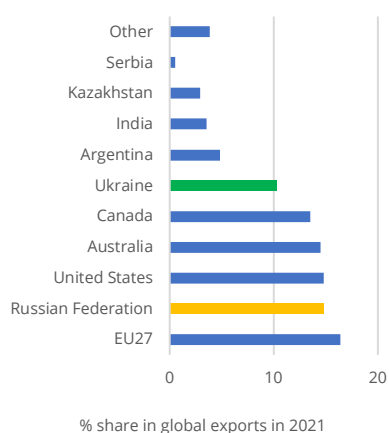


FIGURE 7
Barley

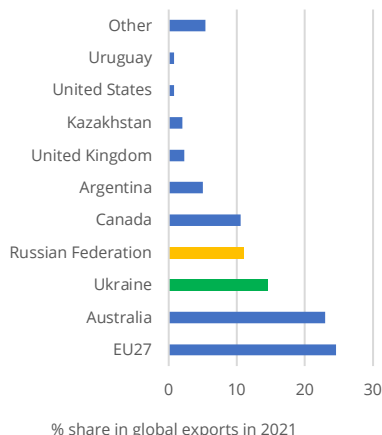


FIGURE 8
Maize

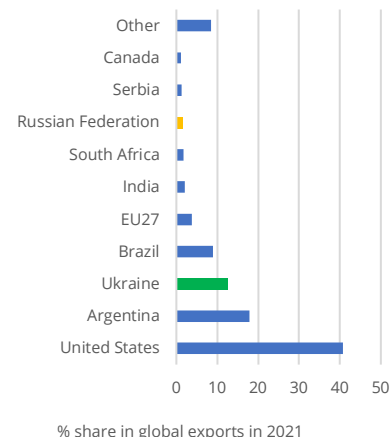


FIGURE 9
Rape seed

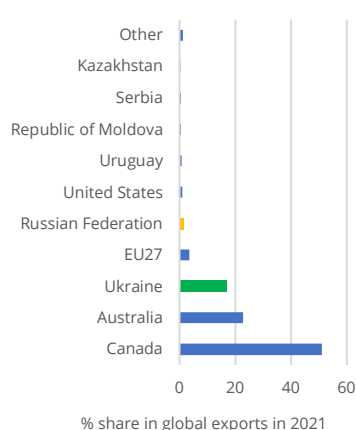


FIGURE 10
Sunflower seed oil

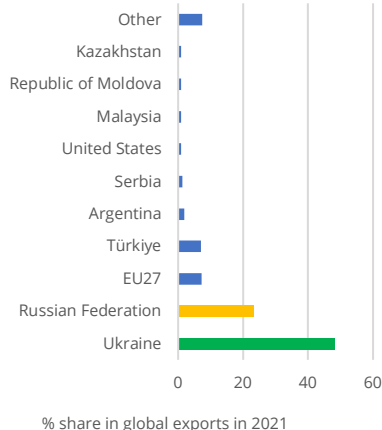


FIGURE 11
Rape seed oil

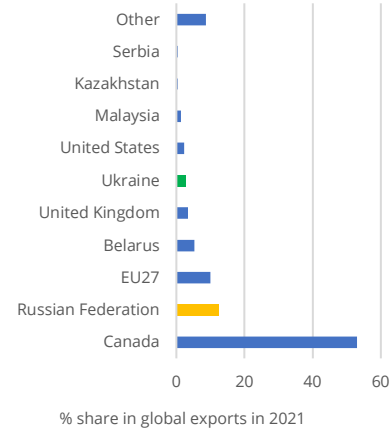


FIGURE 12
N-fertilizer

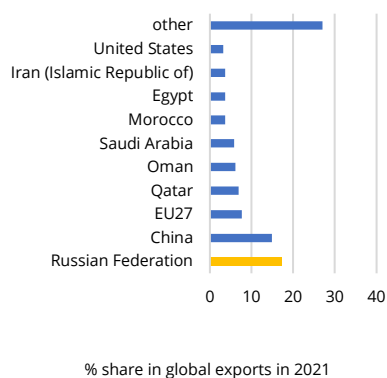


FIGURE 13
P-fertilizer

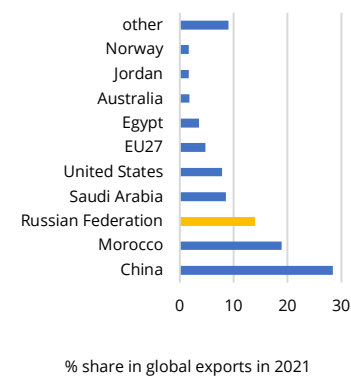
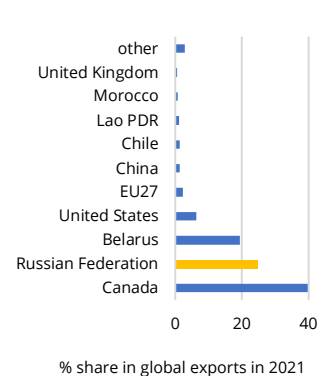


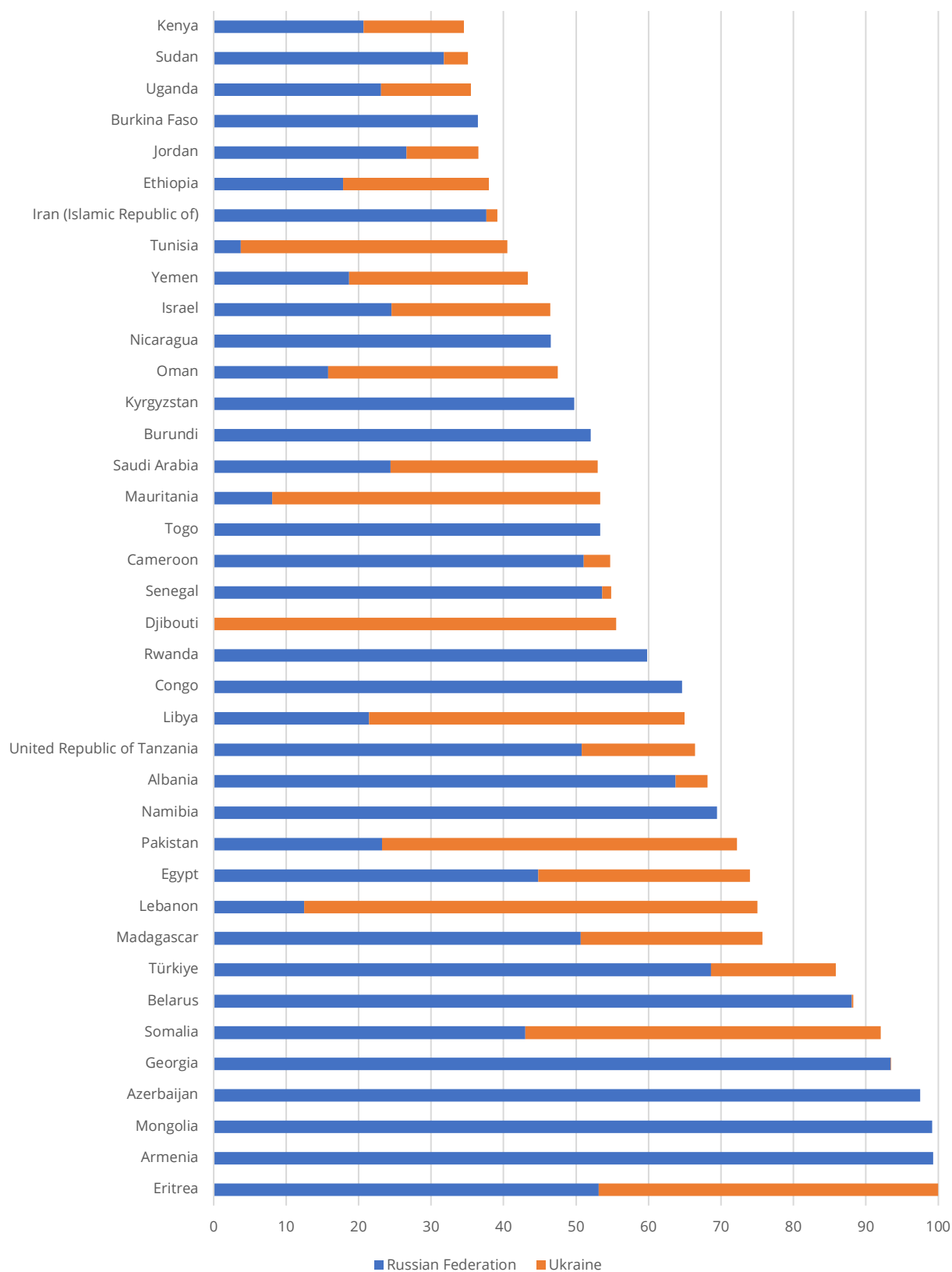
FIGURE 14
K-fertilizer



Source: Trade Data Monitor (TDM), FAO calculations
Note: Processed products are excluded from these estimates.

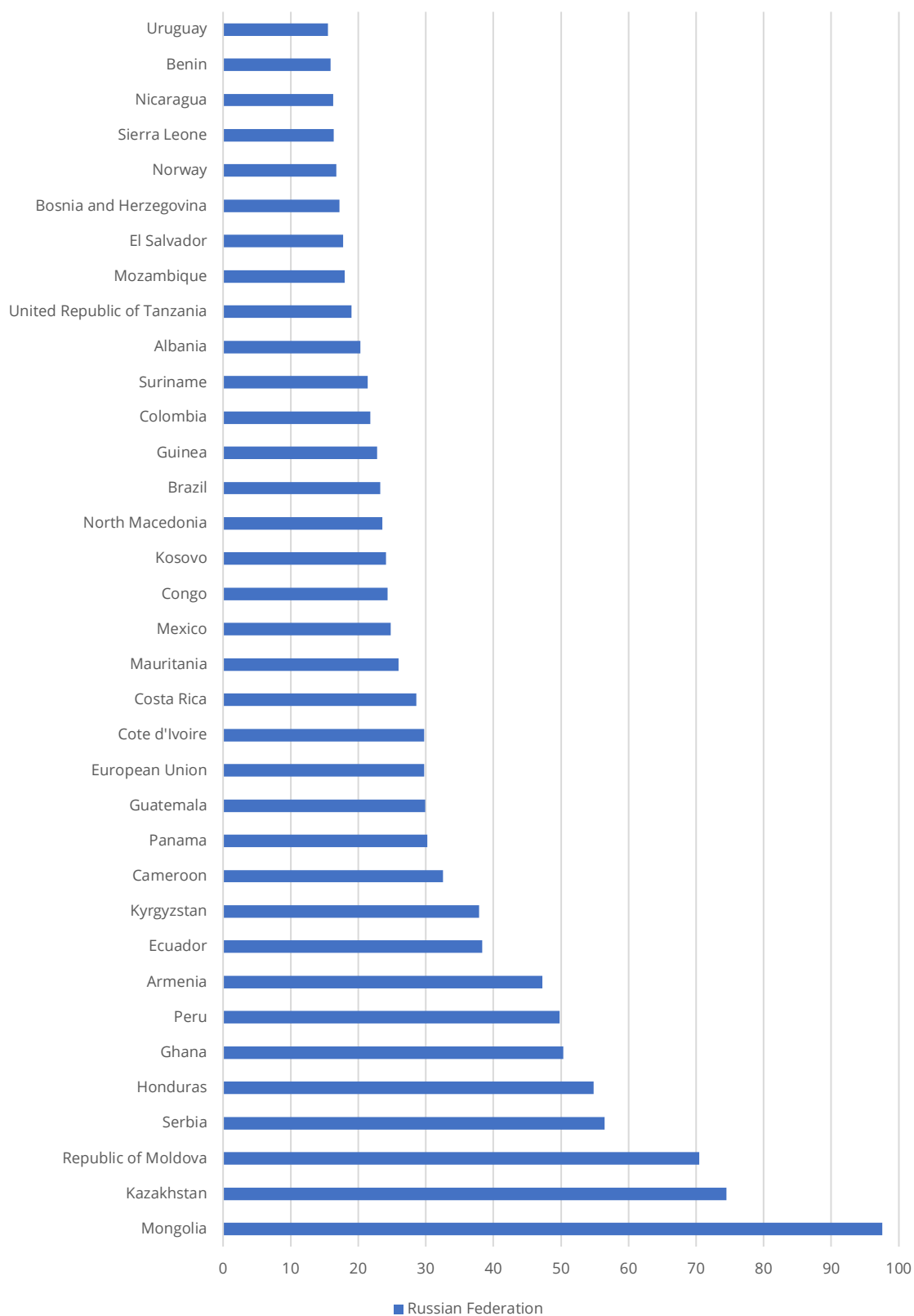
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FIGURE 15**Wheat import dependency, net importers, 2021 (%)**

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FIGURE 16**Fertilizer Import Dependency, net importers, 2021 (%)**

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1.3 Recent trends in international prices of basic foodstuffs and agricultural inputs

As measured by the FAO Food Price Index (FFPI), international export quotations of basic foodstuffs have seen almost uninterrupted increases since the second half of 2020. This upward trend culminated in March 2022, when international quotations reached an all-time high. Although prices eased somewhat in the successive two months, quotations of all the commodity groups in the FFPI² remain high, with the global cereal and vegetable oil markets among those most affected by price increases.

Over the course of 2021, international prices of wheat and barley rose 31 percent over their corresponding levels in 2020, buoyed by strong global demand and tight exportable availabilities resulting from weather-induced production contractions in various major wheat- and barley-exporting countries. In the rapeseed oil and sunflowerseed oil sectors, annual price increases registered in 2021 were 65 and 63 percent, respectively. These increases were spurred by protracted global supply tightness and robust demand, with the latter coming from the biodiesel sector in the case of rapeseed oil.

The upward momentum of grain and vegetable oil prices continued in the first five months of 2022. In the case of wheat, prices surged in March as tighter exportable availabilities ahead of 2022/23 harvests. They were then compounded by export disruptions in Ukraine resulting from port closures and uncertainties regarding Russian export capacity. The export restrictions adopted by countries tended to exacerbate global supply concerns, including the one introduced by India in mid-May. In recent months, the country had emerged as an important alternative exporter.

FIGURE 17

International grain price indices

(2014-16=100)

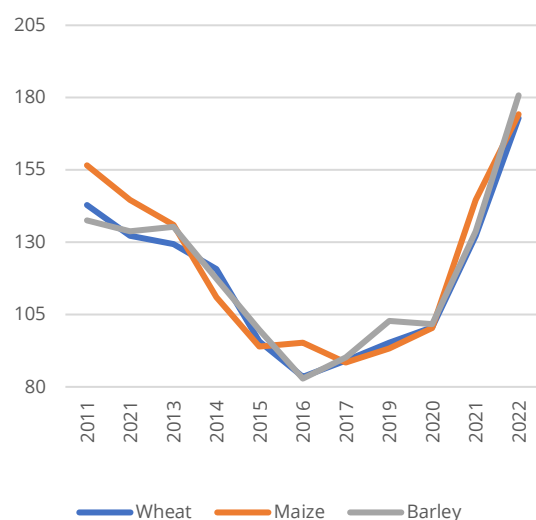
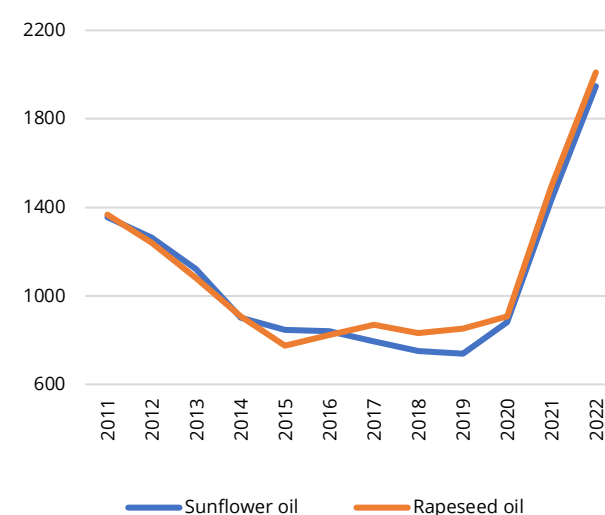


FIGURE 18

International vegetable oil prices

(USD/tonne)



SOURCE: FAO, International Grains Council (IGC) and Oil World. Averages for 2022 computed based on prices available through the second week of March.

In the case of maize, export prices increased steadily in the first quarter of 2022. This was prompted by concerns over crop conditions in Argentina and Brazil, spillover effects from the wheat market, rising energy and fertilizer costs, as well as a significant reduction in maize exports from Ukraine due to port closures. Even though the arrival of freshly harvested supplies from Argentina and Brazil helped ease quotations in April and May, offsetting the pressure stemming from slow

² The commodity groups covered by the FFPI are cereals, vegetable oils, meat, dairy products and sugar.

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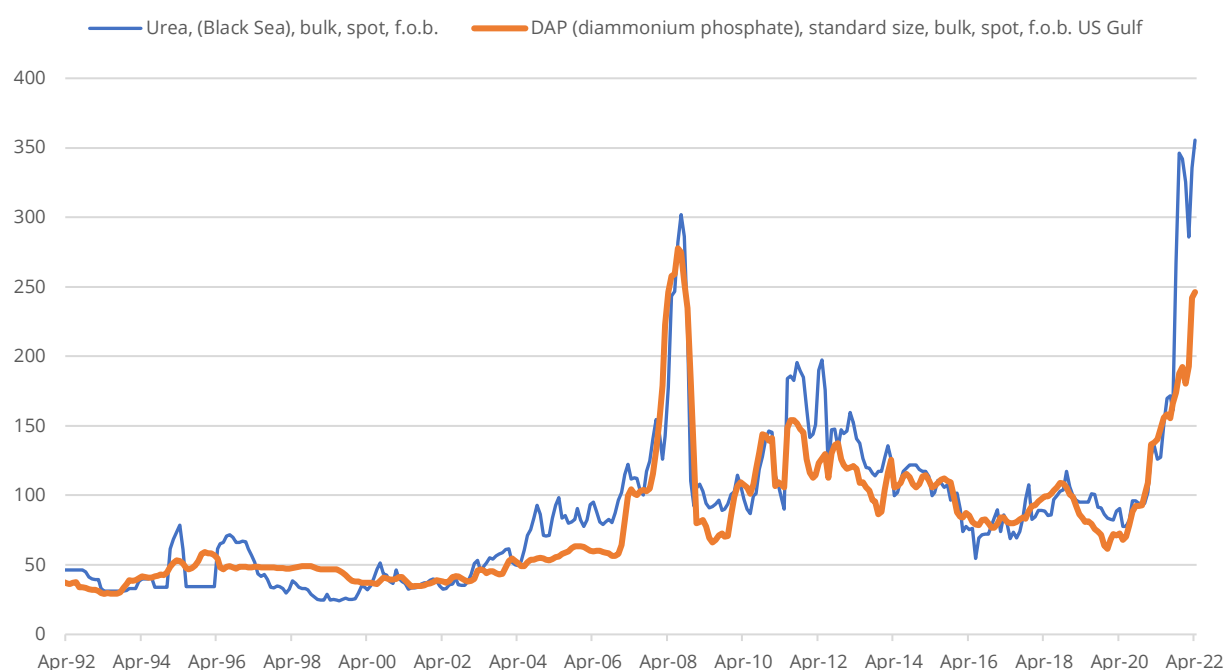
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planting progress in the United States, export quotations of maize in May were still 13 percent above their already elevated levels a year-earlier.

Export disruptions in the Black Sea region have also affected the sunflower and rapeseed oil markets. Prices for these oils reached record highs in March and have since lingered around multi-year highs. International prices of palm oil, a potential substitute for these oils, have increased markedly in parallel, buoyed by concerns over reduced export availabilities from Indonesia, as it tightened export controls in a bid to contain rising domestic prices. Although world vegetable oil prices have weakened somewhat since April, largely owing to the demand rationing instigated by elevated import costs, they remain well above their year-earlier levels.

International benchmark prices of fertilizers rose similarly throughout 2021, with many quotations reaching all-time highs. The most notable increases were registered for nitrogen fertilizer. In May 2022, prices of urea, a key N fertilizer, were two and a half times above their level in December 2020, with prices of phosphorous fertilizer rising in tandem over the same period. While N fertilizer prices have eased somewhat in May and June of 2022, they still hover around levels around three times their longer-term average. Potash (K-fertilizer) prices have also registered considerable gains in recent months, reaching multi-year highs. Like other commodity prices, these fertilizer price dynamics were determined by the interplay of supply and demand. On the demand side, the higher output (crop) prices registered in 2021 boosted affordability of fertilizers, thereby pushing fertilizer prices upwards. On the supply side, energy prices were high and volatile, especially for natural gas, which is crucial for producing N fertilizer. Several other factors contributed to the sharp rise in N fertilizer prices, including weather-induced disruptions to renewable energy. Additional upward pressure on fertilizer prices stemmed from supply disruptions and high transportation costs following the imposition of export restrictions. Sharp increases in bulk and container freight rates caused by the COVID-19 pandemic also contributed to the fertilizer price surge.

The second week of March 2022 saw a notable relaxation in the European gas market, with key quotations for natural gas declining by more than 50 percent from their record highs in just 10 days. This allowed prices for urea to stabilize and then consolidate. However, with gas prices remaining at levels around three times their long-term average, N fertilizer is likely to remain expensive.

FIGURE 19**International urea prices (2014-2016 = 100)**

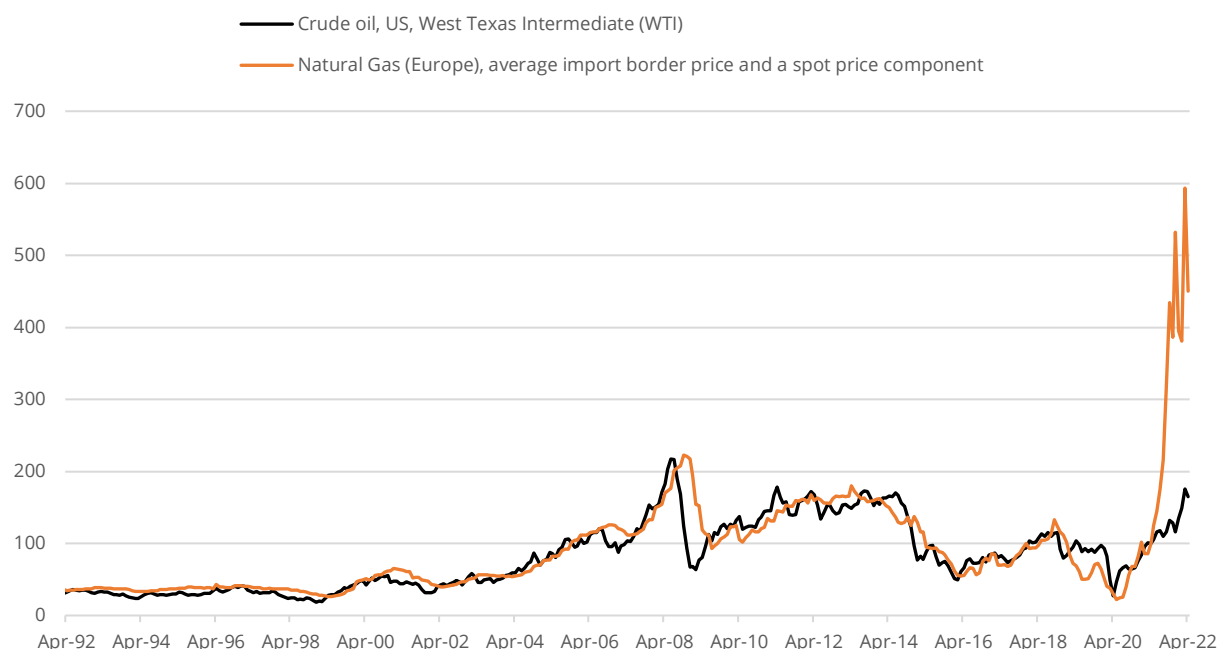
Source: Index Mundi

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FIGURE 20

Natural gas price vs crude oil price, 2014-16 = 100



Source: Index Mundi

2. Risk analysis: Assessing the risks emanating from the war in Ukraine

2.1 Trade risks

War-induced disruptions to food exports from the Russian Federation and Ukraine expose global food markets to heightened risks of tighter availabilities, unmet import demand and higher international food prices.

The war has significantly undermined Ukrainian grain exports, owing to the lack of access to Black Sea ports and the limited means of alternative transportation, such as rail, river or road transport, to compensate for the lack of seaborne shipments. Assuming these war-related disruptions persist, FAO's tentative forecasts for 2022/23 (July/June) indicate that Ukrainian wheat exports could decline by 50 percent (or 9 million tonnes) compared to already constrained 2021/22 levels to 10 million tonnes, while those of maize exports could register a 32 percent (7 million tonnes) annual decline to 15 million tonnes. In the case of wheat, if confirmed, the anticipated reduction in Ukrainian shipments, coupled with anticipated production disruptions in alternative origins such as Australia and Argentina, may outweigh greater anticipated shipments from the European Union (EU), Canada and the Russian Federation, resulting in a global wheat trade contraction from 2021/22 levels. Similarly for maize, shortfalls in Ukrainian shipments, together with export declines in Argentina and the United States could more than offset an expected increase in shipments by Brazil.

On the import side, most countries that typically import from Ukraine are expected to find other origins to purchase from, keeping their overall imports near last season's levels. For instance, purchases by Egypt, the largest global wheat importer, are expected to increase slightly in 2022/23, supported by government measures taken to facilitate imports from other origins, including Argentina and India (under exception to its wheat export restrictions that allows for government-to-government sales). Notable exceptions to this trend include the Islamic Republic of Iran, the world's fifth largest wheat importer in 2021/22, which on average sources more than 60 percent of its wheat imports from Ukraine and Russian Federation (2016/17 – 20/21). While remaining above the five-year average, wheat imports by Iran are

forecast to fall by 57 percent year-on-year in 2022/23 thanks to an expected recovery from last season's low level of domestic production.

Regarding maize imports, purchases by China and the European Union, Ukraine's primary maize export destinations, are both seen registering year-on-year declines in 2022/23. A predicted fall in utilization, largely for feed, amid an expected increase in production is behind the forecast decrease in the EU's purchases. On the other hand, China's expected decline in imports would still register a third consecutive year of high import volumes relative to historical averages, maintaining the country's position as the world's top maize importer for a third year.

As regards sunflower seed oil, prior to the escalation of the war, improved supply situations were expected to enable Ukraine and the Russian Federation to raise their sunflower seed oil shipments over the course of their 2021/22 (October-September) marketing seasons. However, the war has prevented this from happening. In Ukraine, shipments of sunflower seed oil have declined significantly since February due to war-induced logistical bottlenecks at Black Sea port facilities. Only limited amounts have been transported through neighbouring countries via truck or rail. Crushing operations were also initially suspended across much of Ukraine because of the war, and as of early June they had only resumed partially. In the Russian Federation, sunflower seed oil exports have been subject to export quotas since mid-April, as authorities in the country have sought to secure sufficient domestic supplies. The potential impact of the financial sanctions on Russian exports is still uncertain.

Given the significant export shares of Ukraine and the Russian Federation in the global sunflower seed oil market, any disruption to their shipments would have notable implications for major sunflower seed oil importers, namely India, the European Union, China, the Islamic Republic of Iran and Türkiye. As alternative supplies for sunflower oil have been very limited, importers have had to switch to substitutes, such as palm and soy oils. This implies that the impacts of the war could go beyond the sunflower seed oil sector, with spillover effects onto other vegetable oils. Recent international vegetable oil price developments suggest that global markets are already reacting to the war along these lines, with sunflower seed oil quotations from Argentina, the world's third largest exporter, rising sharply since late February, in tandem with a marked increase in international palm, soy and rapeseed oil quotations. Although this rise in world vegetable oil prices has resulted in demand rationing, which has in turn driven some price declines since April, international prices in the vegetable oil complex remained markedly above their year-earlier values in May.

As for rapeseed and rapeseed-derived products, Ukraine stands out as the world's third largest rapeseed exporter. However, its share in global rapeseed trade is more limited, suggesting that there could be room for alternative suppliers, like Canada and Australia, to compensate for potential reductions in Ukrainian rapeseed exports. In addition, as Ukraine's shipments were heavily front-loaded, the country's export programme for the 2021/22 (July/June) marketing season was essentially complete before the war escalated. Nevertheless, it remains to be seen whether Ukrainian rapeseed shipments in the forthcoming 2022/23 marketing season will remain unaffected. The Russian Federation accounts for 10 percent of world trade outflows in the global rapeseed oil market, and there are uncertainties regarding the potential impact of sanctions imposed on the country.

2.2 Price risks

2.2.1 Assessing the possible effects of trade risks on world market prices in the short term (2022/23 marketing year)

To assess the potential impact on international food prices caused by a war-induced reduction in cereal and vegetable oil exports from Ukraine and the Russian Federation, simulations using the Aglink-Cosimo modelling system were conducted. Three scenarios were simulated to account for a range of conceivable export developments during the 2022/23 marketing year:

- 1) A moderate shock under which wheat and maize exports from Ukraine and the Russian Federation underwent a 10 million tonne reduction each, while their exports of other coarse grains were reduced by 2.5 million tonnes and those of other oilseeds by 1.5 million tonnes³;

³ Other coarse grains include barley, oats, rye and sorghum, whereas other oilseeds encompass rapeseed, sunflower and ground nuts.

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- 2) A severe shock, entailing a 25 million tonne reduction in their combined exports of wheat and maize, alongside a 5 million tonne decrease in their shipments of other coarse grains and a 3 million tonne cut to those of other oilseeds.

Both scenarios were based on the assumption that reference crude oil prices would reach USD 100 per barrel in 2022/23, up from an initial baseline value of USD 75 per barrel. On this basis, the global market model calculated new global market equilibriums, projecting international prices, global production, consumption and trade volumes for cereals, oilseeds, meat, dairy products, sugar, cotton and biofuels. The results of these two scenarios, illustrated in figure 21, indicate deviations of international reference prices from the baseline. This baseline already pointed to international prices of critical food commodities remaining close to their elevated levels of 2021, except for other oilseeds, whose prices were seen declining more decisively from their exceptionally high levels of 2021. These results indicate that:

- a) The global reference price of fertilizer would undergo a 13 percent increase in 2022/23, relative to its already elevated baseline level, in response to the more expensive production inputs implied by the higher crude oil price, but also due to higher crop prices. This increase would influence production costs for 2022/23 growing seasons.
- b) In this input price context, the capacity of alternative origins to boost output and exports to compensate for reduced Russian and Ukrainian shipments could be only partial and would vary depending on the magnitude of the market shock and the relative elasticities of supply and demand. Under the moderate shock scenario, this would result in global trade volumes of wheat contracting by 8 million tonnes, as only an additional 2 million tonnes would be supplied by alternative exporters. For maize, the world trade reduction would amount to 7 million tonnes. Under the more severe scenario, global trade volumes would fall by 16 million tonnes for wheat and by 12 million tonnes for maize.
- c) International prices of the four commodities with important Ukrainian and Russian export shares would rise in response to reduced export supplies, with their rate of increase determined by the magnitude of the shock, supply elasticities of alternative suppliers and the commodities' relative demand elasticities. Compared to their already elevated baseline values, wheat prices would increase by 8.7 percent under the moderate scenario and by 21.5 percent under the severe shock. For maize, the increase would be to the tune of 8.2 percent in the moderate case and of 19.5 percent in the severe scenario. For other coarse grains, prices would rise by between 7 and 19.9 percent, and by between 10.5 and 17.9 percent for other oilseeds (figure 21).
- d) Market impacts would be felt in related sectors. For instance, a reduction in exportable supplies for oilseeds (mainly sunflower) would push up the prices of other oilseeds. A cut in feed wheat and maize availabilities would similarly bolster prices of feed products. Combined, these factors would drive livestock prices up, affecting the feed-intensive poultry and pork sectors the most.

2.2.2 Assessing the possible effects of trade risks on world market prices in the medium term

Because of the numerous uncertainties that surround the war itself, including its duration and scale, and given its potential to inflict lasting damages to productive assets and ancillary infrastructure, two separate scenarios were simulated to assess the impact of reduced Ukrainian and Russian export participation for five seasons, or until marketing year 2026/27. These scenarios were developed under the assumption that reference crude oil prices would remain on an upward trajectory to reach USD 108 per barrel in 2026/27. The magnitude of reductions in the Ukrainian and Russian grain and vegetable oil exports were kept in line with those used by the scenarios developed for the 2022/23 marketing year. The results of this scenario analysis are as follows:

- a) Continued gains in crude oil prices would keep the global reference price of fertilizer on the rise over the next five marketing years, contrary to expected trends under the projection's baseline, which foresaw oil and fertilizer prices easing over this period. As a result, the 2026/27 fertilizer export price would stand 25 percent above the originally foreseen baseline value.
- b) Even as alternative producers expand their output in response to the higher prices instigated by reduced Ukrainian and Russian food export participation, a considerable supply gap would remain in the global market. In the moderate scenario, this compensation rate or share of the global export shortfall covered by

non-Russian and Ukrainian origins over the next five seasons would range between 30 and 52 percent for maize and between 19 and 48 percent for wheat. Under a severe scenario, the compensation rate would range from 47 to 67 percent for maize and from 30 to 57 percent, in the case of wheat.

- c) International prices of the four commodities with important Ukrainian and Russian export shares would remain elevated in response to the overall reduced export supplies. Compared with their baseline values, by 2026/27, wheat prices would rise by 10 percent under the moderate scenario and by 19 percent under the severe shock. Similarly, the simulation's projected maize price would be between 8.5 percent and 14 percent above the baseline in 2026/27.
- d) In related sectors, livestock prices would be between 3 to 6 percent above the baseline levels in 2026/27 in the moderate scenario, and between 5 and 10 percent under the severe shock.

2.3 Logistical risks

An immediate source of concern in logistics is the impact of the war on transportation infrastructure. This includes inland infrastructure (mostly railways) carrying food exports to seaports along the Black Sea, such as Novorossiysk, Taman and Tuapse, which service shipments by the Russian Federation and to Odessa and Mykolaiv ports, Ukraine's main ports for bulk agricultural commodities. Ukraine suspended all commercial shipping operations across its ports, whereas Russian Black Sea ports remain operational. Efforts to boost Ukrainian exports of agricultural products through alternative transport means, for instance by rail via neighbouring countries and river barges, are ongoing. However, Ukraine's loss of national maritime shipping capacity, which normally handles about 90 percent of the country's commodity exports, cannot be compensated by other means of transport. This is so even if internal civilian road and rail infrastructure were to remain largely unaffected by the war.

Shipments by railway are constrained by a lack of rail carriages in neighbouring countries. Moreover, even if the availability of railway cars were to improve, deliveries from Baltic ports via Ukraine's western borders with Poland require that railcars' chassis be changed at the border due to the use of conflicting gauges in both countries. The other option is transload the cargo to different train cars. When seaports were open, about 300 000 tonnes of agricultural commodities were traditionally exported via rail per month.⁴ Early in the war, the use of locomotives was prioritised to evacuate people from the areas that were most affected by fighting. At this stage, some 500 000 tonnes of agricultural produce were transported by alternative routes monthly. Even though these volumes have since increased, the maximum feasible export capacity of these routes - estimated to be 1.5 million tonnes⁵ - has yet to be reached. Even if it did, it would be insufficient to match the previous capacity of marine routes.

More broadly, it was reported that several vessels have been hit by shelling in the region since the start of the war. Civil maritime vessels, including those used for food shipments, can still transit through the Turkish Straits (Dardanelles and the Bosphorus). However, increasing insurance premium rates or the lack of war coverage in insurance contracts for vessels sailing into the Black Sea region could exacerbate the already elevated costs of marine transportation, compounding further on the final costs of internationally sourced food paid by importers.

The Turkish Straits are a critical international grain trade juncture, with one fifth of world wheat exports and one sixth of global maize shipments passing through them, much of which originate from the Russian Federation, Ukraine and Kazakhstan.⁶ The impact of any shipping disruption in this area is most directly felt by importers in the Near East and North Africa region. The reliance of these countries on grains originating from the Russian Federation and Ukraine is also associated with the low shipping costs thanks to these countries' physical proximity to the Black Sea basin.

⁴ <https://www.csis.org/events/agriculture-and-food-security-casualties-war-ukraine>

⁵ APK-Inform.

⁶ <https://www.chathamhouse.org/sites/default/files/publications/research/2017-06-27-chokepoints-vulnerabilities-global-food-trade-bailey-wellesley-final.pdf>

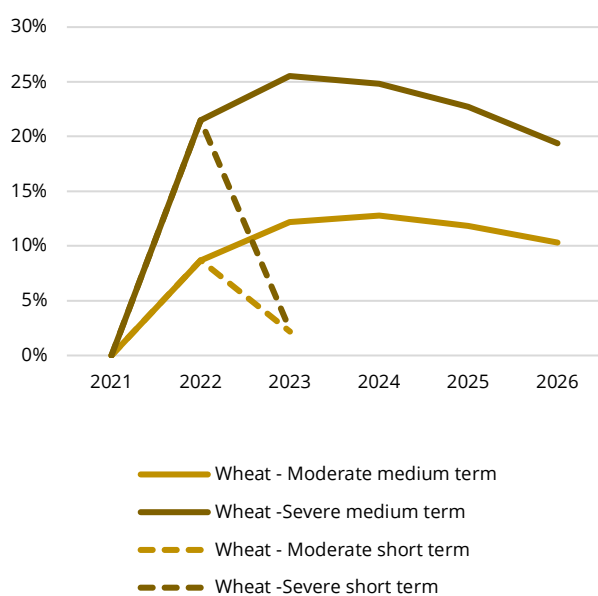
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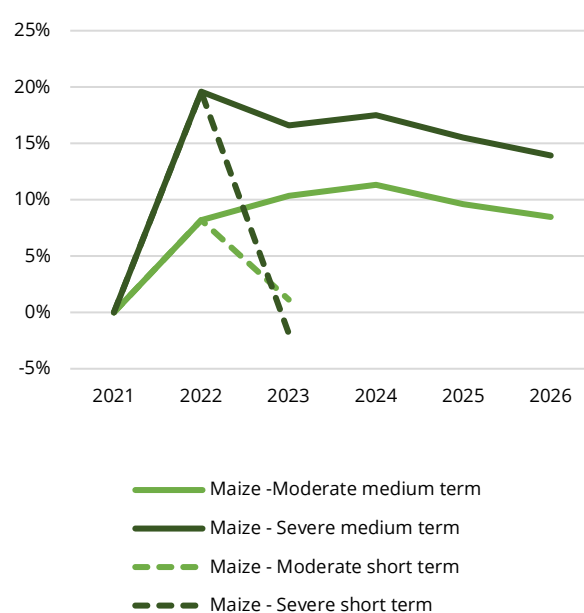
FIGURE 21

A, B, C and D: World price responses to scenarios

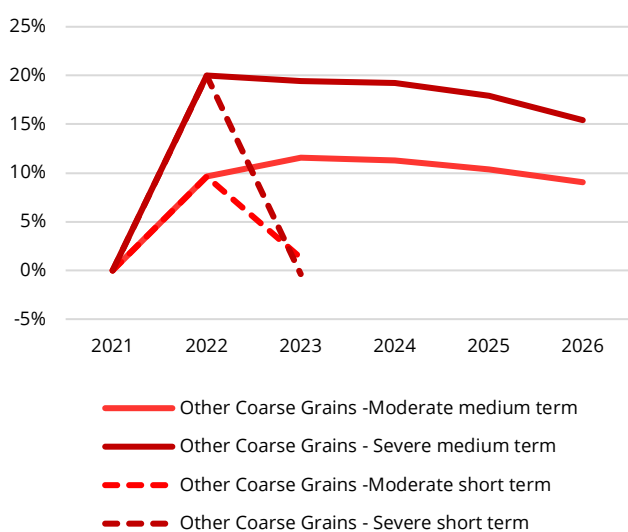
Nominal price response of wheat



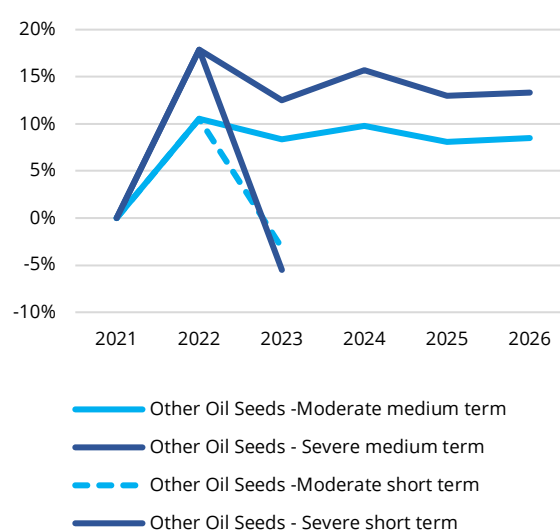
Nominal price response of maize



Nominal price response of other coarse grains



Nominal price response of other oil seeds



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On 11 March, the Council of the International Maritime Organization issued a decision on the Black Sea and Sea of Azov situation, underscoring the need to preserve the security of international shipping and the maritime community, the supply chains that sustain other nations and provide food and medicines to Ukraine.⁷

Many international companies in the grain and oilseed export sectors have stopped operating in Ukraine to protect the safety of their employees. Even though the security situation across much of Ukraine improved as active fighting into the eastern part of the country eased, export volumes remain constrained by a lack of access to ports. This has prevented the sector from fully recovering its operation. In the Russian Federation, a number of multinational agribusiness companies have withdrawn from their export-oriented operations. However, some remain active in the domestic market, such as in feed production or oil crushing. In both countries, delaying exports requires greater reliance on storage facilities, especially silos. Under favourable conditions, grains can be stored for multiple seasons, but the duration that raw oilseeds can be stored is usually shorter. Moreover, to achieve the highest possible oil yields, oilseeds must be crushed shortly after harvest. Before the outbreak of the war, 1 378 grain elevators operated across Ukraine, with a total capacity of over 57 million tonnes.⁸ It was sufficient to store more than 80 percent of total cereal production. It is estimated that up to 15 percent of the storage capacity is in the areas outside the government control.

Although grain elevators and oilseeds crushing facilities are spread across Ukraine, their concentration and carrying capacity are closer to important transportation points and ports, thus increasing their risk of being damaged in war. Smaller regional processing facilities, which do not usually operate for the whole season due to lack of raw materials, are needed for crushing oilseeds.⁹ If modern oil crushing facilities are damaged, the excess capacity of smaller regional processing facilities could balance losses. However, many of the smaller facilities lack the technology to switch between oilseeds varieties.

FIGURE 22:
Grain elevators in Ukraine¹⁰



Source: Based on information from Elevatorist.com

⁷ <https://www.imo.org/en/MediaCentre/PressBriefings/pages/ECSStatement.aspx>

⁸ <https://elevatorist.com/karta-elevatorov-ukrainy>

⁹ https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Oilseeds%20and%20Products%20Annual_Kyiv_Ukraine_04-15-2021

¹⁰ The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

2.4 Production risks

As of mid-June, winter cereal crops in the Russian Federation and Ukraine are approaching the ripening stage. Harvests of these crops is likely to start in early July, depending on weather conditions.

Even though drier-than-average conditions in some regions delayed plantings in October 2021, an above-average area was sown with winter wheat in both the Russian Federation and Ukraine. Adequate rains have supported these crops since their planting, with the accumulation of well-distributed snow cover protecting them from freezing temperatures and securing soil moisture reserves for the spring period. Following below-average precipitation amounts in March, rain levels returned to normal and soil moisture amounts were reported to be above average in most croplands in April. Although this was followed by a drier-than-average May, crop conditions remain favourable.

2.4.1 Assessing crop production risks in Ukraine

Early in the war, there were concerns that war could trigger population displacements, damage civil infrastructure and restrict the movements of people and goods, preventing farmers from attending to their fields, harvesting and marketing their crops. This was further exacerbated by disruptions to essential public services such as provision of water, energy, transport, markets, and banking.¹¹ Following the retreat of the active fighting to the eastern part of the country in early April 2022, economic activities, resumed, including in agriculture. In these areas, farmers returning to their fields were often faced with the urgent need to remove unexploded ordnance before they could apply fertilizers for winter crops or prepare land for spring crops.

Current production prospects for 2022/23 crops in both countries are favourable, but uncertainty prevails over the harvest in Ukraine. Although in some cases shortages of personnel were reported, initial concerns that broad mobilization of military reserves would decrease the number of agricultural labourers and workers along the supply chains did not materialize, as steps were taken to ensure agricultural operations are sufficiently staffed. For instance, in early March 2022, the Government of Ukraine introduced policies granting a deferment from conscription during mobilization, based on submission of a list of critical employments, in order to enable the sector to carry out spring and summer fieldwork in a timely manner.

Despite high fertilizer prices, it appears that large and industrial farmers have secured the necessary fertilizer supplies ahead of time, and localised shortages can largely be attributed to supply chain bottlenecks. Authorities estimated that stocks available in the country would satisfy about 75 percent of the fertilizer and crop protection material needs. However, a lack access to fields and lack of fuel could still prevent producers from carrying out necessary operations to apply them. Nitrogenous fertilizers (such as urea and ammonium nitrate) can also be directed to other uses, such as explosives.

In Ukraine, Vinnytsya, Donetsk, Zaporizhzhya, Kirovohrad, Mykolaiv, Kherson and Khrakiv regions accounted for half of total wheat production in 2020. Vinnytsya, Zhytomyr, Kyiv, Poltava, Sumy, Khmelnytskyi, Cherkasy and Chernihiv regions produced 70 percent of the total maize volume harvested, while 60 percent of sunflower seeds were produced by Chernihiv, Kharkiv, Sumy, Poltava, Mykolaiv, Luhansk. Kirovohrad, Zaporizhzhya, Dnipro and Vinnytsya regions.¹²

Overlapping the most productive agricultural areas of Ukraine with possible scenarios of the territorial spread of the war, in early March, FAO anticipated that 20 percent of winter planted areas may not be harvested because of direct destruction, constrained access or lack of economic resources. Yet, more recent assessments issued by local sources put these area losses at 28 percent, anticipating that out of 7.6 million hectares planted with winter wheat, rye and barley, only 5.5 million hectares could be available for harvesting.¹³ FAO's expectations regarding yield outcomes for winter cereals are also negative, pointing to national yields falling 10 percent below average levels due to delayed or missed application of fertilizers and an inability to control pests and diseases. The lower yields and greater postharvest losses that could occur due to shortages in the labour force or from a lack of storage facilities. These estimates remain valid. The final size of harvests will also be determined by the availability of diesel for harvesting. Most of diesel was imported from

¹¹ <https://www.care-international.org/news/press-releases/care-statement-conflict-escalation-in-ukraine>

¹² ukrstat.gov.ua

¹³ <https://www.apk-inform.com/en/news/1525721>

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the Russian Federation, Belarus and tankers entering via the Black Sea, none of which remain a feasible option at the moment.

Ukraine

Crop Calendar



Source: FAO/GIEWS.

Sowing operations of spring crops (spring wheat and barley, maize, sunflower) began in April. As of June 2, farmers planted 13.2 million hectares with spring crops, about 78 percent of the area planted during the corresponding period of 2021. Although areas planted with some crops, such as spring wheat remained comparable with those of last year and planting data is not yet final, in early June progress of sunflower was reported to be 30 percent below last year's levels, reflecting uncertain export prospects. The 2022/23 rapeseed sowing season will not open until September 2022.

Livestock and poultry rearing as well as production of high value crops, such as fruits and vegetables, could also be constrained in Ukraine.

2.4.2 The spread of African swine fever: A heightened risk for Ukraine and all neighbouring countries

The war is also likely to affect the ability of Ukraine to control its animal disease burden, notably of African swine fever (ASF). ASF is a fatal disease of pigs. It has been reported in the region in pigs and in wild boars, including in Ukraine and the Russian Federation. As no effective vaccine against ASF exists, it can only be controlled by maintaining high biosecurity on pig farms.

The war has significantly increased the risk of a proliferation of animal diseases, notably of ASF. It undermines existing capacities in the areas of surveillance, diagnostics, vaccination, and outbreak control. It hampers food inspection services, restricts access to suspected farms, slaughterhouses, as well as veterinary care facilities and other value chain entities.

The large number of internally displaced people and refugees fleeing from the war could further contribute to the spread of ASF virus (ASFV), via the movement of ASFV contaminated pork products. Similarly, a large number of abandoned domestic animals (pigs) might add to a higher ASF risk exposure, particularly in ASF enzootic areas. The war is also likely to intensify the movement of wild boars, an important vector of the disease, crossing Ukraine's borders into the European Union and Belarus.

These developments could also nullify Ukraine's recent efforts in controlling the disease. The country has been successful in managing its ASF outbreak over the past decade, establishing a satisfactory level of on-farm biosecurity. Basic infrastructure such as clean water supplies and reliable electricity, in conjunction with careful farm management, are indispensable to maintain high levels of farm biosecurity. The current war is changing the biosecurity landscape of pig farms in Ukraine, which will likely result in an increase in ASF outbreaks.

2.4.3 Assessing the global risks arising from an input-intensive Russian agricultural sector

As for output prospects for the Russian Federation, no major impacts are expected on agricultural production in the short term. Assuming normal weather prevails through the remainder of the season, eventual yield reductions for cereals already in the ground will likely be negligible. International sanctions imposed in response to the war could directly or

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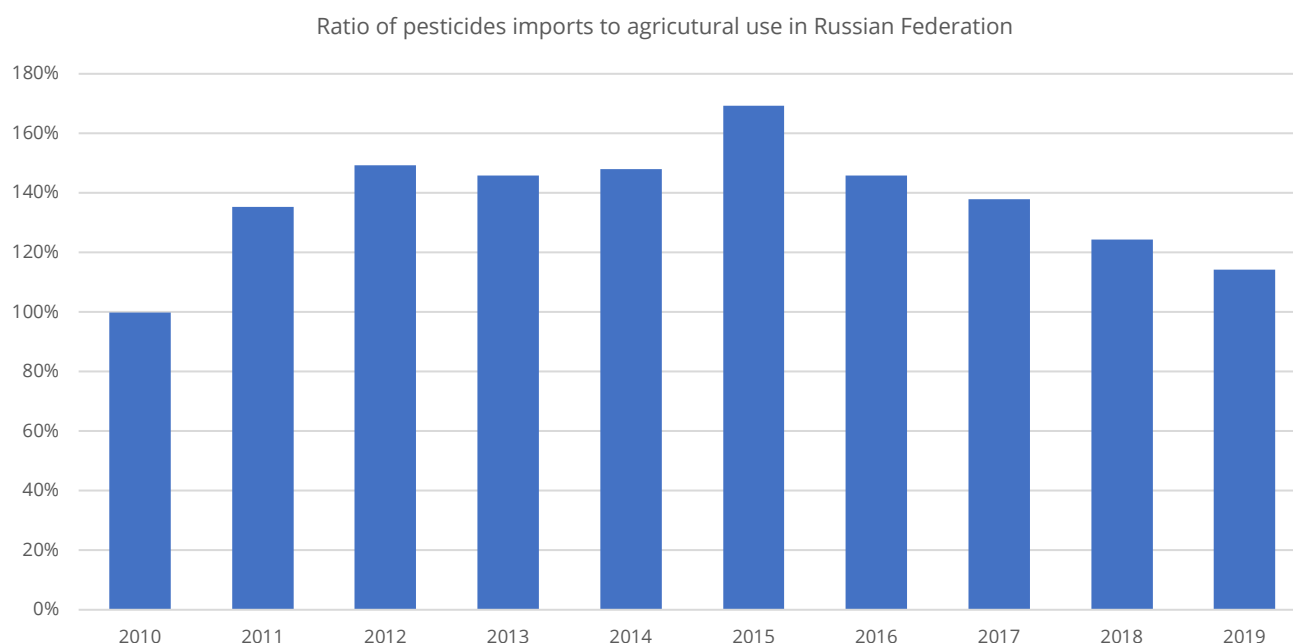
indirectly imply economic losses for the Russian agricultural sector. Indeed, farmer incomes in the country risk being depressed by the loss of export markets and constrained access to financial services needed to complete international transactions. Should these risks materialize, and alternative arrangements fail to emerge, such disruptions could negatively influence future planting decisions. A high dependency on imports of agricultural inputs (other than fertilizers) and potential trade hurdles stemming from economic sanctions imposed on the country also pose risks to the Russian agricultural sector.

Russian agriculture includes a large number of input-intensive, large-scale farms, specialized in supplying international markets with basic food commodities such as wheat and maize. The production of these products is characterized by high application levels of domestically supplied fertilizers, as well as of imported seeds and pesticides.

As evident from figure 23, agriculture in the Russian Federation is particularly dependent on imported pesticides. Even on a net-trade basis (after accounting for exports or re-exports), the Russian Federation regularly imported more pesticides than it used domestically. According to the latest pesticides balances available from FAOSTAT, this feature prevailed throughout the last decade (figure 23). This is a remarkable finding, which deserves a deeper analysis. Here it may suffice to say that this high-import dependency of more than 100 percent could reflect several factors, including a constant trend to stockpile pesticides for non-agricultural uses. For example, herbicides could be used to keep rail tracks free of weeds and vegetation. On the other hand, this could be simply a reflection of the limited quality of the underlying statistics.

FIGURE 23

Unusual import overall dependency on pesticides



Sources: FAOSTAT

Figure 24 suggests that the main rubrics of pesticides, like herbicides, fungicides and insecticides, account for about equal value shares in total imports of pesticides. In addition, the Russian Federation imported a considerable amount of disinfectants in 2021, adding up to overall pesticides imports of USD 872 million.

The Russian Federation also imported seeds for more than USD 400 million, as well as a small amount of fertilizers. As analysed in the fertilizer trade profile section, the Russian Federation is the single largest exporter of fertilizers globally and only imports for reasons relating to transportation costs, given the vast geographic extent of the country.

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The possible sanctions have exposed the Russian Federation's agricultural sector to risks, as it heavily relies on agricultural input imports, notably pesticides and seeds. This poses a risk to global food supplies. Not having access to enough herbicides for instance may lower yields; a lack of fungicides could lower both yields and quality; the resulting fungus pressure would also make it riskier to apply large quantities of N-fertilizer.

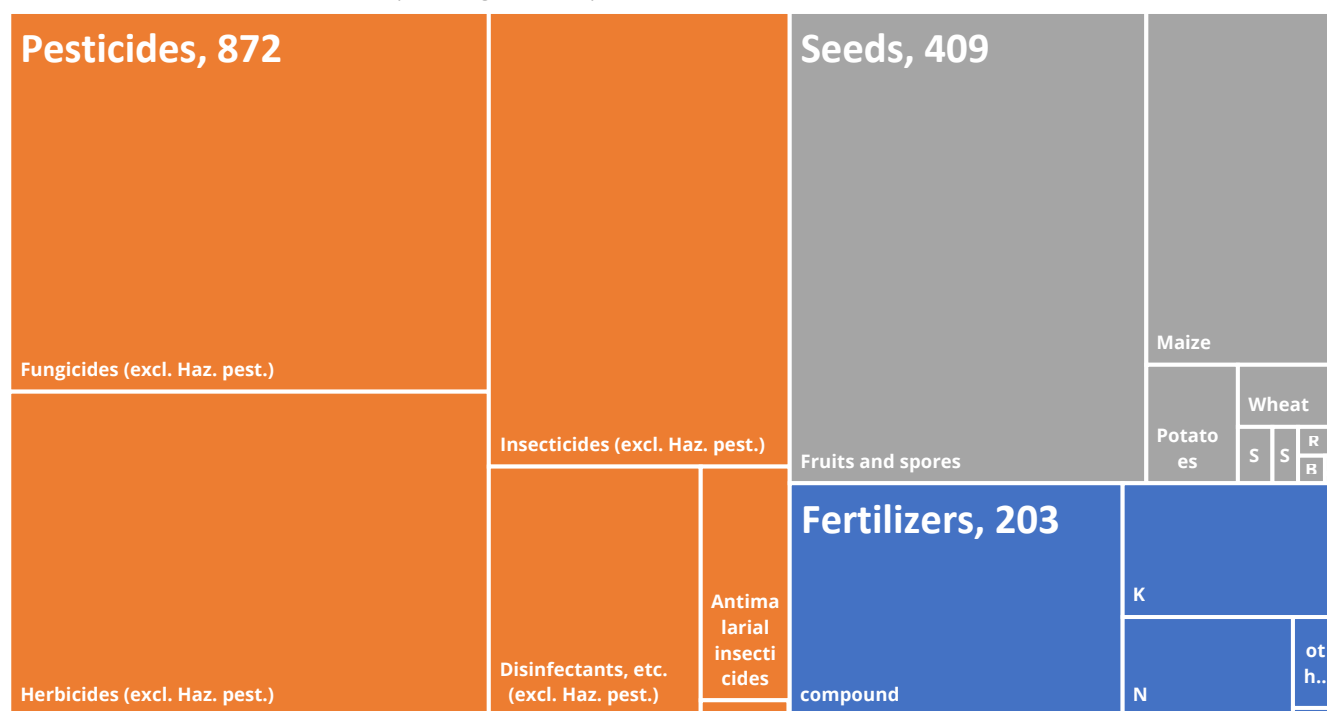
Turning to the sources of these imports, figure 25 reveals that the lion's share of pesticide imports stem from the European Union. The European Union accounts for 58 percent of the pesticides imports by the Russian Federation, other large suppliers include China (15 percent) and Belarus (7 percent). In absolute terms, in 2021, the Russian Federation imported pesticides worth USD 872 million, of which USD 509 million were sourced from countries within the European Union.

Similar degrees of dependencies exist for seeds. In 2021, the Russian Federation purchased seeds to the tune of USD 409 million, 68 percent or USD 277 million of which originated from the European Union, followed by the United States of America and Peru, each accounting for 4 percent of total seed imports. It is important to note that the seed imports analysed here only include "high value" seeds, that is hybrid, genetically modified organism (GMO) or certified seeds. In addition to these high-value imports, there are seeds that are either retained by farmers domestically or imported. Clearly, these are only non-hybrid and non-GMO varieties.

FIGURE 24

Russian imports of pesticides, seeds and fertilizers

Imports of agricultural inputs, Russian Federation, 2021, US\$ millions



Source: Trade Data Monitor (TDM), FAO calculations

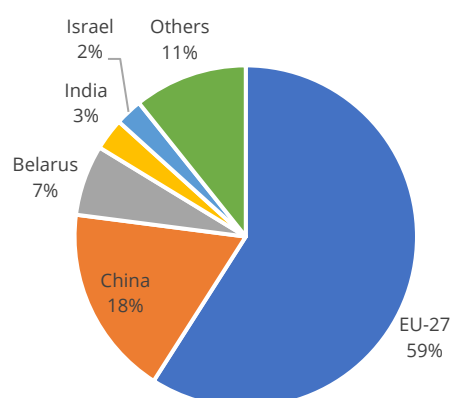
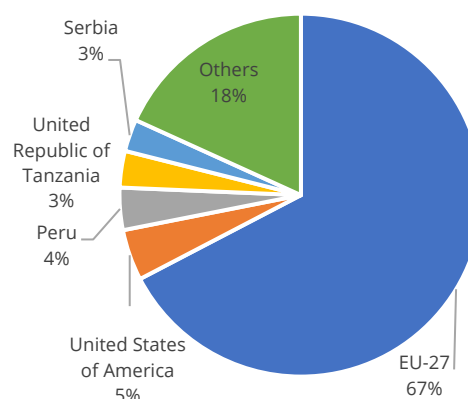
These high import dependencies in conjunction with large import shares of the European Union suggest that possible trade sanctions could take a hefty toll on crop production by the Russian Federation. Lower supplies and less productive varieties could result in less plantings, lower yields, and lower qualities. The combined effect of lower seed and pesticide use could weigh on the availability of many food crops, both for domestic use and, arguably, even more so for crops that are destined for international markets. This would add to upward pressure on international prices and further weigh on global food security.

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Figure 25

Pesticide and seed imports by the Russian Federation

Russian agricultural input imports, **pesticides**, 2021Russian agricultural input imports, **seeds**, 2021

SOURCE: Trade Data Monitor (TDM), FAO calculations

2.5 Humanitarian risks

2.5.1 Assessing the possible effects of the war in Ukraine on domestic food security

War interrupts regular economic and livelihood activities and constrains income flows. Even in cases of sufficient local availabilities, regular supply chains may be disrupted by insecurity, infrastructure damage, energy shortages and lack of personnel. Both Ukraine and the Russian Federation had already been experiencing elevated levels of food price inflation prior to the outbreak of the war, although in both cases local prices remained¹⁴ considerably below the peaks registered in 2015, as the war in the eastern part of Ukraine took its toll on economic activities. Annual food price inflation in February 2022 stood at 14.3 percent in Ukraine, and at 11.5 percent in the Russian Federation, but it increased to 22.4 percent in Ukraine (April 2022) and to 20 percent in the Russian Federation (May 2022). Concerns exist that the continuation of hostilities and war-induced disruptions could keep food inflation levels persistently high in both countries, thus decreasing the purchasing power of local populations, with consequent increases in food insecurity and malnutrition.

Already, prior to 24 February 2022, about 1.5 million people had been displaced as a result of the near eight-year conflict in eastern Ukraine, some 1.1 million were in need of food and livelihood assistance, and about 400 000 of them had needs related to food insecurity. The war has increased humanitarian needs within Ukraine and in neighbouring countries where displaced populations are seeking refuge. While the evolving situation remains unpredictable, the prevalence and severity of domestic food insecurity will depend on the length and scale of the conflict. Sieged areas already report shortages of food and medicine as humanitarian corridors have faced difficulties in reaching those in need. Urban areas are likely to be more affected, as rural dwellers typically cultivate at least some land to supplement household diets.

An estimated 15.7 million people in Ukraine are in urgent need of humanitarian assistance and protection. In response, the World Food Program (WFP) aims to provide in-kind and cash assistance to 3.1 million crisis-affected people and internally displaced people (IDPs) on the move within Ukraine, as well as 300,000 refugees and asylum seekers from Ukraine in neighbouring

¹⁴ Over 50 percent in Ukraine and slightly below 25 percent in Russian Federation.

countries.¹⁵ FAO is aiming to provide urgent livelihoods assistance to almost 1 million people, including displaced and host communities. Ongoing support is reaching some 60 000 people, with a further 25 000 people to be assisted in the coming weeks with current resources.

According to the April update of the Ukraine Flash Appeal 2022 issued by the United Nations, given the scale and direction of the ongoing hostilities, 24 million people are projected to be affected, including up to 7.7 million projected to be newly internally displaced. Although some have returned to their homes since then, western parts of the country are reporting large numbers of IDPs, which are putting a strain on local resources. This is while about 7 million people, mostly women and children, have crossed western borders with over 3 million crossing in the first three weeks since the war's escalation. Public services and resources in smaller and less economically advantaged countries receiving refugees have been under strain. Early reports indicate that a large share of refugees have private host accommodations set up in their destination countries, which are often different from their entry countries. Since April 2022, about 1.7 million crossed the border to enter Ukraine, compared to about 500 000 in March,¹⁶ when returns were motivated by joining the defence forces, but a lack of employment opportunities and services, including day-care facilities for children mothers seeking employment, remain an obstacle in many cases.

2.5.2 Assessing the possible effects of the war in Ukraine on international food security

The 2021 edition of the report on the State of Food Security and Nutrition in the World (SOFI), released in July 2021, estimated that world hunger increased in 2020, under the shadow of the COVID-19 pandemic. After remaining virtually unchanged for five years, the prevalence of undernourishment (PoU) increased by 1.5 percentage points in just one year to reach around 9.9 percent, thus heightening the challenge of achieving the Zero Hunger target by 2030. The SOFI report also indicated that between 720 and 811 million people in the world faced hunger in 2020.

According to the 2022 Global Report on Food Crises, 193 million people experienced acute food insecurity in 2021.¹⁷ Projections for 2022 indicate that in 41 out of 53 countries covered under the Global Report, up to 181 million people could face crisis or worse levels of acute hunger. With most of these analyses not accounting for the impacts of the war in Ukraine, the global food security situation is likely to deteriorate substantially in 2022 without rapid and sustained humanitarian action that includes a strong focus on local food production.

Against this background, the escalation of war engaging such important global agricultural commodity market players, at a time of already high and volatile international food and input prices, raises significant concerns over the war's potential negative impact on food security, both domestically and internationally. Much uncertainty surrounds the war itself, its intensity, geographical scope, and duration. However, domestically, its escalation could directly constrain the countries' agricultural production, which coupled with limited economic activity and increasing prices, could undercut the purchasing power of local populations, with consequent increases in food insecurity levels. Responding to concerns about sufficient supplies on the domestic market, on 5 March, the Government of Ukraine introduced zero quotas for exports subject to licensing in 2022 of maize, oats, buckwheat, millet, sugar, and salt suitable for human consumption.¹⁸ Globally, given the war's potential to disrupt agricultural activities in such significant global suppliers, international markets of foodstuffs and agricultural inputs are not expected to remain immune to its effects. Were it to result in a sudden and prolonged reduction in food exports by either country, it could put upward pressure on international food commodity prices to the detriment of low-income food-deficit countries (LIFDCs).

Although agricultural commodities of different origins are substitutable to a large extent, sourcing from different origins entails increased shipping and transactions costs for many substantial importers, particularly in countries or regions that traditionally rely on Black Sea supplies due to their geographical proximity. While some net food importers are concomitantly exporters of other commodities and may thus be in a more comfortable position to cover their increased food import bills, others are not. A number of countries also maintain consumer subsidies to protect their consumers from price fluctuations on international commodity markets, often at rather steep fiscal costs for governments.

¹⁵ https://api.godocs.wfp.org/api/documents/a01f1168a36c4dbaa98b3eae74f4996/download/?_ga=2.169855457.1922200705.1647596767-1938389256.1630911060

¹⁶ <https://data.unhcr.org/fr/situations/ukraine>

¹⁷ <https://www.fao.org/3/cb9997en/cb9997en.pdf>

¹⁸ <https://interfax.com.ua/news/economic/808490.html>

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Therefore, securing wheat supplies from relatively more affordable destinations (including shipping costs) is crucial for them to maintain a certain degree of fiscal balance. In addition to increasing countries' food import bills, high international food commodity prices make sourcing of food assistance to those most in need across the globe more expensive.

Beyond countries' fiscal positions, high food prices negatively impact populations with lower incomes (including pensioners) in both developed and developing countries, as these groups spend a larger share of their incomes on food. To cope with high food prices, these groups may be compelled to cut other essential expenses, such as schooling, energy, heating or medicines, or to engage in negative coping strategies including skipping meals, and/or purchasing cheaper but less nutritious alternatives.

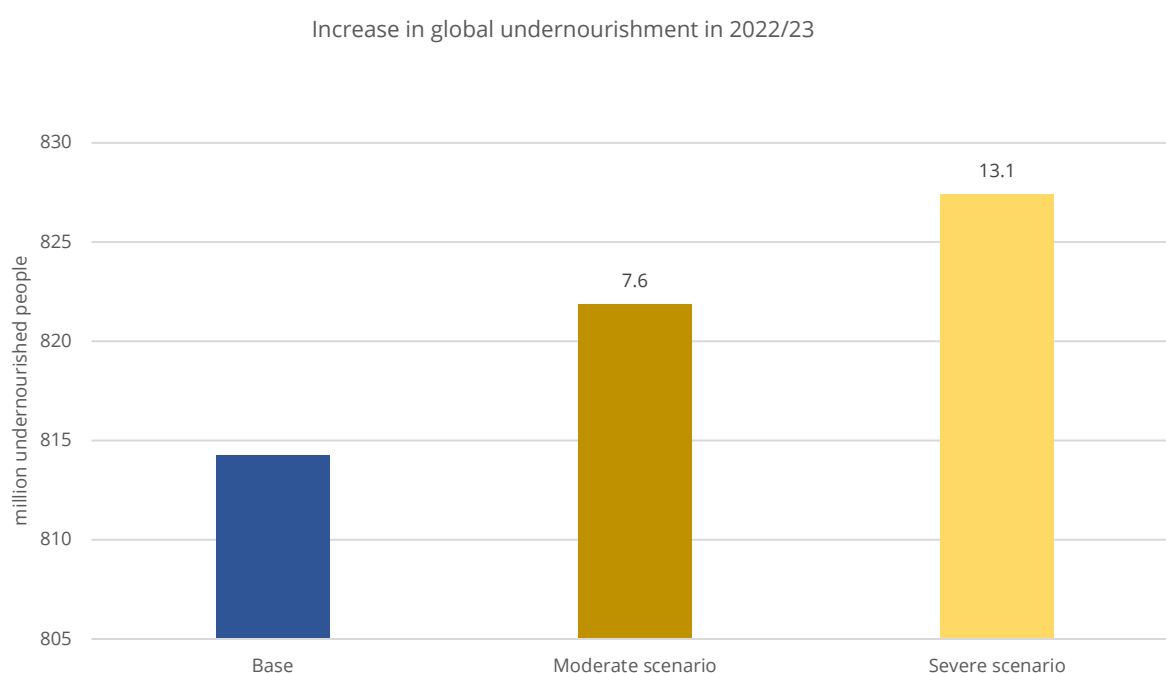
In terms of impacts on food security, FAO simulations suggest that under the moderate shock scenario described in section 2.2, the global number of undernourished people would increase by 7.6 million people, while this level would rise to 13.1 million people under the more severe shock setting (figure 26). From a regional perspective and with respect to the projected baseline levels in 2022, the most pronounced increase in the number of people undernourished would take place in the Asia-Pacific region (up 4.2 to 6.4 million), followed by Sub-Saharan Africa (up 2.6 to 5.1 million) and the Near East and North Africa (up 0.4 to 0.96 million).

A third and more extreme scenario simulating the severe export shortfall from Ukraine and the Russian Federation described in section 2.2 scenario 2 but expanding the shocks to 2022 and 2023, and assuming no global production response because of lack affordability and access to fertilizers, suggests an increase in the number of undernourished by close to 19 million people in 2023.

If war-related factors prolong the countries' export reduction into the 2026/27 marketing year and they keep reference crude oil prices elevated, international food prices would remain elevated. Compared to the baseline estimate, this would raise the number of undernourished by 8.1 million people in a moderate shock setting and by 11.2 million in a severe scenario. From a regional perspective, the most pronounced increase in the number of people undernourished would remain in the Asia-Pacific region, followed by sub-Saharan Africa and the Near East and North Africa (figure 27).

FIGURE 26

A and B: Global number of undernourished



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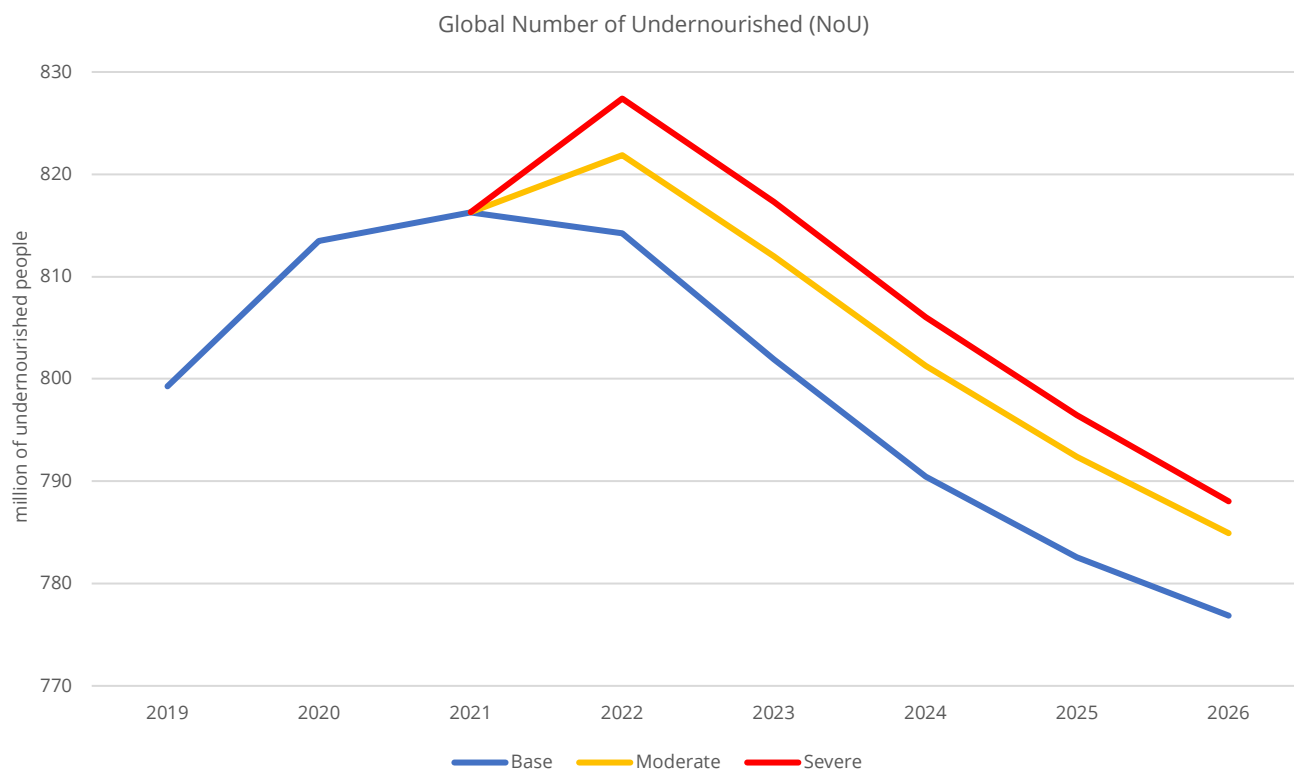
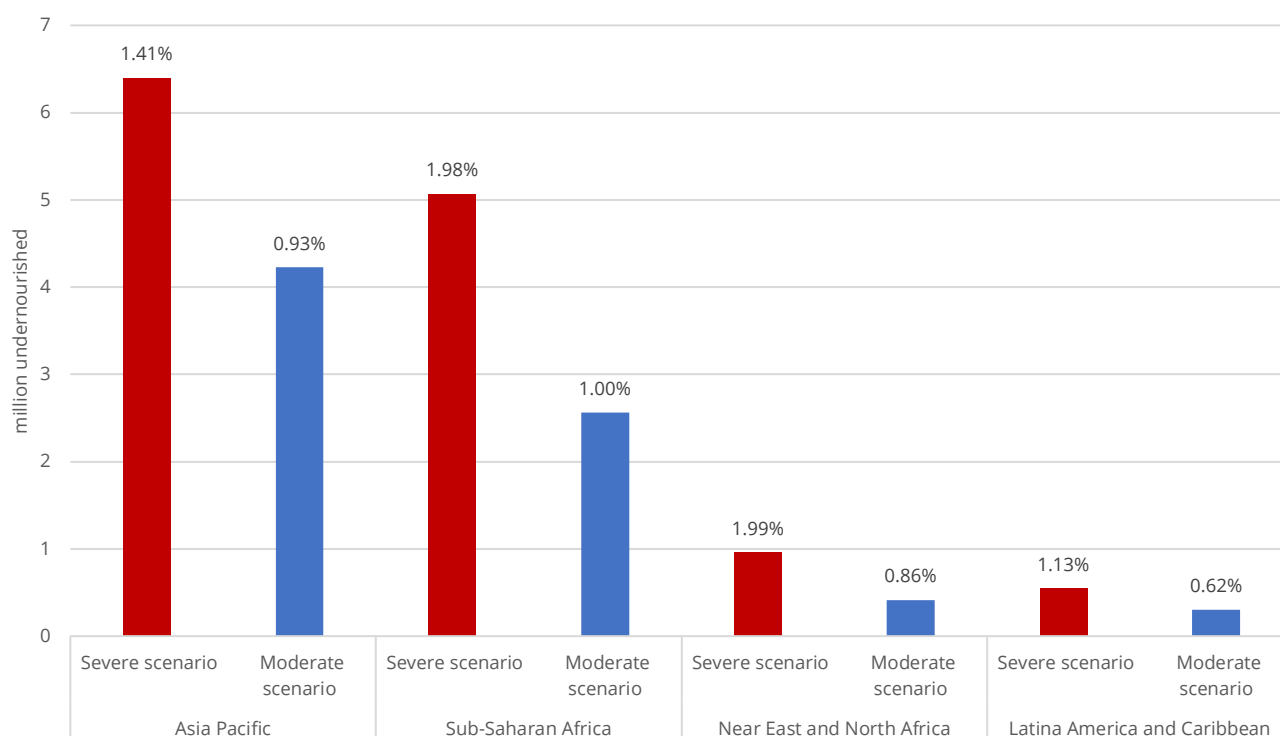


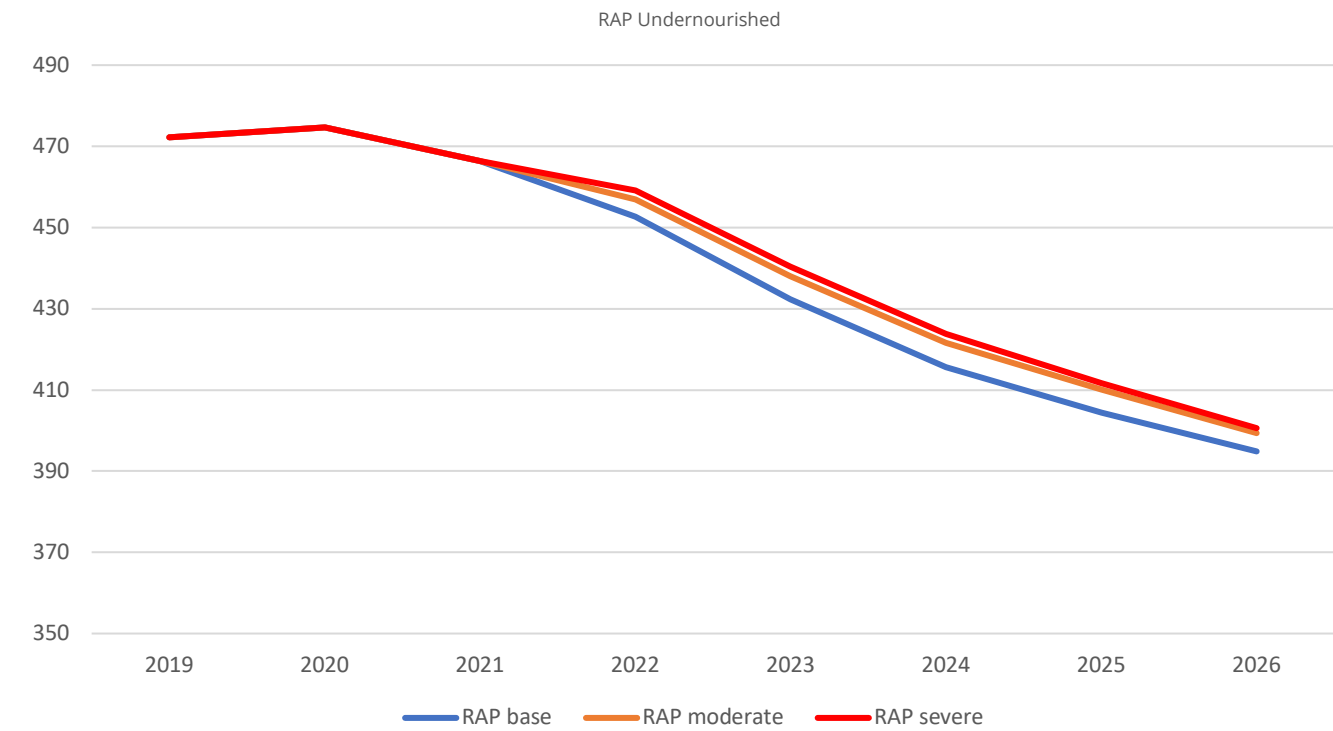
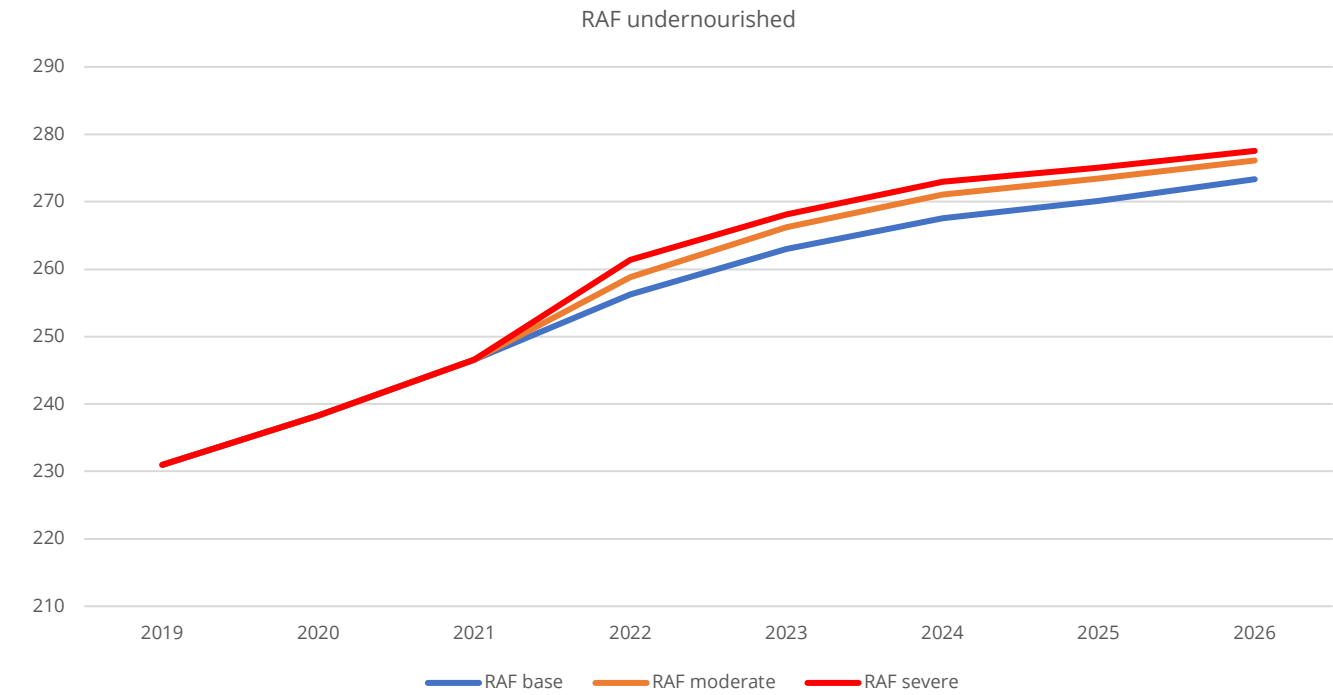
FIGURE 27

A, B, C, D and E: Regional increase in the number of undernourished in 2022/23



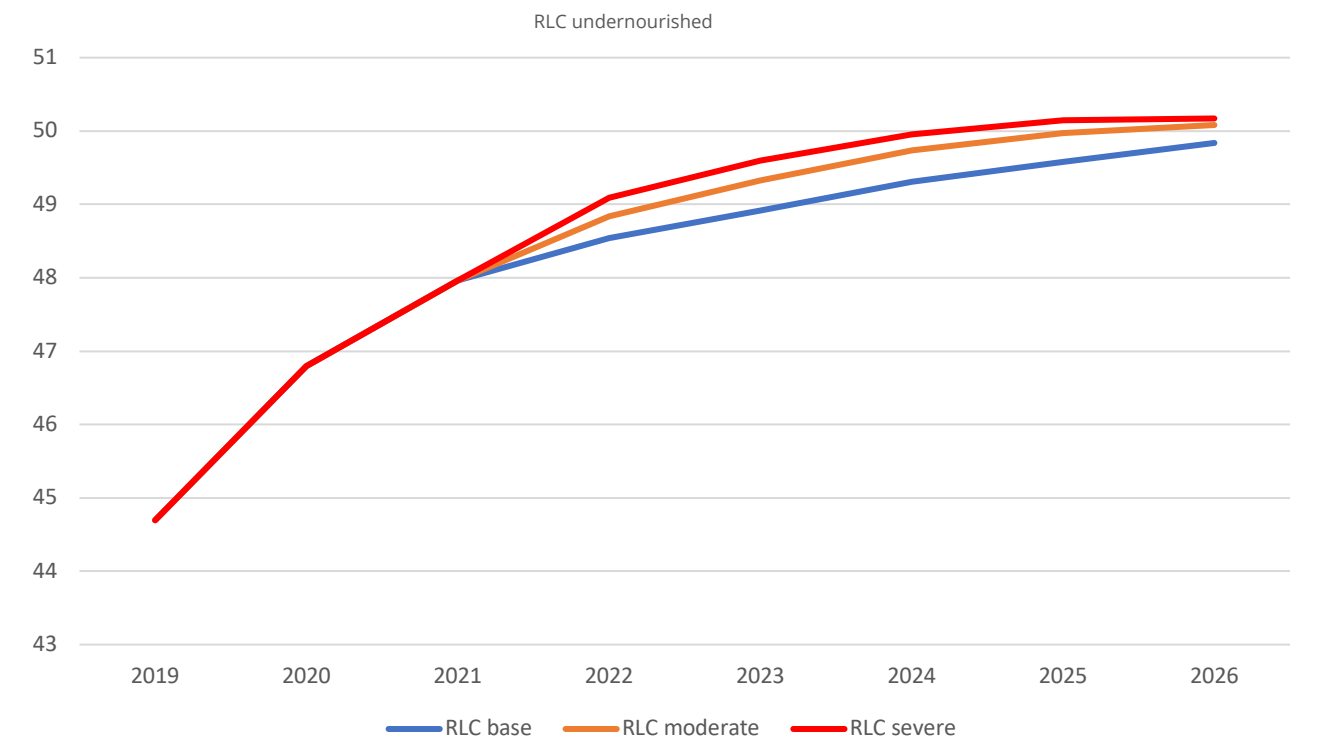
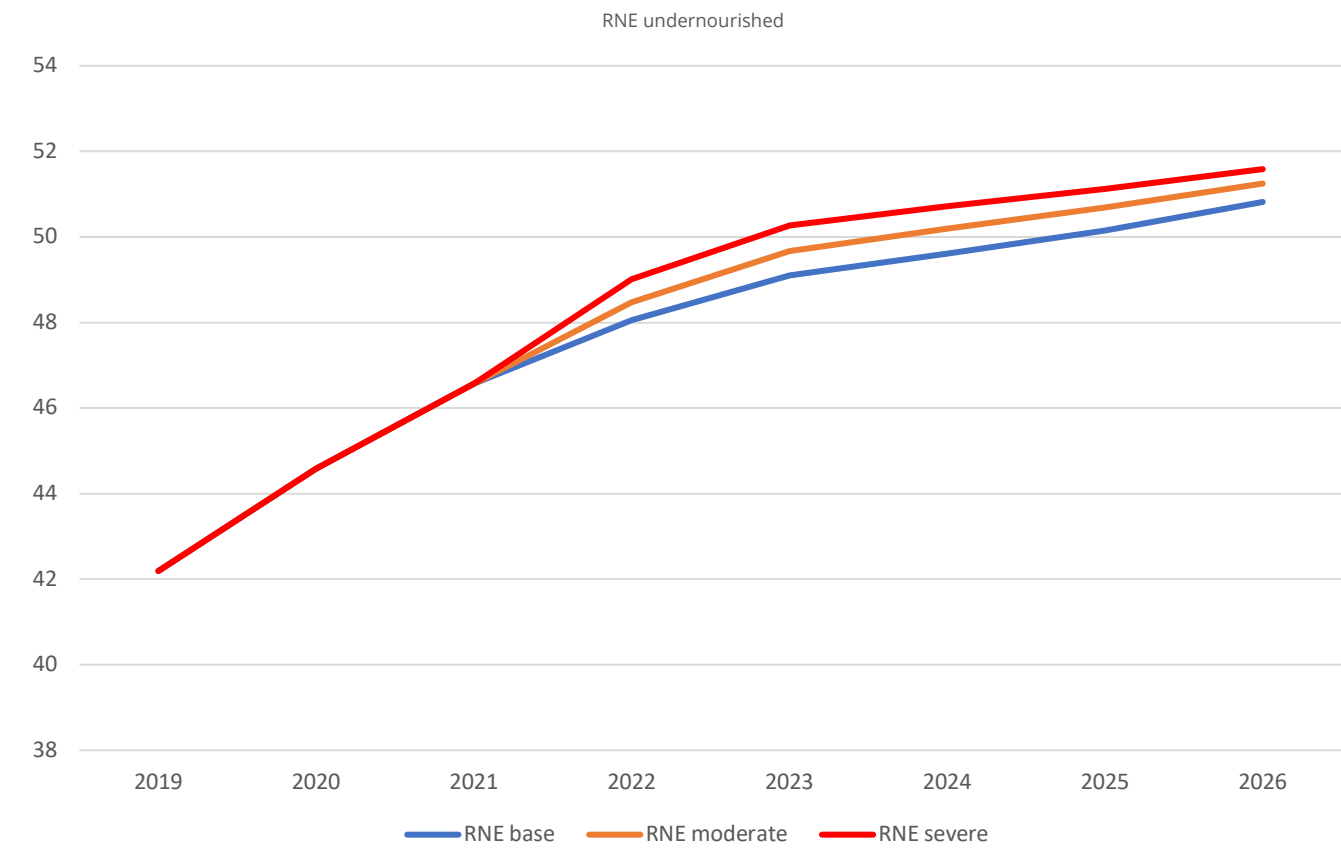
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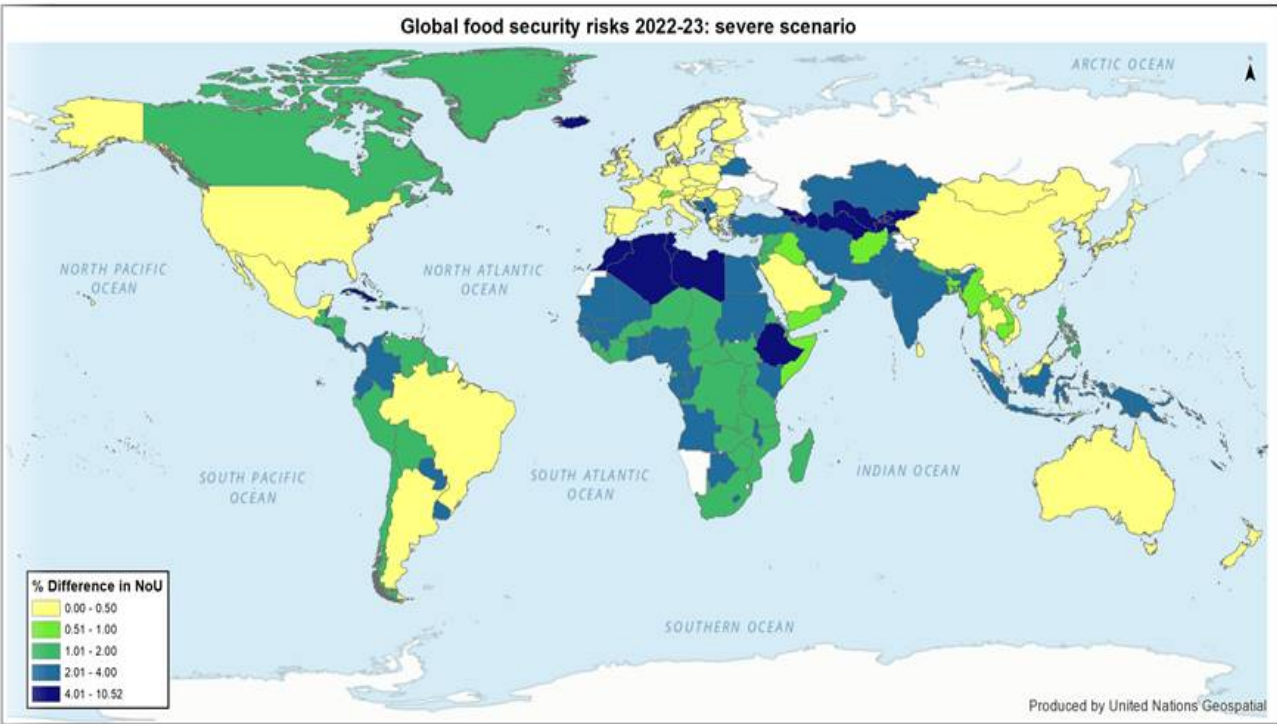
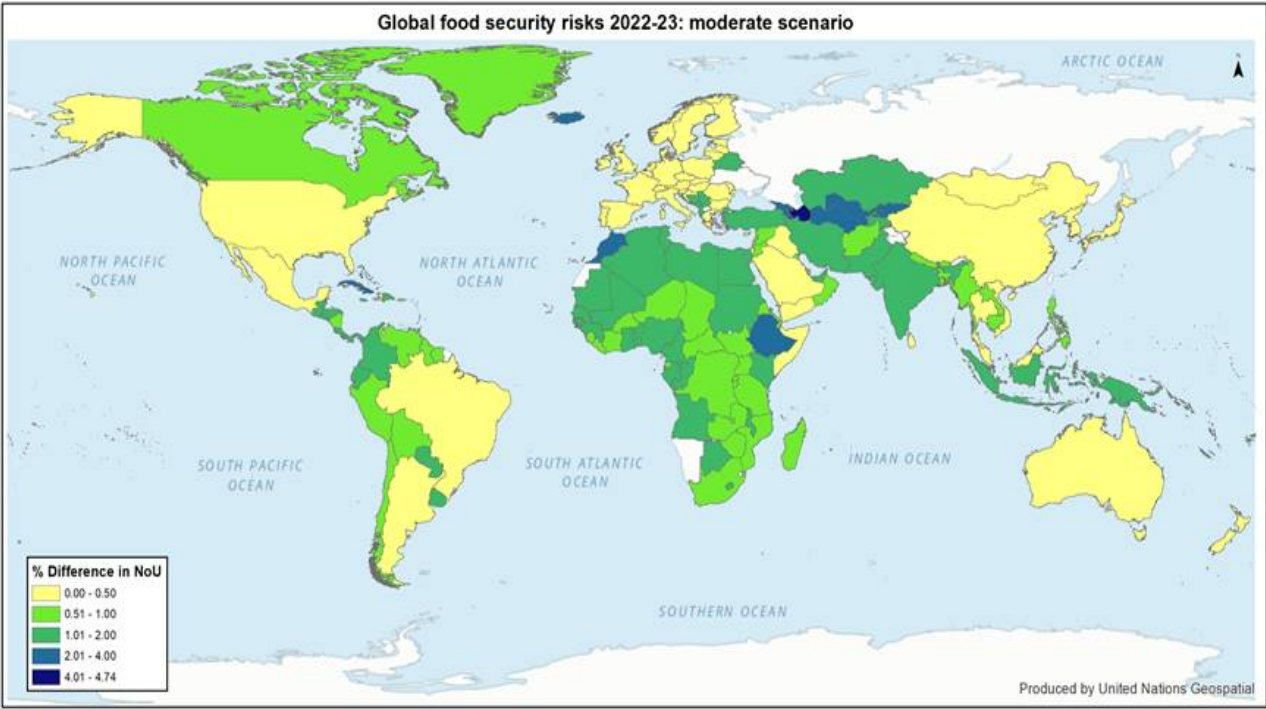
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FIGURE 28
Changes in the number of undernourished people, moderate scenario, impacts over the medium term



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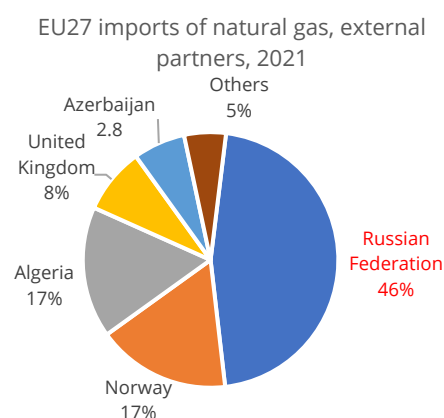
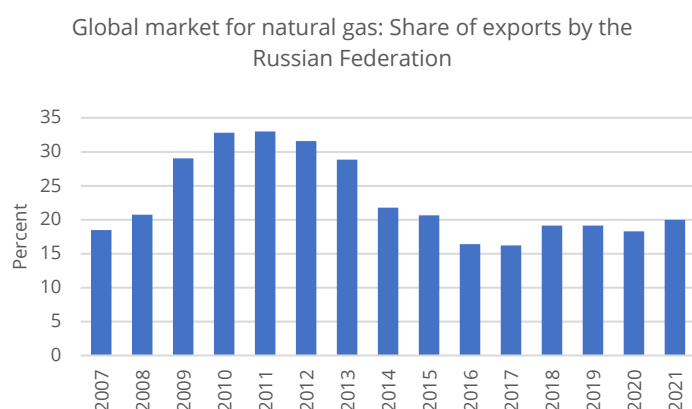
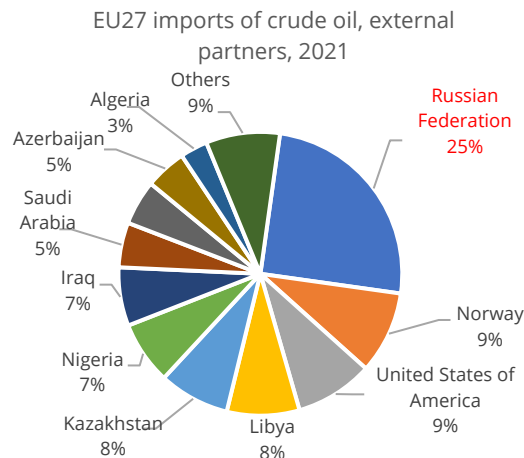
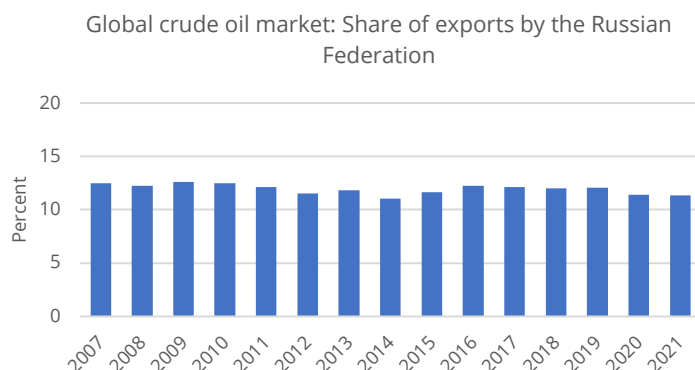
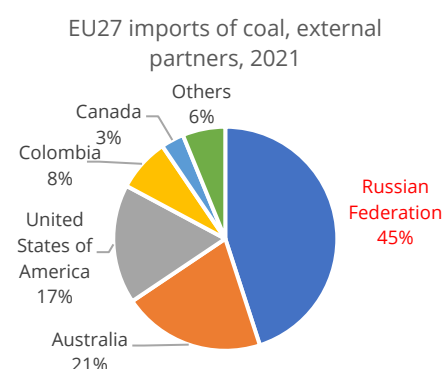
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2.6 Energy risks

The Russian Federation is a key player in the global energy market. Its shipments of coal, oil and gas account for, respectively, 18, 11 and 20 percent of global exports. Russian energy exports are particularly important for the European Union, which sources, respectively, 45, 25 and 46 percent of its coal, oil and gas imports from the Russian Federation. As a highly energy-intensive industry, especially in developed regions, agriculture will inevitably be affected by the sharp increase in energy prices that has accompanied the war (Figure 30 a, b and c).

FIGURE 30

A, B and C: EU imports of energy by country of origin



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Agriculture absorbs high amounts of energy either directly through fuel, gas and electricity use or, indirectly, using agri-chemicals such as fertilizers, pesticides and lubricants, all of which have large, embodied shares of energy. N-fertilizer, for instance, is the product of an energy-intensive process, known as Haber-Bosch synthesis, in which nitrogen and hydrogen are synthesized into ammonia. Ammonia, in turn, is processed into a variety of products, notably fertilizers such as urea and ammonium nitrate, which are then blended with other plant nutrients into compound fertilizers such as diammonium phosphate (DAP), monoammonium phosphate (MAP) or a variety of N-P-K fertilizers. The main energy feedstock for N-synthesis is natural gas, notably in Europe and North America. That said, there is a wide variety of feedstocks used for the Haber-Bosch process ranging from coal to renewable energy sources. Ammonia is also used in numerous other industrial processes, all of which compete with the production of fertilizers. For instance, industrial grade ammonia is used as a liquid to reduce the amount of air pollution created by a diesel engine, which plays a pivotal role for the operation of cars, trucks, and tractors.

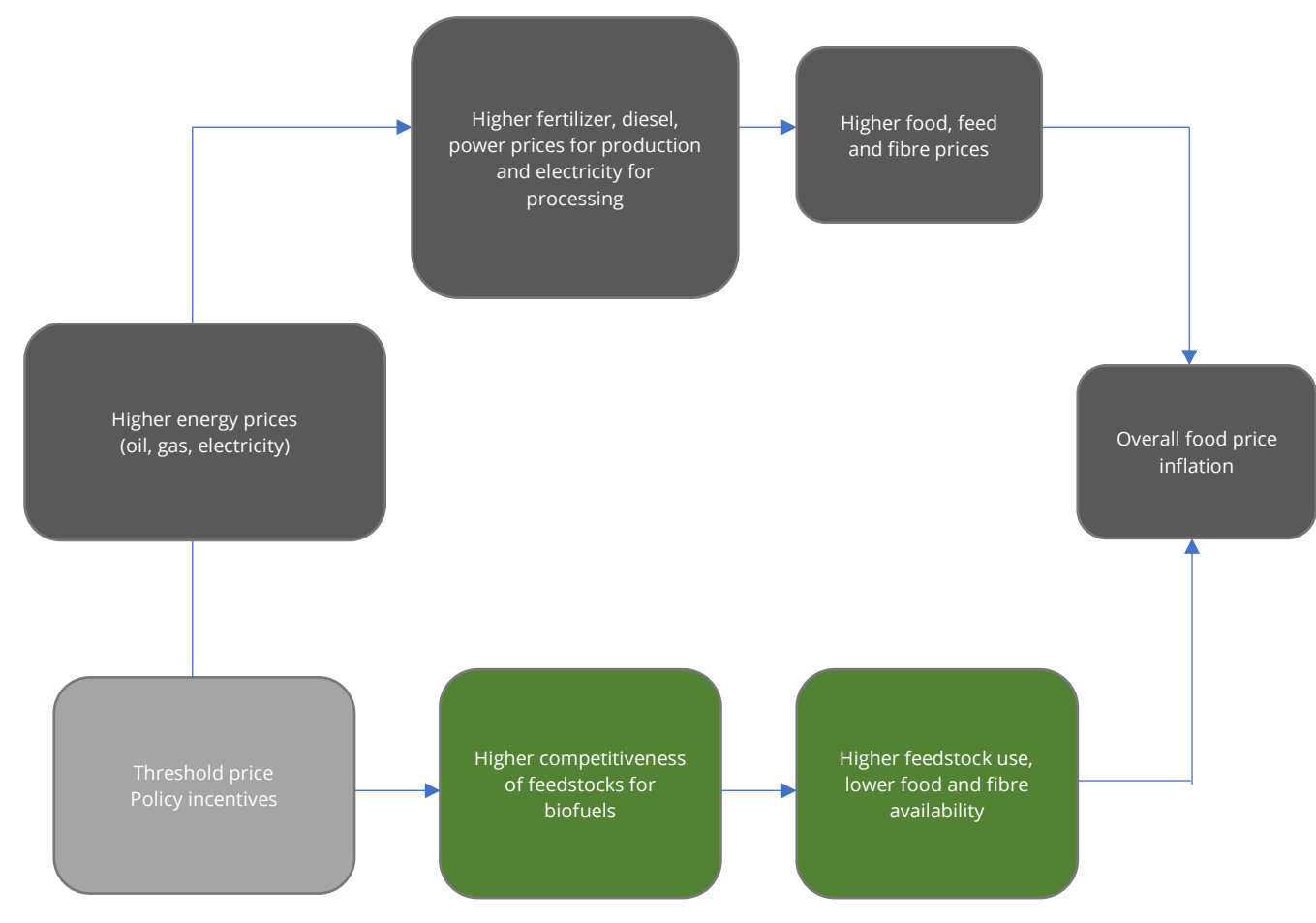
Energy is also required to manufacture feed ingredients, such as the crushing of oilseeds to produce oil meals and the milling of grains to manufacture feedstuffs (pellets, flours, and compound materials). When it comes to food processing, the price of energy features heavily in the cost schedule.

Globally, estimates of direct and indirect energy consumption vary widely across countries. In highly developed agricultural economies, they can exceed 30 percent for direct use and 15 percent for indirect consumption. These substantial shares mean that higher prices of these inputs will inevitably translate into increased production costs and eventually into higher food prices.

2.6.1. How the current crisis affects the nexus between energy and agricultural markets

The lessons from the global food price crisis in 2007/08 show that under scarcity, the diversion of food crops to non-food uses can drive up food prices markedly. To better understand the impact pathways of energy costs on food prices, figure 31 provides a schematic illustration of the linkages and “pass throughs” to food markets. In addition to the links through the input prices, food and fuel prices are increasingly linked through output prices. Two principal channels create the links on the output side.

FIGURE 31
Energy and food markets, tightly linked through input and output markets



2.6.2 Price transmission through the input side

With prices for fertilizers and other energy-intensive products expected to rise because of the war, overall input prices are expected to experience a considerable boost, resulting in lower affordability for farmers and ultimately lower use levels, in theory contingent on the level of output prices. For instance, the recent price increases for fertilizers were so pronounced that they exceeded the price increases for outputs by a considerable margin. The result was a sharp decline in the affordability¹⁹ of fertilizers, which was particularly pronounced for agricultural products that have so far been spared by the otherwise widespread price increases. This was particularly the case for rice and sugar (**Error! Reference source not found**.Figure 22 to 35), where sharply higher fertilizer prices resulted in a precipitous decline in affordability levels. Lower levels of affordability in turn will almost inevitably result in lower input use, lower yields and compromised qualities of yields in the next cropping season, like lower protein levels in milling wheat.

¹⁹ Affordability is defined here as the ratio of output to input prices.

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FIGURE 32
Rice vs fertilizer prices

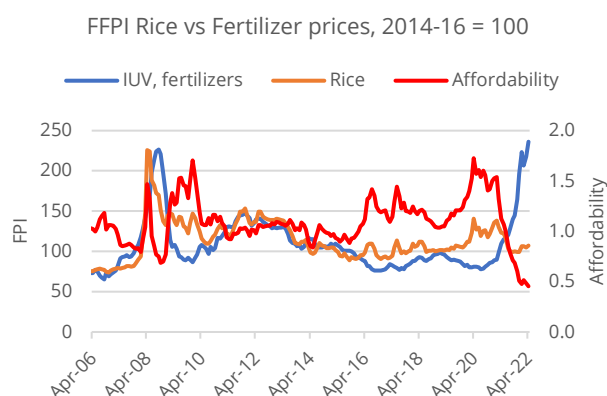


FIGURE 33
Sugar vs fertilizer prices

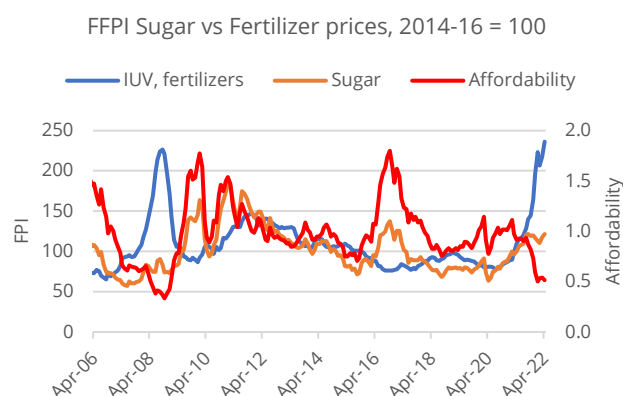


FIGURE 34
Rice vs urea prices

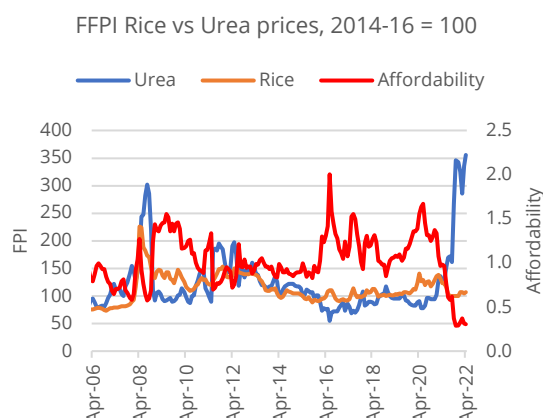
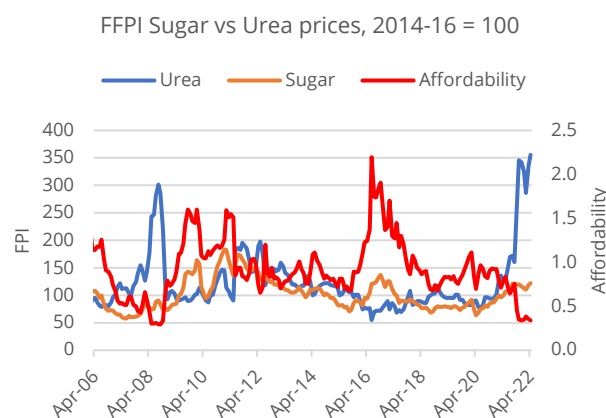


FIGURE 35
Sugar vs urea prices



Source: Index Mundi, Trade Data Monitor (TDM), FAO calculations

2.6.3 Price transmission through the output side

The second channel of transmission involves price linkages through the output side. After the last significant energy price hike in 2008, much of the use of agricultural feedstocks for the energy market was driven by biofuel policies, which, through mandates, tariff protection or price incentives enticed biofuel producers to use a certain and rather inflexible amount of feedstocks for the production of biofuels. Maize, sugar and oilseeds (vegetable oils) are the most common feedstocks, with ethanol and biodiesel the most popular biofuels. These mandated or incentivised quantities are largely independent of energy prices.

However, as energy prices are on a sharp upward trajectory again, the use of agricultural feedstocks can also evolve directly through energy prices. When energy prices rise, there is a threshold at which the production of biofuels from food crops, especially maize, sugar and oilseeds (vegetable oils) becomes competitive. Higher energy prices make more and larger quantities of agricultural feedstocks competitive for conversion into energy and, given the large size of the energy market relative to the food market, pull food prices up to their energy parity equivalents. The food price rise is capped again where agricultural feedstocks become so expensive that they can no longer compete in the energy market.

2.6.4 The current war in Ukraine: will rising energy prices accelerate rising food prices?

Energy prices, notably those for natural gas and crude oil, have seen swift and substantial increases, largely caused by the war. With crude oil prices exceeding USD 126/bbl on 8 March 2022 and fluctuating around these levels again till June, an increasing number and quantity of feedstocks has become competitive as inputs into the energy sector. This has added upward pressure on feedstock prices, notably on maize, sugar and various vegetable oils. The added demand will only attenuate when feedstock prices have risen far enough to become too expensive as inputs for bioethanol or biodiesel. The additional demand will eventually come to a halt, when the energy parity price of an agricultural feedstock is reached and the agricultural feedstocks price themselves out of the energy market.

Figure 36 through 39 illustrate the various price relationships. Figure 38 and figure 39 depict the dependency of fertilizer prices on energy prices while figure 36 and figure 37 capture the link between energy prices and food prices. In terms of the price relationship between gas and urea prices, the close co-movement of these two series came to an abrupt halt in the fourth quarter of 2021 (Q4-2021), when prices for natural gas underwent a massive price hike. This hike was so pronounced that the upgrading margins between gas and ammonia as well as gas and urea prices turned negative and urea plants were forced to shut down or reduce output considerably. Since Q4-2021, prices for natural gas have remained very volatile and upgrading margins have shifted back-and-forth from positive into negative territory.

However, the increases in energy prices triggered by the war's escalation in late February were followed by a notable relaxation in the European gas market during the second week of March 2022. Key quotations for natural gas declined by more than 50 percent from their peaks in just ten days, amid milder spring weather in Europe and rising liquefied natural gas (LNG) imports by the EU. They have remained at these lower levels since then. While this allowed the strength in urea prices to moderate, it is likely to re-establish positive upgrading margins for fertilizer producers. With gas prices remaining at very high historical levels in Europe and the United States, there is limited scope for fertilizer prices to decline in 2022. This may cause lower yields and lower qualities in the 2022/23 crop season, giving further risk to the state of global food security in the coming years.

Uncertainties also cloud the supply outlook for natural gas and fertilizers going forward, notably in Europe (among EU member states) and Central Asia. On the one hand, high (natural) gas prices could make once-unprofitable investments in energy production, such as fracking installations in the United States, commercially viable, thus easing international fertilizer prices. At the same time, amid efforts to wean themselves off imported gas (especially from the Russian Federation), EU countries and companies could be inclined to shift from using natural gas for fertilizer production to using it for other outputs with higher marginal-value products. This could in turn have further implications for world fertilizer availability, as the EU is also among the leading global suppliers of fertilizers.

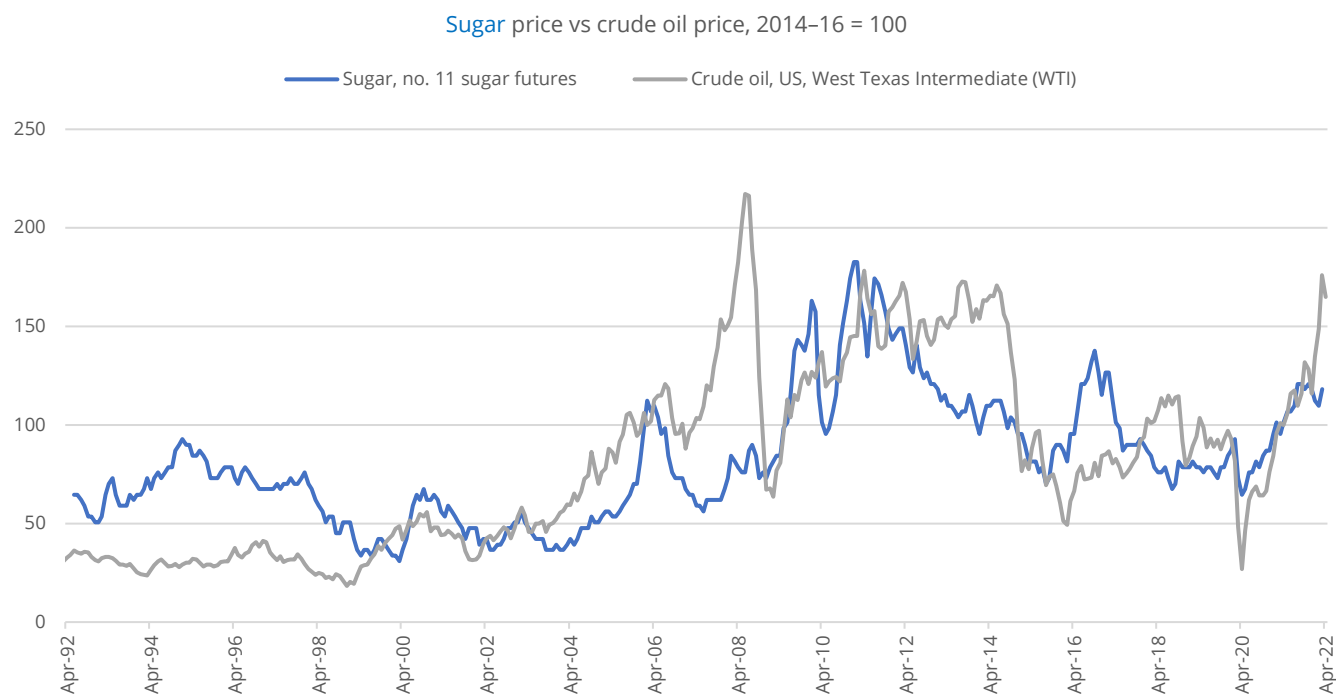
Similarly, the recent rise in crude oil prices has exceeded the price increases for some of the key biofuel feedstocks. This portends to the need of maize prices to rise to their energy price equivalent, that is, the energy parity prices. Unlike in the fertilizer market, however, industry-specific constraints such as maximum blend levels, blend walls and free refinery capacity can delay this process and keep prices for feedstocks such as maize or sugar temporarily below their energy price equivalents.

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FIGURE 36

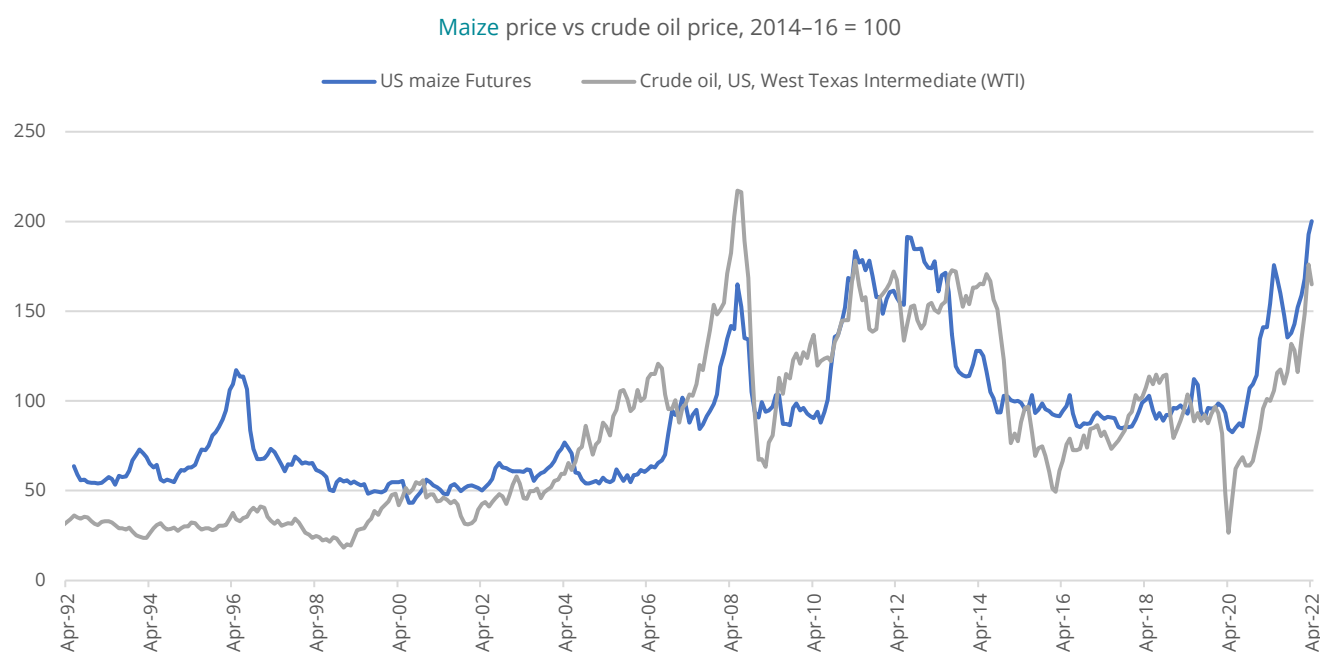
Energy and food markets, tightly linked through input and output markets



Source: Index Mundi

FIGURE 37

Maize prices move in sync with crude oil prices



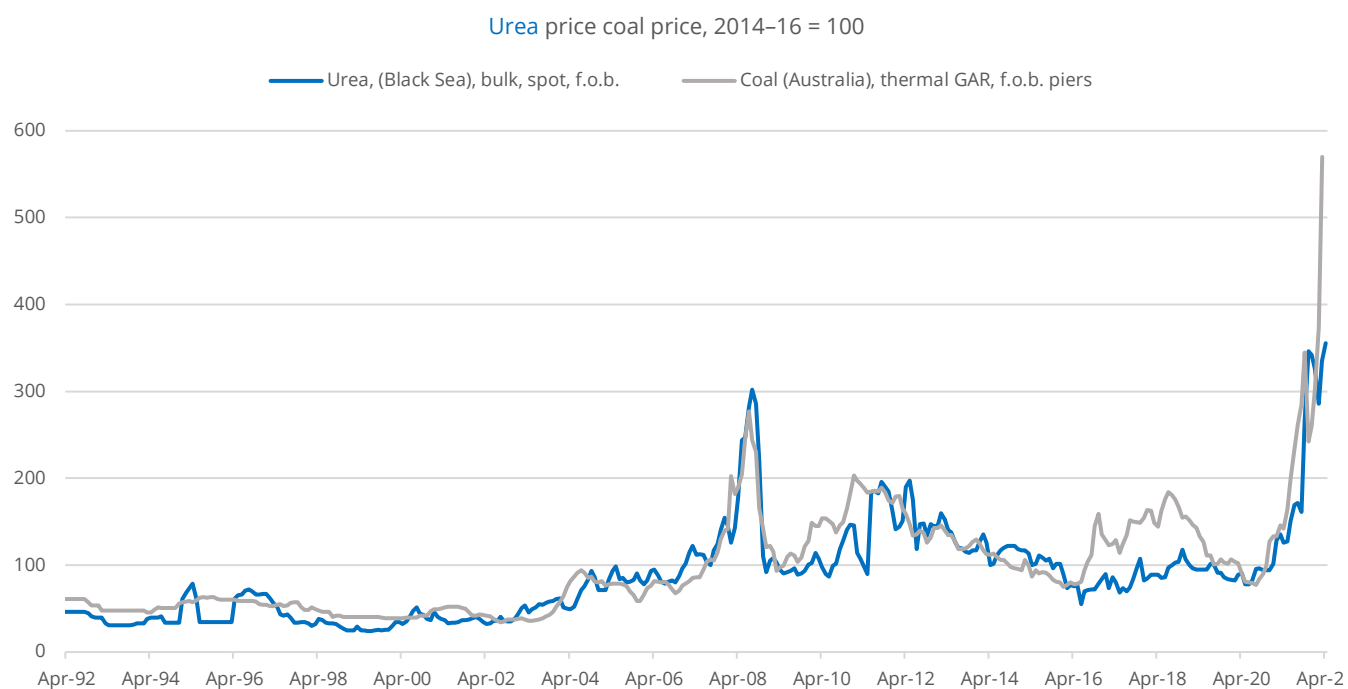
Source: Index Mundi

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FIGURE 38

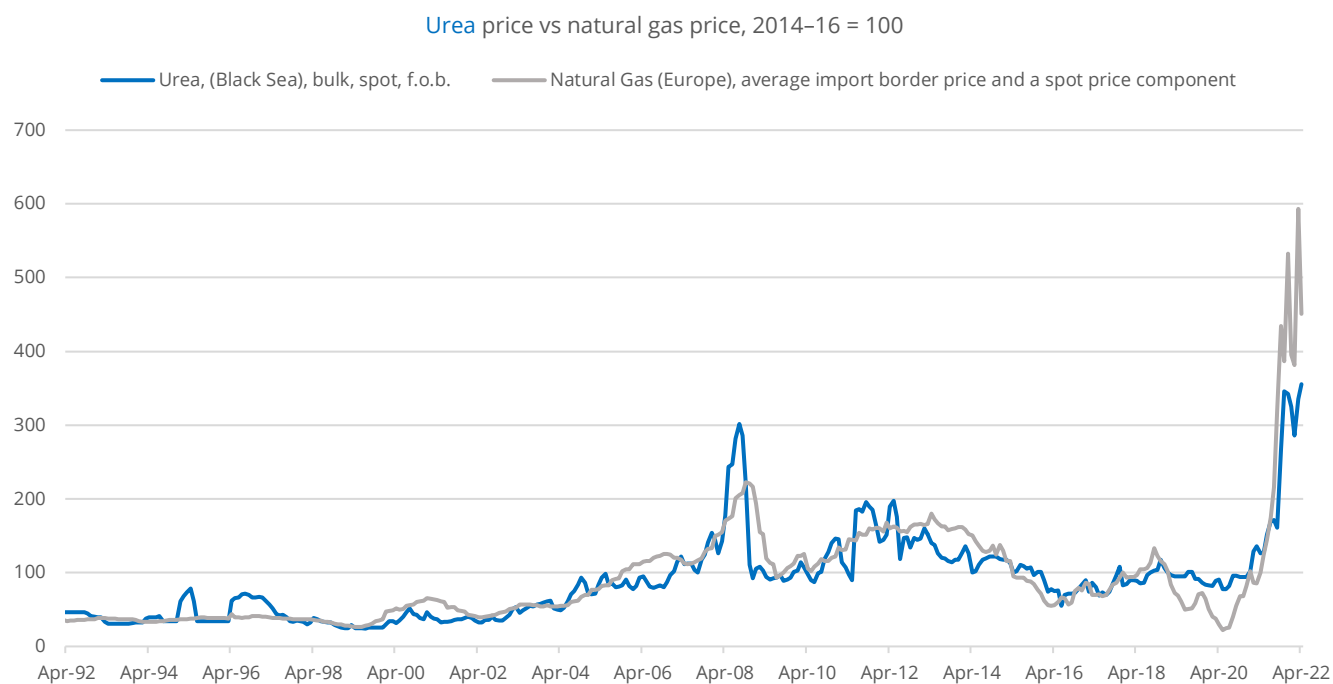
Upgrading margins have become negative even for coal-fired urea plants



Source: Index Mundi

FIGURE 39

War-induced gas price rises have resulted in negative upgrading margins for urea



Source: Index Mundi

2.7 Exchange rate, debt and growth risks

The economic sanctions imposed on the Russian Federation, in particular those targeting the country's banking sector, have led to a significant swings in the value of Russian rouble against other major currencies. The Ukrainian hryvnia has also weakened considerably and reached a record low against the US dollar in early March 2022, however stabilizing and even recovering since then. A lasting lower exchange rate would have repercussions for Ukrainian agriculture, boosting its export competitiveness and curb its ability to import.

The war has already taken a toll on the economic output of the Russian Federation. The downturn is expected to have knock-on effects on countries in Central Asia through the reduction of remittance flows, as for many of these countries remittances constitute a significant part of gross domestic product (GDP). For example, estimates by the Knowledge Partnership on Migration and Development (KNOMAD)²⁰ suggest that in the Kyrgyz Republic remittance flows in 2021 constituted 32.8 percent to the country's GDP with almost 82 percent of flows coming from the Russian Federation. The corresponding shares for Tajikistan are estimated to be 34.5 percent and 76 percent, respectively. KNOMAD anticipates a decrease in remittances in 2022 of as much as 32 percent for the Kyrgyz Republic and of 22 percent for Tajikistan.

The current war may also have global spillovers. While its impact on the global economy remains uncertain and will depend on several factors, the most vulnerable countries and populations are expected to be hit hard by slower economic growth and increased inflation at a time when the world is still attempting to recover from the recession triggered by the COVID-19 pandemic.

Agriculture is the backbone of the economy in many developing countries, the majority of which rely on the United States dollar for their borrowing needs. As such, a lasting appreciation of the U.S. dollar in relation to other currencies, particularly in the context of rising interest rates in the United States, may have significant economic consequences for these countries, including for their agri-food sectors. According to the World Bank, efforts to cushion the impact of the COVID-19 pandemic raised the debt burden of the world's low-income countries by 12 percent in 2020 to a new record. The external debt stocks of low- and middle-income countries, combined, increased by 5.3 percent in 2020.²¹ The deployment of funds by multilateral creditors, such as the World Bank and the International Monetary Fund (IMF)²², can play an important role in offsetting the impact of a strong United States dollar on the agricultural sector of developing countries.

On 19 April 2022, the IMF released its World Economic Outlook, projecting global growth to slow down from an estimated 6.1 percent in 2021 to 3.6 percent in 2022 and 2023 because of the war. This represents a 0.8 and 0.2 percentage points downward revision for 2022 and 2023, respectively, relative to January projections. The IMF expects a severe double-digit drop in GDP for Ukraine and a large contraction for the Russian Federation, along with worldwide spillovers through commodity markets, trade and financial channels.²³

On 7 June 2022, the World Bank issued its Global Economic Prospects report, projecting global growth in 2022 to drop to 2.9 percent, down from 5.7 percent in 2021. This is 1.2 percentage points lower than the 4.1 percent predicted in January. The World Bank predicts no tangible recovery to take place in 2023, as global growth is forecast to reach 3 percent in 2023, mainly as high commodity prices and monetary tightening are expected to persist. Growth in advanced economies is seen decelerating from 5.1 percent in 2021 to 2.6 percent in 2022, which is 1.2 percentage points below previous projections. Growth in emerging markets and developing economies is projected to slow from 6.6 percent in 2021 to 3.4 percent in 2022. The report also highlights the danger of global stagflation, namely "a combination of high inflation and sluggish growth." According to the report, in April 2022, global inflation (7.8 percent) and inflation in emerging markets and developing economies (9.4 percent) were at their highest levels since 2008, while inflation in advanced economies was at its highest level since 1982 and up from near-zero during April-December 2020. War-driven supply shortages and shipping disruptions have added to price increases, compounding the sharp price rises already registered since mid-2020, and to global inflationary pressures.²⁴

²⁰ https://www.knomad.org/sites/default/files/2022-05/Migration%20and%20Development%20Brief%2036_May%202022_0.pdf

²¹ <https://openknowledge.worldbank.org/handle/10986/36289>

²² Three IMF facilities allow for significant financing and more concessional terms: the Rapid Credit Facility (RCF), the Standby Credit Facility (SCF), and the Extended Credit Facility (ECF)

²³ <https://www.imf.org/en/Publications/WEO/Issues/2022/04/19/world-economic-outlook-april-2022>

²⁴ <https://openknowledge.worldbank.org/bitstream/handle/10986/37224/Global-Economic-Prospects-June-2022-Global-Outlook.pdf>

The reduction of GDP growth in several parts of the world, combined with the elevated prices, is expected to affect global demand for agrifood products, with negative consequences for global food security and nutrition. Lower GDP growth will also likely reduce the availability of funds for development, especially if global military expenses increase.

3. Summary and policy recommendations

The war in Ukraine has fully engulfed two of the most important agricultural commodity exporters at a time of already high and volatile international food and input prices. This raises significant concerns over its potential negative impact on food security, both domestically and internationally. Domestically, the escalation could directly constrain the countries' agricultural production, which coupled with limited economic activity and increasing prices, could undercut the purchasing power of local populations. Globally, were it to result in a sudden and prolonged reduction in food exports by either country, the war could exert additional upward pressure on international food commodity prices to the detriment of low-income food-deficit countries (LIFDCs), in particular. Simulations undertaken to assess the possible ramifications if that reduction were to take place, confirm such apprehensions. The simulations suggest that this scenario could lead to further increases in international prices of the foods most traded by the countries, including spillover effects into other food sectors, as well as an increase in the global number of undernourished people. To avert this set of circumstances from materializing, it would be advisable to:

1. Keep trade in food and fertilizers open

Open trade helps prevent the war from negatively affecting productive and marketing activities in both countries in order to enable them to meet domestic production and consumption needs, while also satisfying global demands. To ensure that supply chains continue to function properly or resume operations swiftly, such efforts should include steps to protect productive assets, including standing crops, livestock, inputs and machinery, from damages or any war-induced disruption. This must also extend to food processing infrastructure, such as grain mills and oilseed crushing facilities, as well as ancillary storage, transportation and distribution systems.

2. Find new and more diverse food supplies.

Countries that rely directly on food imports from Ukraine and the Russian Federation will have to absorb the shocks and remain resilient. By resorting to other sources of supply, these countries become less vulnerable to place-specific shocks. Greater resilience can also be achieved by relying on existing food stocks and by enhancing the diversity of domestic production to ensure the supply of food necessary for healthy diets. (See box 1 in Appendix)

3. Support vulnerable groups, including internally displaced people, as called for by FAO's Ukraine Rapid Response Plan, March-December 2022²⁵, which focuses on three main outcomes:

- a. Critical food production systems are maintained, through provision of critical agricultural inputs, livestock services and cash to smallholders;
- b. Agri-food supply chains, value chains and markets are supported; and
- c. Accurate analysis of the evolving food security status and needs is ensured.

4. Support for internally displaced people, refugees and those directly affected by the war in Ukraine

Until the start of the war, Ukraine's social protection system was reaching 30 percent of the population and 77 percent of the poorest quintile.²⁶ The government of Ukraine has stated that despite the disruptions caused by the ongoing hostilities, it will continue to provide social protection support (cash benefits and subsidies) to its population, in accordance with information contained in the Unified Social Information System. Payments will be

²⁵ <https://www.fao.org/3/cb8935en/cb8935en.pdf>

²⁶ ASPIRE: The Atlas of Social Protection Indicators of Resilience and Equity. The World Bank. Accessed on 9 March 2022. Available at <https://www.worldbank.org/en/data/datatopics/aspire>

made electronically to beneficiaries' bank accounts²⁷. In addition, the Federation of Trade Unions of Ukraine (FPSU) and the Confederation of Free Trade Unions of Ukraine (KVPU) have joined in efforts to provide for people's basic needs by providing food and shelter.

The population in need of social protection support is larger than that reached by the national system and reaching them is difficult due to security risks and mobility – within and beyond national borders. The social protection response can come through the national system and, for those that have crossed international borders, through the social protection systems of host countries. More specifically, steps should be taken to

- a. Expand the reach of Ukraine's national social protection system by registering additional population groups within the Unified Social Information System and help ensure that people without bank accounts can access cash payments. Thanks to their neutrality, agencies such as the United Nations and the International Red Cross have a role to play in physically providing access to cash payments to people in those parts of the country in which national social protection bodies are unable to function. This is particularly the case in rural areas where fewer people are likely to have a bank account and are therefore unable to access payments provided through the national system.
- b. Ease access to social protection systems and jobs within host countries so that refugees can access them, something that as non-citizens they would otherwise be unable to do. This involves lifting legal barriers to access and, where the refugee caseload is high, increasing the capacities of host countries' social protection systems to absorb additional caseloads. With respect to lifting legal barriers, on 3 March 2022, the European Union's Council of Ministers approved the "Temporary Protection Device in the event of mass influx of displaced persons". This ensures immediate access to housing and medical assistance to all foreign nationals with legal residence in Ukraine, thereby exempting them from the standard lengthy asylum application. Member States of the European Union have taken similar measures.²⁸ For instance, Polish authorities are providing accommodation, food and education and are facilitating access to jobs by refugees by eliminating the previous legal restrictions applied to refugees. Similarly, Italy is providing Ukrainian refugees with immediate access to the national social welfare system and jobs.
- c. Enable host country social protection system to absorb spikes in refugee caseloads. The Turkish response to the Syrian refugee crisis in 2016 offers an example of how this can be achieved. To manage the influx of Syrian refugees, the Government of Türkiye, with financial support from the European Union, developed a dedicated social safety net for refugees and asylum seekers. This was integrated within the national social protection system managed by Ministry of Family and Social Policy. Thanks to this integration, program participants were able to access different types of benefits through one single registration process and one single payment system (the 'Kizilaykart').

The capacity of a host country's social protection system to expand coverage to assist refugees and asylum seekers depends on factors linked to the system itself and to the unfolding crisis. The former includes the host country's legal framework and social security regulations, which may restrict access to non-citizens; the availability of financial resources needed for the expansion; and the system's capacity to deal with a surge in caseload. The latter depends, among other things, upon the scale of population movements and the expected duration of displacement, as well as the kind of accommodation where refugees are hosted (camps or other). Despite these challenges, channelling humanitarian assistance through established national social protection systems and, in protracted situations, integrating the refugee population in such systems will: avoid dependency on ad-hoc costly humanitarian infrastructures; promote more efficient and effective delivery of social protection benefits; strengthen social protection systems themselves; and reduce potential tensions between hosting and hosted communities by boosting household income and consumption in the short term and by promoting integration and reducing inequalities in the medium run.

²⁷ <https://www.msp.gov.ua/news/21511.html>

²⁸ <https://ec.europa.eu/social/main.jsp?langId=en&catId=86&newsId=10190&furtherNews=yes>

5. Support for the most vulnerable groups by

- a. Monitoring prices and food security outcomes of groups that were already vulnerable before the war, as well as groups pushed into hunger and poverty by deteriorating economic conditions resulting from the war and the respective increase in prices, in both urban and rural areas.
- b. Linking monitoring and early warning to anticipatory action to avert forecast deteriorations and mitigate the impacts of the war and other shocks on vulnerable people.
- c. Providing timely and well-targeted social protection interventions to alleviate the hardship caused by the war on affected local populations and to foster a recovery from it. In doing so, due consideration should be given to the fact that high prices of food and energy are regressive on poor consumers (since a larger share of their disposable income is spent on these necessities), as they may entail a reduction in quantities and/or qualities of food consumed, thereby leading to more hunger and malnutrition, or less money for other necessities such as health and education. Curtailing such important expenditures could send communities into a vicious cycle of deepening and entrenching food insecurity and poverty, with potentially irreversible effects. More specifically, possible responses include:
 - Increasing the monetary value of transfers provided through already existing cash transfer programs. The increase should be commensurate with the increases in consumption and production costs.²⁹ Similarly, the value of food and agricultural input subsidies can be increased to offset increased costs on a temporary basis.
 - Expanding the coverage of existing social protection programs or introducing new programs to reach poor and vulnerable populations that are currently not accessing social protection. Countries in the region did this in response to COVID-19 and in response to conflicts (e.g., Libya, Syria and Yemen).
 - Using the existing delivery mechanisms (institutional coordination entities, registries, payment modalities) of national social protection systems to implement humanitarian assistance programs. This facilitates the swift implementation of these programs and coordination between social protection and humanitarian responses. Moreover, investments delivered through humanitarian assistance programs can contribute to strengthening the capacities of national social protection systems.
 - Due to existing food subsidies, the current increase of global food prices does not seem to have affected other Near East and North African countries, such as Morocco, where subsidies remain in place. However, many of these schemes have been reformed in the last 20 years, in places like Egypt, Mauritania, Algeria or Sudan, to set up national social safety net programs targeting the poorest. These programs are essential to mitigate the impacts of potential shocks.
 - Ensuring that humanitarian responses to food crises incorporate a strong focus on safeguarding agriculture-based livelihoods, on which the overwhelming majority of the acutely food insecure rely. This includes providing quality, adapted agricultural inputs (seeds, fertilizers, livestock feed, etc.) and services (animal health campaigns, infrastructure rehabilitation, etc.), alongside cash to meet immediate needs and secure nutritious food production at a local level.

6. Avoid ad hoc policy reactions

Measures put place in countries affected by potential disruptions ensuing from the war must be carefully weighed against their potentially damaging effects on international markets in the short term and long term. For instance, while reductions in import tariffs and/or the use of export restrictions could help improve availability in domestic markets in the short term, they would inevitably add to the upward price pressure on international markets and exacerbate the situation globally. Ad hoc policy measures must always be avoided.

²⁹ In 2016, to inform responses by Lesotho's and Zambia's national social protection programmes to increases in food prices caused by droughts, FAO estimated the required increase in the value of transfers provided through national cash transfer programmes to offset increases in the costs of food (For more information see this link for [Lesotho](#) and this link for [Zambia](#))

7. Contain the spread of African swine fever (ASF) by:

- a. Improving biosecurity and using good husbandry practices on-farm to minimize the risk of introduction of the ASF virus to domestic and wild pig populations at all levels: national, international, and internal administrative borders, sub-national and farm levels.
- b. Facilitating early detection, timely reporting and rapid containment of the disease, as delays can lead to a rapid spread of the diseases.
- c. Implementing surveillance schemes that support detection of ASF in both pigs and wild boars. Farmers and hunters should be encouraged to report to veterinary authorities once they see unusual clinical signs in animals (increased mortality, skin blotching [cyanosis], haemorrhagic clinical picture, fever) or suggestive pathological findings (such as enlarged spleen, haemorrhagic lymph nodes, or/and ecchymosis of the kidneys and other organs).
- d. Implementing targeted sampling of animals rendering a higher likelihood of detecting the virus (i.e., dying or recently dead animals). The nonspecific clinical signs require laboratory diagnostic support, with adequate logistic capacity, equipment, reagents, and skilled personnel in place.

8. Strengthen market transparency and dialogue.

Global market transparency plays a key role when agricultural commodity markets are under uncertainty and need to adjust to shocks affecting supply and demand. Initiatives like the Agricultural Market Information System (AMIS) strive to increase such transparency through the provision of objective, timely and up-to-date market assessments that enable informed policy decisions. Through its Rapid Response Forum, AMIS also provides a unique platform for policy dialogue and coordination among members, which include the Russian Federation and Ukraine. Policy dialogue and coordination are necessary to minimize disruptions and ensure that international markets continue to function properly and that trade flows efficiently to meet global demand and safeguard food security.

4. FAO Policy proposals

As a response to the challenges described FAO has developed 8 policy proposals to address the global food security situation and the risks associated with the war.

1. [Rapid Response Plan for Ukraine](#), the focus of this plan is threefold. First, to maintain food production, through providing cash and inputs for cereal crop production in October, and the Spring vegetable and potato production, as well as supporting harvesting of the 2021 winter crop in July and August; and includes providing livestock production and health inputs and services. Second, to support agrifood supply chains, value chains and markets by engaging government and the private sector to provide technical support services to household level and smallholder producers through public-private partnerships. Finally, to coordinate the Food Security and Livelihoods Cluster, in particular through continued assessments of food security, markets and value chains.
2. [Establishing a Food Import Financing Facility \(FIFF\)](#). FAO has developed a proposal³⁰ for a financing facility to help poor net food importing countries access international food markets. The facility would be limited to net food importers in the low-income and lower-middle income group of the World Bank classification, providing them with credit to purchase food on global markets. Beneficiary countries would commit to investing in sustainable agricultural productivity, thereby reducing their future food import needs (an automatic stabilizer). The facility has already been stress-tested. The endogenous – or distortionary – world market price effects would not exceed a maximum of 15-20 percent, even at its maximum use level of USD 25.3 billion. However, the FIFF would guarantee the food security for up to 15 million people³¹, thus negating any need for households to curtail expenditures on other essential goods and services, such as health and education.

³⁰ For further materials re the FIFF, see e.g., a short note for decision makers, available at: <https://www.fao.org/3/cb9444en/cb9444en.pdf>, and technical background paper, available at: <https://www.fao.org/3/cb9445en/cb9445en.pdf>

³¹ This estimate is derived from the initial estimates of price and undernourishment effects caused by a supply shock to the tune of USD 25 billion.

3. [Strengthening social protection for food security and nutrition](#). The war in Ukraine that began on 24 February has not only created an unprecedented humanitarian crisis but a looming increase in food insecurity, in countries both close and far from the war. Humanitarian and social protection responses will be needed to cushion the negative impact of these developments on the food security and nutritional status of Ukrainians affected by the war as well as of nutritionally vulnerable groups in food-importing countries, particularly in North, East and West Africa as well as in West and Central Asia. Given the multiple ramifications of the war, FAO has identified three main ways in which social protection can help address the current crisis and its aftermath. All of these interventions should be gender responsive and ensure older people and people living with disabilities have access to appropriate assistance. They consist of: i) Enhancing the capacity of Ukraine's social protection system to respond to the crisis and help rebuild rural/agricultural livelihoods after the war; ii) Strengthening social protection systems to support the socio-economic integration of refugees and vulnerable host communities in host countries, in coordination with agricultural sector actors; and iii) Responding to increases in food and fertilizer prices in net food-importing countries and reduction of remittances in Central Asia.
4. [Assessing investment needs in Ukraine's agricultural reconstruction and recovery](#). While the war in Ukraine is ongoing and its outcome is not yet clear, the damage to the country's agrifood sector is already of an unprecedented scale. Reconstruction and rehabilitation plans for Ukrainian agriculture are urgently needed in order to mitigate the impact of the war domestically and internationally. Damage caused by war to a country with an agricultural output and exports as significant as that of Ukraine is unparalleled since the Second World War. The total value of capital stock in Ukrainian agriculture (including down- and upstream sectors) is estimated at USD 29 billion. The potential direct damage to agriculture assets can initially be estimated at USD 6.4 billion (this includes destroyed irrigation infrastructure, storage, machinery and other agricultural equipment, in-port infrastructure, greenhouses, field crops, livestock and processing units). The additional expected economic losses from the war in 2022 are estimated at about USD 22 billion. Reconstruction and investment plans for agriculture would be critically important to mitigate the scale of war effects at local and global levels. FAO will work closely with its investment and financial partners, such as the World Bank and the European Bank for Reconstruction and Development that have already pledged USD 3 billion and 2 billion, respectively, for the recovery of Ukraine. However, it is clear that actual recovery and investment needs will be much higher than these initial commitments in agriculture and the agrifood industry alone. While it is early to consider developing investment plans, considering the extent of the war and its impact on a complex food system such as the one in Ukraine, a post-war recovery plan for Ukrainian agriculture will likely include the following main components: support to rural household, incomes and food security; supporting liquidity of farmers and access to finance; de-mining; support to supply of critical inputs, national seed production and livestock breeding; compensation for lost assets; and support to export market access.
5. [Addressing animal health](#). The war has caused disruptions to the normal animal health services, surveillance and control, resulting in delayed recognition of, and response to, important animal diseases. Large numbers of abandoned animals might contribute to transmission and spread of the disease. The most significant disease risks pertain to African swine fever (ASF), highly pathogenic avian influenza (HPAI), rabies and leptospirosis as well as food borne zoonotic diseases (i.e. brucellosis, salmonellosis). The initiative aims to address the risk of disease spread in Ukraine and neighbouring countries, which needs to be re-evaluated to apply coordinated and targeted, risk based control measures. Recommended actions include the establishment of a multi-disciplinary panel of experts to work on risk evaluation and monitoring of the situation jointly with the Government of Ukraine, setting up a system of collection information on the problems and issues related to animal production and health, enhancing disease reporting and detection through appropriate surveillance methods, evaluating the risk of transmission and spread of diseases into neighbouring countries, activating early warning systems applying the One health approach, provision of vaccine against rabies and related equipment, and a risk communication campaign to all stakeholders and the general public on risk of emergence and spread of transboundary diseases including zoonosis.
6. [Assessing food insecurity in 2022/23 at national and sub-national levels](#) in 50 countries vulnerable to the effect of the Ukraine-Russia crisis. While it has become clear that the consequences of the ongoing war are potentially far-reaching, there is an urgent need for evidence to assess the potential impacts on food security. Detailed information about the situation in different geographic areas and populations groups at the sub-national level is key to guiding countries to take effective action. To fill this information gap and guide interventions, FAO

proposes a programme of work that will contribute to assessing the impact of the Ukraine-Russia crisis on the access to food of people living in the countries that are particularly vulnerable to the likely consequences of the war. The objective would be to assess food insecurity in 2022/23 at national and sub-national levels through the Food Insecurity Experience Scale (FIES) measurement system in 50 countries vulnerable to the crisis. The overall goal of the programme is producing and strengthening food security statistics to inform monitoring frameworks, classification systems, and monitoring and evaluation (M&E) assessments to guide policies and interventions. In terms of activities, the work would focus on the following aspects: i) data collection; ii) data analysis and technical support; and iii) dissemination and communication of results to guide actions.

7. [Using soil maps to promote efficient use of fertilizers](#). This proposal is in response to the expected decline in fertilizer use particularly in poorer countries due to price hikes of fertilizers, especially in view of the export restrictions imposed by the Russian Federation, which is the top exporter of nitrogen (N), the second leading supplier of phosphorus (P) and the third largest exporter of potassium (K) fertilizers in the world. Farmers can use fertilizers more efficiently to deal with the rapid increases in prices. Ethiopian producers have successfully used soil maps to identify the best blending of N, P and K fertilizers for their plots, cutting the use of fertilizers while optimizing yields. This approach should be adopted by all countries. Detailed information on the soil profile and its spatial distribution is essential for promoting sustainable agriculture, with precise inputs in quantity, space and time. In particular, accurate and updated soil attributes allow for better and more efficient fertility management, benefiting crop productivity and sustainability and at the same time reduce the quantity of fertilizers being used. The proposed initiative looks to establish a self-sustaining, government-managed national soil database to become a public good to be used by public policies, private sector and farmers. The goal is to publish the country's total land mass for which soil information is available. It also aimed to provide accurate soil management information system and advice to smallholder farmers to enhance efficiency and crop productivity and yields.
8. [Food Loss and Waste reduction](#). We must reduce food loss and waste. Currently the high amounts of food loss and waste could feed around 1.26 billion people per year, and results in a huge negative impact on the environment. If we reduce food loss and waste by 50%, there would be sufficient fruits and vegetables available in the food supply to cover the recommended amount of 400 grams per person per day and as a result increase the resilience of our agrifood systems. This proposal has therefore the overarching objective to create the evidence base using the methodology developed by the FAO for measuring and monitoring progress against SDG target 12.3 and formulate recommendations for policy- and decision-making in line with the SOFA 2019 guiding principle to find solutions for reducing food loss and waste. The expected impact is that countries take informed decisions on loss and waste reduction interventions to structurally reduce the level of food losses and waste of key commodities and ultimately improve the efficiency of their main supply chains as well as the food security of selected population groups, and to create new jobs opportunities while resolving this problem.

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APPENDIX

Box 1: dietary sourcing flexibility index (DSFI)

To measure a country's absorptive capacity to shocks, FAO developed the **dietary sourcing flexibility index (DSFI)**, which measures the diversity of food supply in terms of sourcing channels and food commodities. A high value indicates multiple possible sourcing pathways and thus a high capacity to absorb shocks and ensure food availability to consumers. It also highlights the role of international trade in enhancing absorptive capacity in the face of domestic and external disruptions.

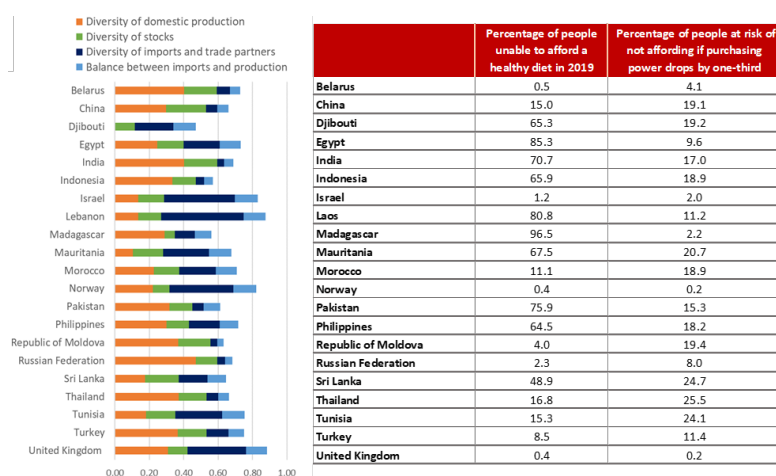
The DSFI is composed of different components that contribute to food supply diversity: domestic supply (i.e., domestic production and stocks) and imports. An additional component reflects the balance between domestic supply and imports, whereby the closer we are to a 50/50 split between the two, the larger the balance contributing to the total DSFI value. Figure 1 illustrates, for selected countries that import large amounts of maize and wheat from Russia and Ukraine, the DSFI for all food items (measured for kilocalories). The horizontal axis indicates the contributions of the above-mentioned components to the total value of the DSFI.

Despite all depending on Russia and Ukraine for grain supply, Figure B.1 (on the left hand side) shows that countries diversify their sources of food in different ways, with some appearing more able to absorb disruptions triggered by the war. For instance, Israel, Lebanon, Norway and the United Kingdom all rely heavily on imports (between one-third and 60 percent of all kilocalories are imported) but, at the same time, with high diversification across trade partners and commodities (illustrated by the large size of both blue bars). These countries may therefore be less affected since their DSFI scores are high and balanced between different components, indicating that they have multiple options to replace the reduction in imports from Ukraine and Russia. Conversely, countries like Indonesia, Madagascar, Pakistan and the Republic of Moldova are among those with lowest diversity of imports. In these countries, the flexibility of a food system is mostly determined by what is internally produced for the domestic market. Indeed, imports only represent between 4–23 percent of all kilocalories supplied to consumers, although imports of specific commodities and from specific trade partners – such as maize and wheat from Russia and Ukraine – still matter.

Thus, immediate disruptions must be absorbed through the diversification of domestic production and existing food stocks. In the longer term, engagement with new international trade partners – preferably with diverse agro-climatic and socio-political profiles – can further improve their resilience. Those with low diversity of food stocks (e.g., Madagascar) could also invest in stocks to improve their immediate capacity to respond to disruptions.

FIGURE B.1.

DSFI for kilocalories, all food items, 2016–2018 (left) and economic access to a healthy diet (right)



Source: FAO. 2021. The State of Food and Agriculture 2021. Making agri-food systems more resilient to shocks and stresses. Rome.

Supply disruptions following the Ukraine–Russia war will likely have an impact on food affordability, especially food that makes up a healthy diet, as prices increase and remain volatile. This can be particularly relevant for the poorer segments who spend most of their incomes on food. The Table contained in Figure B.1 analyses the extent to which countries face the challenge of unaffordability of healthy diets in normal times and/or the challenge of risking unaffordability in the face of a shock that raises food prices or reduces income. For countries like Egypt, India, Laos, Madagascar and Pakistan, more than 70 percent of the population already cannot access a healthy diet and are in dire need of greater affordability. Other countries have both a large share of the population who cannot afford a healthy diet but also large sectors at risk of not being able to afford one if their purchasing power drops by one-third (e.g., Mauritania, Sri Lanka, Thailand, Djibouti and Indonesia). These populations may be negatively affected by the impact of the war on food prices, both directly in terms of the impact on the world prices of wheat and maize, and indirectly for all food items through increasing energy prices.

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Contact information:

Food and Agriculture Organization of the United Nations (FAO)
Chief-Economist@fao.org
www.fao.org