

Chapter 5. Focus and perspectives

Building on the CropWatch analyses presented in chapters 1 through 4, this chapter presents first early outlook of crop production for 2021 (section 5.1), as well as sections on recent disaster events (section 5.2), an update on El Niño (section 5.3), and the impact of the Russia Ukraine conflict on global food security (section 5.4).

5.1 CropWatch food production estimates

Table 5.1 presents this year's second forecast by the CropWatch team of global maize, rice, wheat, and soybean production in 2022. Winter crops in the Northern Hemisphere are still growing and summer crops are in the early stages, or yet to be planted in May. The harvest of the 2021/22 summer or monsoon season in the Southern Hemisphere has been completed. CropWatch will further update and review the production in the August and November 2022 CropWatch bulletins.

This bulletin uses the global crop monitoring system (CropWatch) to quantitatively assess the crop growth of 35 major agricultural producing and exporting countries from January to mid-May 2022 and to conduct remote sensing monitoring and forecasting of bulk food and oil crops (maize, rice, wheat, and soybean). All the analyses are based on multi-source remote sensing data (e.g., Sentinel-1/2), and are combined with global agroclimatic and agronomic conditions. The percentage of modeled production in global production varies: 21.5% for maize, 58.8% for rice, 75.9 % for wheat (mostly northern hemisphere winter wheat), and 45.5 % for soybeans. CropWatch production estimates rely on crop-specific remote sensing indicators (major producing countries), combining ground observation, statistics (minor producing countries) and crop masks.

(1) Global production

For 2022, CropWatch forecasts the global production of the four main crops as follows: Maize production at 1.086 billion tonnes, an increase of 8.37 million tonnes (+0.8%); Rice production at 769 million tonnes, an increase by +5.47 million tonnes (+0.7%); Wheat production at 713 million tonnes, decreasing by 7.53 million tonnes (-1.0%); Soybean production at 310 million tonnes, decreasing by 3.3% (Table 5.1). During January to early May 2022, the global agricultural climate conditions were generally normal, though extreme heat and severe drought conditions in some regions affected the production of wheat and soybean. In addition, armed conflicts and the Covid-19 pandemic caused a tightening of food exports and exacerbated the shortage of wheat available for international trade.

(2) Wheat supply situation is threatened by shranked sown area, decreased yield by drought, extreme heat and regional conflicts

During the autumn of 2021 in the northern hemisphere, conditions were generally on the dry side, causing winter wheat sown area to decline at varying degrees as compared to the year before. In the northern hemisphere, the period for sowing of rainfed winter wheat lasts from mid September to mid November. During late September to mid-October 2021, short-term rainfall deficits occurred in Europe, Middle East, Central Asia and the south of the USA. As a result, the wheat sown areas decreased in Hungary, Italy, Poland, Romania, Russia, Iran, the United States and Afghanistan. Iran and Romania had the largest reduction in winter wheat acreage, shrinking by 11.2% and 11.0% respectively. China's winter wheat sown area decreased by 2.3%, mainly due to severe flooding in some areas of northern China during the winter wheat sowing period. In

addition, heavy rainfall and excessive soil wetness delayed wheat sowing in some areas. However, conditions during the winter and spring were quite favorable for wheat growth in most of China. Thanks to developed irrigation facilities, India's and Pakistan's wheat sowing was stable. Wheat planting area increased by 2.7% and 1.5%, respectively. The eastern region of Ukraine had experienced a significant increase in wheat sown area and the national winter wheat sown area increased by 3.9%.

Some wheat-producing countries suffered from drought and extreme heat, causing shrivelled grains and a production decline in more than a dozen wheat-producing countries. In the Punjab of India and Pakistan, as well as in Haryana, temperatures were 5°C higher than usual starting from mid March. The ensuing terminal heat stress caused a fast brown-down of the crops and shortened the grainfilling period. At the national level, this resulted in wheat yields decreases by 4.9% with production of 25.57 million tonnes in Pakistan and by 2.8% with 93.24 million tonnes production in India. In addition to high-temperatures, continued drought has also led to a yield reduction in the United States, Iran, Italy, Romania and Afghanistan, and other countries. The most serious drought occurred in Morocco. It had started during the wheat sowing period and lasted until late winter. It caused a significant reduction by 40% in wheat production to 5.4 million tonnes. Wheat yields in the Ukraine and Turkey were also affected by drought conditions. However, the increase in wheat sown area mitigated the yield decrease and led to a slight increase in total wheat production. Global wheat production is expected to be 713 million tonnes, a further decline after 2021's reduced production. The global wheat supply is expected to remain tight, considering Ukrainian wheat cannot be exported via the Black Sea because of the war, economic sanctions against Russia and wheat export limitations imposed by several countries.

(3) Brazil drought leads to reduced soybean production in the southern hemisphere

The La Niña led to a severe drought in Brazil's main soybean-producing regions, causing soybean production to decline by 7.09 million tonnes. This is a continuation of the reduction observed for last year. The total 2022 soybean production of Argentina and Brazil, two major soybean-producing countries in the southern hemisphere, was 140.98 million tonnes, a 4.7% reduction in production. Drought conditions led to a 4.9% decline in Brazil's soybean yields. Total production is estimated at 89.21 million tonnes, which is 7.09 million tonnes or 7.4% lower than last year. Argentina's soybean production is expected to be 51.77 million tonnes, an increase of about 0.3%. Thanks to the favorable weather conditions, the soybean yield increased by 2.1% and offsetted the negative impact of a reduction in planted area.

(4) With expanded sown area, maize production is expected to increase

The sown area increases of southern hemisphere and equatorial countries contributed to an increased production. The drought at the Horn of Africa caused a significant reduction in maize production. Sowing of maize in the USA and Europe started in mid April only. Total maize production in the southern hemisphere and equatorial countries (Table 1, about 21.5% of total global maize production) is expected to be 233.16 million tonnes with an increase of 10.37 million tonnes (+4.7%), due to an increase in maize growing areas in countries such as Angola, Argentina, Mexico, Mozambique, South Africa and Thailand. Higher maize prices make it more lucrative for farmers to grow maize. Brazil's first season maize area was significantly reduced by the severe drought, but the second season maize area increased significantly by 9.2%, and the annual maize area still increased slightly. Thanks to the expansion of maize growing area, most of the southern hemisphere and equatorial region countries' maize production increased slightly, and Brazil's second season maize production increased significantly, prompting the Brazil's annual maize production to increase by 9.0%. Among the world's major maize-producing countries, only Kenya's

maize was affected by a severe drought. It caused a reduction in both yields and area, resulting in a 12.9% decrease of maize production. Based on remote sensing analyses, CropWatch found that maize sowing progress was delayed in Russia (-22.4%), Ukraine (-35.0%), Romania (-14.6%), Italy (-5.9%), the United States (-13.1%) and Canada (-27.8%) .

(5) Global rice production is well expected

The rice production in most rice-producing countries of South and Southeast Asia increased slightly, contributing to an increase of 5.47 million tonnes in global rice production, while rice production in the Philippines and Thailand decreased slightly. This monitoring period marks the dry season in most of South and Southeast Asia countries. The beginning of the rainy season varies between April and June. Most rice production during the winter months is irrigated. Bangladesh (4.2%), Cambodia (1.1%), India (1.5%), Indonesia (3.1%), Myanmar (4.8%), Sri Lanka (3.3%), and Vietnam (1.7%) experienced an increase in rice production. Thailand and the Philippines experienced a small decline in rice area, resulting in a 0.7% and 0.2% decrease in rice production, respectively. In the southern hemisphere countries such as Argentina, Brazil, and Mozambique, rice area also shrank, resulting in a reduction of 2.9%, 9.1%, and 5.3% in rice production, respectively.

Table 5.1 2022 cereal and soybean production estimates in thousand tonnes. Δ is the percentage of change of 2022 production when compared with corresponding 2021 values.

	Maize		Rice		Wheat		Soybean	
	2022	Δ %	2022	Δ %	2022	Δ %	2022	Δ %
Afghanistan					3617	-7.4		
Angola	2737	4.3	49	9.8				
Argentina	54971	2.9	1846	-2.9			51774	0.3
Bangladesh	3933	0.1	50142	4.2				
Brazil	90887	9	10774	-9.1			89206	-7.4
Cambodia			10044	1.1				
China					127635	-1.2		
Egypt					11240	-2		
France					35907	0.7		
Germany					27680	5.6		
Hungary					5050	2.2		
India			184599	1.5	93244	-0.2		
Indonesia	16917	1.1	68422	3.1				
Iran					11094	-12.5		
Italy					7473	-3.6		
Kenya	1990	-12.9						
Mexico	25366	2.7			3917	14		
Morocco					5406	-40.1		
Mozambique	2148	2.2	378	-5.3				
Myanmar	1872	-1.3	26058	4.8				

Pakistan					25573	-3.5		
Philippines	7330	3.5	20498	-0.2				
Poland					10915	1.1		
Romania					6609	-17.4		
Russia					53883	-0.1		
South Africa	11446	-0.1						
Sri Lanka			2609	3.3				
Thailand	4374	3.1	40060	-0.7				
Turkey					16899	0.5		
Ukraine					24499	1.6		
United Kingdom					13075	1.6		
United States					49630	-4.4		
Uzbekistan					8052	7.2		
Vietnam	5637	4.8	47393	1.7				
Zambia	3554	-0.9						
Subtotal	233162	4.7	452828	1.6	541398	-1.6	140980	-4.7
Other	852390	-0.2	316661	-0.6	171450	0.7	168962	-2
Global	1085552	0.8	769490	0.7	712848	-1	309942	-3.3

Several natural and man-made disasters keep threatening global health, food, and the economy in 2022. The current report highlights the major disasters with the most significant impacts on human life in 2022.

5.2 Disaster events

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Drought

Morocco is facing a record drought threatening the country's water resources and food security. With only 15% of agricultural land using irrigation systems, rising temperatures and irregular rainfall have affected agricultural production in the country, including the citrus and horticultural crops, particularly in the Souss-Massa region. Consequently, Morocco's cereal production in 2022 reached its lowest level since 2008, 69% down from last year. This year's drought mainly affected the winter cereals, while spring crops are expected to fare better. To mitigate the impact of the severe drought, Morocco has undertaken drought risk management initiatives and launched a nearly 10 billion dirhams (\$1 billion) aid programme to help its agriculture industry, and spent 32 billion dirhams (\$3.3 billion) on subsidies of soft wheat, cooking gas and sugar.



Figure 5.1 The effects of the drought on vegetation in Morocco In 2022 form satellite images
 (source: <https://www.copernicus.eu/en/media/image-day-gallery/effects-drought-vegetation-morocco>).

The Horn of Africa is experiencing one of its most severe droughts in recent history, with more than 15 million people acutely food insecure in Ethiopia, Kenya, and Somalia. Drought is helpful to reduce the impact of desert locusts disaster since 2019. Latest forecasts indicate that the March to May 2022 rainy season is likely to be average to below average. If the current March-May rains fail, this would be the first time in the last 40 years that the region has endured four consecutive below-normal seasons. Due to the present severe drought, millions of livestock have died, including more than 1.5 million animals in Kenya, and over 1.5 million livestock in Somali and Ethiopia. Moreover, food prices are rising in many drought-affected areas, due to a combination of macro-economic challenges, below-average harvests, and rising prices on international markets. The cost of a food basket has already risen by 66% in Ethiopia and by 36% in Somalia, leaving families unable to afford even basic items and forcing them to sell their hard-earned properties. More funding is immediately required to help families in their fight against the drought impacts.

Another food crisis is ongoing in West Africa and the Sahel in 2022, where food insecurity has reached an unprecedented level. The estimated number of food-insecure people has been on an upward trend since 2014 and almost quadrupled between 2019 and 2022, driven by severe shocks: localized shortfalls in cereal production, worsening conflicts and insecurity, high food prices, and reduced cross-border trade due to the COVID-19 pandemic. Food insecurity conditions could worsen further if constrained access to fertilizers and unfavorable weather conditions resulted in lower cereal production in 2022.

Floods and Landslides

A Series of severe floods hit South Africa in 2022 but the extreme event was on 11-13 April when heavy rainfall caused flooding and landslides caused in southern and south-eastern parts of South Africa, particularly the Provinces of KwaZulu-Natal and Eastern Cape. The floods caused the death of 443 people in KwaZulu-Natal and over 40,000 were missing. More than 40,000 people have been displaced, while nearly 4,000 houses were destroyed and more than 8,000 others were damaged, mostly across Durban City and its surrounding areas. Hence, on the 18th of April, the President of South Africa declared a national state of disaster due to flood severity.



Figure 5.2 The devastating impacts of floods in KwaZulu-Natal Province (KZN), South Africa, in April 2022
(<https://floodlist.com/africa/south-africa-kwazulu-natal-floods-april-2022>).

In Brazil, three hours of extremely heavy rain on 15th February 2022 led to more than 250 landslides, including mudslides that caused mass destruction in Petrópolis, a city built on a hillside like many low-income neighborhoods located in the north of Rio de Janeiro. The mudslides took everything in their path: cars, homes, and people, causing the death of 231 people, with five people missing. The recorded rain in a few hours on the 15th of February was more than the rains that typically occur in the whole month of February, being the highest in more than 90 years. While experts attribute the increased rainfall to climate change and weather, the growth of the city is also to blame for the disaster. As Petrópolis has expanded, residents have moved onto the hills, clearing forests that once acted as a buffer against mudslides and building homes on terrain that is often too steep and unsuitable for development.



Figure 5.3 The mudslides caused by floods in Petrópolis, Rio de Janeiro, in February 2022
(<https://floodlist.com/america/brazil-floods-landslides-petropolis-march-2022>).

Landslides, floods, electrical storms, and strong winds caused by the 2022 rainy season have been affecting Colombia since the 15th of March, causing the death of 28 people, one person is missing and 45 individuals sustained injuries. Besides, more than 100 houses have been destroyed and 2,000 others were damaged in addition to the destruction of 335 road sections, 38 bridges, and 17 educational institutions.

In Australia, the east coast endured three intense weather systems that led to record rains and flooding from late February to early April. On the 30th of March, an intense low-pressure system brought heavy rains to Australia's east coast, forcing thousands to flee their homes. The first three

months of 2022 brought a year's worth of rain to Sydney. On the 7th of April, Sydney received nearly a month's rain overnight, leading to the evacuation of thousands of people.



Figure 5.4 Properties inundated by floods in Goodna, Australia on the 2nd of March, 2022 (<https://www.npr.org/sections/pictureshow/2022/03/02/1083314101/photos-record-breaking-floods-devastate-eastern-australia>).

Covid-19

The Covid-19 pandemic has remained a global threat to human lives and national economies. Besides its massive impacts on global health, food security and the economy of all countries were significantly affected since enough food is available globally, but COVID-19 is disrupting supply and demand in complex ways. In the poorest countries, the virus poses a serious threat to food security and livelihoods, where agricultural production systems are more labor-intensive and there is less capacity to withstand a severe macroeconomic shock. Besides, there has been a major shift in the structure of demand, with a collapse in demand from restaurants, hotels, and catering, the closure of open markets, and a surge in demand from supermarkets. Measures put in place to prevent or slow the spread of COVID-19 are also disrupting the functioning of food supply chains. The impacts on labour are of particular concern leading to a vulnerable food sector. Measures to contain the spread of the COVID-19 are causing delays and disruptions to transport and logistics services. Border closures and additional procedures and checks have led to congestion and delays, affecting the transit of perishable products. For example, social distancing requirements have reduced the number of import and export inspectors at borders, increasing the time needed for customs clearance.



Figure 5.5 Countries, territories, or areas with reported confirmed cases of COVID-19, the 4th of April 2020 (Source: World Health Organization).

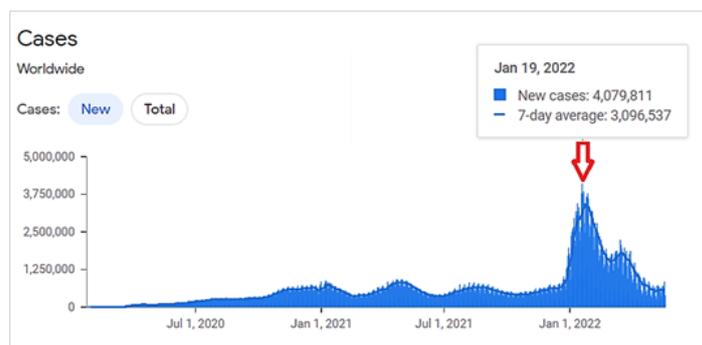


Figure 5.6 The number of cases increased significantly by the start of 2022 (source: JHU CSSE COVID-19 Data).

5.3 Update on El Niño

According to the Australian Government Bureau of Meteorology, the 2021–2022 La Niña continues in the tropical Pacific, with little change in strength in the past few weeks. Several indicators of La Niña, including tropical Pacific Sea surface temperatures, cloudiness near the Date Line, and the Southern Oscillation Index (SOI), have maintained or slightly increased their strength over the past fortnight.

Figure 5.10 illustrates the behavior of the standard Southern Oscillation Index (SOI) for the period from April 2021 to April 2022. The SOI increased from 4.1 in January until 22.6 in April, indicating a typical and increasing La Niña during the monitoring period.

Another commonly used measure of El Niño is known as the Oceanic Niño Index (ONI). Figure 5.11 shows several ONIs and their locations. Values of the three key ONIs for April 2022 were: NINO3 -0.5°C , NINO3.4 -0.7°C , and NINO4 -0.6°C . It implies that the average sea surface temperature in all three regions is lower than the historical average. Moreover, the three key NINO indices decreased 0.1°C compared to March. This is an indication that the La Niña slightly increased its strength over the past month.

Sea surface temperature (SSTs) for April 2022 (Figure 5.12) show cool SST anomalies across the central to eastern equatorial Pacific and along the coastline of South America, and mostly weak warm SST anomalies over parts of the Maritime Continent. Compared to March, cool anomalies in the central to eastern tropical Pacific have strengthened, while in the west SST anomalies are closer to average than they were during March.

In conclusion, from January to April, La Niña continued to be active in the tropical Pacific and its atmospheric indicators were stronger than the oceanic ones. This resulted in a continued impact of La Niña on global weather and climate during the monitoring period. For example, La Niña conditions increased the chances of above average rainfall for much of eastern Australia and caused relatively rare widespread cold and snowy weather in northeastern China. Autumn in the Southern Hemisphere is the usual time of the year in which ENSO events decay and return to neutral. However, no such empirical trend of decay has been observed so far.

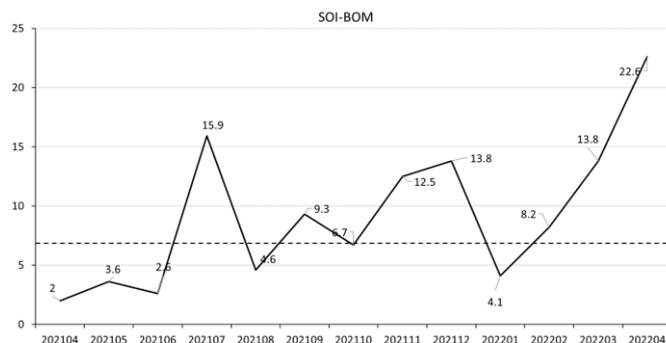


Figure 5.7 Monthly SOI-BOM time series from April 2021 to April 2022

(Source: <http://www.bom.gov.au/climate/enso/soi/>).

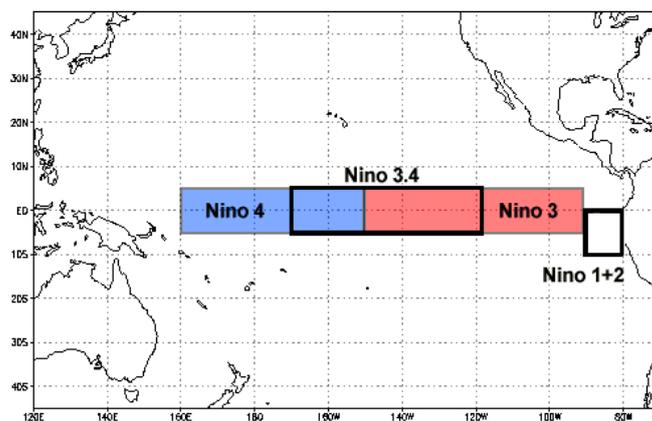
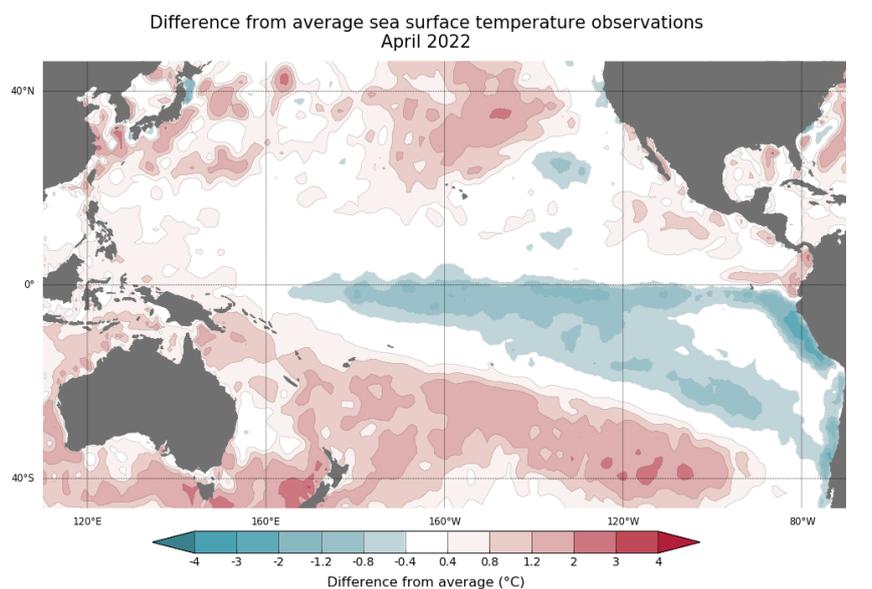


Figure 5.8 Map of NINO Region (Source: <https://www.ncdc.noaa.gov/teleconnections/enso/sst>).



Data: BOM SST
 Climatology baseline: 1961 to 1990
 © Commonwealth of Australia 2022, Australian Bureau of Meteorology
<http://www.bom.gov.au/climate>
 Monthly average: April 2022
 Created: 09/05/2022

Figure 5.9 Monthly temperature anomalies in the tropical Pacific for April 2022

(Source: <http://www.bom.gov.au/climate/enso/wrap-up/#tabs=Sea-surface>).

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5.4 The impact of the Russia Ukraine conflict on global food security

Both Ukraine and Russia are important food exporters to the global markets. According to FAOSTAT, nearly 30 countries have relied on Ukraine and Russia for at least 50 percent of their wheat imports during the last five years. Russia is the largest wheat exporter in the world and Ukraine is the 'breadbasket of Europe' and a major exporter of wheat, maize and sunflower oil. Both countries accounted for about 30% of the global wheat market in 2021. The conflict between the two major crop exporters and economic sanctions imposed by the West against Russia and its oligarchs, in addition to the ongoing COVID-19 pandemic have created further downward pressure on the global economy (He, 2022).

The Russian-Ukrainian conflict that began on the 24th of February 2022 has caused loss of life, citizens' displacement, and massive destruction of infrastructure in Ukraine. More than 6.4 million people had been forced to abandon their homes and flee across borders to safety, while millions more are internally displaced. The conflict has resulted in the suspension of commercial operations

in Ukraine’s ports, hampering the country’s ability to export its products. Nearly 50 countries depend on the Russian Federation and Ukraine for at least 30 percent of their wheat import needs. Subsequently, the FAO Cereal Price Index achieved a record value in March 2020 (since 1990).

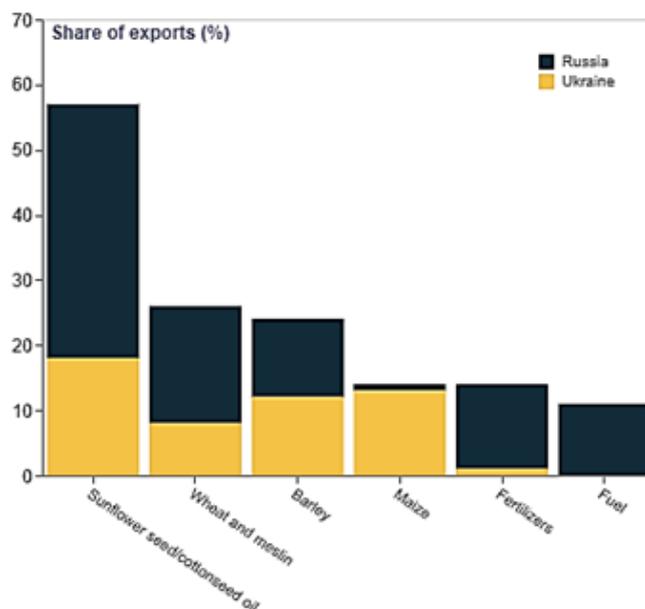


Figure 5.10 Share of total world exports for major food-related commodities (2020). Source: World Integrated Trade Solution, WITS (2022).



Figure 5.11 The situation of the conflict between Russia and Ukraine

The participation of the Ukraine in the world market is indispensable for the global food supply. The fertile black soils are key to the high productivity of Ukrainian agriculture. These soils have a high humus content and therefore can store large amounts of nutrients and moisture. The Ukrainian black soils account for 40% of the total black soil area in the world. They are mainly concentrated in the central and eastern regions of the country.

Since 24 February 2022, the conflict between Russia and Ukraine has expanded significantly. As the winter crops were already planted in the previous year, the conflict had no impact on the planted area for winter crops. Since 19 April, the conflict reaches Ukraine’s eastern Donbas region. It has put eastern Ukraine major winter crops producing regions in the front line of the conflict. It is likely to cause the proportion of harvest in the conflict zone to drop to about 60%, which means that about 1.2 million hectares of winter crops cannot be harvested, including about 900,000 hectares of wheat crops.

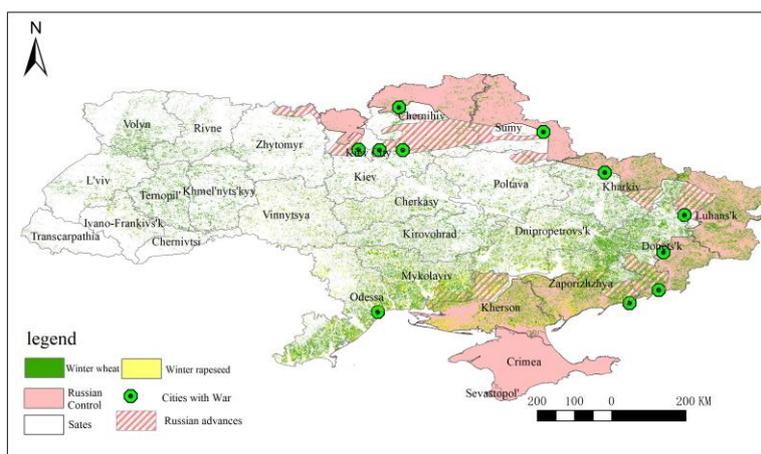


Figure 5.12 The distribution of winter crops in Ukraine

The situation for spring crops is more worrisome. The lack of labor, fuel and agricultural inputs in the southern regions due to the conflict has had a significant impact on the sowing of spring crops. The Ukrainian government estimates that 50-70% of agricultural land is usually grown with summer crops. According to a survey conducted by the Ukrainian government, four out of five of nearly 1,300 large agricultural enterprises do not have enough fuel to plant this summer.

Labor and the accessibility of the farms might be another issue. More than 6.4 million refugees have left Ukraine,[1]. Approximately one-quarter of the country's total population had left their homes in Ukraine by 20 March. This will have a dramatic effect on the management and harvest of winter crops. Safety is a problem for farmers when operating machinery in the field.

Ukraine is also the biggest exporter of sunflower oil and the second largest of barley. Global agricultural markets have endured supply-side shocks and price spikes before. Even before the conflict started in February 2022, many countries around the world were struggling to get access to adequate food supplies following the economic downturn triggered by Covid-19. According to the Global Report on Food Crises 2022, about 193 million people face acute food insecurity in 2021. This represents an increase of nearly 40 million people compared to the previous high reached in 2020.

With the closure of Black Sea ports, exports of cereals have been drastically reduced [FAO, AMIS]. Grains exports are currently limited to 500,000 tons a month, down from as much as 5 million tons before the conflict [Bloomberg]. Previously, 96% of Ukraine's grain, oilseeds and vegetable oils were exported by sea. The situation has now changed to 70% by rail and 30% through the only two ports currently in operation - Reni and Izmail on the Danube.. The Ukrainian government has asked the EU to plan for storage and logistic support for the next harvests [Ouest France].

Global wheat exports in 2021 were 206 million tons. The combined wheat exports of Russia and Ukraine accounted for nearly 28.5% of the global share. Ukraine exported 24 million tons of wheat, accounting for 11.6%. Russian wheat exports amounted to 35 million tons, accounting for 16.9% of global wheat exports. It was the world's largest wheat exporter.

The current Russia-Ukraine conflict has had a major impact on the global food security situation, with wheat prices having risen by 44% so far this year. From March 2021 to March 2022, India's wheat exports totaled 7.85 million tons, a 275% increase from the previous year. An extreme and ongoing heatwave has cut into India's wheat harvest. The worst affected Indian states due to the heatwave were the two major wheat-growing regions – Punjab and Haryana. In order to stabilize domestic prices, India banned exports in May.

In 2020/21, Ukraine was the world's largest exporter of sunflower oil, accounting for 47% of exports, followed by Russia (29%), Argentina, the European Union (EU) and Turkey (6-7% each). Sunflower production is mainly located in the east, north and south of the country, i.e., the areas most affected by the conflict. It will dramatically affect the supply of sunflower oil.

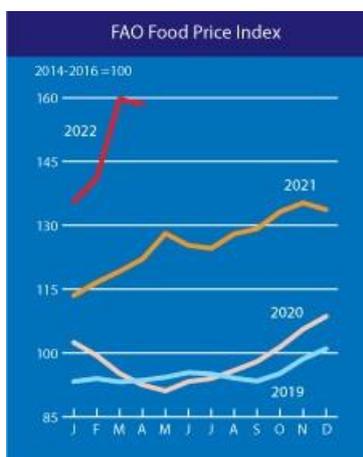


Figure 5.13 FAO Food Price Index

Reference:

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