# 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), Drought impacts on rice production in lower Mekong river (5.3) and an update on El Niño (5.4).*

## 5.1 CropWatch food production estimates

Table 5.1 presents this year's second estimate by the CropWatch team of global maize, rice, wheat and soybean production in 2020. The production is forecasted based on remote sensing data from the start of growing season up to the end of April 2020. Winter crops in the Northern Hemisphere are still growing and summer crops are in very early stages, or yet to be planted in May. The harvest of last year's summer season/monsoon season has been completed while winter crops were mostly in their vegetative growth period. CropWatch will further update and review the production in the August and November 2020 CropWatch bulletins when more in-season satellite data become available.

The current bulletin only focuses on the crops grown or harvested between January and April as listed in table 5.1 below. The production values for each country are all remote sensing-based estimates/predictions while global production is projected by combining remote sensing model estimates and production trends. The percentage of modelled global production varies according to crops: 21% for maize, 36% for rice, 77% for wheat (most of it being northern hemisphere winter wheat) and 46% for soybeans. The crop conditions for 42 countries at national and agro-ecological zone level are provided in detail in chapter 3 while a whole chapter is devoted to China (Chapter 4). The 42 + 1 countries are referred to conventionally as the "Key Targeting Countries". "Others" include the 142 countries from Albania, Algeria, Armenia [...] to Venezuela, Yemen and Zimbabwe.

CropWatch predicts the global production of the major commodities at 1057 million tonnes of maize, and 755 million tonnes for rice, both of which are the same as 2019. Wheat and soybean productions are projected at 737 million tonnes, and 329 million tonnes, up by 3% and 1% from 2019, respectively. The outlook for each country is described below.

***Maize:***

In this bulletin, maize production was projected for only 13 countries in the Southern Hemisphere or Equatorial areas out of the 43. Maize in other countries was either harvested by the end of 2019 or is just planted, or to be planted in the coming months. The total production of the 13 maize producing countries is projected at 218 million tonnes, 2% above 2019. Among the 13 countries, Brazil and Argentina are the top 2 maize producers with a 2% drop and 2% increase from 2019, respectively. The largest production increase in percentage was observed for South Africa whose maize production increased by 27% to 14,759 thousand tonnes. The significant increase of maize production is attributed to both expanded maize planted area and the increased yield thanks to the conducive rainfall in the main producing regions. Other big producers such as Indonesia and Mexico also present marginal increase of production by 2% and

1%. Maize production dropped in Mozambique, Myanmar, Vietnam and Zambia mainly due to the water stress during the growing season. The largest production drop was observed in Myanmar by 12% from 2019.

***Rice:***

Rice production was projected using remote sensing data for twelve countries as listed in table 5.1. Two thirds of the countries are located in South and Southeast Asia. Two countries in Africa (Angola and Mozambique), and two countries in South America (Argentina and Brazil) are also included. Among those 12 countries, Indonesia (same as 2019), Bangladesh (6% below 2019), Vietnam (3% below) and Thailand (6% above) are the top producers but with different inter-annual changes in production. Since rainfall in rice producing countries is relatively high, there is relatively less water stress in those countries and the production changes in percentage compared with 2019 are in general marginal to moderate, ranging from -5% in Bangladesh and Cambodia to +6% in Thailand. Still, most countries with reduced rice production are those that were affected by drought conditions, such as Brazil, Cambodia, Myanmar, and Vietnam.

***Wheat:***

Since most winter wheat in the Northern Hemisphere was sown around September to October of last year and the weather was generally favorable during winter to spring, the outbreak of COVID-19 has limited impacts on wheat production. According to the latest prediction, the total production of the 22 key wheat producing countries is at 569.4 million tonnes, which is 3% up from 2019. Greater differences are observed among countries in terms of inter-annual production change compared with the other three crops, ranging from 22% lower than 2019 in Ukraine and 23% up from 2019 in Mexico. It is also noteworthy that the top wheat producers (China, India, Russia) all present an increased wheat production, by 4%, 14% and 6% respectively, which contribute to a 20.54 million tonnes of production increase. Wheat production in USA, another important wheat producer, is projected at the same level as 2019. However, if the lockdown continues to the harvest season of winter crops, it might hamper harvest practices. Meanwhile, for several countries in Europe and Asia forecasted outputs are lower as compared to 2019, including Afghanistan, Belarus, France, Germany, Iran, Kyrgyzstan, Romania, Ukraine, United Kingdom, and Uzbekistan mainly due to the reduced planted area.

***Soybean:***

Considering the crop calendar, this CropWatch May Bulletin only focuses on the two major soybean producing countries in the Southern Hemisphere, Brazil and Argentina. The soybean productions for Brazil and Argentina are estimated at 99.85 million tonnes and 52.59 million tonnes, which are 1% below and 2% above 2019, respectively. The decrease in soybean production is mainly due to the dry spell in central-southern Brazil which resulted in lower yield compared with 2019. The combined soybean production of these two countries contributes to almost half of global soybean production and remains at the same level as 2019 which is a benefit for the global soybean market.

***Early warning:***

Based on the CropWatch early warning indicators, CropWatch also tracked the sowing progress for some countries at high latitude in the Northern Hemisphere such as spring crops in Canada and Kazakhstan, as well as summer crops in USA. By early May, sowing in Canada is 14% in advance from 2019 and it is 8% in advance in Kazakhstan. Maize sowing progress in USA is at same pace with 2019, while rice sowing is 7% in advance and soybean sowing progress is 1% delayed compared with the same period last year. According to our analyses, the lockdown did not result in a significant delay of sowing for spring crops and summer crops in the Northern Hemisphere. CropWatch will keep an eye on the impacts from COVID-19 in the following months and next bulletin.

**Table 5.1: 2020 cereal and soybean production estimates in thousands tonnes. All the national production values in the table are remote sensing model-based estimates while the global production is projected by adding up the model-based production and trend-based model for all other countries. Δ is the percentage of change of 2020 production when compared with corresponding 2019 values**

| | Maize | | Rice | | Wheat | | Soybean | |
|---|---|---|---|---|---|---|---|---|
| | 2020 | Δ% | 2020 | Δ% | 2020 | Δ% | 2020 | Δ% |
| Afghanistan | | | | | 5482 | -17% | | |
| Angola | 2865 | 3% | 46 | 2% | | | | |
| Argentina | 54054 | 2% | 1938 | 5% | | | 52587 | 2% |
| Bangladesh | 2453 | 4% | 45690 | -5% | | | | |
| Belarus | | | | | 2613 | -11% | | |
| Brazil | 84098 | -2% | 11228 | -4% | | | 99849 | -1% |
| Cambodia | | | 9544 | -5% | | | | |
| China | | | | | 128472 | 4% | | |
| Egypt | | | | | 12712 | 8% | | |
| France | | | | | 35206 | -1% | | |
| Germany | | | | | 26776 | -4% | | |
| Hungary | | | | | 5247 | 7% | | |
| India | | | | | 102873 | 14% | | |
| Indonesia | 16776 | 3% | 64154 | 0% | | | | |
| Iran | | | | | 15767 | -2% | | |
| Italy | | | | | 7868 | 2% | | |
| Kenya | 3134 | 15% | | | | | | |
| Kyrgyzstan | | | | | 522 | -12% | | |
| Mexico | 22345 | 1% | | | 5167 | 23% | | |
| Morocco | | | | | 6303 | -5% | | |
| Mozambique | 2071 | -1% | 384 | 0% | | | | |
| Myanmar | 1630 | -12% | 26474 | -4% | | | | |
| Pakistan | | | | | 29121 | 10% | | |
| Philippines | 6986 | 0% | 21000 | 3% | | | | |
| Poland | | | | | 10329 | 2% | | |
| Romania | | | | | 7575 | -2% | | |

| | Maize | | Rice | | Wheat | | Soybean | |
|---|---|---|---|---|---|---|---|---|
| | **2020** | **Δ%** | **2020** | **Δ%** | **2020** | **Δ%** | **2020** | **Δ%** |
| Russia | | | | | 56312 | 6% | | |
| South Africa | 14750 | 27% | | | | | | |
| Sri Lanka | | | 2420 | 1% | | | | |
| Thailand | | | 41831 | 6% | | | | |
| Turkey | | | | | 18553 | 0% | | |
| Ukraine | | | | | 16327 | -22% | | |
| United Kingdom | | | | | 13246 | -2% | | |
| USA | | | | | 54832 | 0% | | |
| Uzbekistan | | | | | 8099 | -1% | | |
| Vietnam | 5067 | -2% | 44678 | -3% | | | | |
| Zambia | 1847 | -1% | | | | | | |
| **Sub-total** | **218077** | **2%** | **269388** | **-1%** | **569403** | **3%** | **152436** | **0%** |
| **Global** | **1057321** | **0%** | **755420** | **0%** | **736553** | **3%** | **327882** | **1%** |

## 5.2 Disaster events

*Introduction*

In late 2019, humanity was severely hit by a highly contagious and rapidly spreading type of coronavirus named COVID-19, leading to a massive health crisis. Hence, a period of fewer than three months was enough time for the new virus to spread all over the world. A pandemic was announced by WHO on March 11, 2020. Under the current pandemic conditions, governments were forced to take unprecedented actions of border closures, quarantines, and restricting people's movement. Up to mid-May, about 4.67M persons were infected by the virus around the world, and 1.71M persons had recovered, while 312,645 persons have lost their lives (Figure 5.1).

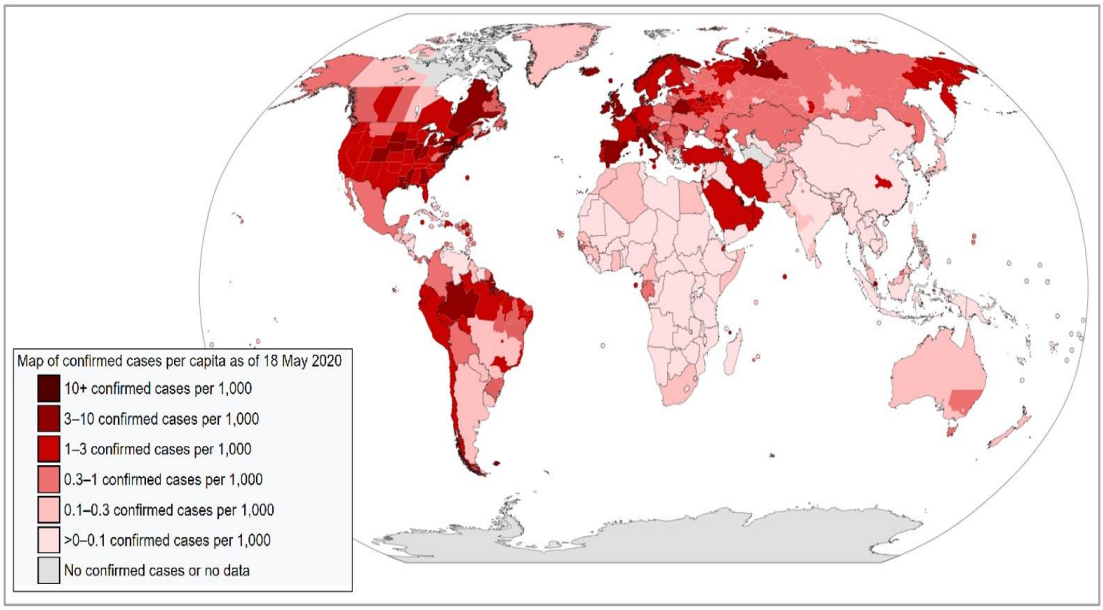

**Figure 5.1 Crop growth condition in the major winter wheat-producing areas during the period from March 1st to 10th,2020 (left), and the statistical proportion of winter crops condition compared to 2019 for each province (right)**

Currently, scientists around the world are racing to find a vaccine for this new virus, and several specialized international organizations such as WHO, FAO and World Bank are attempting to assess the damage of COVID-19 on public health, economy, and food security. In this context, many scenarios for how COVID-19 could impact human life were introduced. All agree that the bill for this crisis will depend on the length of the duration of the lockdown until a vaccine has been developed. The most affected countries will be the poorest ones, where the public health systems are very weak to cope with the current situation. Vulnerable groups, including small-scale farmers, migrant and informal workers, will be extremely affected. They are in an urgent need for intervention and assistance to mitigate the negative impacts of COVID-19.

The first quarter (January to April) of 2020 was warmer than average particularly over Russia, Europe, Central Asia, and southern America. The same period can be characterized as being drier-than-average, particularly over Europe, South-East Asia, and the southern part of North America. After intensive wildfires at the end of 2019, Australia received some rainfall by the start of 2020. It helped fight wildfires and even caused some floods in the northern part. Also, the West Indian Ocean area, Madagascar and eastern Africa experienced positive rainfall anomalies and flooding over the land areas.

*COVID-19 impacts on food and agriculture*

The current and prospective impacts of COVID-19 on food and agriculture sectors are primarily assessed by FAO. As of now, according to FAO analysis, the food market has been stable so far since the food demand was reduced due to the crisis and in the meantime, the food supply has been adequate. Global cereal stocks are at comfortable levels and the outlook for wheat and other major staple crops for 2020 is positive. The shortage of fruits and vegetable production was not noticeable due to the low demand during the lockdowns. As of early May, the world market prices of some major food staples, such as maize, wheat, and palm oil, have declined. The only staple food that has seen rising prices is rice, and that was linked to the export restrictions of a key exporter, i.e., Vietnam.

A particular concern raised by FAO is to have a long duration of lockdowns waiting for vaccines. As demand for food will decrease over the next months, prices should go down in 2020, and this will harm farmers and the agricultural sector. Countries that depend on primary commodity exports (food, raw materials, fuels) will be affected by the significant reduction of demand from import countries. The restrictions of movement in the medium and long run are expected to impede farmers from accomplishing their farming process (e.g. fertilizing and harvesting) which finally must affect agricultural production, such as what happened in Sierra Leone (2014-2016) during the Ebola Virus Disease outbreak.

In the same context, the CropWatch analyses based on Big Earth Data (Landsat-8, Sentinel-2, and survey data) revealed favorable crop conditions over the major winter wheat-producing areas of China, mostly distributed in the Provinces of Hebei, northwest Shandong, central and northeast Jiangsu, and Shaanxi (Figure 4.8 and Figure 4.94). The conditions over Hebei were the most favorable (75% of the cultivated area was above 2019's crop conditions), except over Jingzhou and Puyang municipal region, accounting for 8% of the province's winter crop cultivation area. Overall, the outbreak of COVID-19 in China has limited impacts on the production of winter crops.

Furthermore, remote sensing observations revealed that the land preparation for early rice sowing and transplanting started earlier than last year in the Province of Guangdong, one of the major early rice-producing areas in China.

Food security of vulnerable communities already grappling with hunger or other crises (e.g. the Desert Locust outbreak in the Horn of Africa, insecurity in Yemen, or the Sahel) is also another important concern raised by FAO since these current crises are overlapping with the pandemic's impacts. In the absence of timely and effective policies, millions more are likely to join the ranks of the hungry as a result of the COVID-19-triggered recession which will be a setback to global Zero Hunger efforts. Vulnerable groups including small-scale farmers, migrant, and informal workers will be hard hit by lockdowns since accessing markets to sell their products or buy essential inputs will be challenging.

To reduce the negative impacts of COVID-19 on agriculture and food production, FAO is urging all countries to keep international trade open and take measures that protect their food supply chain. Seeds and planting materials must continue to flow to smallholders; animal feed to livestock breeders; and aquaculture inputs to fish farmers. Also, countries should focus on the needs of the most vulnerable communities and groups, and scale up social protection programmes including cash transfers.

*Desert locust*

Vast regions in Africa, the Middle East and Asia are now under the threat of Desert locust. The threat started when large swarms were on the move, traveling over the Red Sea to Ethiopia and Somalia. Aided by uncommonly heavy rains that buffeted East Africa from October to December 2019, the insects spread south to Kenya, Uganda, and Tanzania. During the last four months (January to April 2020) and up-to-now, the locusts were migrating to other areas in Africa, the Middle East and southwest Asia (Figure 5.2). Isolated locust swarms in Algeria, Morocco, and northern Mali were reported with very limited breeding possibilities due to the low rainfall in those regions during April. However, the possibility was higher at limited agriculture irrigated perimeters in the Adrar valley (Algeria) and the Draa Valley (Morocco). The situation is more serious over Kenya, Ethiopia, Iran, Pakistan, and Saudi Arabia. All these countries have received light to moderate rains in April, while heavy rains fell over Yemen, Ethiopia, and Kenya. The moderate or heavy rains could be helpful to new-generation swarms such as what is currently happening in Kenya and Ethiopia intensively, with fewer numbers over other countries (Figure 5.3). As reported by FAO, the total area treated in April was more than 302,000 ha compared to 182,000 ha in March.

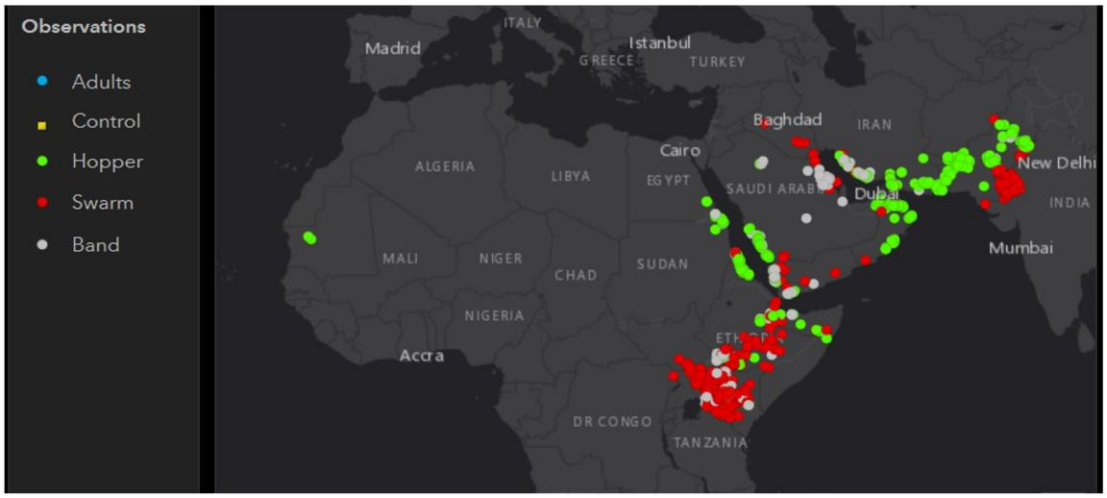


**Figure 5.2 Desert Locust Data Explorer for January – May 2020 issued by FAO/ESRI locust Hub. Source of image: https://locust-hub-hqfao.hub.arcgis.com/.**

Another aspect of concern is the overlapping between COVID-19 and Locusts threat over some regions. Over East Africa in particular, the pandemic is disrupting the supply chains for pesticides and other equipment necessary to control the spread of locusts. Also, border closures and delays posed by quarantine measures are imposing restrictions on the movement of personnel and equipment to aid in the locust response. The aid teams and control officers themselves are under the risk of getting infected by the virus or even to spread the virus to remote rural locations where locust control operations take place. These issues need to be considered by governments and funding organizations to financing responses and taking the measures to protect teams and the communities they engage with are required.

*Drought*

In the lower Mekong River Basin, rice is cultivated in two different seasons. The main season is the rainy season from May through December. The second is the dry season from December through July. The production in the dry season is irrigated and thus depends on an ample supply of water. The current reporting period is corresponding to the second season when extensive dryness continued throughout the lower Mekong River Basin. According to the Ministry of Agriculture in Thailand, the extremely dry weather particularly over the North region resulted in near-historic low water levels in the top two reservoirs, Bhumibol and Sirikit. These reservoirs are essential for the dryland cultivated rice crop –predominantly irrigated – as the reservoirs provide approximately 80% of the irrigation water supply to rice areas in the lower North and Central Plains regions (refer to the section 4 in this chapter for details of the impact of drought on the crop yield).

The drought was the main driver for delaying the planting progress of soybeans (from Dec. 2019 to early January 2020) in Northeast Brazilian states in addition to the Rio Grande do Sul this year. The Northeast recovered due to favorable rains in January, but Rio Grande do Sul experienced another drought in late February which reduced production by 30% below the 5-year average, according to USDA. However, Brazil is expected to overtake the United States as the world's leading soybean producer despite weather-related production losses in the Rio Grande do Sul. Also, USDA estimates Argentina soybean production for 2019/20 to be 6% down from last year due to dry conditions in the last half of February and into March (Figure 5.3). In Australia, a large decline in Cotton production (72% from last year) occurred due to the reduction of cotton

cultivated area by 84% compared with last year. This was due to below-normal precipitation during the first half of the growing season and a subsequent lack of soil moisture for dryland sowing operations.

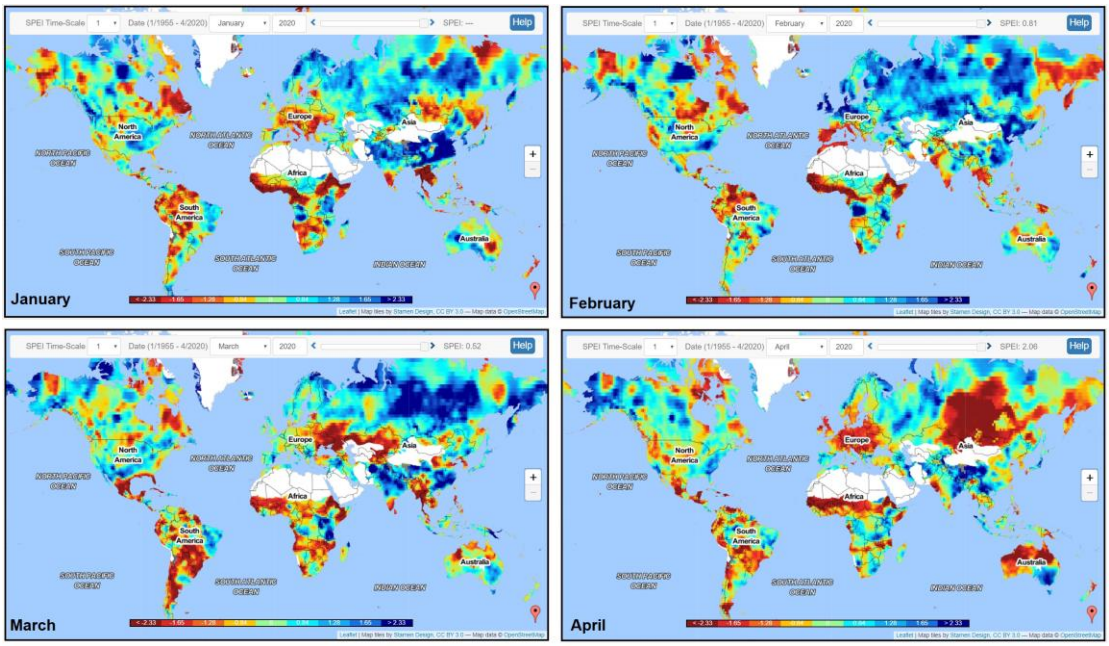


**Figure 5.3 The Standardised Precipitation-Evapotranspiration Index (SPEI) estimated globally for the months; January to April of 2020, https://spei.csic.es/map/maps.html#months=1#month=3#year=2020.**

Many African regions have received a significantly below-average cumulative rainfall during the period from January to March 2020. In south-western Morocco, close to harvest, vegetation conditions are worse than in the drought-affected 2019 season. Hence, the High Commission for Planning of Morocco forecasts a 4.3% drop in the agricultural value-added economic growth because of the drop in cereal production this year. In southern African countries, particularly in Zimbabwe, Zambia, Botswana, Namibia, and South Africa, in addition to the western parts of Madagascar, 45 million people are food insecure as the region enters the peak of the lean season (January-March 2020), as reported by WFP on Jan. 14th, 2020. The most affected country by drought was Zimbabwe where 4.1 million people are facing acute food insecurity.

*Floods*

Since the beginning of the season in February/March, significantly above-average rains affected west, central and south-east Kenya, parts of Ethiopia and parts of Uganda. Since mid-April heavy rains triggered floods, mudslides, flash floods, and river overflows in parts of East Africa, particularly in south Ethiopia, north Tanzania and most of Somalia States (Figure 5.4). These heavy rains led to casualties, displacement of people, and destruction of infrastructure and loss of standing crops. According to government officials, 214 people have lost their lives in floods and 185,600 have been displaced in Kenya, Uganda, Somalia, and Ethiopia.

In general, East African countries are confronted with multiple crises. The exceptional rainfall conditions created favorable conditions for desert locust development, adding pressure to the multiple crises caused by COVID-19 containment measures, pests, and previous drought seasons. Above-average rainfall is expected to continue across most parts of the region according to forecasts for May, with average to above-average rains concentrating in northeastern Tanzania, Kenya, eastern Ethiopia, and Somalia.

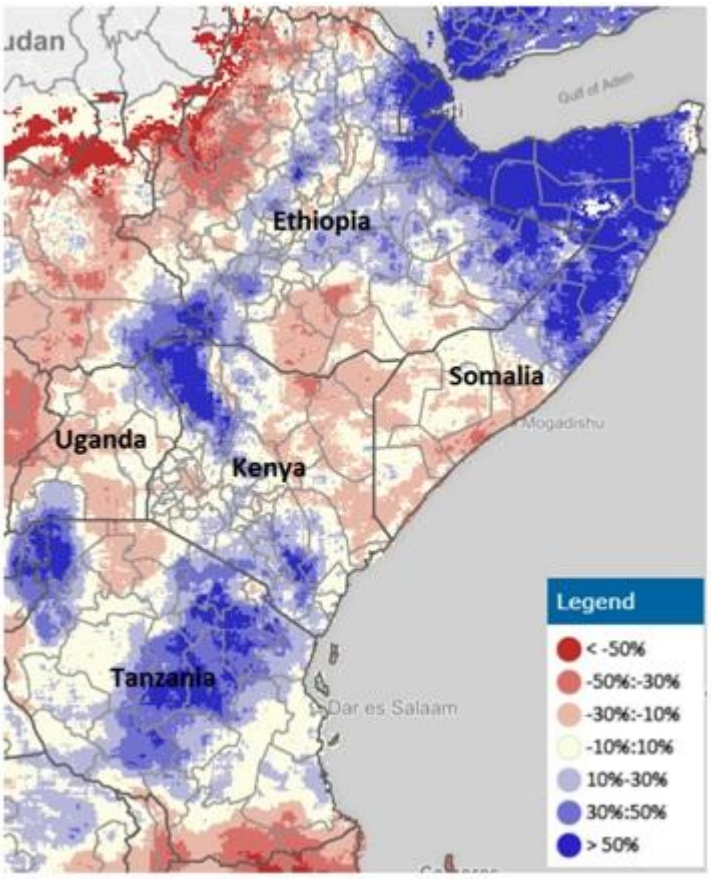


**Figure 5.4 90-day rainfall anomaly map showing above-average rainfall received between February to April 2020 in Ethiopia, Somalia, Kenya and Tanzania (Source: CHIRPS, data mapped by JRC).**

Another affected region by floods is in the north of Argentina which was hit by earlier floods immediately after peak flowering of soybeans which are expected to affect crop production. In Southern Africa, localised production shortfalls are expected in areas affected by floods in Zimbabwe, southern Zambia, and southern Mozambique.

*Fires*

Many fire alerts were recorded by global forest fires watch over Central Africa (Central African Republic, South Sudan, DRC Congo, and Nigeria) from January to April 30 of the current year, in addition to south and southeastern Asia (Myanmar, India, and China), Russia, and Australia (Figure 5.5). Over these regions and during the period (January to April) the temperature was warmer than average and precipitation was drier than average, except in January when Australia received some rainfall by the start of 2020 to help fight wildfires.

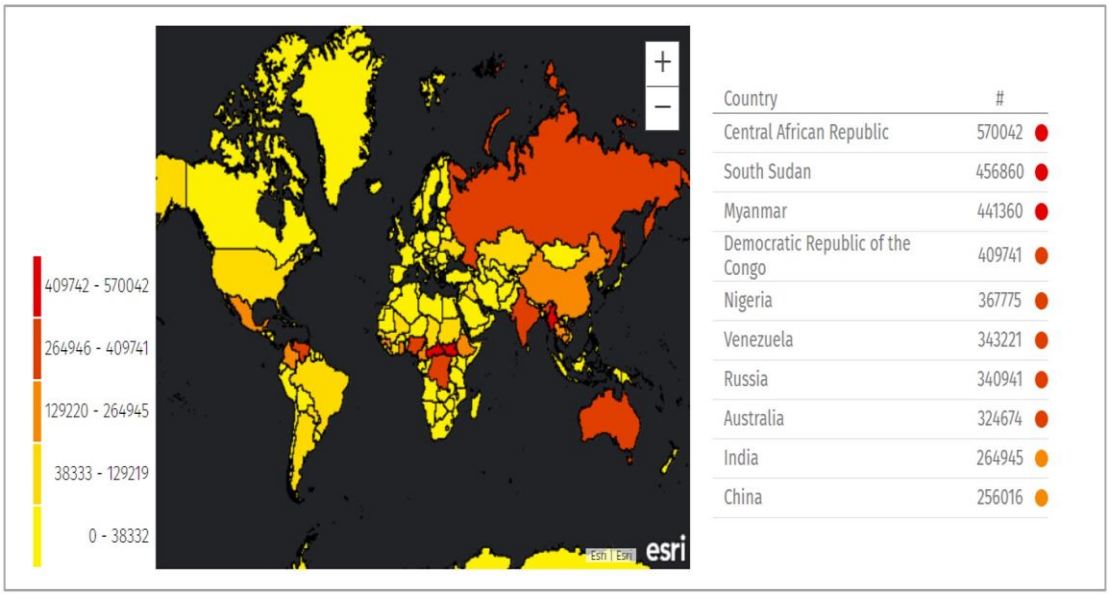


**Figure 5.5 Number of fires alerts by countries (Jan.2020–April 30, 2020) Source: https://fires.globalforestwatch.org/**

## 5.3 Drought and impacts on rice production in the lower Mekong river

CropWatch and DroughtWatch team had monitored the crop conditions affected by drought in the Mekong River Basin (including Cambodia, Laos, Myanmar, Thailand, Vietnam, and the Yunnan Province of China) from February to April of 2020. The results indicated that the five countries of the Mekong River Basin and the Yunnan Province of China had severe deficits of precipitation from February to April 2020, and a meteorological drought occurred in varying degrees (Figure 5.6). The precipitation deficits mainly occurred in the lower Mekong region in February, in Cambodia in March, and along the borders of Myanmar, Thailand and Laos in April.

Since it is the dry season of the Mekong and Lancang Jiang Rivers in February and March and it is not a main season for crop planting, the severe meteorological drought had not produced a significant impact on agriculture (Figure 5.7). Table 5.2 showed the drought situations since February in terms of the proportion of drought-affected area to crop planting area. Laos was hit the hardest: its average proportion reached 38.3% with a peak value of 58.5% in early March. Laos is followed by Cambodia (27.7%), Myanmar and Thailand (18.3% and 17.1%, respectively). The drought impact on Vietnam and the Yunnan Province of China was relatively low, about 13.1% and 11.0% respectively (Table 5.2).

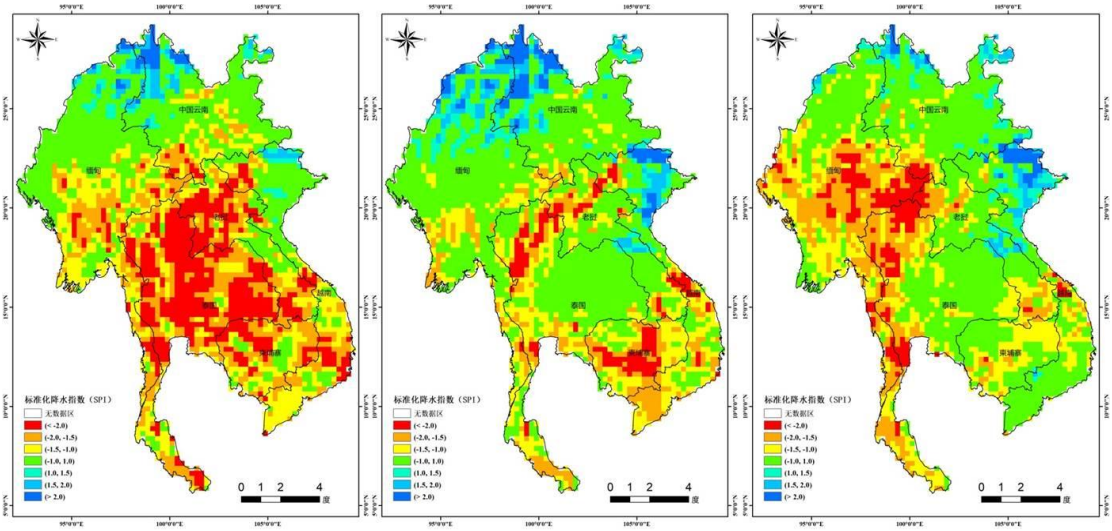


**Figure 5.6** Distribution and changes of Standardized Precipitation Index (SPI-3) in the Mekong River Basin in early February, early March and early April 2020

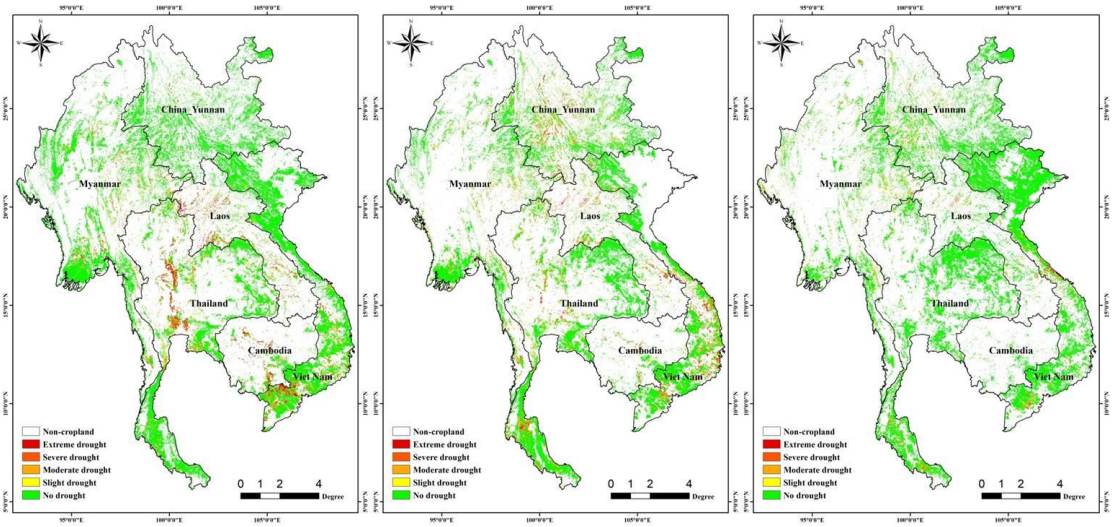


**Figure 5.7** Spatial distribution and changes of drought in the Mekong River Basin in mid-February, mid-March and mid-April 2020

**Table 5.2** Dekadal crop drought proportion from February to April 2020

| February-April | The proportion of drought-affected area to crop planting area (%) | | | | | |
|---|---|---|---|---|---|---|
| | Cambodia | Laos | Myanmar | Thailand | Vietnam | Yunnan of China |
| First dekad of February | 25.9 | 36.6 | 15.3 | 14.9 | 8.30 | 4.7 |
| Second dekad of February | 36.4 | 46.2 | 13.9 | 20.7 | 13.5 | 3.0 |
| Third dekad of February | 32.6 | 42.8 | 7.70 | 10.4 | 8.60 | 2.2 |
| First dekad of March | 26.6 | 58.5 | 17.1 | 25.3 | 13.8 | 11.2 |
| Second dekad of March | 28.0 | 42.9 | 20.2 | 18.0 | 18.9 | 23.5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Third dekad of March | 28.2 | 35.5 | 27.5 | 18.3 | 8.0 | 21.8 |
| First dekad of April | 37.3 | 28.1 | 26.1 | 22.9 | 26.5 | 11.7 |
| Second dekad of April | 6.60 | 15.9 | 19.0 | 6.20 | 7.4 | 10.2 |
| Average | **27.7** | **38.3** | **18.3** | **17.1** | **13.1** | **11.0** |

There were differences in the temporal and spatial distribution of drought impact in the countries. The drought occurred mainly in the north of Laos and in the central and western regions of Cambodia (February). The southern and central and eastern regions in Myanmar were heavily affected by drought (February-March). The central and western Thailand (February) and the southern region (March) were relatively hard hit. The Mekong Delta and central Vietnam (February-March) and central and southern Yunnan Province of China (March) also suffered a rather serious drought. By mid-April, the drought situation in the Mekong River Basin had eased as a whole. However, the trend of drought still warrants continuous monitoring, and special attention should be paid to the drought impact as the main crop growing season starts.

The total rice production in Cambodia, Thailand and Vietnam harvested during September 2019 to April 2020 or to be harvested is estimated to be up by 320 thousand tons. The production of rainy season rice harvested before February 2020 increased 17% compared to the same period of last year. The rice supply of the three countries decreased only by 1%, with a limited impact on their rice exports.

The growth condition of rainy season rice in Cambodia, Thailand and Vietnam in 2019-2020 was generally above the previous five years average (5YA) except for the scattered areas of Kampong Cham and Siem Reap Provinces in Cambodia where rice condition was below the 5YA. In contrast, the rice development during dry season was overall inferior to the average level, among which the growth of rice in western and northwest Thailand, Eastern, northern and southwest Cambodia, the southern and southwest coastal areas of Vietnam were significantly below the 5YA (Figure5.8).

Among the three countries, rice in Vietnam outperformed that of Thailand and Cambodia, with about 85% of rainy season rice in an above-average condition. It is also noteworthy that 16% of the rainy season rice achieved the best condition over the last five years. Meanwhile, about two-thirds of dry season rice presented above-average condition. As for Cambodia, rice growth condition during rainy season was in general favorable, and about 75% of the rainy season rice was in an above-average situation. However, the dry season rice suffered from drought stress with only 29% of the rice area reaching the average level. Similarly, an above-average rice growth condition was also observed during rainy season in Thailand, accounting for 78% of rainy season rice area. However, rice development in dry season was hampered by severe drought with more than half of rice in a below-average condition(Figure 5.9).

Artificial intelligence algorithms were applied to estimate the cultivated area of dry and rainy season rice from October 2019 to April 2020 in Cambodia, Thailand and Vietnam. The total rice area was estimated at 12,225 thousand hectares, up by 6% compared with the same period last year. The cultivated area of rainy season rice in Cambodia, Thailand and Vietnam increased by 5%, 24% and 8%, respectively. However, the rice area in dry season in the three countries decreased by 23%, 4% and 9% respectively as affected by the severe drought. Remote sensing-

based model revealed that the yield of rainy season rice in Cambodia and Thailand increased by 5% and 3% respectively while it remained at same level as the previous season in Vietnam. The rainy season rice production in the three countries increased by 10%, 28% and 8% respectively compared to the same period last year. Their total production of rainy season rice since mid-October 2019 reached 27.22 million tons, with a year-on-year increase of 4.05 million tons (or +17%).

Dry season rice was severely affected by drought although most rice are irrigated. The dry season rice yield in Cambodia, Thailand and Vietnam dropped by 8%, 12% and 1% year-on-year (YoY), respectively, and the production fell by 30%, 15% and 10% respectively. In total the dry season rice production of the three countries was only 19.99 million tons, a decrease of 3.73 million tons or 16%, compared with the same period last year (Table 5.3).

Consequently, the total output of rice harvested or to be harvested in rainy season and dry season from October 2019 to April 2020 was estimated at 47.21 million tons, an increase of 1% or 0.32 million tons. As for each country, Vietnam was less affected by the drought. From mid-October 2019, the total output of rice harvested or to be harvested in Vietnam was 14.84 million tons, a slight decrease of 3% from the same period of last year. Cambodia was the most affected country, with the total output of rice of 9.55 million tons, a decrease of 5% from the same period of last year. A large increase in rice production during the rainy season (major rice) in Thailand more than compensated the loss of dry season rice caused by the drought. Rice production of Thailand increased by 1.24 million tons. Considering the overall stable rice production during the past three years in Cambodia, Thailand and Vietnam, the drought-induced loss of dry season rice over the period monitored had limited impacts on the rice market and the total rice supply of the three countries only dropped by 1% year on year.

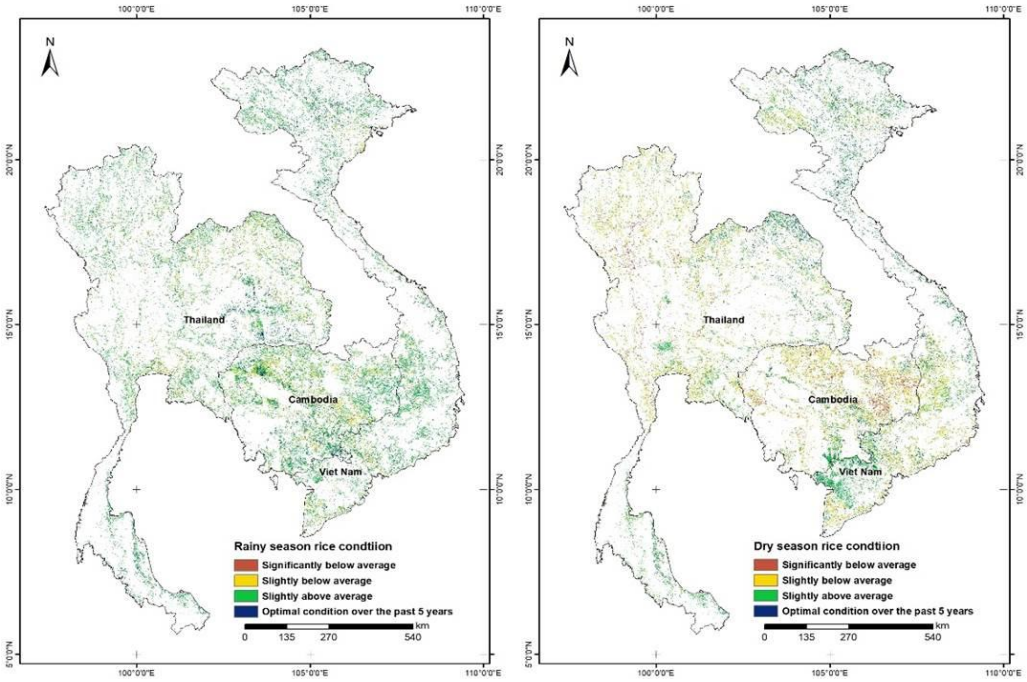


**Figure 5.8** Rice growth condition in Cambodia, Thailand and Vietnam during the rainy season (left) and dry season (right) in 2019-2020

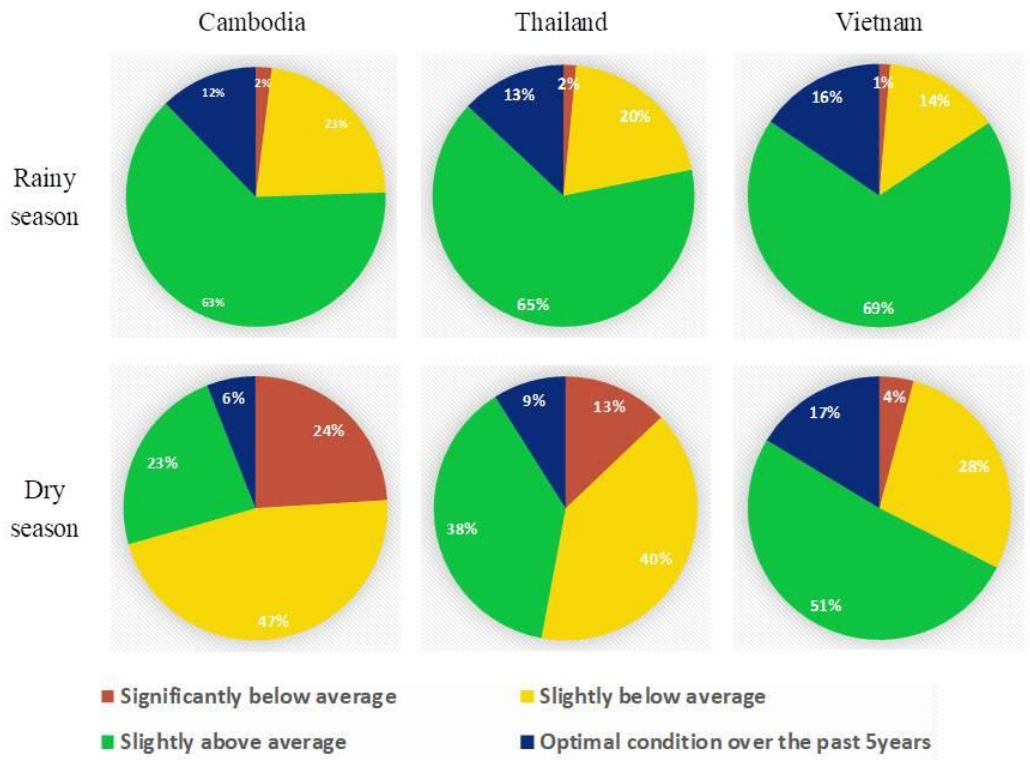


**Figure 5.9** Statistical analysis of different categories of rice growth condition during rainy and dry seasons in Cambodia, Thailand and Vietnam in 2019-2020

**Table 5.3** Rainy and dry season rice production in Cambodia, Thailand and Vietnam

| Rice type | Country | Area | | Yield | | Production | |
|---|---|---|---|---|---|---|---|
| | | 2019-2020 (thousand hectares) | Departure YoY (%) | 2019-2020 (Kg / ha) | Departure YoY （%） | 2019-2020 （million tons） | Departure YoY (%) |
| Rainy season rice | Cambodia | 1,834 | 5 | 3744 | 5 | 6.87 | 10 |
| | Thailand | 4,821 | 24 | 2807 | 3 | 13.53 | 28 |
| | Vietnam | 1,179 | 8 | 5786 | 0 | 6.82 | 8 |
| | Subtotal | 7,834 | 16 | - | - | 27.22 | 17 |
| Dry season rice | Cambodia | 602 | -23 | 4448 | -8 | 2.68 | -30 |
| | Thailand | 2,513 | -4 | 3696 | -12 | 9.29 | -15 |
| | Vietnam | 1,276 | -9 | 6289 | -1 | 8.02 | -10 |
| | Subtotal | 4,391 | -9 | - | - | 19.99 | -16 |
| Total | | 12,225 | 6 | - | - | 47.21 | 1 |

Note: the rainy season rice in this report represents the rice whose sowing concentrated from early August to October 2019, and whose harvest concentrated from mid-October 2019 to early February 2020. Each country uses different terminology to name the rainy season rice. For example, it is named as major rice in Thailand, median rice and late rice in Cambodia, and winter-spring rice in southern Vietnam. The dry season rice in the report is a general term for the rice

whose sowing period was from late November 2019 to early January 2020, and harvest period was from late March 2020 to late April 2020.

## 5.4 Update on El Niño

Neutral El Nino condition prevails across the Pacific Ocean continuously. Figure 5.10 illustrates the behavior of the standard Southern Oscillation Index (SOI) of the Australian Bureau of Meteorology (BOM) from April 2019 to April 2020. 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 decreased from 1.3 in January to -5.2 in March, then increased to -0.5 in April, 2020, indicating a neutral El Nino situation.

The sea surface temperature anomalies in April 2020 for NINO3, NINO3.4, and NINO4 regions were +0.3°C, +0.5°C, and +0.9°C, respectively, somewhat warmer than the 1961-1990 average according to BOM (see Figure 5.10 and Figure 5.11). Both BOM and NOAA conjecture that the warmer condition indicates a neutral El Niño (www.climate.gov/enso). CropWatch will keep monitoring the situation (Figure 5.12).

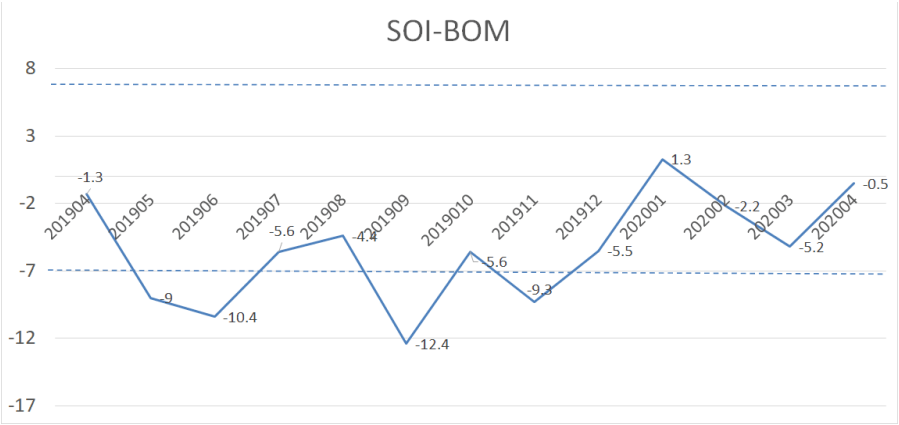


**Figure 5.10 Monthly SOI-BOM time series from April 2019 to April 2020 (Source: http://www.bom.gov.au/climate/current/soi2.shtml)**

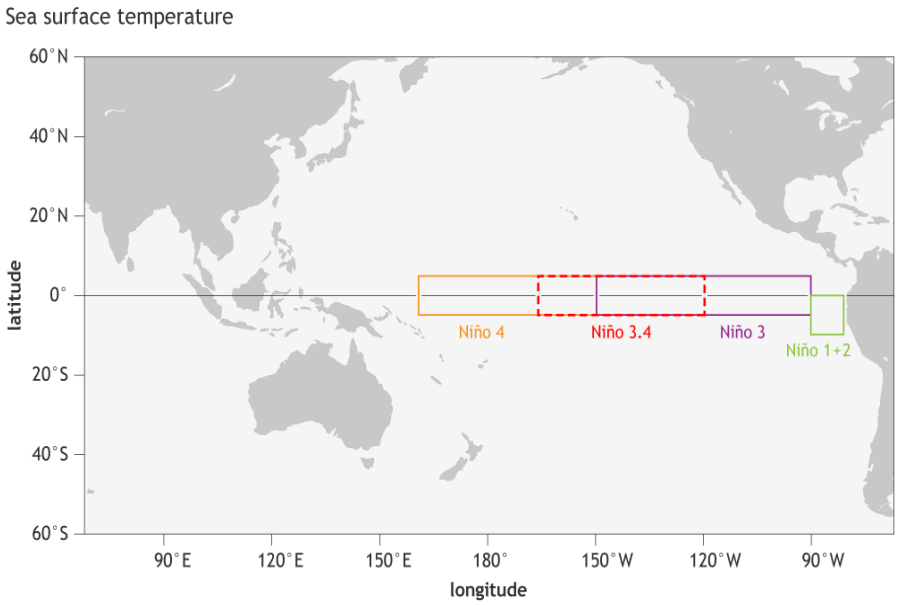

**Figure 5.11 Map of NINO Region (Source: https://www.climate.gov/sites/default/files/Fig3_ENSOindices_SST_large.png)**

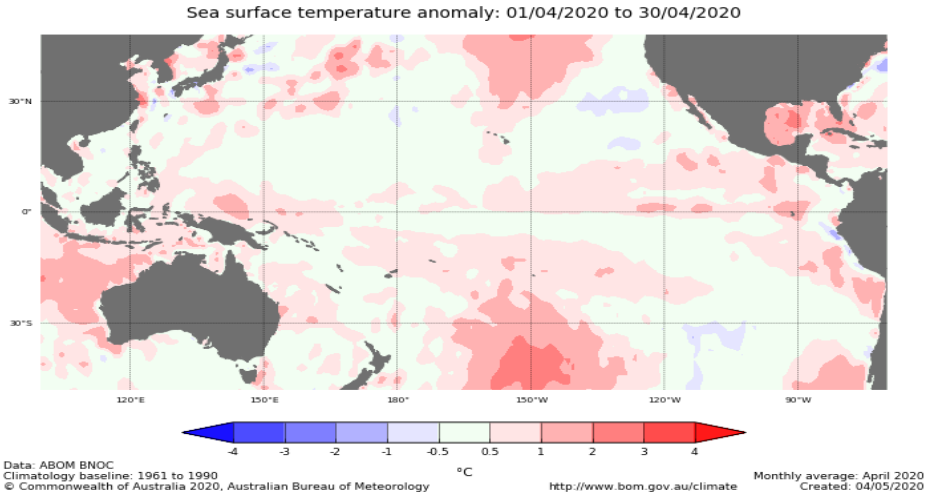


**Figure 5.12 April 2020 sea surface temperature departure from the 1961-1990 average (Source: http://www.bom.gov.au/climate/enso/wrap-up/archive/20200512.ssta_pacific_monthly.png?popup)**