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 2020 (section 5.1), as well as sections on recent disaster events (section 5.2), and an update on El Niño (5.3).

5.1 CropWatch food production estimates

Methodological introduction

CropWatch production estimates are based on a combination of remote-sensing models combined with CropWatch global agro-climatic and agronomic indicators as well as meteorological data from over 20,000 meteorological weather stations around the world. The major grain crops (maize, rice, wheat) and soybean production of 43 major producers and exporters are estimated and predicted for 2022. The results are as follows.

Production estimates

Overall, extreme heat and dry weather in Europe in 2022 led to reduced crop yields in most European countries, and extreme heat also occurred in the Horn of Africa, South America and the Yangtze River Basin in China, affecting the production of crops. 2022 global maize production is expected to be 1.037 billion tonnes, a decrease of 40.68 million tonnes or 3.8%, it is the largest decrease in the past five years. Global rice production is expected to be 768 million tonnes with an increase of 3.54 million tonnes or 0.5%. Global wheat production is expected to be 708 million tonnes, a reduction of 12.68 million tonnes or 1.8%. Global soybean production is expected to be 320 million tonnes with a slight decrease of 0.2%. The overall supply situation of crop production is tightening (Table 5.1).

Maize

The main maize producing countries in the Northern Hemisphere are affected by high temperature and dry weather. Both maize cultivation area and production declined; the Southern Hemisphere countries have expanded their maize acreage and production increased. In the 2022 Northern Hemisphere summer, extreme heat and dry weather had a serious adverse impact on agricultural production in Europe, resulting in reduced maize yields in France, Germany, Hungary, Italy, Romania, Ukraine and other countries. Hungary, Italy, and Romania were the most severely affected countries. Their maize yields declined by more than 10%; the crisis in the Ukraine limited the country's agricultural production. Both area and yield fell sharply, resulting in a large decline by 34% or 12.22 million tonnes in the country's maize production to 23.72 million tonnes. The U.S. is the world's top maize producer. It experienced drought conditions in its main maize-producing regions in June, resulting in a decrease in maize production to 363.59 million tonnes, down by 17.51 million tonnes or 4.6 %. China's maize acreage shrank, and the high temperature and drought in the Yangtze River basin and flooding in some northern areas led to a reduction in maize production to 222.76 million tonnes, down by 11.08 million tonnes or 4.7%. The continued drought

in Ethiopia and Kenya in the Horn of Africa led to a 20.1% and 7.8% reduction in production, respectively. Production in Canada, Nigeria, Vietnam and other countries was slightly reduced. As the largest maize producer in the Southern Hemisphere, Brazil suffered from persistent drought conditions. The first season maize production fell by 8.7%; the second season maize acreage increased by 9.2% because in April, during the grain filling period, agricultural conditions were significantly better than the same period last year. Yield increased by 6.7%. The second season total maize production increased significantly by 16.5%, prompting Brazil's total maize production to reach 91.3 million tonnes, an increase of 9.6%; Argentina and South Africa maize production is estimated to be 54.97 million tonnes (+2.9%) and 11.86 million tonnes (+3.5%), respectively.

Rice

Production in the important rice producing countries increased slightly, prompting an increase of 3.54 million tonnes in global rice production. Asian rice production is dominant in the world, and China is the world's largest rice producer. Although local areas were affected by high temperatures, drought or flooding. But the national rice production generally remained stable. Rice production is expected to increase slightly by 0.3% to 197.01 million tonnes. Southeast Asian countries are in the rainy season. Precipitation has generally been normal for Thailand, Vietnam, Indonesia, the Philippines, Myanmar and Bangladesh. Pakistan has received significantly more precipitation, causing local flooding. But overall conditions are still conducive to the growth of rice. Production is estimated to increase by 6.8%. In central and north-central India, precipitation is significantly below average, but the main rice producing areas have well-developed irrigation systems, and the dry and hot weather has less of an impact on rice production. The country's rice production is expected to decline slightly by 1.7%. Rice production in Cambodia, the U.S. and Nigeria also declined by varying degrees. Overall, the global rice production and supply situation is basically stable.

Wheat

Global wheat acreage shrank. In addition, drought and extreme heat caused unfavorable conditions in some production regions and the global wheat production has declined for two consecutive years. In Western and Central Europe, the temperatures were 1℃ to 5℃ above average. In combination with a rainfall deficit, most countries suffered from the dual impact of shortened wheat filling period and severe drought. Romania was the country that was most severely affected and its wheat production decreased by 13.2%. In India and Pakistan, a heat wave led to a shorter filling period, resulting in a yield decline by 2.8% and 4.9%, respectively. Total wheat production is estimated at 93.24 million tonnes and 25.57 million tonnes, respectively. Due to droughts, Morocco (-33%), Ethiopia (-20.7%), Kenya (-16,6%) and Afghanistan (-7,4%) saw sharp declines in their wheat production. In Iran, wheat acreage and yields fell simultaneously, resulting in a decline of the country's wheat production by 13.4%. Among the major wheat-producing countries, only Australia, Brazil, Canada, Mexico and Kazakhstan and Kyrgyzstan in Central Asia have increased wheat production. Total global wheat production has fallen to the lowest level in the past five years, and the tight situation of global wheat supply is expected to continue.

Soybean

Production in major soybean exporting countries declined, while production in China, the largest importer, increased significantly. The United States and Brazil are the world's two largest soybean exporters. Production is estimated at 102.36 million tonnes and 95.14 million tonnes, respectively, a decrease of 2.35 million tonnes and 1.16 million tonnes or 2.2% and 3.3%. The main reason for the reduction in soybean production in the United States is the low precipitation and high temperatures in the main soybean producing areas in June and July, affecting soybean flowering and podding, while Brazil is mainly affected by persistent drought conditions, which reduced yields. In contrast, China, the largest soybean importer, increased its soybean acreage significantly this year, prompting Chinese soybean production to reach 18.15 million tonnes, the highest production in nearly 10 years, an increase of 3.81 million tonnes or 26.5%. This increase offesets reductions in U.S. and Brazilian production. Soybean production in Canada and India decreased by 260,000 tonnes and 440,000 tonnes, respectively, while soybean production in Russia and Argentina increased by 230,000 tonnes and 170,000 tonnes, respectively. Overall, the global soybean supply situation is basically normal.

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	`				3,617	-7		
Angola	2,737	4	49	10				
Argentina	54,971	3	1,846	-3	17,216	-4	51,774	0
Australia					29,991	1		
Bangladesh	3,989	2	49,411	3				
Belarus					2,991	-1		
Brazil	91,305	10	11,354	-4	7,490	2	95,137	-1
Cambodia			9,791	-1				
Canada	11,786	-3			29,936	4	7,588	-3
China	222,762	-5	197,010	0	134,229	0	18,151	27
Egypt	5,875	0	6,591	2	11,240	-2		
Ethiopia	5,394	-20			2,862	-21		
France	14,153	-9			33,361	-6		
Germany	4,675	-6			25,095	-4		
Hungary	4,429	-22			4,452	-10		
India	17,867	-2	178,823	-2	93,244	0	12,554	-3
Indonesia	16,648	0	67,224	1				
Iran			2,590	6	10,974	-13		
Italy	5,087	-19			7,362	-5		
Kazakhstan					12,953	15		
Kenya	2,087	-9			243	-17		
Kyrgyzstan	773	25			744	41		
Mexico	23,268	-6			4,015	17	818	-8
Mongolia					299	-5		
Morocco					6,050	-33		
Mozambique	2,204	5	400	0				
Myanmar	1,935	2	25,858	4				

Nigeria	9,380	-10	4,090	-4				
Pakistan	5,558	1	12,125	7	25,573	-3		
Philippines	7,433	5	21,289	4				
Poland					10,292	-5		
Romania	11,270	-13			6,945	-13		
Russia	13,664	1			52,451	-3	3,817	7
South Africa	11,861	4			1,543	-15		
Sri Lanka			2,585	2				
Thailand	4,299	1	40,676	1				
Turkey	6,496	2			16,859	0		
Ukraine	23,723	-34			21,433	-11		
United Kingdom					12,644	-2		
USA	363,593	-5	10,891	-4	51,572	-1	102,361	-2
Uzbekistan					8,336	11		
Vietnam	5,221	-3	46,695	0				
Zambia	3,556	-1			239	7		
Sub-total	957,998	-4	689,298	0	646,250	-2	293,671	-1
Others	78,506	0	78,260	3	61,451	3	26,078	-2
Global	1,036,503	-4	767,558	0	707,701	-2	319,748	0

Global Crop Production Index

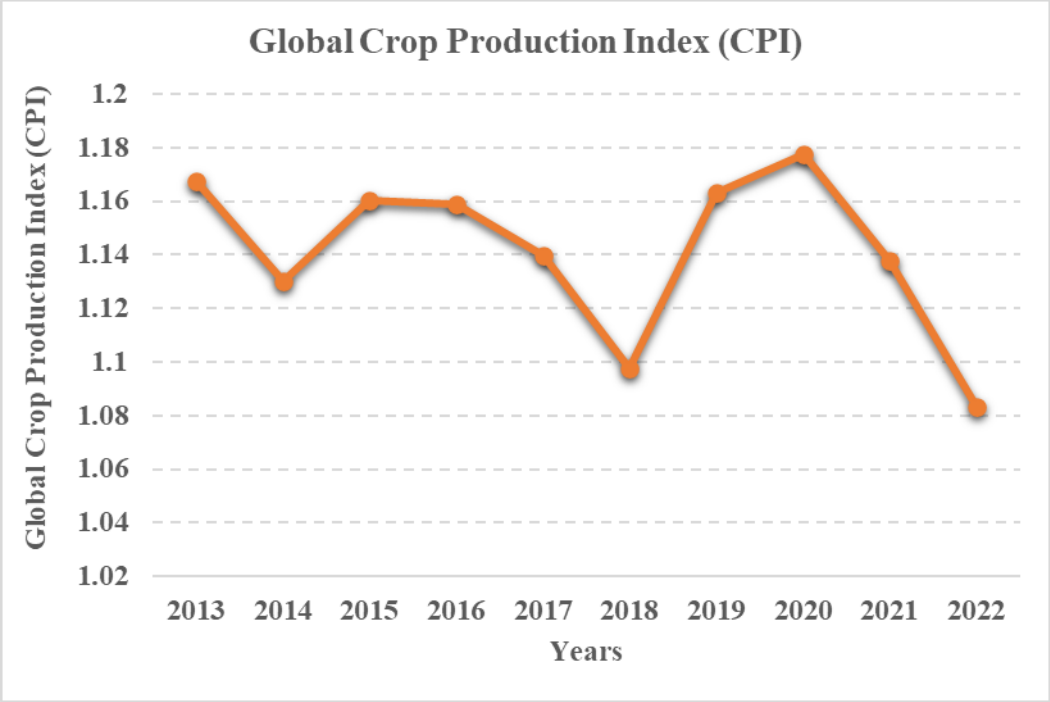

Figure 5.1 **Global agricultural production situation index from April to July of the past 10 years**

The Crop Production Index (CPI) is an indicator that CropWatch is developing and testing to characterize the agricultural production situation in a designated area. The index takes into account the distribution of irrigated and rainfed cropland, VCIx, CALF, land productivity, and crop acreage in a designated area to measure the production situation in a given growing season in a normalized value.

Over the 10-year period, the production situation was poor in 2018 and 2022, and the production situation in 2020 was the highest in the 10-year period (CPI=1.18). Starting from 2021, the global agricultural production situation decreases significantly for two consecutive years, and in 2022 it decreases significantly to the worst in the 10-year period (CPI=1.08). This is consistent with the trend reflected in the global agroclimatic indicators monitored by CropWatch.

5.2 Disaster events

The number of people suffering from acute food hunger is expected to increase in 2022-2023, which was around 817 million in 2021, as estimated by FAO. According to the recently released 2022 State of Food Security and Nutrition in the World (SOFI) report (**https://www.fao.org/3/cc0639en/cc0639en.pdf**), the world continues to lose ground in its efforts to end hunger, food insecurity, and malnutrition in all its forms by 2030 due to several natural and man-made disasters affecting health and food production. This report summarizes those major disasters global wide.

Russia-Ukraine conflict

The Russia-Ukraine conflict that began on 24 Feb. 2022 has caused extensive damage and loss of life, spread across rural areas, and sparked massive population displacement. More than 3.6 million people have been forced to abandon their homes and flee across borders to safety. Millions more are internally displaced. It is clear that the crisis has resulted in a massive and more deteriorating food insecurity situation, disrupted livelihoods during the agricultural growing season in Ukraine, and has also affected global food security. Nearly 50 countries depend on the Russian Federation and Ukraine for at least 30 percent of their wheat import needs. Out of these countries, 26 source over 50 percent of their wheat imports from these two countries. In that context, this crisis keeps disrupting global markets and food supplies. It has caused a challenge for food security in many countries, especially for low-income food import-dependent countries and vulnerable population groups.

Before the crisis in Ukraine, international food commodity prices had reached an all-time high. This was mostly due to market conditions but also due to high prices of energy, fertilizers, and all other agricultural services. The crisis has aggravated the situation. In March 2022, the FAO Food Price Index reached a new historical record high, up 12.6 % from February and 33.6 % from its level a year earlier, and 15.8 % higher than the peak in February 2011. In Lebanon, food prices rocketed by 332 percent, Iranian food bills jumped by 87 percent, and Turkish grocery costs rose by 95 percent. Moreover, the currencies of Zimbabwe, South Sudan, Turkey, Sri Lanka, Laos, and Malawi have lost at least 25 percent of their value against the greenback, leading to a price increase for local companies or governments purchasing global commodities, which are priced in U.S. dollars. As a result, a total of 345 million people in 82 countries are in danger of dying because of insufficient food, according to World Food Program. Despite the recent easing of prices in the commodity markets, food, fuel, and fertilizer remain significantly more expensive than a year ago. Following efforts by multi-faceted, Russia and Ukraine signed an agreement with Turkey and the United Nations in Istanbul on July 22 regarding the outbound shipment of agricultural products from Black Sea ports, reopening three ports in southern Ukraine, including the port of Odessa. By the end of August, the volume of agricultural products shipped out of Ukrainian ports under the agreement framework had exceeded 1 million tons. With the increase in the volume of agricultural products shipped out of Ukraine, international food prices have fallen further, and related

initiatives have also enabled the World Food Program to resume purchasing wheat from Ukraine to provide food aid to countries such as Ethiopia and Yemen to alleviate local famine problems.

Figure 5.2 The FAO Food Price Index reached a new historical record high In March 2022.

(Source: https://www.fao.org/worldfoodsituation/foodpricesindex/en/)

The conflict between Russia and Ukraine has affected the summer crop production in Ukraine. The crop growth based on NDVI shows that it is always lower than the historical average level in this period, especially in the conflict affected areas in the southeast, with the best vegetation state index lower than 0.5.

Accodgin to the monitoring of remote sensing data, by the end of July, the proportion of arable land planted in the main wheat-corn producing region of southeastern Ukraine was only 70% and about 30% of the arable land was affected by the conflict and could not be sown, compared with 94% in the same period in 2021; Kherson, Odessa, Nikolaev, Crimea, Zaporozhye, Donetsk and Dnepropetrovsk oblasts in southeastern Ukraine were the most significantly affected, with the proportion of cultivated land falling by 48%, 42%, 33%, 29%, 28%, 12% and 12% respectively. The conflict led to a significant reduction in the area planted with corn and other fall crops, while the ongoing drought led to a year-on-year decline in crop yields, resulting in a significant decline in the country's corn production to 23.72 million tons, down 12.22 million tons or 34% year-on-year, and most other fall crops, including sunflowers, also had varying degrees of yield reduction.

Floods

In Pakistan, over 1 million people were affected by heavy rains and floods, including 580 people killed and 939 injured during the summer of 2022. Pakistan has received over 60 % of its total normal monsoon rainfall in just three weeks since the start of the monsoon season in July. Heavy rains have resulted in urban and flash floods and landslides, particularly affecting Balochistan, Khyber Pakhtunkhwa (KP), and Sindh provinces. Compared to pre-monsoon levels, rainfall has increased by 267% in Balochistan and 183% in Sindh, causing substantial damage to lives, infrastructure, and livelihoods. Some 107,000 livestock (including 29,000 large ruminants) have perished because of the floods. Over 1,000 animal shelters have been damaged, and over 1 million acres of crops have been affected by the recent floods. The recent Integrated Phase Classification (IPC) analysis of acute food insecurity projects that over 955,000 people will be food insecure in the flood-affected areas of Balochistan between July and November 2022.

Figure 5.3 Over 50 Villages in Pakistan Submerged in Flash Floods: Report.

(Source: https://www.ndtv.com/world-news/over-50-villages-in-pakistan-submerged-in-flash-floods-report-3210040)

In Sudan, the massive floods during the summer season in 2022 have caused the death of 52 people, while another 25 were injured. The floods have also destroyed about 8,900 houses and damaged another 20,600 in 12 Sudanian states. As of 14 Aug., the estimated number of people affected by heavy rains and floods since May exceeds 146,000. The rainy season in Sudan usually starts in June and lasts up to September, with the peak of rains and flooding observed between August and September. The Nile River water level increased during July last week but remains below the alert level. The Atbara River water level, some 300 km northeast of Khartoum, exceeded the alert level on 6 August due to heavy rain in eastern Sudan and the north-western part of Ethiopia. Compared to the same period last year, the water levels along the five major stations remain below the alert level.

In the Nelson region, New Zealand, massive floods are currently occurring, causing damage to roads and homes and forcing more than 1200 households to evacuate. The floods came after four days of heavy rains brought by an 'atmospheric river' starting on 19 Aug. 2022. The higher than a usual number of atmospheric rivers driven by climate change is likely playing a major role in New Zealand floods in addition to high air and sea surface temperatures. As the atmosphere warms, it can hold more moisture, increasing the likelihood of extremely heavy rainfall events.

Figure 5.4 Flooded properties in the Nelson region of New Zealand on Friday, 19 Aug. 2022.

(Source: https://www.theguardian.com/world/2022/aug/19/new-zealand-floods-could-take-years-to-clean-up-with-1200-people-displaced)

Drought

Europe is now hit by the most severe drought in 500 years. The drought conditions have deteriorated this summer as repeated heatwaves roll across the continent. July was reportedly the driest month in France for 60 years. By August, 100 villages had run out of drinking water, and water use had been restricted in nearly all metropolitan departments of France. Consequently, the national maize harvest is expected to be 18.5% lower than in 2021, and milk shortages are expected to follow. In Germany, the River Rhine's water level fell to 30 cm in August. The Rhine is one of Europe's most important trade routes. In Romania, water restrictions were introduced in July 2022 in preparation for drought since the national government has warned citizens not to use drinking water for other purposes such as irrigation, industrial needs, swimming pools, grass, or watering gardens. Spain and Portugal have suffered their driest climate for at least 1,200 years, with severe implications for food production and tourism. Droughts severely impact the landscape and the region's agriculture: the current meteorological conditions threaten to ruin this season's crops, which are to be exported to other European countries. Satellite images revealed that the Almendra reservoir in the Castilla León autonomous region, the third-largest reservoir in Spain, is currently at only 35.9% of its capacity. According to environmentalists, the Tagus River, the longest in the region, is at risk of drying up completely. The reservoirs at the mouth of the river Tagus have lost 23.53 cubic hectometers until mid-August and currently store 566.14 cubic hectometers, representing only 22.5% of their capacity. In the United Kingdom, July 2022 was the driest month since 1935. Agriculture fields and heathland have dried up, and reservoir levels are at a 25-year low.

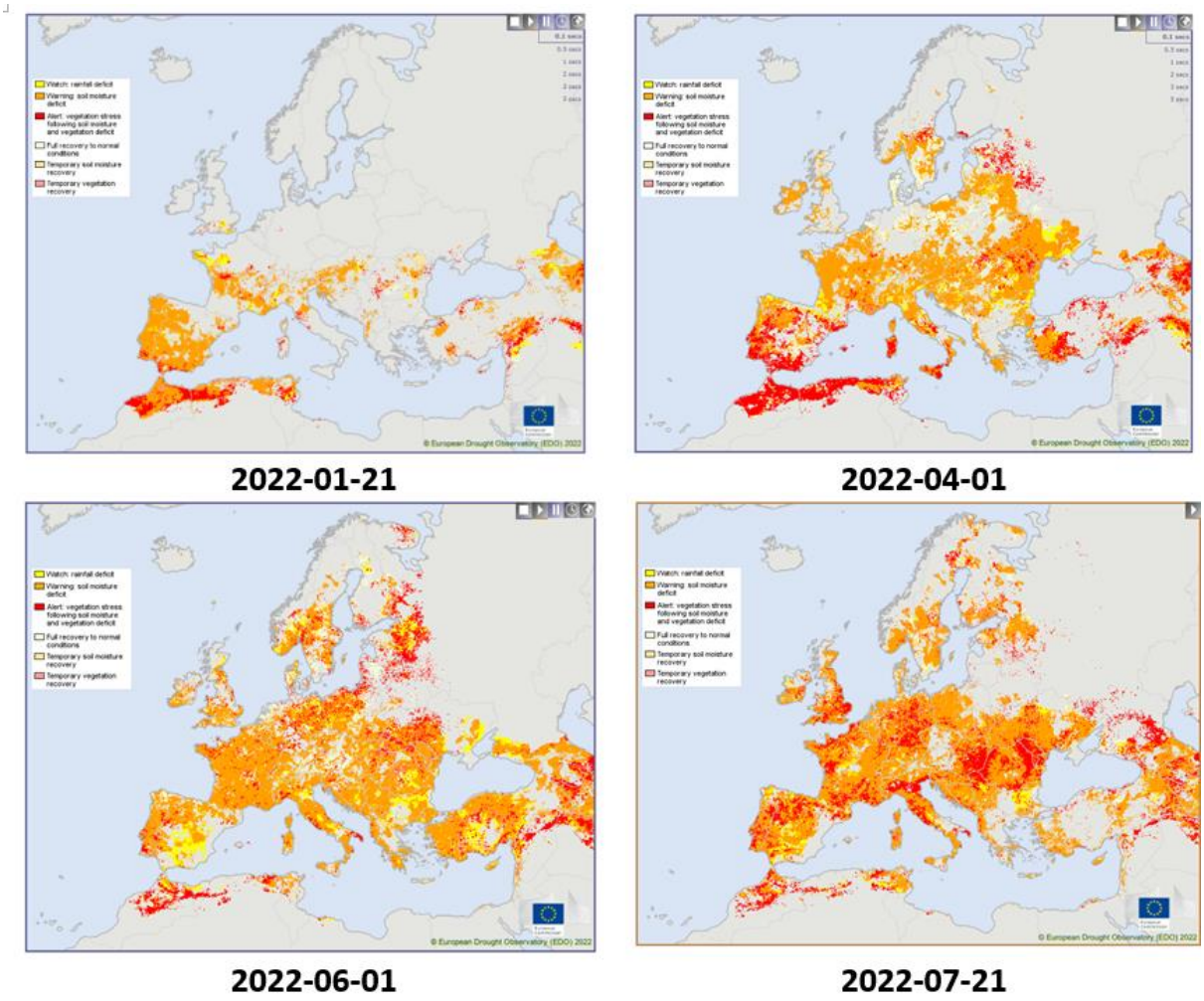

Figure 5.5 Drought propagation in Europe during the current summer as observed by EOD- the European Drought Observatory.

(Source: https://edo.jrc.ec.europa.eu/edov2/php/index.php?id=1000)

In Afghanistan, people continue to face the highest prevalence of insufficient food consumption globally. For nearly ten consecutive months, over 90 percent of the population has faced insufficient food consumption. Drought conditions exacerbated the extreme hunger and poverty that the country is already facing. Intense summer heat and a weak spring rainy season have effectively spelled doom for a meaningful harvest in the country. About 70% of households are unable to meet basic food and non-food needs, with particularly devastating effects for homes headed by widows, the elderly, people with disabilities, and children. An estimated 3 million children are at risk of malnutrition and susceptible to diseases such as acute watery diarrhea and measles due to weakened immunity.

The Horn of Africa, which stretches from Eritrea in the north through Ethiopia and Djibouti to the southern tips of Kenya and Somalia, is experiencing its worst drought in more than 40 years. More than 18 million people face severe hunger in Ethiopia, Somalia, and Kenya. Around 7 million children are acutely malnourished, and 1.5 million people have been displaced. A combination of several factors such as COVID-19, climate change, and armed conflicts is pushing up international food and fuel prices. The region has experienced lower-than-average rainfall for four consecutive years. Ukraine Crisis has impacted wheat and fertilizer supplies to the Horn of Africa. At the same time, the drought has devastated farming, with millions of livestock deaths and significant drops in food production because of failed harvests. The UN estimated that the cost of an average food

basket has risen by 66% in Ethiopia and 36% in Somalia, leaving many people unable to afford even basic items. Millions of livestock animals have died due to the drought in Ethiopia (1 million), Kenya (1.5 million), and Somalia.

In China, a nationwide drought alert was issued on 19 August 2022 as a long-running severe heatwave occurred in China's heavily populated southwest. The abnormal atmospheric circulation is the main reason for the drought in the middle and lower reaches of Yangtze River and Sichuan and Chongqing areas. This year, the weak intensity of plum rains, coupled with the few typhoons deep inland in July and August, the subtropical high-pressure anomaly, resulting in persistent low precipitation, high temperature, long lasting high temperature weather and strong extremes, and rapid development of meteorological drought. The record-breaking drought has caused some rivers in China, including parts of the Yangtze, to dry up. The Yangtze is the world's third largest river, providing drinking water to more than 400 million Chinese people, and is the most vital waterway to China's economy. The low water level in Yangtze River has affected hydropower, halted shipping. The situation was even graver in Sichuan province, which gets more than 80% of its energy from hydropower. The water flow to Sichuan's hydropower reservoirs dropped by half with the increase of electricity demand by 25% this summer. The reduction in hydropower has also reportedly affected downstream populations, including Chongqing city and Hubei province. Overall, the drought has affected at least 2.46 million people and 2.2m hectares of agricultural land in Sichuan, Hebei, Hunan, Jiangxi, Anhui, and Chongqing. But after that, in western part of China including south-central Shaanxi, the northern part of the Sichuan basin, the Han River, the western part of the Yellow River and the Huaihuai River, meteorological drought will begin to mitigate this situation due to the high precipitation process.

Figure 5.6 The Jialing River bed at the confluence with the Yangtze River is exposed due to drought on 18 August, 2022 in Chongqing, China.

(Source: https://www.cnbc.com/2022/08/19/china-issues-first-national-drought-emergency-scorching-temperatures-.html)

CropWatch carried out meteorological drought and agricultural drought monitoring in 6 provinces and cities in the Yangtze River Basin of China (including Anhui, Jiangxi, Hubei, Hunan, Chongqing, and Sichuan), and assessed the mitigation effect of meteorological drought. In general, a severe meteorological drought occurred in the Yangtze River Basin from July to August, but the agricultural drought was not serious, and the mitigation effect of farmland infrastructure was good.

Since July 2022, serious meteorological drought has occurred in 6 provinces and cities in the Yangtze River Basin (Fig. 1). In mid July, the rainfall deficit mainly occurred in most of Jiangxi and Western Sichuan, and in the middle of Jiangxi, Western Hubei, southwestern Hunan, Chongqing, and Western Sichuan in late July; In August, the meteorological drought intensified, mainly in Jiangxi, Hunan, Hubei, and the central part of Sichuan. In addition to the continuous high temperature weather, the drought affected area in the middle of the month further increased, and the meteorological drought was further aggravated.

Meteorological drought causes soil water deficit, causes agricultural drought (Fig. 2), and affects crop growth. As of the middle of August, the drought affected area of arable land reached 51.94 million mu (Table 1), accounting for 13.7% of the total area of arable land in the region. Among them, Sichuan Province in the upper reaches of the basin suffered the most drought, reaching 19.16 million mu, accounting for 21.5% of the total cultivated land area of the province, mainly distributed in the central and eastern regions. The proportion of cultivated land affected by drought in Chongqing is 18.6%, of which the proportion of moderate drought and above is more than 60%, which is distributed in the West and North. The drought affected areas of Anhui, Jiangxi, Hubei, and Hunan provinces account for 9-12% of the total cultivated land area, and the drought affected area is between 4-10 million mu. The proportion of moderate drought and above is more than 5%, mainly distributed in the northwest of Anhui Province, the north central of Jiangxi Province, the north and south of Hubei, and the East and north of Hunan.

There are obvious differences in the scope and intensity of meteorological drought and agricultural drought, which reflect the mitigation effect of drought relief measures. Drought mitigation measures such as irrigation and terracing have alleviated the impact of meteorological drought on crop growth (Fig. 3), so that the crop growth of most cultivated land affected by meteorological drought has not been greatly affected, and the cultivated land with agricultural drought is mainly light and medium drought (Fig. 2). Compared with the area affected by meteorological drought, the agricultural drought area in Jiangxi Province has decreased by 70%, Hubei and Hunan provinces by 60-70%, Anhui Province by 50%, Chongqing by about 50%, and Sichuan Province by about 40%. The reason for the low mitigation effect in Chongqing and Sichuan is that the agricultural drought in sloping farmland accounts for a large proportion.

Table 5. 2 Drought affected area and proportion of cultivated land in 6 provinces (municipalities directly under the central government) in the Yangtze River Basin of China

Province/municipality	Affected area by at least slight drought (thousand mu)	Proportion of drought affected area to total cultivated land (%)	
		slight drought or above	moderate drought or above
Anhui	9330	10.9	5.7
Jiangxi	4100	9.7	5.4
Hubei	7830	11.2	5.8
Hunan	5260	9.3	4.8
Chongqing	6250	18.6	11.2
Sichuan	19160	21.5	9.8
Total	**51940**	**13.7**	**7.2**

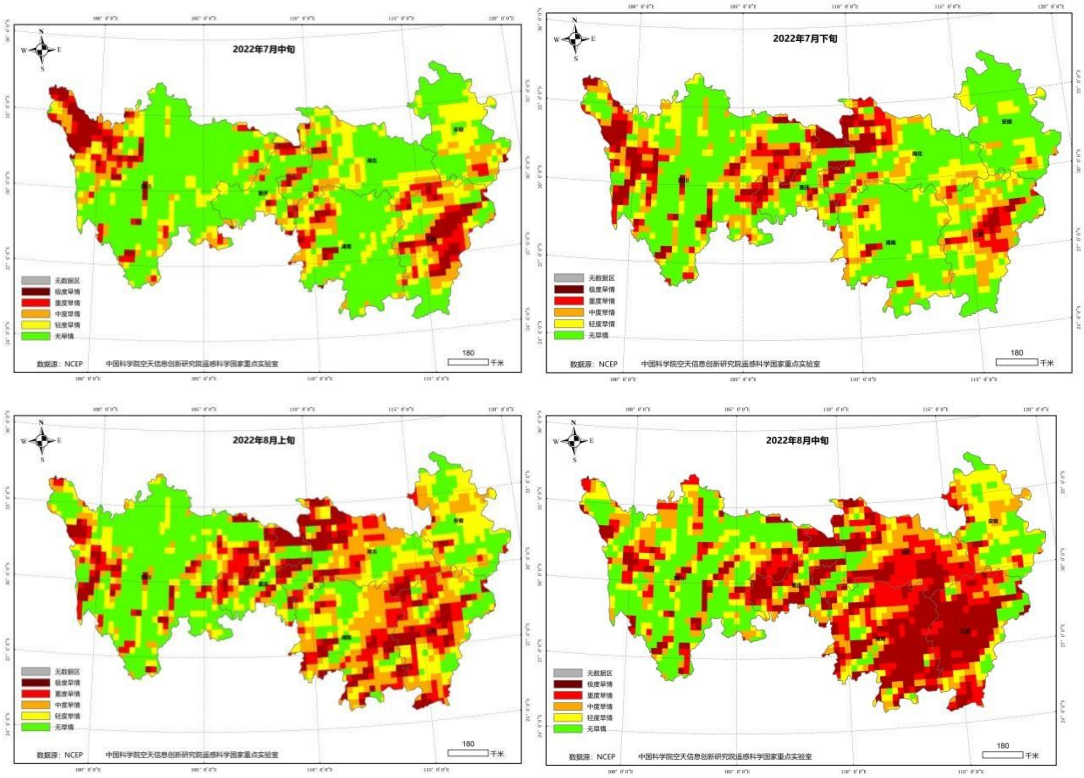

Figure 5.7 Distribution map of meteorological drought time in 6 provinces (municipalities directly under the central government) in the Yangtze River Basin from mid July to mid August 2022.

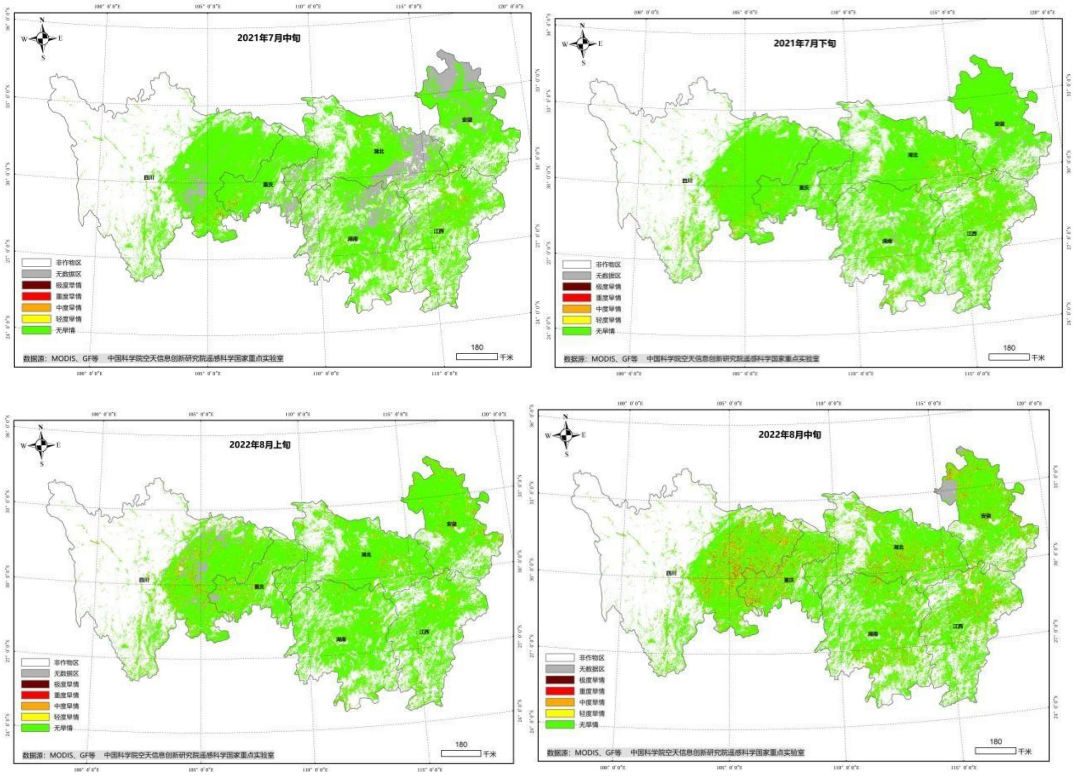

Figure 5.8 Spatial distribution map of cultivated land drought in 6 provinces (municipalities directly under the central government) in the Yangtze River Basin from mid July to mid August 2022.

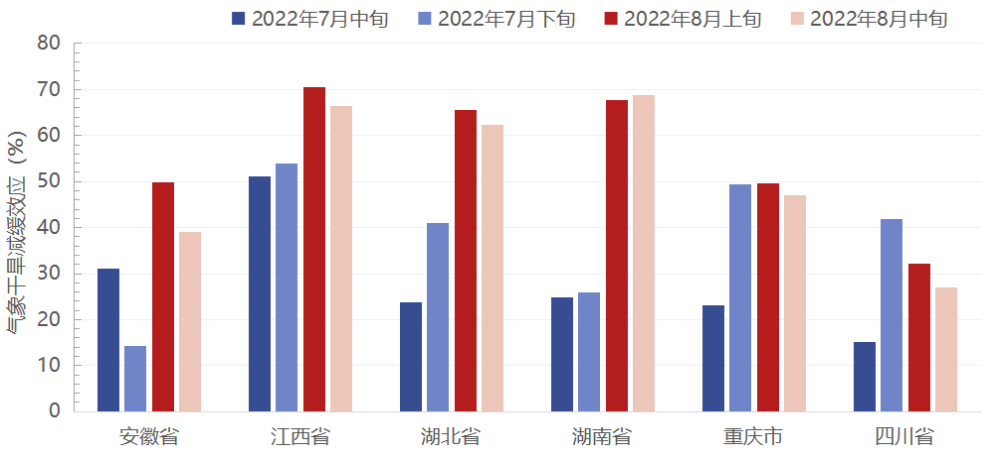

Figure 5.9 Mitigation effect of meteorological drought in 6 provinces (municipalities directly under the central government) in the Yangtze River Basin from mid July to mid August 2022.

Covid-19

The COVID-19 pandemic remains a real threat to lives and food chains in 2022. The pandemic fully exposed the vulnerability of the global agri-food system to shocks and stresses, highlighting the need for transformation and action to make it more resilient and inclusive. The spread of COVID-19 led to significant global disruptions to household livelihoods and food security. Income losses due to the COVID-19 restrictive measures had pushed households into more severe food insecurity and less diverse nutritional outcomes. In 2022, the World Bank's support to developing countries in the Middle East and North Africa exceeded US$5 Billion to mitigate the impacts of COVID-19 and the crisis in Ukraine on the economy and food security.

Desert Locust

Desert Locust is the most destructive migratory pest in the world. They are ravenous eaters who consume their own weight per day, targeting food crops and forage. Starting in early 2020, a massive desert locust upsurge broke out across greater Eastern Africa, Southwest Asia, and the area around the Red Sea, as favorable climatic conditions allowed widespread pest breeding. According to the FAO's latest updates, the current situation was calm in all regions during June and July 2022. Only low numbers of solitarious adults and hoper groups were reported in July 2022 from different sites in the summer breeding areas in the interior of Sudan, and few isolated immature solitarious adults were reported in the summer breeding areas of Marib Governorate in Yemen. As the predictable weather models indicated, above-normal rains are likely in summer breeding areas during August and September, small-scale breeding will occur in the northern Sahel from Mauritania to western Eritrea, and in breeding areas with sufficient rainfall, particularly in Sudan and Yemen, and along both sides of the Indo-Pakistan border. Limited breeding may also occur in northeast Ethiopia and Somalia if good rains fall during the forecast period. These breeding activities will cause locust numbers to increase slightly by the end of the forecast period, which requires vigilance and regular surveys to be maintained in the summer breeding areas.

5.3 Update on El Niño

According to the Australian Government Bureau of Meteorology, the El Niño-Southern Oscillation (ENSO) outlook remains at La Niña WATCH, meaning there is around a 50% chance (double of the normal likelihood) of La Niña forming later in 2022. The current situation is as follows: ENSO indicators are currently at neutral levels. However, some atmospheric indicators, such as the Southern Oscillation Index, continue to show a residual La Niña-like signal. Trade winds have also recently re-strengthened in the western Pacific (more La Niña-like).

Figure 5.10 illustrates the behavior of the standard Southern Oscillation Index (SOI) for the period from July 2021 to July 2022. The SOI has remained positive and high (greater than +7) for the past four months while trending downward in July. Much of the persistent positive SOI signal is due to high pressure systems over Tahiti. While the SOI is an important index that tracks changes in tropical air pressure, a much wider range of atmospheric and oceanic conditions is considered when assessing the status of ENSO. This includes winds, clouds, ocean currents, and both surface and sub-surface ocean temperatures, as well as outlooks for the months ahead.

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 NINO indices for June 2022 were: NINO3 -0.3° C, NINO3.4 -0.4° C, and NINO4 -0.3° C (Data for the full month of July is not yet available). It implies that the average sea surface temperature in all three regions is lower than the historical average. Moreover, cool anomalies have weakened, while warm anomalies around northern Australia and to Australia's northeast have strengthened as compared to May. This indicates that La Niña weakened slightly in intensity in June.

Sea surface temperature (SSTs) for June 2022 (Figure 5.12) were generally close to average close to the equator across the Pacific, but SSTs were slightly cooler than average over much of the tropical central and eastern Pacific south of the equator and in some scattered areas north of the equator. Cool anomalies were strongest close to South America. Warm SST anomalies were present over much of the Maritime Continent.

In summary, La Niña continues to be active in the tropical Pacific from April to July but is becoming weaker. La Niña's impact during the Northern Hemisphere summer is generally neutral. It mainly affects winter and spring. In some regions, however, this convention is broken. For example, La Niña was a factor in the hot weather in June in Henan and Hebei, China, and even more so in late July and early August, causing many cities to break historical temperature records. In addition, it caused above-average rainfall over much of northern and eastern Australia during the monitoring period. La Niña events also increased the chances of flooding in Southeast Asia. They also increased the risk of drought and mountain fires in the southwestern United States, and created multiple hurricane, cyclone and monsoon patterns in the Pacific and Atlantic Oceans, as well as triggering weather anomalies in other regions.

During the next monitoring period, La Niña is likely to continue and may bring more flooding to the southern part of China. Brazil is prone to experience droughts during La Niña events. Attention should also be paid to La Niña in the fall and winter (northern hemisphere), which tends to bring cold winters. There is about a 50% chance that La Niña will continue later in 2022, yet the form of La Niña's impact varies by country and region.

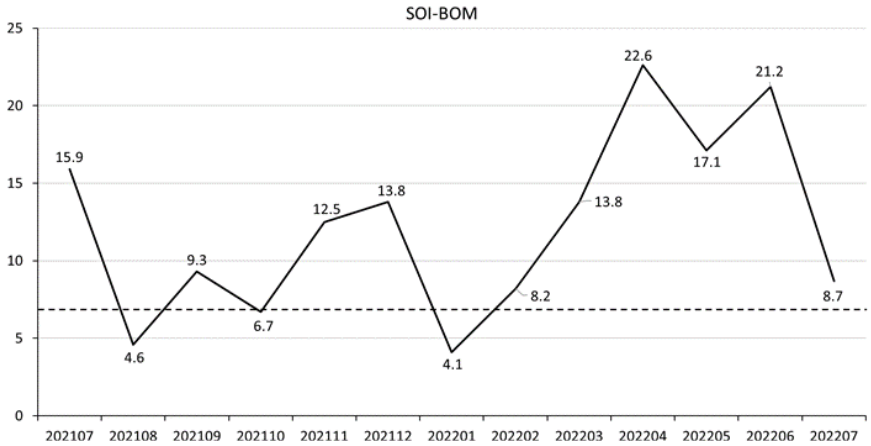

Figure 5.10 Monthly SOI-BOM time series from July 2021 to July 2022

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

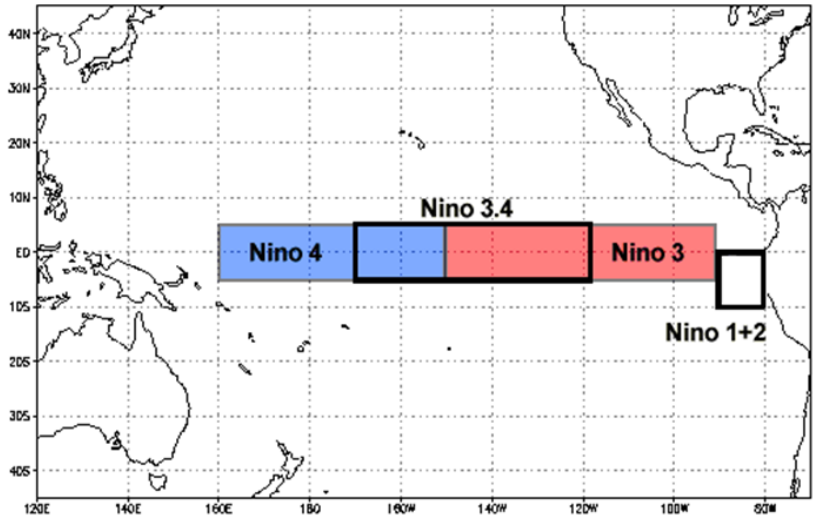

Figure 5.11 Map of NINO Region

(Source: https://www.ncdc.noaa.gov/teleconnections/enso/sst)

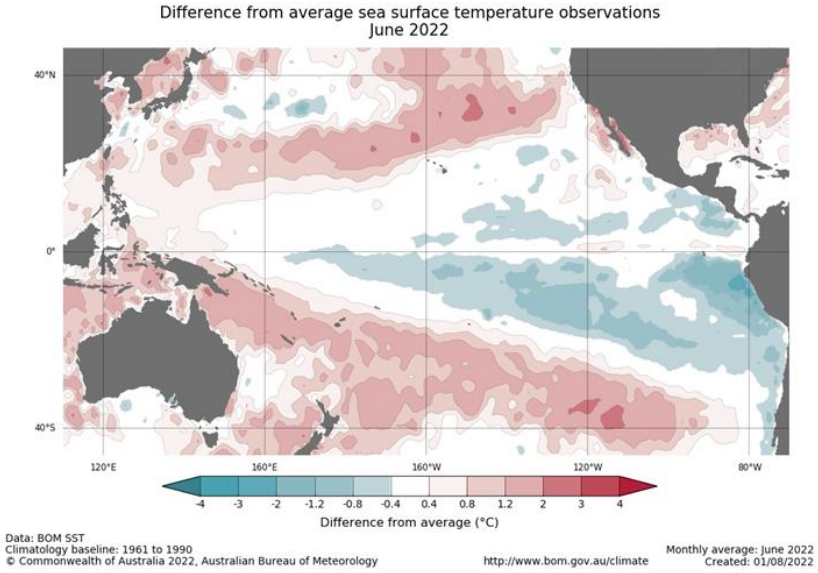

Figure 5.12 Monthly temperature anomalies in the tropical Pacific for June 2022

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

Source

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