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), and an update on El Niño (section 5.3).

5.1 CropWatch food production estimates

The production outlook for the current bulletin includes only the major producers in the Equatorial region, the Southern Hemisphere, and some isolated Northern Hemisphere countries where crop development is sufficiently advanced to ensure that estimates are reliable.

CropWatch production estimates differ from most other global estimates by the use of geophysical data in addition to statistical and other reference information such as detailed crop distribution maps. Recent sub-national statistics are used for the calibration of remote-sensing-based models. It is also stressed that the assessments and underlying data are crop-specific, i.e. based on different crop masks for each crop and that, for each crop listed in Table 5.1, both yield variation and cultivated area variation are taken into account when deriving the production estimates.

Table 5.1 Preliminary 2021 production estimates in thousands tonnes for selected countries in Equatorial region, and Southern Hemisphere as well as early crops in the Northern Hemisphere. Δ% stands for the change in % compared with the corresponding season in 2020.

	Maize		Rice		Wheat		Soybean	
	2021	Δ%	2021	Δ%	2021	Δ%	2021	Δ%
Afghanistan					3905	-25		
Angola	2623	-11.4	45	-1.9				
Argentina	53440	-1.1	1901	-1.9	16313	3.7	51608	-1.9
Australia					30606	1.3		
Bangladesh	3476	-10.9	44800	-2.6				
Belarus					3267	5.7		
Brazil	83345	-4.8	11851	2.4	6121	-1.8	96300	-4.7
Cambodia			9850	-2.7				
Canada	12096	1.3			28777	-15.2	7872	2.6
China	231602	2.4	202798	0.8	127981	0.7	14371	-1.4
Egypt	5915	-3.4	6574	-3.3	11466	-4.9		
Ethiopia	6074	-12.4			3374	-8.6		
France	14647	1.5			33813	-2.9		
Germany	4850	0.4			26075	-2.1		
Hungary	6023	-5			4942	-5.2		
India	18856	1.4	185038	2.6	93439	-2.5	12434	6.7
Indonesia	16652	0	65004	0.1				
Iran			2439	-17	12157	-26		

	Maize		Rice		Wheat		Soybean	
	2021	Δ%	2021	Δ%	2021	Δ%	2021	Δ%
Italy	6315	-2			7750	-0.9	1571	-2.8
Kazakhstan					11055	-14.1		
Kenya	2451	-15.2			274	-13.7		
Kyrgyzstan	672	-4.9			534	-14.7		
Mexico	25710	8.2			3436	-20.3	955	10.4
Mongolia					316	13.2		
Morocco					9024	43.2		
Mozambique	2102	4.1	399	4.5	20	1.9		
Myanmar	1897	1.1	24900	-2.7				
Nigeria	10108	0.2	4012	-4.3				
Pakistan	5329	-5.1	10404	-9.4	25822	-6.1		
Philippines	7211	0.9	21010	1.3				
Poland					10656	-0.9		
Romania	13885	8.5			8002	8		
Russia	13583	-1.7			57601	3.5	3624	-3.5
South Africa	11459	-2.6			1647	-3.9		
Sri Lanka			2461	-2.1				
Thailand	4216	0.4	41525	2.2				
Turkey	6432	-1.6			16809	-13.1		
Ukraine	34860	24.8			24122	9		
United Kingdom					12875	1.2		
United States	384063	2.6	11424	-2.2	53722	0.7	105239	0.7
Uzbekistan					7073	-22.4		
Vietnam	5394	-0.2	47593	1.6				
Zambia	3586	4			88	1.6		
Total	998870	1.4	694028	0.6	653063	-2.3	294213	-1.4
Others	82693	-2.7	56761	-19.6	58065	-16.6	26378	5.1
Global	1081563	1.1	750789	-1.3	711128	-3.7	320591	-0.9

Affected by persistent hot and dry weather in Northwestern North America, Brazil, Central Asia, West Africa, and Southern Africa, global rice, wheat, and soybean production is expected to reduce. Global maize production in 2021 is expected to be 1.082 billion tones, an increase of 1.1%, 11.3 million tones. Global rice production is expected to be 751 million tones, a decrease of 1.3%. Global wheat production is expected to be 711 million tones, a 3.7% decrease of 26.99 million tones; global soybean production is expected to be 321 million tones, a 0.9% decrease.

Maize

In 2021, the United States, China and Ukraine ranked the top 3 in maize production, with maize production of 384.06 million tones, 231.60 million tones and 34.86 million tones, an increase of 9.8 million tones (2.6%), 5.52 million tones (2.4%) and 6.93 million tones (24.8%) respectively, mainly due to more favorable agro-meteorological conditions during the maize reproductive

period and larger maize growing area. Brazil, the world's third largest maize producer, reduced 4.8% at 83.34 million tones. Brazil's high temperature and dry weather since the maize planting period continued to lead to a 4.5% decline in maize yield. Mexico's maize growing area and yield increased simultaneously, prompting the country's production of 1.95 million tones. Romania recovered from the 2020 drought year with an increase in maize production of 1.08 million tones. Changes in maize production in the remaining major maize producing and exporting countries were less than 1 million tones, with a relatively small impact on total global maize production.

Rice

Asian rice production accounted for more than 90% of the total global production. Agro-meteorological conditions vary widely among the major producing countries. Bangladesh, Myanmar and Iran were affected by drought conditions, and rice production decreased by 1.21 million tones (2.6%), 690,000 tones (2.7%) and 500,000 tones (17.0%), respectively. Pakistan was affected by the reduction of rice acreage; rice production fell by 1.08 million tones. China and India, as the world's two largest rice producers, the overall rice production situation is good, production increased by 1.62 million tones and 4.76 million tones, respectively. Under sufficient precipitation and other favorable weather, Thailand and Vietnam rice production increased by 900,000 tones and 760,000 tones respectively. The total rice production of the remaining major producing countries decreased compared with 2020, offsetting the increase in rice production in China and India, and the total global rice production is expected to decline slightly.

Wheat

Due to the continued dry weather, some wheat-producing countries in the northern hemisphere shrink planted area, most wheat-producing countries affected by drought yields fell, global wheat production is lower than 2020. China's total winter wheat production will increase by 0.9%.Since sowing period, precipitation in the Northern Hemisphere has been generally lower than the average of the past 15 years, with poor winter wheat growth and impaired yields in several countries, including Iran, Afghanistan, Uzbekistan, Canada, Kyrgyzstan, Turkey, Pakistan and India, combined with the reduction in wheat growing area in some countries, and wheat yields reduced by 26.0%, 25.0%, 22.4%, 15.2%, 14.7%, 13.1%, 6.1% and 2.5% respectively. In addition, wheat production in most countries in Western Europe also declined slightly. The severe drought in the northwest of United States only affected the production of spring wheat in the region, the country's total wheat production still increased by 0.7%. The good agricultural weather of Russia's winter wheat production areas prompted a 3.5% increase in production. Most countries in Eastern Europe also achieved an increase in wheat production. Morocco's wheat yields increased significantly compared to the severe drought year of 2020, with a recovery increase in wheat production of 43.2%.

Soybean

The widespread drought in South America led to a decline in soybean production in Brazil and Argentina. Affected by persistent hot and dry weather, Brazil's soybean slumped to 96.3 million tones, down 4.74 million tones (4.7%), the lowest production in the past three years. The agro-meteorological conditions of early growing stags in Argentina's main soybean production areas were normal while since April, the continued reduction in precipitation on late sowybean growing

season led to a 980,000 tones fall (1.9%) at 51.61 million tones. As the world's largest soybean producer, the United States soybean production areas are not affected by high temperature and dry weather, soybean yields increased slightly, total soybean production increased by 0.7% to 105.24 million tones. The increase in soybean growing area in India led to an increase in total soybean production of about 6.7%, an increase of 780,000 tones. The decline in soybean growing area in northeast China, influenced by market factors such as the continued rise in corn prices, led to a decrease in soybean production in China of about 1.4%.

5.2 Disaster events

Introduction

Extreme weather events from severe drought to massive floods negatively influence key agricultural regions worldwide, driven by human-induced climate changes. According to the 2021 Intergovernmental Panel on Climate Change (IPCC) report, these extreme weather events are projected to increase since climate change intensifies the water cycle leading to more intense rainfall and associated flooding and more intense drought in many regions. Hence, this report discusses several disasters related to climate change threatening human lives and food production worldwide.

Floods

Record-breaking floods occurred in Henan province, China, during July 2021, caused by intensive rainfall. As of Aug. 2, 2021, provincial authorities have reported the death of 302 people, with 50 more that went missing and 815,000 people were evacuated, 1.1 million were relocated, and 9.3 million people were affected. It not only caused great losses in human lives and property but also has a high potential impact on the national food supplies, as the province is one of China's leading grain producers. According to a report released by the provincial government, the record floods affected 712,000 hectares of crops in Henan, accounting for 9 % of the fall crop area, and damaged about 23,000 hectares. Besides, the disaster may still cause serious damage to the processing, storage, and transportation of summer grain. CropWatch shows that about 116,000 ha of autumn crops in Henan Province were damaged, with 36,000 ha of maize and 31,000 ha of other autumn crops going out of production, which is greater than the government's published data. The heavy precipitation also brought sufficient water for maize growth in other parts of Henan Province, and the increased yields in other areas somewhat compensated for the reduced maize yields caused by the floods, making Henan Province's maize production only 1.1% lower than in 2020.

Figure 5.1 A complete village in Hebei, Henan province, was inundated on July 23, 2021, due to the dam breach caused by floods (https://www.chinadaily.com.cn/a/202107/26/WS60feb99da310efa1bd664784.html).

Several European countries have been affected by massive floods during July 2021, causing the death of 270 people, including 184 in Germany, in addition to the severe damage to infrastructure, mainly in Belgium and Germany. During the flooding event, many farms and livestock in Belgium had to be evacuated, and many fields were damaged and crops destroyed by inundation. The two regions severely affected in Germany were Rhineland-Palatinate and southern North Rhine-Westphalia. Families are currently providing their labor, tractors, and equipment for cleanup, and many fields were submerged and could not be be replanted immediately. In Turkey, the intensive floods in August were also responsible for the death of 70 persons, and 329 people went missing. Kastamonu province is the worst-hit area where several buildings in the town of Bozkurt were destroyed when the Ezine River burst its banks.

Figure 5.2 Protected crops in greenhouses were inundated by intensive floods in Limburg, in the South of Netherlands(https://www.hortidaily.com/article/9340224/heavy-rain-causes-severe-damage-to-open-field-fruit-and-vegetable-crops-in-western-europe/)

In western Japan, more than a million people have been urged to seek shelter due to the unprecedented levels of rain that lead to intensive floods and landslides during July 2021. As reported by the local government, at least 18 people had died, and 14 were missing in the prefectures of Kumamoto and Kagoshima, where the strength of the floodwaters completely destroyed houses.

Wildfires

Last month was the worst July for wildfires on record worldwide, as described by many scientists. Wildfires were severe, particularly in North America, Siberia, Africa, and southern Europe. The high temperature and prolonged drought ignited the forests and grasslands to release 343 mega tonnes of carbon, about a fifth higher than the global peak in July 2014, where more than 50% of the carbon came from two regions – North America and Siberia.

In Siberia, the total carbon emissions from wildfires during June and July reached 188 mega tonnes, equivalent to 505 mega tonnes of carbon dioxide. This amount of carbon dioxide is more than half of the emissions from Germany, Europe's biggest polluter, in the entire year 2018. Consequently, the region has lost almost 500,000 square kilometers of vegetation to the fires, according to end of July estimates.

In the USA, National Interagency Fire Center's situation report listed a total of 39,267 wildfires across the country that had burned over 1.4 million hectares until Aug. 8. In Canada, the number of wildfires was reported by the Canadian Interagency Forest Fire Centre (CIFFC) as 5,619 wildfires until Aug. 7, which had burned more than 3.7 million hectares.

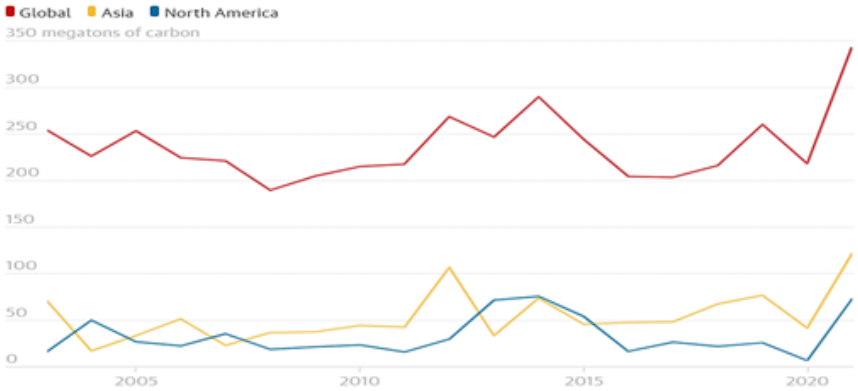

Figure 5.3 The amount of carbon emissions during 2005 -2020 from Asia and North America compared to global emissions. (https://www.theguardian.com/world/2021/aug/06/last-month-worst-july-wildfires-since-2003)

Another hotspot of wildfires was the Mediterranean region, particularly in Turkey, Italy, Greece, Spain, Algeria, and Tunisia. According to the European Forest Fire Information System, about 128,000 hectares of vegetation were burned in Turkey by the end of July, which is eight times higher than the average. Most of the fires in turkey were mainly in southern provinces such as Antalya, Adana, and Mersin. Overall, three people were killed in the fire, and the Disaster and Emergency Management Authority (AFAD) announced on July 29 that 122 people were affected by the fire while 58 were still hospitalized.

Italy had also suffered from intensive wildfires during July 2021 when 80,000 hectares of vegetation were burnt, four times higher than the 2008-20 average. According to local experts, much of the damage has been in national parks, including ancient UNESCO-protected beech forest in the Aspromonte national park in Calabria, which will need at least 15 years to recover. Scientists attributed most wildfires to global warming that makes heat waves more frequent and intense. However, the minister for the Green Transition, Roberto Cingolani, attributed about 70 percent of fires to humans, particularly those who benefit financially from the fires (e.g., private companies of firefighting workers, plane and helicopter fleets) and those who want to convert land for development or pasture.

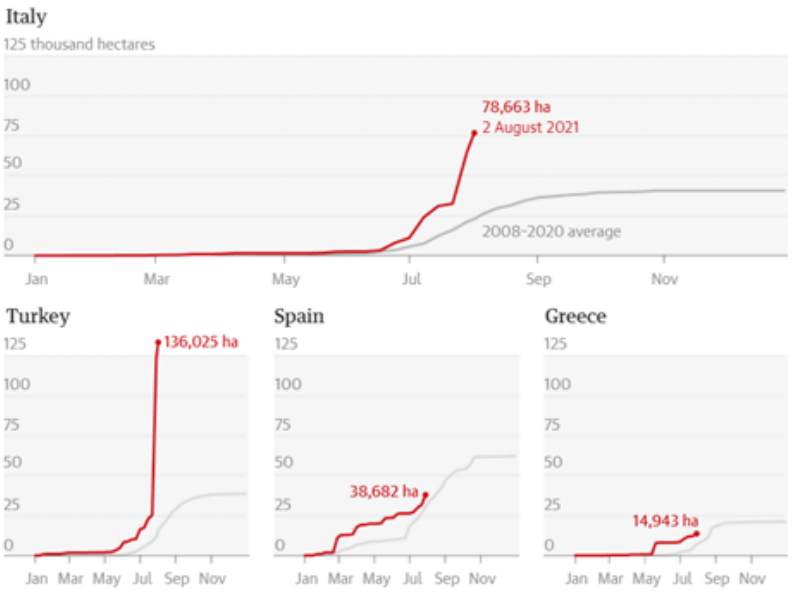

Figure 5.4 The burnt area by wildfires during last four months in four Mediterranean countries; Italy, Turkey, Spain, and Greece. (https://www.theguardian.com/world/2021/aug/06/last-month-worst-july-wildfires-since-2003).

Figure 5.5 A residential area was devastated by wildfires in Manavgat district in Antalya, southern Turkey, on July 29, 2021, as seen from an aerial photo. (https://www.dailysabah.com/turkey/suspicious-forest-fires-rage-in-turkeys-south-for-a-second-day/news?gallery_image=undefined#big)

In Algeria, at least 69 persons lost their lives during their fight against wildfires until Aug. 12. Meteorologists attributed the wildfires to the heatwave that hit North Africa during July and August, with temperatures in Algeria reaching 46 degrees Celsius. According to the Algerian Minister of Agriculture and Rural Development, about 8,000 hectares have been damaged by wildfires since the beginning of July.

In Tunisia, the temperature in the capital Tunis hit a record of 49 degrees Celsius (120 degrees Fahrenheit) on Aug. 10, 2021. In addition, wildfires were reported in the border regions between Tunisia and Algeria during the last week of August, and more than 2500 hectares of land were damaged.

Despite its vital role in curbing climate change by absorbing greenhouse gases, wildfires that intensively hit the Amazon rainforest in Brazil during June and July were responsible for the high deforestation rate, which has increased by 1.8% in June 2021 compared to last year, to 1.062 million hectares, according to national space research agency (Inpe).

Drought

Drought hits several regions around the globe during the last three months. The areas with severe drought were Canada and the north USA, South America, Eastern Europe, and Central Africa. During June and July of 2021, about 36% of the USA regions were under severe to extreme drought, threatening recently planted corn, soybean, and spring wheat crops in Iowa, Minnesota, and the Dakotas. California farmers were prompted to leave fields fallow in the western part of the USA and triggered water and energy rationing in several states due to severe drought. Spring wheat was also under drought stress, as estimated by local experts. Moreover, about 41% of Iowa, the nation's top corn producer and No. 2 soybean state, was under severe drought during the last two months, according to the weekly U.S. drought monitor report. In the western Corn Belt, drought in July and August, critical months for corn, has already trimmed the U.S. corn yield average by 2 to 4 bushels per acre.

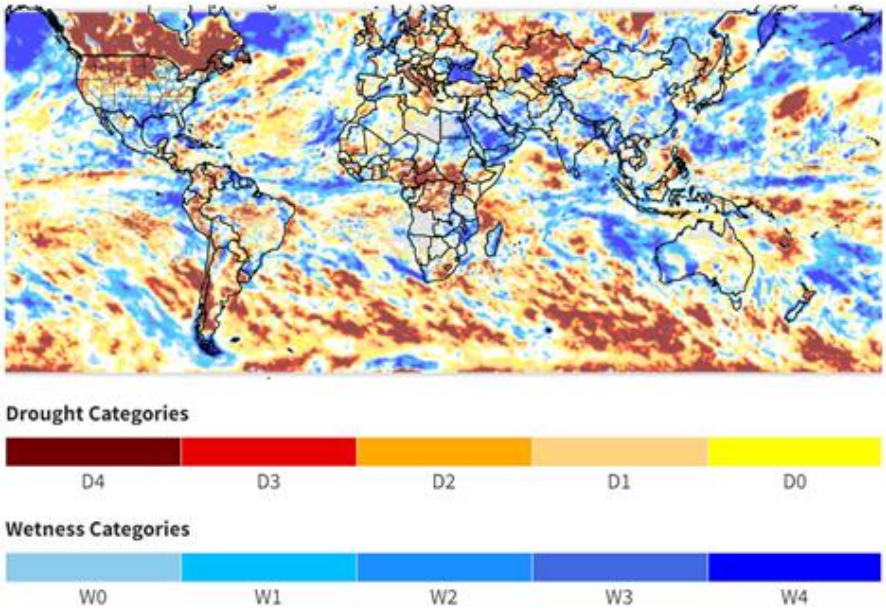

Figure 5.6 The 3-month Standardized Precipitation Index (SPI) indicates the global scale's drought/wet conditions(https://www.drought.gov/international).

In South America, drought continues to hit the Paraná River, one of the leading commercial waterways which go through Brazil, Paraguay, and Argentina, threatening vast ecosystems. The river has reached its lowest level in nearly 80 years due to a prolonged drought in Brazil that scientists attribute to climate change. According to the national water institute of Argentina, the low water level of the Paraná River is the worst since 1944. The Paraná waterway is of paramount importance since its aquifers supply fresh water to some 40 million persons in Brazil and Argentina. As a main waterway in South America, almost 3.9 million tonnes of goods, including soybeans and corn, were moved on the Parana system last year. The low water level in the river caused the down of import goods from an average of 5.6 million tonnes between 2017 and 2019.

Figure 5.7 A photo was taken on July 29, 2021, showed the shallow water level in the Paraná River due to the severe drought and scares rainfall over South America. (https://www.register-herald.com/region/drought-hits-south-america-river-threatening-vast-ecosystem/article_cd52843d-f489-576b-81ee-c6aedb7ee5f6.html)

Desert locust

A limited to moderate swarm breading is now taking place over eastern Africa. Due to the unstable security and political situation in northern Ethiopia, the control operations were hampered, despite the good rainfall over the region during June and July, which could help more swarms to bread and laying eggs. It is expected that the mature swarms in northeast Ethiopia will finish laying eggs in areas of recent rain, including adjacent areas of southern Djibouti. Hatching and band formation is expected to take place this month in Afar, causing locust numbers to increase and leading to the formation of new immature swarms from late September onwards. If the necessary survey and control operations cannot be carried out safely in Afar, then a greater number of swarms are likely to form than originally anticipated that would migrate east and threaten eastern Ethiopia and northern Somalia in October. In Yemen, small-scale breeding is underway in the interior. Elsewhere, the situation remains calm, and no significant developments are likely.

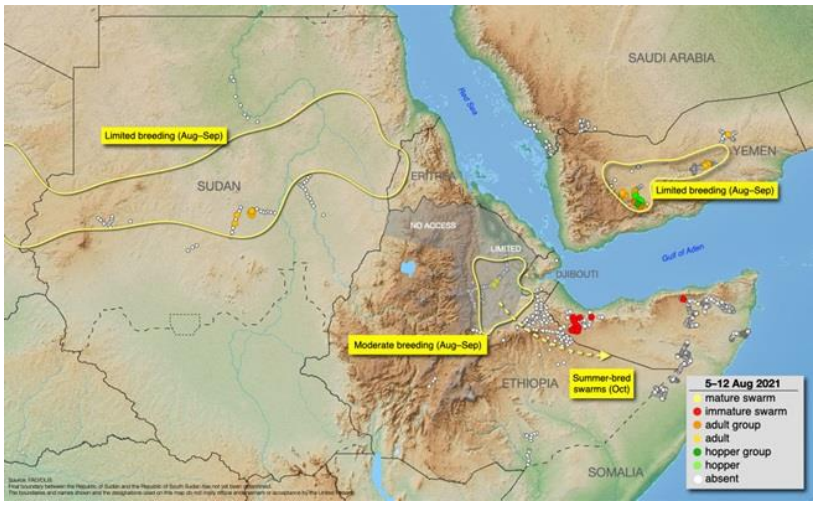

Figure 5.8 The current distribution and movement of different desert locust groups over African horn and Yemen(http://www.fao.org/ag/locusts/en/info/info/index.html).

COVID-19

Nearly 2.37 billion people (or 30% of the global population) lacked access to adequate food in 2020. As estimated by WFP, about 272 million people are already or are at risk of becoming acutely food-insecure in 2020-2021 due to COVID-19. Moreover, the prices of crops such as maize, wheat, and rice were about 43%, 12%, and 10% above their January 2020 levels, as estimated by FAO. Although the hunger trend was increasing even before COVID-19, the pandemic was a setback to all UN efforts to reduce poverty and hunger worldwide.

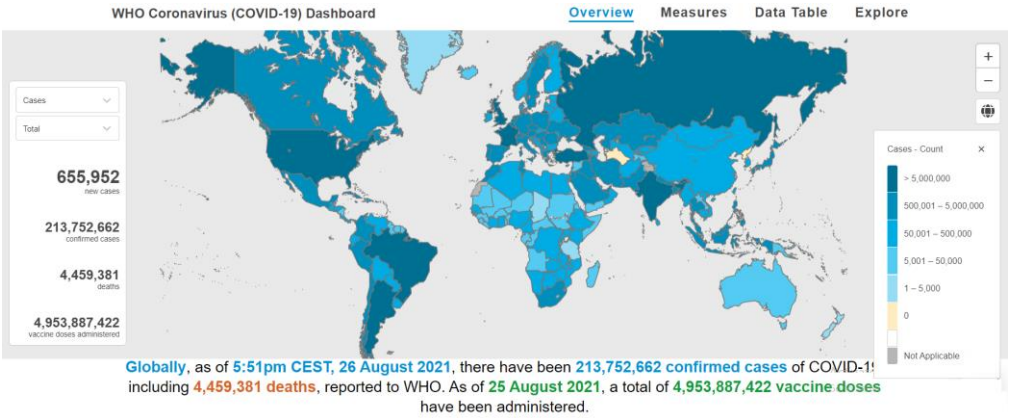

Figure 5.9 The WHO COVID-19 Dashboard (source:https://covid19.who.int/).

5.3 Update on El Niño

The El Niño –Southern Oscillation (ENSO) remains neutral with most oceanic and atmospheric indicators within the neutral range. While pressure patterns show some La Niña-like characteristics, as indicated by the latest Southern Oscillation Index (SOI) 30-day value of +15.1, it is likely that some of this shift in pressure is driven from warm conditions in the eastern Indian Ocean. Most climate model outlooks indicate the central tropical Pacific is likely to cool over the coming months, with three of seven models surveyed by the Bureau indicating this cooling will be enough to reach La Niña thresholds in spring, with the remaining four models staying neutral. Along with the negative Indian Ocean Dipole (IOD), this may be contributing to the wetter than median climate outlooks in Australia.

Figure 5.10 illustrates the behavior of the standard Southern Oscillation Index (SOI) published by the Australian Bureau of Meteorology (BOM) for the period from July 2020 to July 2021. Sustained positive values of the SOI above +7 typically indicate La Niña while sustained negative values below -7 typically indicate El Niño. Values between about +7 and -7 generally indicate neutral conditions. During this monitoring period, SOI increased from 2.0 in April to 3.6 in March, then decreased to 2.6 in June, then increased to 15.9 in July.

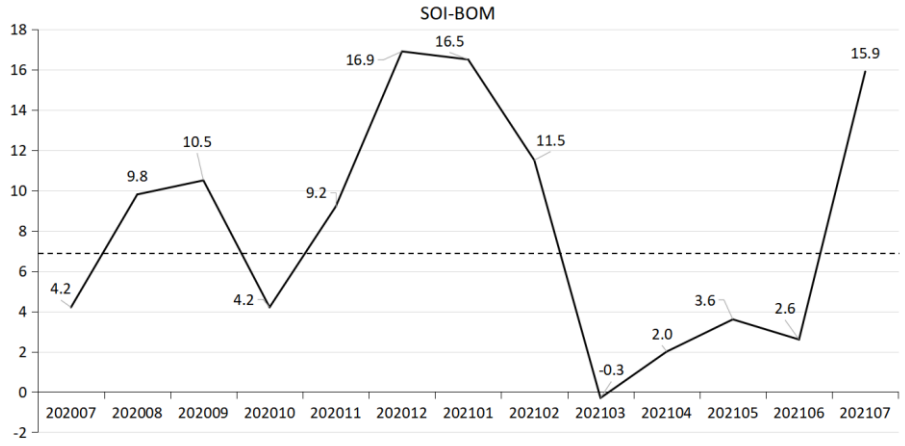

Figure 5.10 Monthly SOI-BOM time series from July 2020 to July 2021

(http://www.bom.gov.au/climate/current/soi2.shtml)

The SST map (Figure 5.11) for July 2021 shows SSTs were close to average across most of the equatorial Pacific Ocean, although warmer than average SSTs continued in the eastern Pacific Ocean close to South America. SSTs were warmer than average in waters around the north and southeast of Australia. Values of the three key NINO indices for July 2021 were: NINO3 +0.1 ℃, NINO3.4 +0.0 ℃, and NINO4 +0.1℃.

The sea surface temperature anomalies in January values of the three key NINO indices were: NINO3 -0.4℃, NINO3.4 -0.8℃, and NINO4 -0.9℃, respectively, somewhat colder than the 1961-1990 average according to BOM (see Figure 5.10 and Figure 5.11). La Niña has developed and is expected to last into next year, affecting temperatures, precipitation and storm patterns in many parts of the world, according to the World Meteorological Organization (WMO).

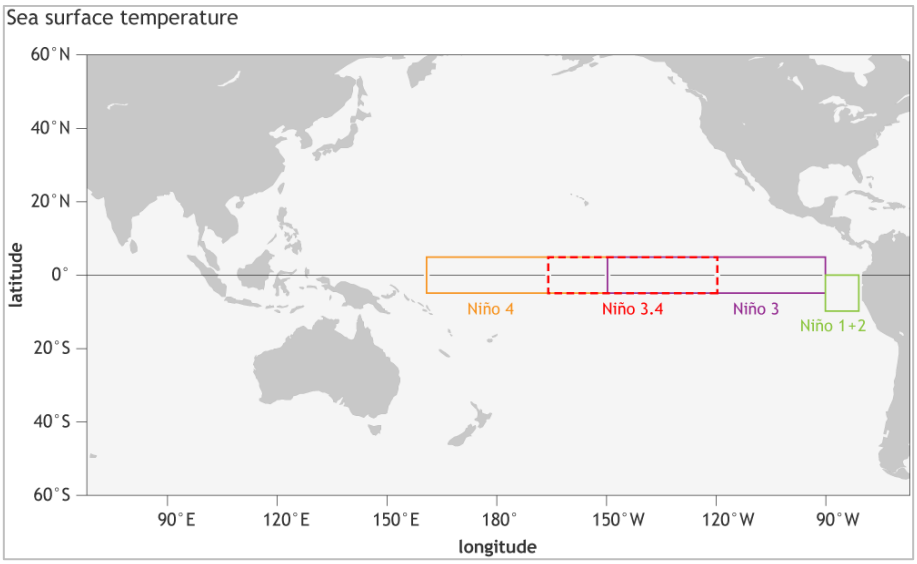

Figure 5.11 Map of NINO Region

(https://www.climate.gov/sites/default/files/Fig3_ENSOindices_SST_large.png)

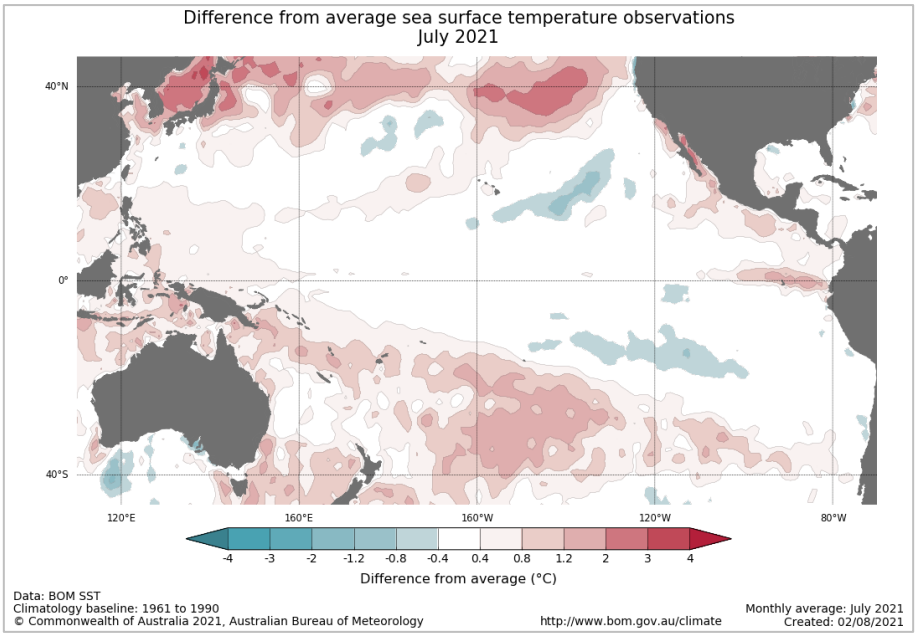

Figure 5.12 July 2021 sea surface temperature departure from the 1961-1990 average

(http://www.bom.gov.au/climate/enso/wrap-up/archive/20210511.ssta_pacific_monthly.png?popup)