

Chapter 3. Core countries

3.1 Overview

Chapter 1 has focused on large climate anomalies that sometimes reach the size of continents and beyond. The present section offers a closer look at individual countries, including the 42 countries that together produce and commercialize 80 percent of maize, rice, wheat, and soybean. As evidenced by the data in this section, even countries of minor agricultural or geopolitical relevance are exposed to extreme conditions and deserve mentioning, particularly when they logically fit into larger patterns.

1. Introduction

The global agro-climatic patterns that emerge at the MRU level (chapter 1) are reflected with greater spatial detail at the national and sub-national administrative levels described in this chapter. The “core countries”, including major producing and exporting countries are all the object of a specific and detailed narrative in the later sections of this chapter, while China is covered in Chapter 4. Sub-national units and national agro-ecological zones receive due attention in this chapter as well.

In many cases, the situations listed below are also mentioned in the section on disasters (chapter 5.2) although extreme events tend to be limited spatially, so that the statistical abnormality is not necessarily reflected in the climate statistics that include larger areas. No attempts are normally made, in this chapter, to identify global patterns that were already covered in Chapter 1. The focus is on 166 individual countries and sometimes their subdivisions for the largest ones. Some of them are relatively minor agricultural producers at the global scale, but their national production is nevertheless crucial for their population, and conditions may be more extreme than among the large producers.

2. Overview of weather conditions in major agricultural exporting countries

The current section provides a short overview of prevailing conditions of maize, rice, wheat and soybeans in a group of just 20 countries, conventionally taken as the major exporters, with each of them exporting at least one million tons of the covered commodities. They include the top 10 exporters in the world, with the United States and Argentina exporting all four crops, and Brazil, Ukraine and Russia exporting three of them each.

Maize: Maize exports are dominated by just 4 countries: USA, Brazil, Argentina and the Ukraine. Together, they supply three quarters of maize being traded internationally. In South America, this reporting period covered the grainfilling period of late (2nd crop) maize and its harvest. Conditions in all South American maize production regions tended to be on the dry side, which provided good conditions for harvest. However, soil moisture conditions in Parana, Goias and Mato Grosso do Sul were drier than usual in April and May, which may have negatively impacted yields. In general, a high production can be expected, mainly due to increased acreage.

In the USA, weather conditions for maize were generally favorable. Spring was somewhat on the wet and cooler side, but the CropWatch indicators had reached positive territory by July. Planting was delayed in some areas of North and South Dakota due to cool and wet conditions. A powerful storm, called Derecho, hit Iowa on August 10, 2020. Its highest measured wind speed was 203 km/h. It affected about 6 million ha, or half of Iowa's cropland. Many maize fields got flattened, but it is too early to accurately assess the impact on maize yields.

Maize in Europe largely benefitted from rather favorable conditions for maize production. No periods with prolonged excessive heat were reported and rainfall during May, June and July was close to average, although rather on the dry side, especially in France and Germany.

In Ethiopia and East Africa, maize keeps benefitting from above average rainfall. However, locusts continue to cause crop damage in some hot spots.

In China, maize was off to a good start, helped by the generally above-average precipitation and favorable temperatures.

Rice: Four out of the 5 top rice exporting countries are located in South and Southeast Asia: India supplies about 1/3 of the rice that is internationally traded, followed by Thailand with 1/5. The USA, number 3, supplies less than 10%. Vietnam contributes about 7% and Pakistan close to 6%.

Southeast Asia, with a combined market share of a bit more than 25%, was still suffering from the prolonged drought that caused record low water levels in the Mekong river. This in turn hampered irrigated rice production during the dry season. The rainy season was off to a slow start in May, however, rains reached average levels by July. Crop conditions in all of mainland Southeast Asia had recovered to average levels by the end of July. Excessive monsoon rainfall caused wide-spread flooding in Bangladesh and Eastern India, especially in Bihar and Assam. It remains to be seen what the impact on yields will be, since rice can tolerate short periods of submergence. In other parts of India, as well as in Pakistan, abundant monsoon rains caused generally favorable conditions for rice production.

Wheat: This monitoring period covers the sowing of wheat in the Southern Hemisphere. Conditions were favorable in Argentina, South of Brazil, Cape Province of South Africa, and Southeast Australia. However, drier-than-normal conditions prevailed in Southwest Australia.

Most winter wheat sown in the Northern Hemisphere reached maturity by May, June or July. Spring wheat harvest typically starts in August. Conditions in the USA and Canada were generally favorable. The cool temperatures in the spring caused favorable conditions for yield formation. There were a couple of frost events in April and early May in the USA, but damage was limited. Precipitation was favorable, except for the western region of the Great Plains (Colorado and Oklahoma), where conditions were drier than normal.

In Europe, conditions were very wet during the planting season last fall, especially in the UK. Warmer winter temperatures caused an early spring green-up, followed by dry and sunny weather until the end of April. This caused a depletion of soil moisture in France, Germany and the UK. Subsequent rains were close to average, but they came too late and were not sufficient to help fully compensate for the yield losses. Similarly, dry conditions in March and April in Romania and the Ukraine caused significant yield losses for winter wheat. Conditions were more favorable for most of Russia. Spring wheat in Kazakhstan was off to a good start, but drier-than-normal conditions in July caused moisture stress in some regions.

Morocco and the other nations in the Maghreb suffered from drought conditions during the winter months. This caused crop failures in Morocco, especially in the south. In the other Maghreb countries, significant yield losses for rainfed wheat occurred.

In India and Pakistan, where wheat was harvested in late March and April, the crop benefitted from abundant moisture and generally favorable weather conditions. However, untimely rainfall in April caused some delays in harvest and may also have negatively impacted grain quality.

Winter wheat in the North China Plain reached maturity in late May/early June. The area increased in the region from last year. Higher rainfall may have increased the disease pressure and solar radiation was also reduced. Moreover, the region experienced a few hot days in early May, during which temperatures reached close to 40°C.

Soybean: In the southern hemispheres, most of the soybean had been harvested by March and were covered in the May CropWatch bulletin. In the USA, Canada and the Ukraine, conditions for soybean production have been favorable so far. Slightly cooler-than-normal conditions prevailed in North America until May, which delayed growth and development. Subsequently, the conditions for soybean improved to above average and high yields can be expected. In the Ukraine, conditions are generally favorable and same production levels as last year can be expected. Conditions for soybean production in China have been favorable so far, mainly due to above-average rainfall.

Figure 3.1 National and subnational rainfall anomaly (as indicated by the RAIN indicator) of April to July 2020 total relative to the 2005-2019 average (15YA), in percent

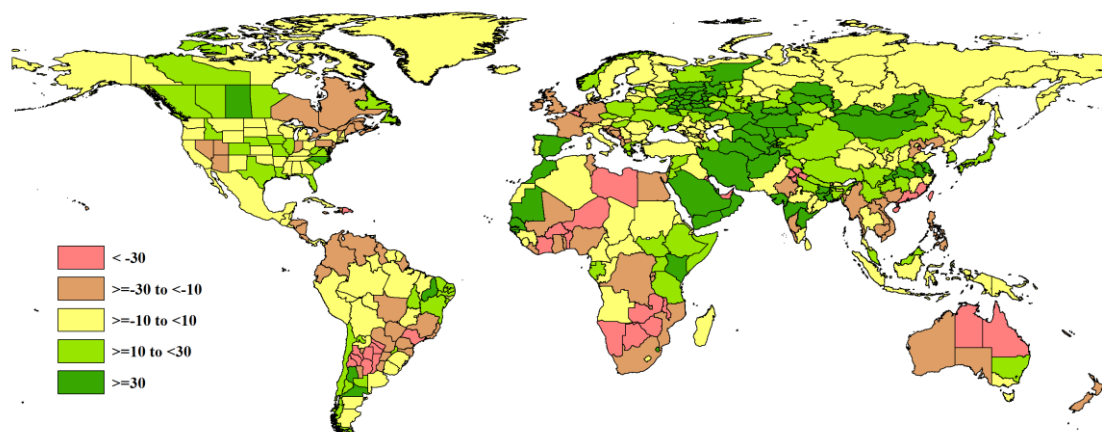


Figure 3.2 National and subnational temperature anomaly (as indicated by the TEMP indicator) of April to July 2020 average relative to the 2005-2019 average (15YA), in °C

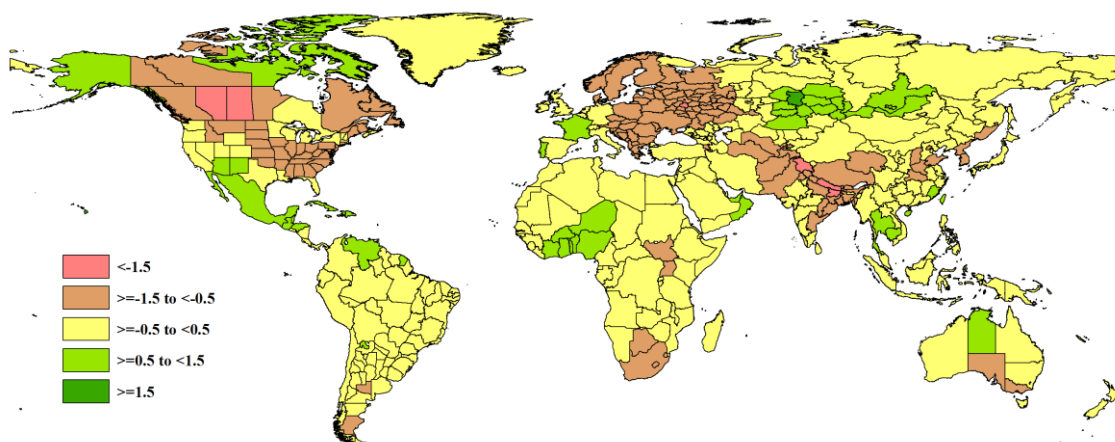


Figure 3.3 National and subnational sunshine anomaly (as indicated by the RADPAR indicator) of April to July 2020 total relative to the 2005-2019 average (15YA), in percent

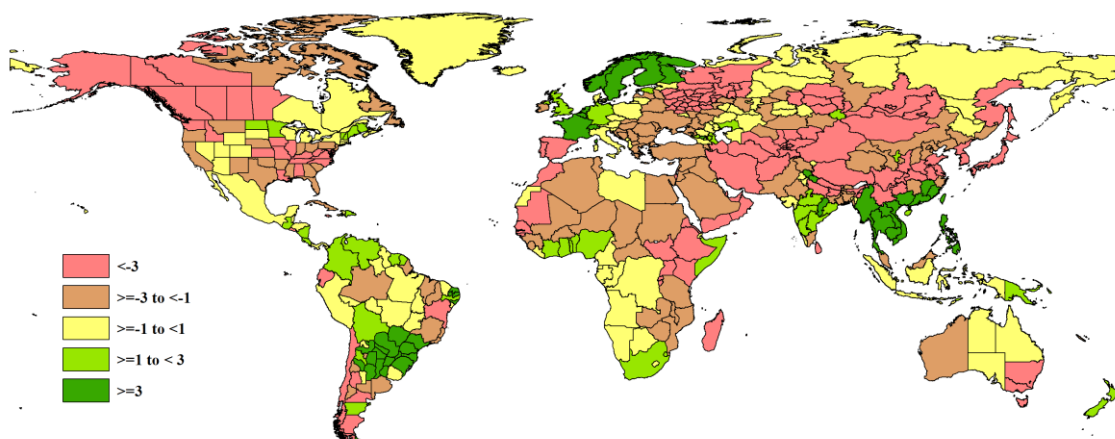
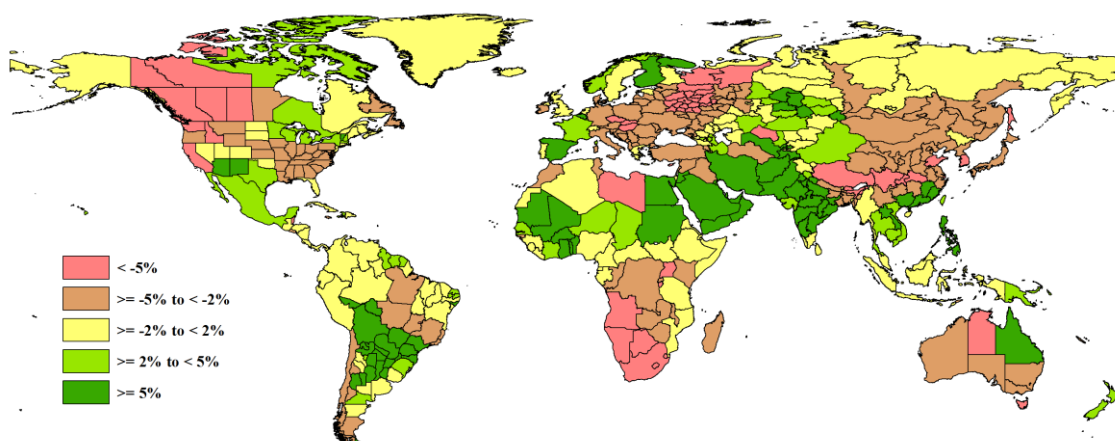


Figure 3.4 National and subnational biomass production potential anomaly (as indicated by the BIOMSS indicator) of April to July 2020 total relative to the 2005-2019 average (15YA), in percent



3.2 Country analysis

This section presents CropWatch analyses for each of 42 key countries (China is addressed in Chapter 4). The maps and graphs refer to crop growing areas only: (a) Phenology of major crops; (b) Crop condition development based on NDVI over crop areas at national scale, comparing the April - July 2020 period to the previous season and the five-year average (5YA) and maximum; (c) Maximum Vegetation Condition Index over arable land (VCIx) for April - July 2020 by pixel; (d) Spatial NDVI patterns up to April - July 2020 according to local cropping patterns and compared to the 5YA; and (e) NDVI profiles associated with the spatial pattern under (d). Next, separate graphs (labeled as figures (f), (g), and subsequent letters) are included to illustrate crop condition development graphs based on NDVI average over crop areas for different agro-ecological zones (AEZ) within a country, again comparing the April - July 2020 period to the previous season and the five-year average (5YA) and maximum.

Refer to Annex A, Table A.1-A.11 for additional information about indicator values by country. Country agricultural profiles are welcome to visit the CropWatch Explore module of the cloud.cropwatch.com.cn website for more details.

Figures 3.5 - 3.45; Crop condition for individual countries ([AFG] Afghanistan to [ZMB] Zambia) including agro-ecological zones (AEZ) from April - July 2020.

[AFG] Afghanistan

Wheat, maize and rice are the main cereals that are grown in Afghanistan. The country produces spring and winter wheat. The sowing of spring wheat starts in March and April and the harvest is in August and September. Winter wheat is sown in October and November and harvested in May and June. Maize sowing starts in May and harvest is in August. Likewise, rice sowing starts in May/June and harvest is in October/November.

During this reporting period, the precipitation in Afghanistan was higher than the 15YA and lower than in 2019. Rainfall gradually declined from April to June. Temperature was lower than average in early April and mid-May 2020. Biomass was estimated to be 10 to 14% below the 15YA. According to crop condition development graphs based on NDVI, the national crop conditions were above average and close to the 5-year maximum.

The cropped arable land was mainly in Badghis, Faryab, Balkh, Kunduz, Takhar, Badakhshan, and Nuristan. The cropped arable land fraction (CALF) increased by 93% over the 5YA. According to the maximum vegetation condition index (VCIx) map, the vegetation in the south was better than in the north. As to the spatial distribution of NDVI profiles, crop conditions in most of the area (about 85.8% of cropped area) were above average or close to average from April to July. The most favorable conditions (28.4%) were identified mainly in the north of Badghis, Faryab, Saripul, and Samangan provinces. For 14.2%, the conditions were below average. This was mainly in the northern part of Baghlan.

In general, the conditions for wheat and maize are favorable.

Regional analysis

CropWatch subdivides Afghanistan into four zones based on cropping systems, climatic zones, and topography. They are described below as Dry region, Central region with sparse vegetation, Mixed dry farming and irrigated cultivation region, and Mixed dry farming and grazing region.

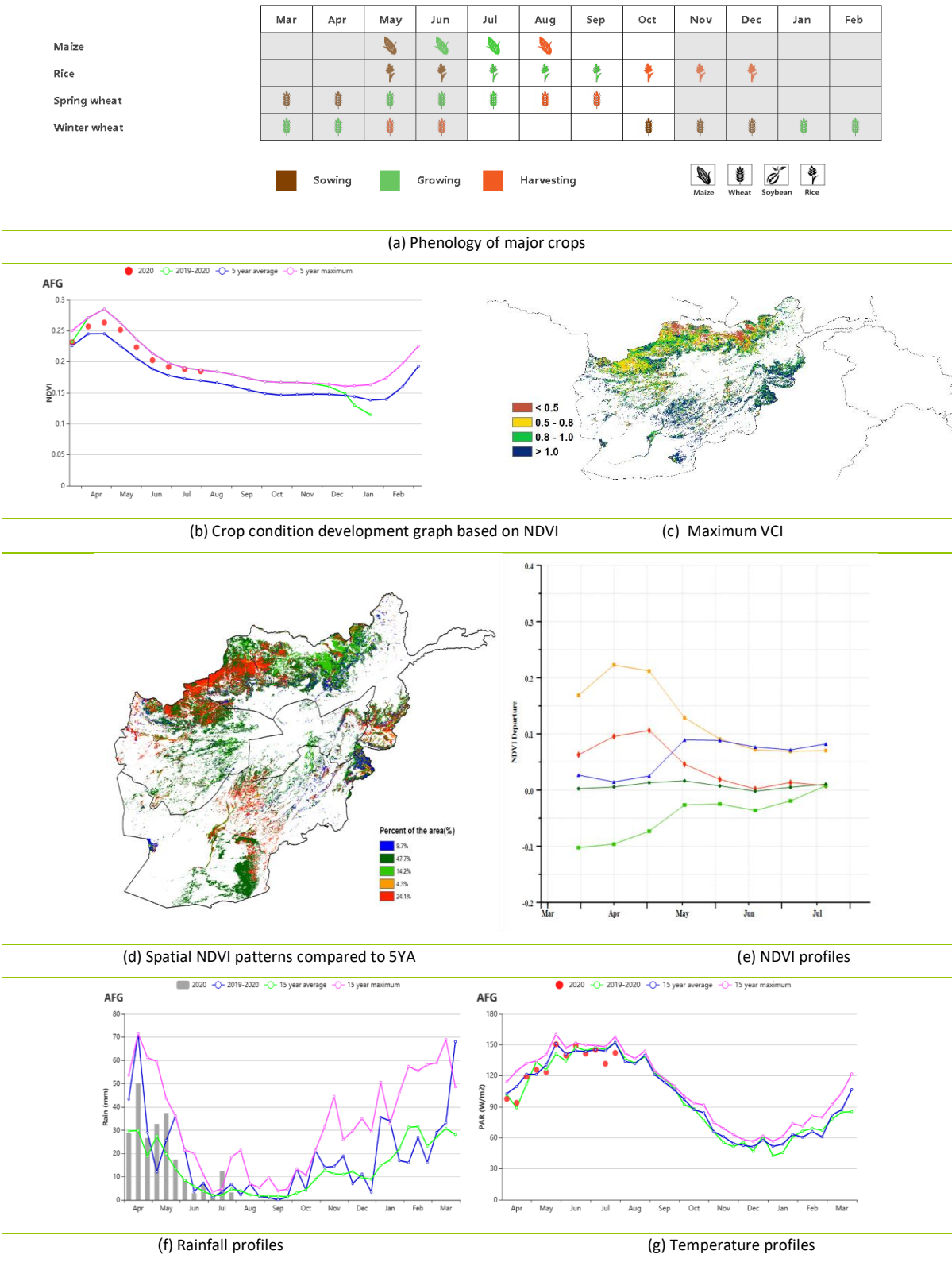
The RAIN in the Central region with sparse vegetation was 159 mm (+9%). The TEMP was 23.6°C (-0.8°C), and the RADPAR was 1571 MJ/m² (-4%). According to the NDVI-based crop condition development graph, the NDVI was higher than the average level and almost equal to the 5-year maximum. Potential biomass increased by 13%, CALF had increased substantially (+74%) and VCIx was 1.11.

The Mixed dry farming and grazing region recorded 90 mm of RAIN (+43%), TEMP was lower than average at 20.1°C (-0.8°C), and the RADPAR was 1601 MJ/m² (-3%). According to the NDVI-based development graph, crop conditions were better than the five-year average. CALF in this region increased by 38% and VCIx reached 0.93.

In the Mixed dry farming and irrigated cultivation region, the following indicator values were observed: RAIN 415 mm (+45%); TEMP 16.3°C (-1.0°C); RADPAR 1494 MJ/m² (-5%). Potential biomass was 453 g DM/m² (+5%) and CALF was 31% above the average. According to the NDVI-based crop condition development graph, NDVI was higher than the average level and VCIx reached 0.84.

The Dry region recorded 83 mm of RAIN (+15%). TEMP was 21.9°C (-0.6°C) and the RADPAR was 1626 MJ/m² (-2%). The CALF was 105% higher than the 5YA. VCIx was 1.0 and the potential biomass increased by 21%. According to the crop condition development graph, the NDVI was higher than maximum level recorded over the past 5 years.

Figure 3.5 Afghanistan’s crop condition, April - July 2020



● 2020 ○ 2019-2020 ◇ 5 year average ◆ 5 year maximum

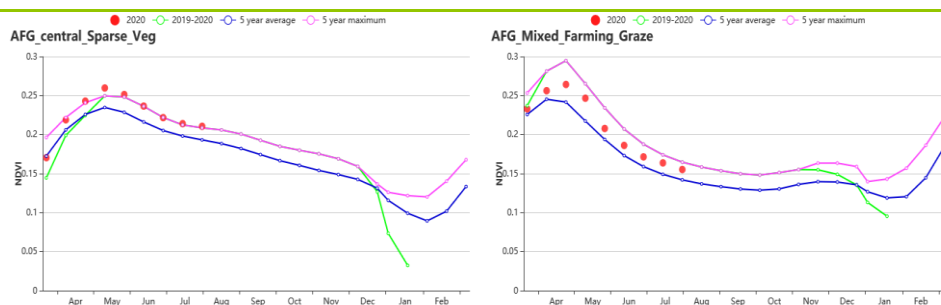
(b) Crop condition development graph based on NDVI (c) Maximum VCI

(d) Spatial NDVI patterns compared to 5YA (e) NDVI profiles

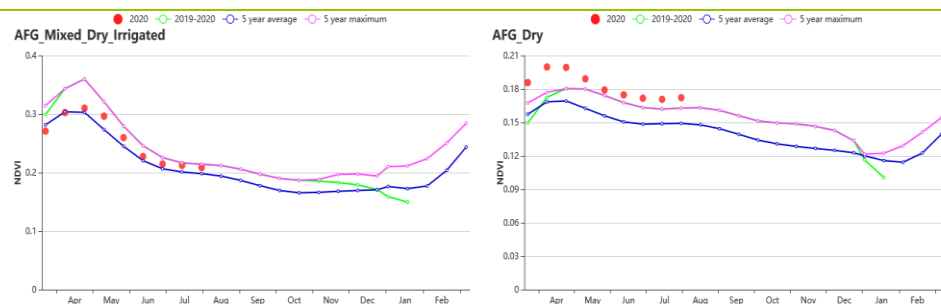
■ 2020 ◇ 2019-2020 ◇ 15 year average ◆ 15 year maximum

● 2020 ○ 2019-2020 ◇ 15 year average ◆ 15 year maximum

(f) Rainfall profiles (g) Temperature profiles



(h) Crop condition development graph based on NDVI (central_Sparse_Veg Region (left) and Mixed_Farming_Graze Region (right))



(i) Crop condition development graph based on NDVI (Mixed_Dry_Irrigated Region (left) and Dry (right))

Table 3.1 Afghanistan's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Central region	159	9	13.6	-0.8	1571	-4	415	13
Dry region	83	15	21.9	-0.6	1626	-2	468	21
Dry and irrigated cultivation region	415	45	16.3	-1.0	1494	-5	453	5
Dry and grazing region	90	43	20.1	-0.8	1601	-3	320	-6

Table 3.2 Afghanistan's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	
Central region	15	74	1.11
Dry region	9	105	1.00
Dry and irrigated cultivation region	29	31	0.84
Dry and grazing region	15	38	0.93

AFG AGO ARG AUS BGD BLR BRA CAN DEU EGY ETH FRA GBR HUN IDN IND IRN ITA KAZ KEN KGZ KHM LKA MAR MEX MMR MNG MOZ NGA PAK
PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF ZMB

[AGO] Angola

During this monitoring period, maize and rice reached maturity and wheat sowing started in May. Rainfall was below average (RAIN, -7%), whereas temperature (TEMP, -0.1°C) and radiation remained close to normal. Biomass was estimated to be 14% below average, although NDVI was close to the 5YA at the national level.

VCIx values varied from 0.8 to more than 1 throughout the country. The spatial distribution of NDVI profiles indicates that in nearly 29.5% of the cropped area, crop conditions were above average during the entire monitoring period, especially in Cunene and Cuando Cubango provinces. Rainfall was quite variable in space and time, which caused moisture deficits in the south and west. But crop conditions were in general close to normal.

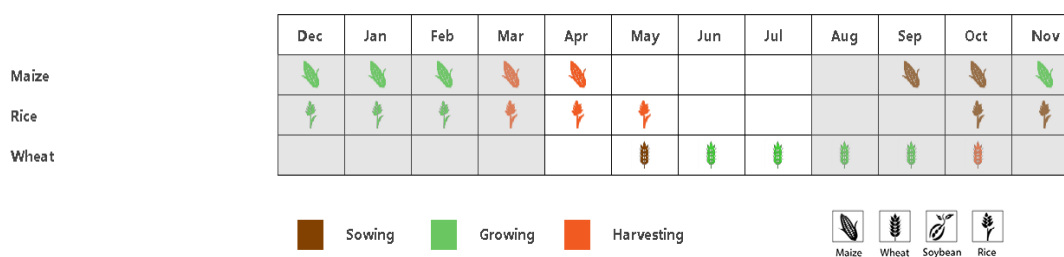
Regional Analysis

Considering the cropping systems, climatic zones and topographic conditions, Angola is divided into five agro-ecological zones (AEZs): (1) Arid zone, (2) Central Plateau, (3) Humid zone, (4) Semi-arid zone, and (5) Sub-humid zone.

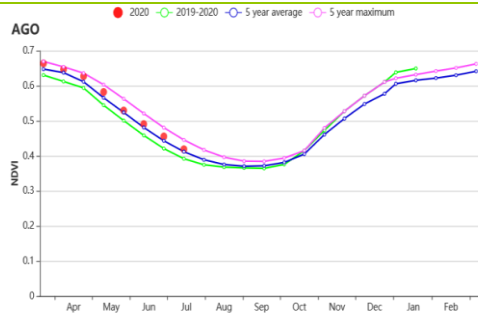
During the reporting period, four zones received below-average rainfall, including Arid zone (-24%), Central Plateau (-24), Semi-arid zone (-34%), and Subhumid zone (-4%). Above-average rainfall (RAIN +4%) was only recorded in Humid zone. The Arid zone was the only region which recorded above-average temperatures (TEMP +0.5°C). It was cooler than normal in the Central Plateau (-4°C). The remaining zones recorded decreases in temperature varying from 0.1°C to 0.2°C. Except for a decrease of 3% in the Humid zone, the remaining zones recorded increases in radiation by 1%. Biomass decreased in all agro-ecological zones. However, despite the increases in rainfall, the total biomass production in the Humid zone decreased by 21% compared to the past fifteen years average, due to a reduction in both temperature and radiation. Large departure in CALF by 6% was observed in the Semi-arid zone while the remaining regions recorded an about-average CALF. Favourable vegetation condition indexes (VCIx) were observed in all agro-ecological zones.

The Arid zone was the one with the lowest VCIx. The lowest VCIx verified in this region, also reflects the reported below-average crop conditions during the entire period (figure f). Close-to-average crop conditions were recorded in the Semi-arid zone while in the Sub-humid zone, and Central Plateau, crop conditions were favourable. In the Humid zone, crop conditions were well above the average of the past five years in April, dropping to below-average from early May till the end of the reporting period.

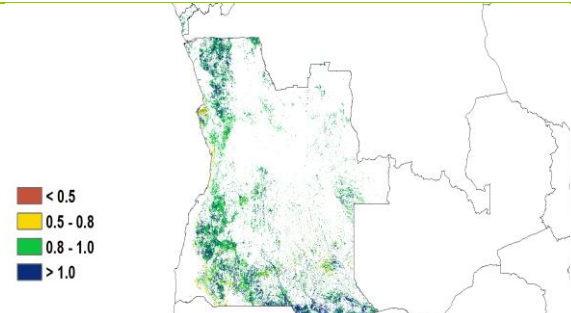
Figure 3.6 Angola's crop condition, April - July 2020



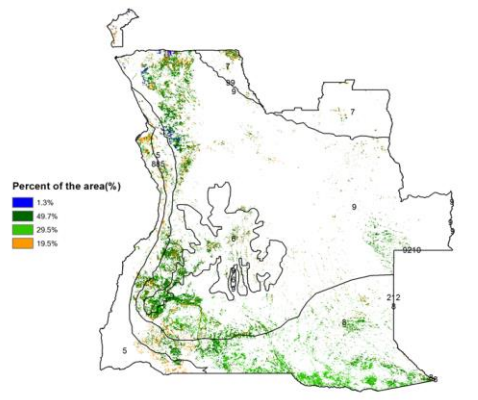
(a). Phenology of major crops



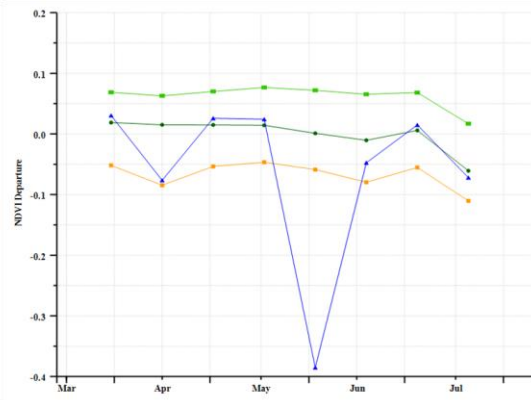
(b) Crop condition development graph based on NDVI



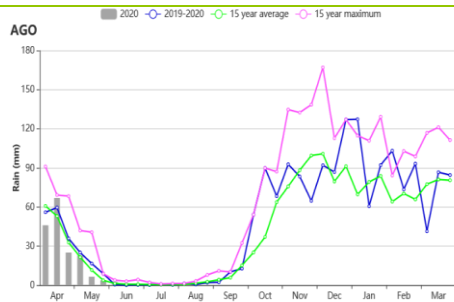
(c) Maximum VCI



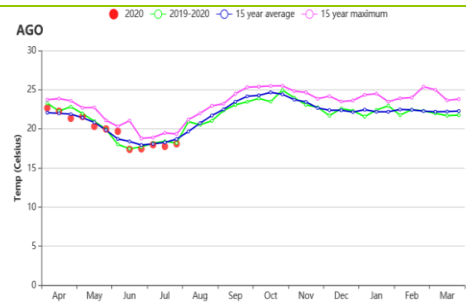
(d) Spatial NDVI patterns compared to 5YA



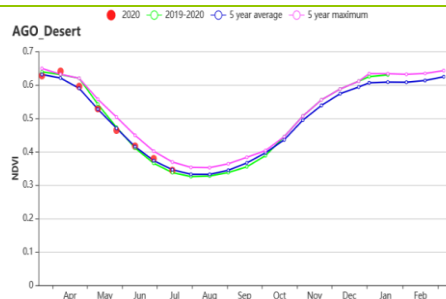
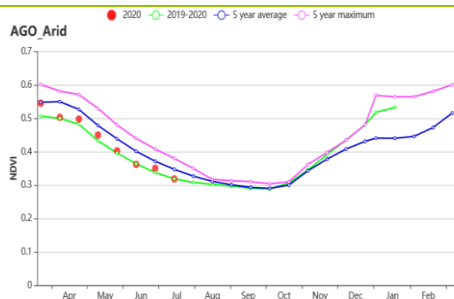
(e) NDVI profiles



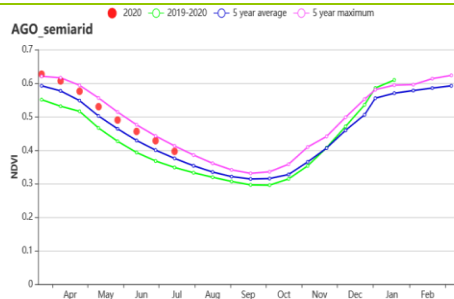
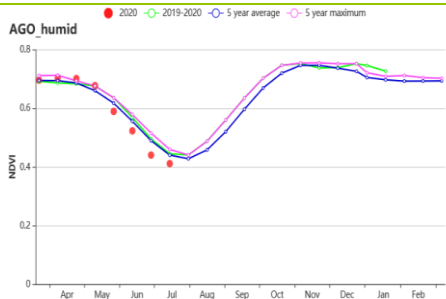
(f) Rainfall profiles



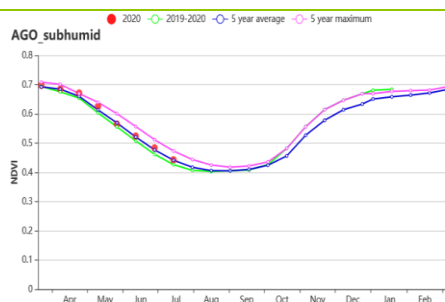
(g) Temperature profiles



(h) Crop condition development graph based on NDVI-Arid zone (left), and Central Plateau (right)



(i) Crop condition development graph based on NDVI-Humid zone (left), and Semi-arid zone (right)



(j) Crop condition development graph based on NDVI-Subhumid zone

Table 3.3 Angola agro-climatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Arid Zone	102	-24	22.8	0.5	1207	1	392	102
Central Plateau	94	-24	16.0	-0.4	1256	1	188	94
Humid zone	428	4	22.5	-0.2	1194	-3	424	428
Semi-Arid Zone	49	-34	18.8	-0.2	1194	1	199	49
Sub-humid zone	234	-4	20.0	-0.1	1230	1	326	234

Table 3.4 Angola agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Arid Zone	79	0	0.83
Central Plateau	100	1	0.97
Humid zone	100	0	0.99
Semi-Arid Zone	99	6	1.00
Sub-humid zone	100	0	0.97

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POL ROU RUS THA TUR UKR USA UZB VNM ZAF ZMB

[ARG] Argentina

The reporting period covers the harvest of late maize, soybean and rice and the subsequent fallow period. Wheat sowing started in June. For the whole country, rainfall showed a 14% negative anomaly, TEMP showed a slight negative anomaly of 0.2°C, RADPAR and BIOMSS showed positive anomalies of 6% and 8% respectively. CALF showed a 1% reduction and maximum VCI value was 0.83. The observed rainfall deficit may have negatively affected planting and emergence of wheat. However, drier conditions than usual had limited impact on the crops that were harvested in April and May. CropWatch keeps the production estimate at the same level as in the May forecasts.

The rainfall temporal profile showed negative anomalies in April, May and July. The temperature profile followed the average time series, with some positive and negative deviations. The graph of NDVI development at the national level showed negative anomalies during the entire reporting period

For the whole country, the crop condition classification based on NDVI showed that more than 80% of the area was near or below average during the entire reporting period. The crop condition classification based on VHI showed that at the beginning of the reporting period, near 30% of the area was affected by moderate or severe drought or more than 40% if minor droughts were also considered. A tendency of reduction in the area affected by drought was observed towards to the end of this monitoring period. Only 5% of the area was affected by severe or moderate and 10% by minor drought. Rainfall returned to average starting in late May.

Regional Analysis

CropWatch subdivides Argentina into eight agro-ecological zones (AEZ) based on cropping systems, climatic zones, and topography; they are identified by numbers on the NDVI departure cluster map. During this monitoring period, most crops were grown in the following four agro-ecological zones: Chaco, Mesopotamia, Humid Pampas, and Subtropical highlands. The other four agro-ecological zones were less relevant for this period.

Mean values of rainfall showed negative anomalies for the main agro-ecological zones: Chaco (-36%), Mesopotamia (-14%), Pampas (-10%), Subtropical highlands (-8%). TEMP showed no anomaly in Chaco, positive anomaly in Subtropical highlands (+0.2°C), and negative anomalies in Mesopotamia (-0.4°C) and Pampas (-0.2°C). RADPAR showed positive anomalies in the four zones: Chaco (+14%), Mesopotamia (+11%), Subtropical highlands (+3%) and Humid Pampas (+2%). BIOMSS also showed positive anomalies in Chaco (+20 %), Mesopotamia (+12 %), Subtropical highlands (+6%) and Humid Pampas (+4%). CALF was almost complete (99%) for Chaco, Mesopotamia and Subtropical highlands, while Pampas showed somewhat lower values (90%). VCIx values were higher in the Subtropical highlands (0.88), followed by Mesopotamia (0.84), Pampas (0.83) and Chaco (0.78).

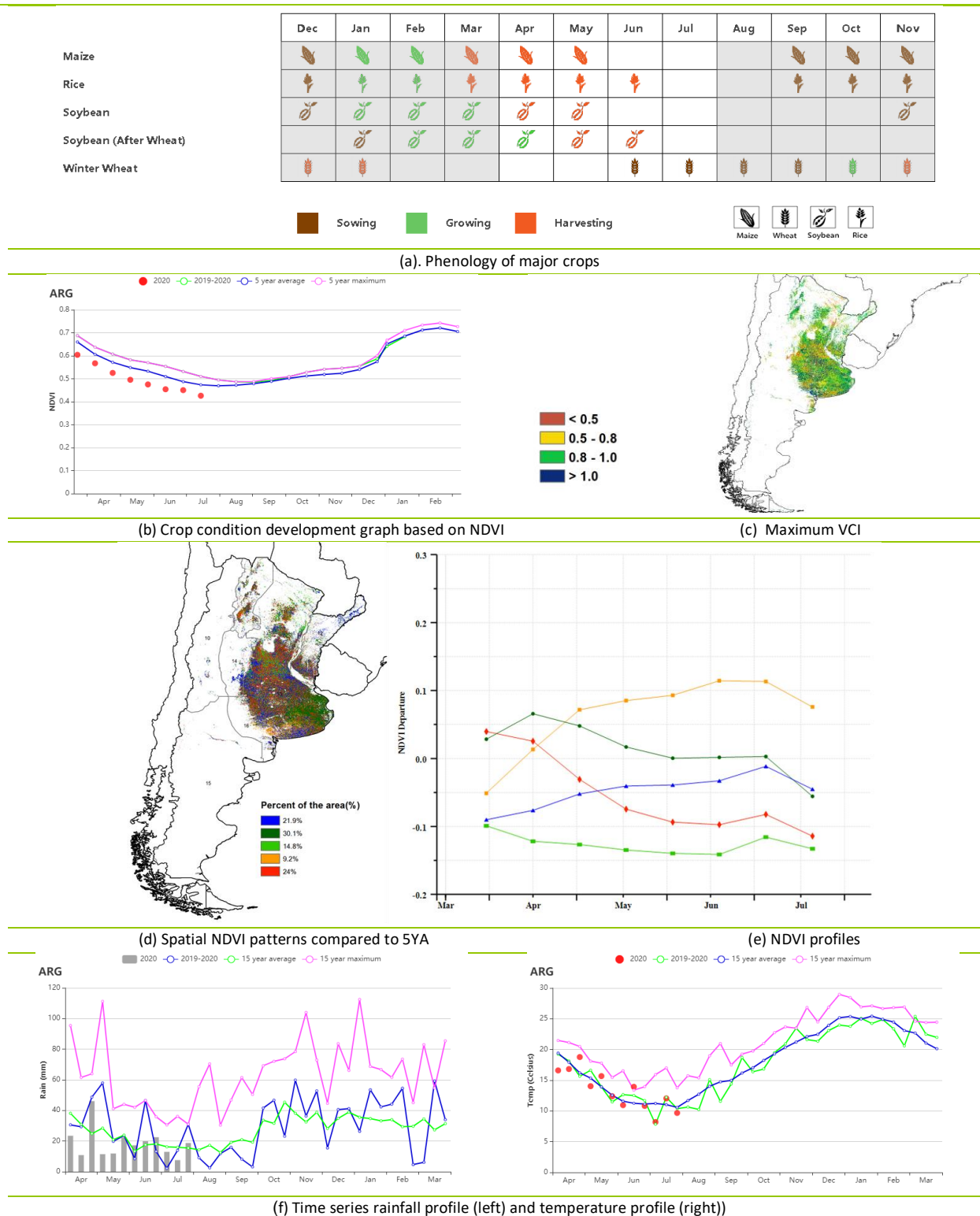
Rainfall profiles for Humid Pampas showed lower than average values during May and July. Chaco also showed negative anomalies in April. Mesopotamia showed most negative anomalies during April and May. Subtropical highlands showed near-average values during the entire reporting period. NDVI profiles showed near average values for Pampas, negative anomalies during end of April, May and June for Mesopotamia. Subtropical highlands showed negative NDVI anomalies during most of the period and Chaco showed negative anomalies all the time.

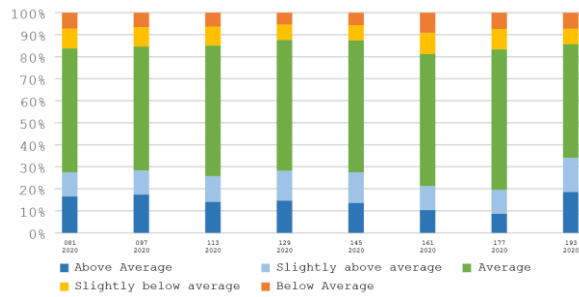
Spatial distribution of NDVI profiles showed a mixed spatial pattern, with the exception of Flooding Pampas (dark green profiles) with positive anomalies at the beginning of the reporting period and no or negative anomalies at the end. Also, the blue profile, with below average values at the beginning and no anomalies at the end, can be identified in small areas at Center West and Center East Pampas, South Pampas and North Mesopotamia. Most of Pampas, Chaco and Subtropical highlands showed a mixture of light green and red patterns; the light green profile was below average during the entire period, while the red profile showed a decrease in NDVI values with negative anomalies starting by late April. VCIx showed also a quite mixed pattern. Near half of the areas of Pampas showed poor conditions with lower than 0.8 values. Low VCIx

values were observed also for East Chaco (lower than 0.5 in some cases) and for South Mesopotamia (mostly lower than 0.8).

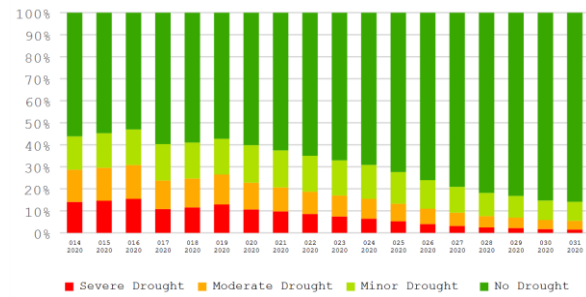
Argentina showed poor conditions in several indices (Precipitation and NDVI anomalies, VCIx and CALF), but a tendency of improving conditions at the end of the period was observed (e.g. VCI_m crop condition classification). Dry conditions could have affected the planted area of wheat as shown in a CALF reduction for the Pampas.

Figure 3.7 Argentina's crop condition, April - July 2020

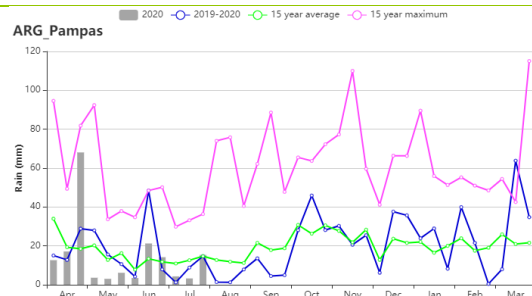




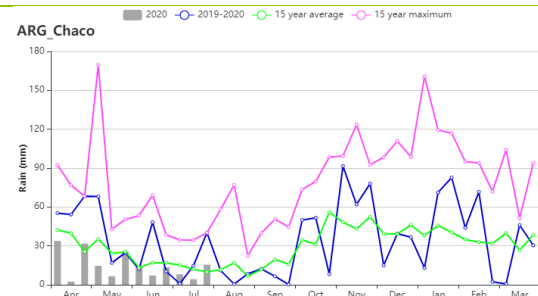
(g) Proportion of NDVI anomaly categories compared with 5YA



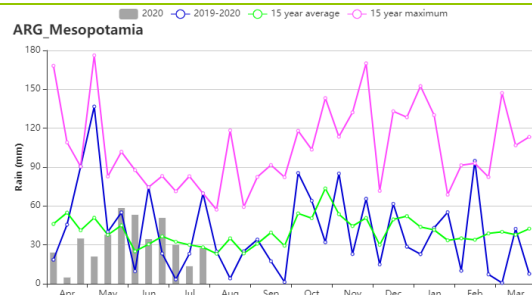
(h) Proportion of VHI categories compared with 5YA



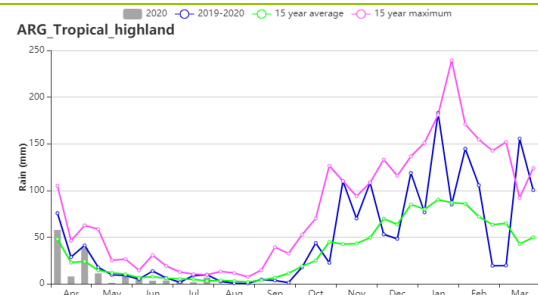
(i). Time series rainfall profile (Humid Pampas)



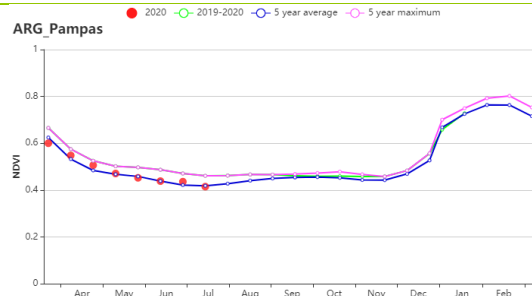
(j). Time series rainfall profile (Chaco)



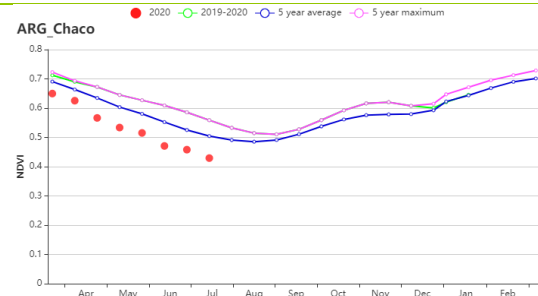
(k). Time series rainfall profile (Mesopotamia)



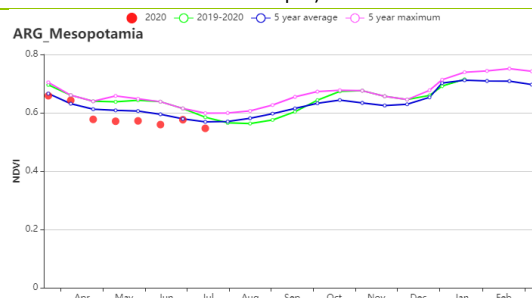
(l). Time series rainfall profile (Subtropical highlands)



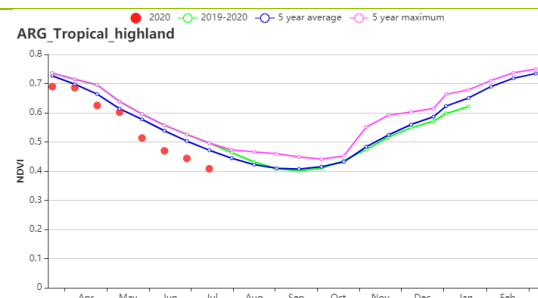
(m). Crop condition development graph based on NDVI (Humid Pampas)



(n). Crop condition development graph based on NDVI (Chaco)



(o). Crop condition development graph based on NDVI (Mesopotamia)



(p). Crop condition development graph based on NDVI (Subtropical highlands)

Table 3.5 Argentina agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Chaco	177	-36	16.4	0	716	14	312	20
Mesopotamia	391	-14	15.1	-0.2	670	11	270	12
Humid Pampas	172	-10	12	-0.4	614	2	204	4
Subtropical highlands	150	-8	14	0.2	826	3	289	6

Table 3.6 Argentina's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Chaco	99	0	0.79
Mesopotamia	99	1	0.84
Humid Pampas	91	-2	0.83
Subtropical highlands	99	0	0.88

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[AUS] Australia

The sowing of wheat and barley started in May, as these crops are grown during the Australian winter season.

At the national scale, Australia experienced weather conditions that were close to the 15YA. Rain was off to a good start in April, but subsequently dropped to below-average levels in July. Accordingly, rain, temperature, solar radiation, and biomass were slightly below the 15YA: RAIN -6%, TEMP -0.2°C, RADPAR -2%, BIOMSS -3%. The agronomic indicators were positive, with a VCIx of 0.87 and an increased CALF (+5%).

The conditions in the four main wheat production states can be divided into two groups. The southeastern states, including New South Wales and Victoria, had above average rainfall, and below-average temperature and sunshine, which resulted in below-average biomass accumulation. While the southwestern states, including South Australia and Western Australia, both had below-average rainfall, low sunshine and biomass accumulation. As a result, the maximum VCI data for the southeastern states were better than for the southwest.

The national NDVI profile shows that overall crop conditions were even better than the 5-year maximum. The spatial NDVI pattern further shows that more than 50% of the cultivated cropland trailed slightly below the long-term average. Those areas were mostly located in the southwest. However, all the cropland had positive NDVI departures in July.

Overall, the agro-climatic indicators in the reporting period are promising. The above average CALF and NDVI indicate generally favorable crop conditions.

Regional analysis

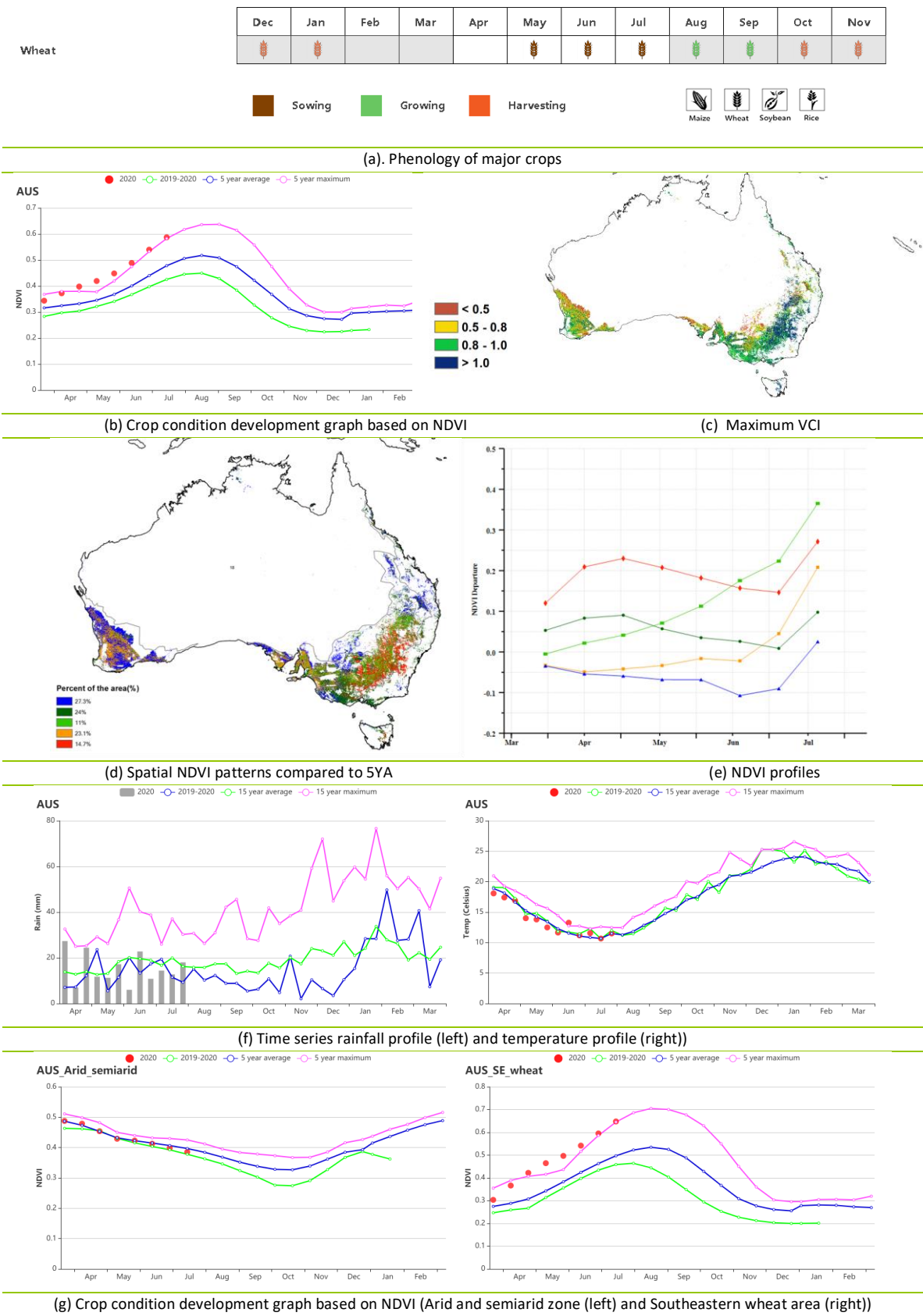
This analysis adopts five agro-ecological regions for Australia, namely the Arid and Semi-arid Zone (marked as 18 in NDVI clustering map), Southeastern Wheat Zone (19), Subhumid Subtropical Zone (20), Southwestern Wheat Zone (21), Wet Temperate and Subtropical Zone (22).

According to the NDVI profiles, three of the five regions can be assigned into a group, which had average NDVI. They include the Arid and Semi-arid Zone, Southwestern Wheat Zone and Wet Temperate and Subtropical Zone. These 3 regions all had below-average rainfall, average or above-average temperature, average sunshine, and below average biomass. The CALF was also average. VCIx was 0.99 for the Wet Temperate and Subtropical zone.

The Southeastern Wheat Zone had positive rainfall departure (+11%), negative temperature departure (-0.7°C) and sunshine (-4%). The biomass was consequently below average (-7%). The CALF and VCIx were positive; the crop conditions in this region were generally favorable.

The last region is the Subhumid Subtropical Zone. Although the rainfall (-9%), temperature (-0.1°C) and sunshine (-2%) were below average, the biomass was average. Combined with the largely improved CALF (+21%) and good maximum VCI (0.94), the crop conditions are promising.

Figure 3.8 Australia crop condition, April - July 2020



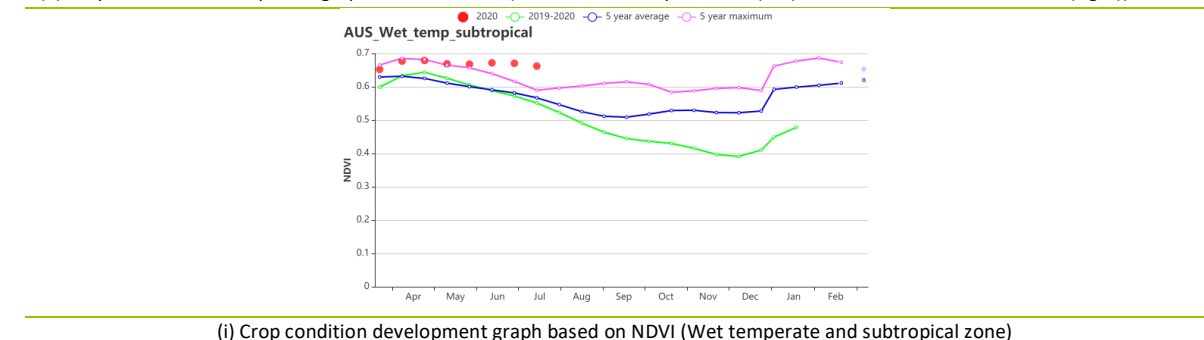
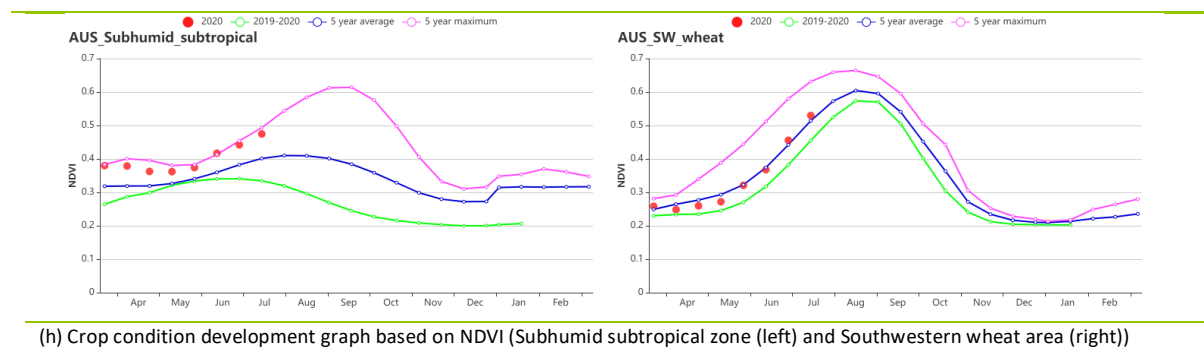


Table 3.7 Australia agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Arid and semiarid zone	96	-24	21.9	0.5	1012	0	306	-8
Southeastern wheat area	220	11	11.4	-0.7	548	-4	183	-7
Subhumid subtropical zone	127	-9	14.2	-0.1	760	-2	268	0
Southwestern wheat area	187	-17	14.5	0.4	616	-2	234	-1
Wet temperate and subtropical zone	216	-7	12.6	-0.1	646	-2	234	-1

Table 3.8 Australia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Arid and semiarid zone	71	-1	0.77
Southeastern wheat area	95	4	0.91
Subhumid subtropical zone	70	21	0.94
Southwestern wheat area	87	3	0.72
Wet temperate and subtropical zone	99	1	0.99

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[BGD] Bangladesh

During this monitoring period, rice was the most important crop, followed by wheat. Rainfall was above average by 14%. The average temperature was a bit lower (-0.6°C) and the photosynthetically active radiation was 1248 MJ/m^2 (1% lower than average). The national NDVI development curve shows that crop conditions across the country were slightly better than the 5-year average in April and May, but dropped to below-average levels thereafter due to widespread flooding. The spatial NDVI pattern shows that 30.7% of the crops were above the 5-year average throughout the season, dispersed over the country but concentrated in the lower Ganges River and Chittagong. The best Vegetation Condition Index (VCIx) ranged from 0.8 to 1, indicating good crop growth prospects in the whole country, and the national VCIx value was 0.94, with most areas higher than 0.8. However, the floods in June and July caused wide-spread crop damage or delayed planting of a man rice.

Regional analysis

Bangladesh can be divided into four Agro-Ecological Zones (AEZ): Coastal region, the Gangetic plain, the Hills, and the Sylhet basin.

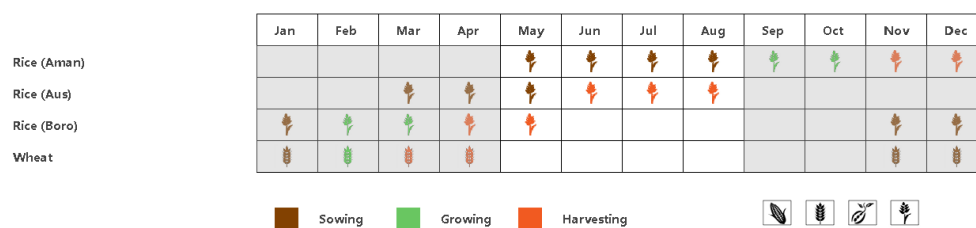
In the **Coastal region**, both RAIN and RADPAR were above average (+8% and +2%, respectively). Temperature was below average (-0.6°C). The crop condition development graph based on NDVI shows that crop conditions were close to the 5-year average from April to May and then below average. CALF was at 90% and VCIx at 0.97, with BIOMSS up 4% (the highest for any region), which indicate average conditions.

The **Gangetic plains** received the largest precipitation amount (+38% above average). Temperature was below average (-0.9°C) and RADPAR was 2% below. The NDVI was similar to the Coastal region, starting close to average and exceeding the average in May, but then dropping sharply. During the monitoring period, high CALF (98%) and VCIx at 0.97 indicated good prospects. But the sharp drop in NDVI in June and July indicates that conditions are generally unfavorable.

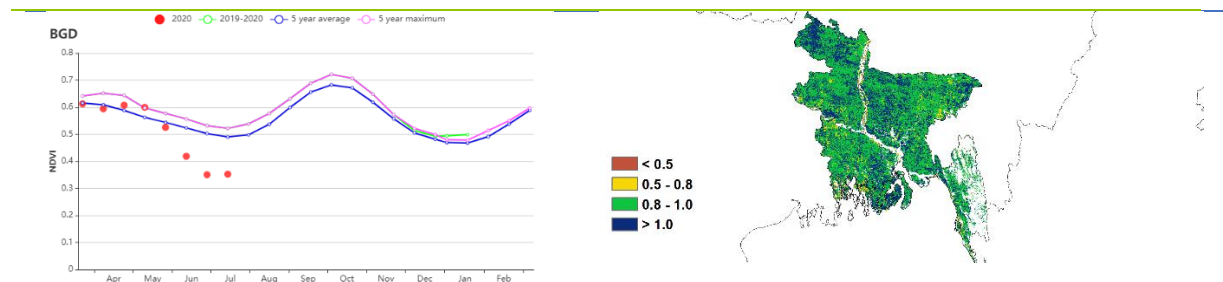
In the **Hills**, rainfall was 12% above the average, with a below-average TEMP (-0.4°C) and favourable sunshine (RADPAR +1%). The crop condition development graph based on NDVI shows that crop condition was close to, but below average during the whole monitoring period. BIOMSS was below average (-3%), CALF was 95% and VCIx was 0.95, indicating unsatisfactory crop conditions.

In the **Sylhet Basin**, rainfall was above average by 11%. TEMP was 0.5°C below the average and RADPAR was 2% below. The BIOMSS potential of 817 g DM/m^2 was also 2% below the 5YA, with CALF at 99% and VCIx of 0.97. Widespread flooding in June and July caused unfavorable crop conditions.

Figure 3.9 Bangladesh's crop condition, April - July 2020

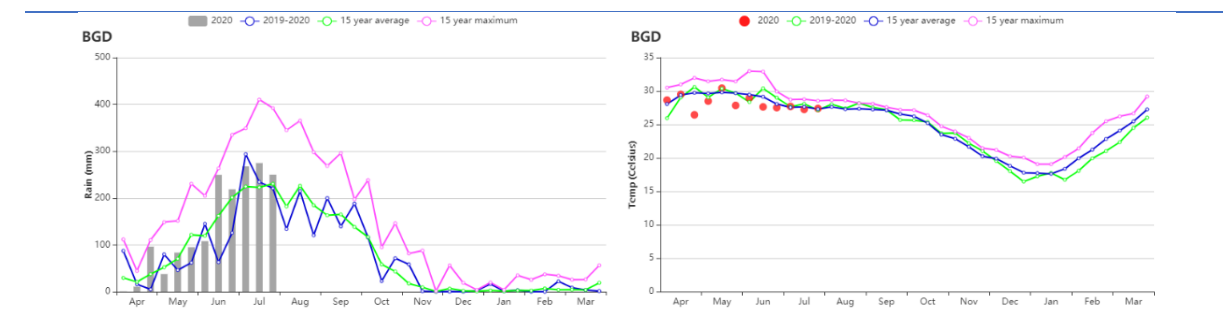


(a). Phenology of major crops



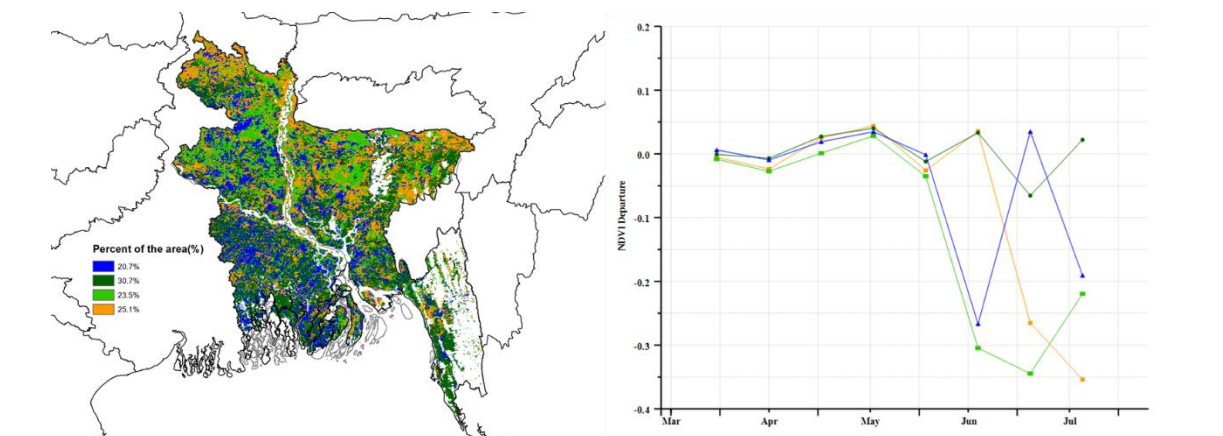
(b) Crop condition development graph based on NDVI

(c) Maximum VCI



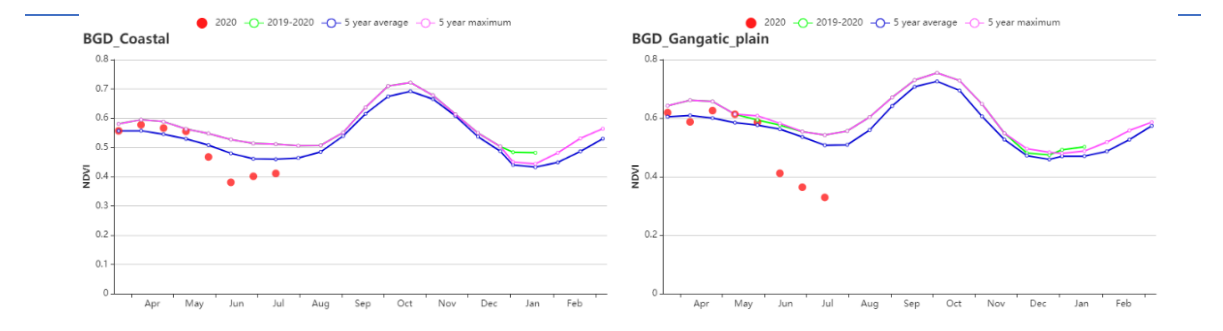
(d) Rainfall Index

(e) Temperature Index



(f) Spatial NDVI patterns compared to 5YA

(g) NDVI profiles



(h) Crop condition development graph based on NDVI (Coastal Region (left) and Gangetic Region (right))

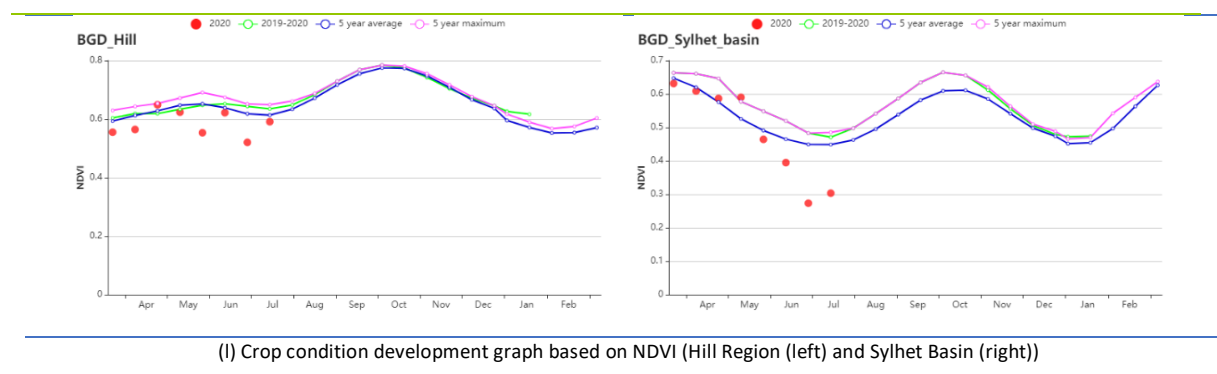


Table 3.9 Bangladesh's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (gDM/m ²)	Departure (%)	Current (MJ/m ²)	Departure (%)
Coastal region	1524	8	28.8	-0.6	1340	2	902	4
Gangetic plain	1725	38	28.7	-0.9	1227	-2	791	-4
Hills	1700	-12	27	-0.4	1303	1	830	-3
Sylhet basin	1671	11	27.8	-0.5	1207	-2	817	-2

Table 3.10 Bangladesh's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April- July 2020

Region	CALF		Maximum VCI
	Current (%)	Departure (%)	Current
Coastal region	90	6	0.97
Gangetic plain	98	1	0.97
Hills	97	1	0.95
Sylhet basin	99	2	0.97

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[BLR] Belarus

In Belarus the reporting period includes the planting of spring wheat and summer crops until June and the harvest of winter wheat from July. The nationwide rainfall amount reached 352 mm, which was 11% above average. However, solar radiation (RADPAR -3%) and temperature (-1.0°C) fell below the 15YA average, the potential biomass was decreased by -7% and lower than average. Agronomic conditions were shown as favorable: very good values of VCIx (0.97) and cropped arable land fraction (CALF, 100%) were observed.

The NDVI development graph was generally below 5-year average from April to early May and recovered in June. The spatial pattern showed diverse patterns. In about 69.1% of cropped area crop condition was close to or above 5-year average. Only 11.4% of cropped areas were 0.1 NDVI units below the average, mostly scattered in the south-east and along the western border. Average national VCIx exceeded 0.97, indicating fair crop prospects in most crop area. Overall, although agronomic conditions were satisfactory in this period, water shortage in previous months during spring might have constrained crop growth, and more solar radiation will be needed to ensure good winter wheat production and summer crop development.

Regional analysis

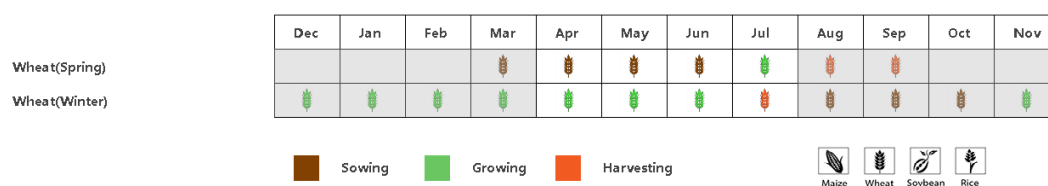
Based on cropping system, climatic zones and topographic conditions, regional analyses are provided for three agro-ecological zones (AEZ), including Northern Belarus (028, Vitebsk, northern area of Grodno, Minsk and Mogilev), Central Belarus (027, Grodno, Minsk and Mogilev and Southern Belarus (029) which includes the southern halves of Brest and Gomel regions.

North Belarus (Vitebsk, northern area of Grodno, Minsk and Mogilev) recorded a minor radiation deficit (-4%) combined with lower temperature (-1.0°C) and higher rainfall (+13%). BIOMSS decreased 8% below average. The VCIx had reached 0.99, and CALF had reached 100%. The NDVI development curve was below or close to average in April and early May and slightly higher in June. Crop overall condition is normal.

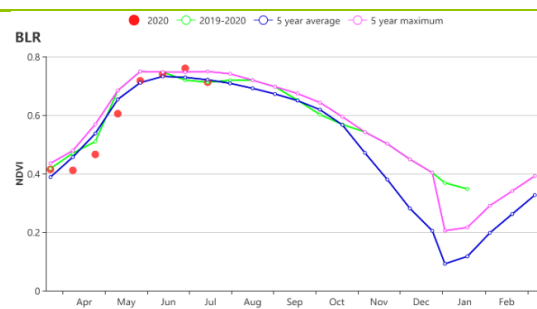
Central Belarus (Grodno, Minsk and Mogilev) also experienced higher rainfall (12%) and lower temperature (-1.0°C) and less sunshine (-2%). Potential biomass decreased about 6%. High CALF (100%) and VCIx (0.97) were also recorded. Similar to northern Belarus, the NDVI growth curve remained close to the average trend from April to May but showed recovery since June.

Precipitation in **Southern Belarus** was higher by 14%, while temperature and radiation were slightly lower by 1.0°C and 2%, respectively. Potential biomass was expected to decrease by 7%. The CALF and the VCIx were 100% and 0.95 respectively. Although agronomic indicators showed that crop growth was generally favorable, the impact of water shortage in spring and radiation deficit in this period on the crops requires close attention. The average NDVI development curve suggests that from April to June, crop condition was general below average for most of the time.

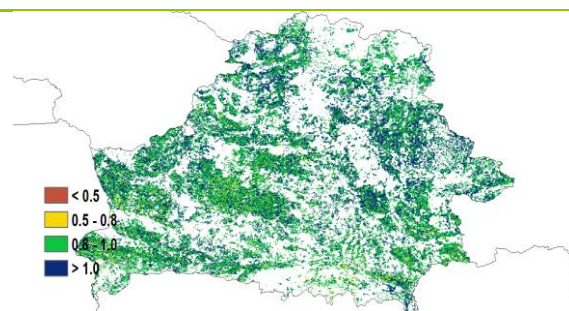
Figure 3.10 Belarus's crop condition, April - July 2020



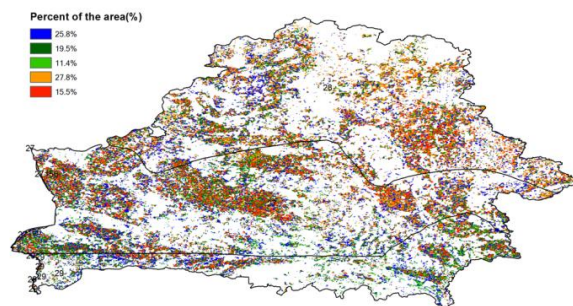
(a). Phenology of major crops



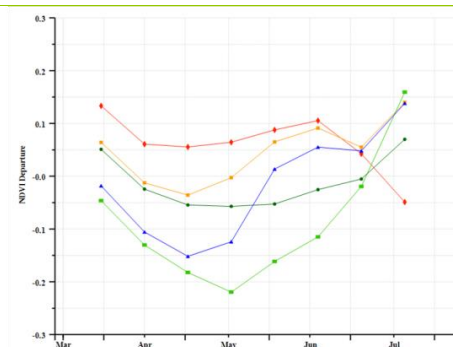
(b) Crop condition development graph based on NDVI



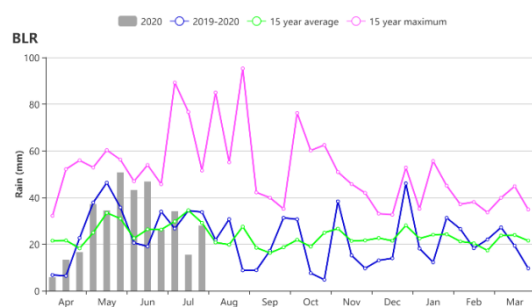
(c) Maximum VCI



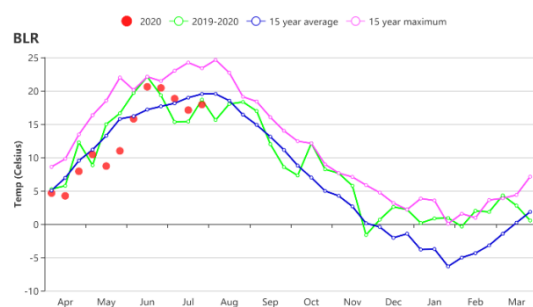
(d) Spatial NDVI patterns compared to 5YA



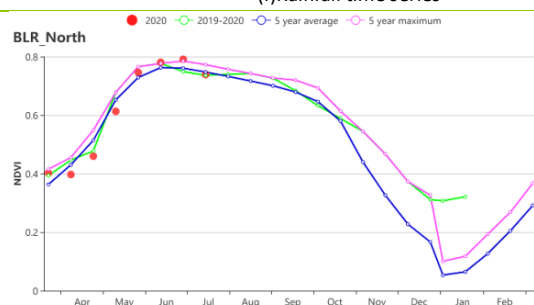
(e) NDVI profiles



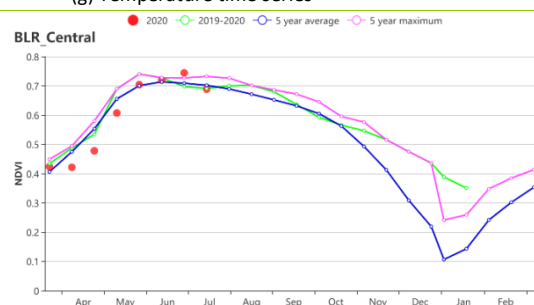
(f) Rainfall time series



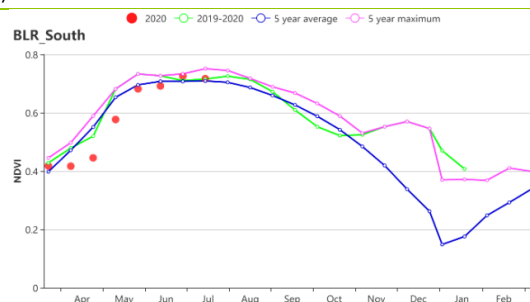
(g) Temperature time series



(h) Crop condition development graph based on NDVI (North Belarus)



(i) Crop condition development graph based on NDVI (Central Belarus)



(j) Crop condition development graph based on NDVI (South-west Belarus)

Table 3.11 Belarus's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Center	353	12	13	-1.0	1095	-2	427	-6
North	369	13	12	-1.0	1054	-4	386	-8
South-west	312	4	14	-1.0	1114	-2	455	-7

Table 3.12 Belarus's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Center	100	0	0.97
North	100	0	0.99
South-west	100	0	0.95

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[BRA] Brazil

During this reporting period, the harvest of summer crops (maize, soybean, and rice) was almost concluded except for maize in north-eastern regions. Wheat was sown in April to May and was approaching peak growth in July. Overall crop conditions in Brazil remained close to average compared to the previous five years.

Agro-climatic indicators present generally close to average conditions with 0.1°C higher temperature and 1% above average RADPAR while rainfall was 4% lower compared with the 15YA. Slightly below-average rainfall resulted in a 1% reduction of potential biomass. Although agro-climatic indicators remained close to average, significant departures were observed among different states of Brazil ranging from -45% in Sao Paulo to +33% in Piaui. Diversified accumulated rainfall was also presented among states with largest rainfall at 1358 mm in Amapa and least rainfall at 174 mm in Sao Paulo. Largest rainfall departure from the 15YA was also observed in Rio Grande Do Norte, Bahia and Sergipe with 22%, 24% and 26% above average, respectively. Mato Grosso Do Sul and Rio De Janeiro suffered from water shortage with 29% and 27% less rainfall, respectively. Radiation departures among the provinces ranged from -6% in Bahia to +11% in Parana. Sao Paulo, Mato Grosso Do Sul, and Santa Catarina also presented larger than 5% positive departures of radiation. According to the national rainfall profiles, the 10-days accumulations of rainfall also show overall average conditions except for the period from early April to early May. Temperature was overall close to average for all states. Large negative departures of BIOMSS occurred in Distrito Federal, Goias and Minas Gerais, by -11%, -8% and -7% respectively, as a result of below average rainfall, temperature, and radiation. Above-average radiation in Mato Grosso Do Sul, Santa Catarina, Alagoas, Parana, and Sao Paulo benefitted the biomass accumulation and resulted in positive deviations by more than 5% from the 15YA. For more detailed information, it is recommended to visit CropWatch Explore

(<http://cropwatch.com.cn/newcropwatch/main.htm?language=en>).

The crop condition development graph based on NDVI for Brazil presents slightly below-average values which recovered to average by late June. According to the NDVI departure clustering maps and profiles, below-average conditions were mostly located in Southern Brazil including Sao Paulo, Rio Grande Do Sul, Parana, Santa Catarina, and Mato Grosso Do Sul. The below-average NDVI could be attributed to the lower rainfall since the beginning of the year as the similar pattern was observed in the rainfall departure map at state level (Figure h). Scattered areas within the regions mentioned above show relatively low VCIx values (below 0.8), which confirmed the unfavorable crop conditions. Northeast Brazil including Nordeste, and northern part of East Coast presented above-average crop conditions throughout the monitoring period, thanks to the above-average rainfall (Figure h). Most other areas showed generally close-to-average NDVI compared with the previous five years. The bar graph showing the proportion of different categories of crop condition indicates that the above-average conditions accounted for more than 20% to 35% of the area during the monitoring period while the percentage of below-average conditions was less than 20%. In late June to early July, the proportion of above-average crops reached the lowest point but with limited impact on crop production since most summer crops were already harvested. As shown in figure g, drought conditions generally stayed at below 20% when severe, moderate, and minor drought were considered. Above-average rainfall since mid-May also eased the drought conditions as indicated by the decreasing trend of the percentage of cropland affected by drought. National VCIx is 0.92 and CALI is 1% above average. Cropland is almost 100% cultivated. Several non-major agricultural producing states in the northeast presented above 1.0 VCIx, which benefited from favorable agro-climatic conditions. Five agricultural states in southern Brazil showed VCIx at levels below 0.9, which coincided with the below-average condition presented in the NDVI departure clustering map. All in all, crop conditions in Brazil were close to average and CropWatch estimates close to average outputs for soybean and maize. It is also noteworthy that the above-average radiation at the end of the monitoring period is favorable for the drying and harvest of the crops in the southern states (Figure i).

Regional analysis

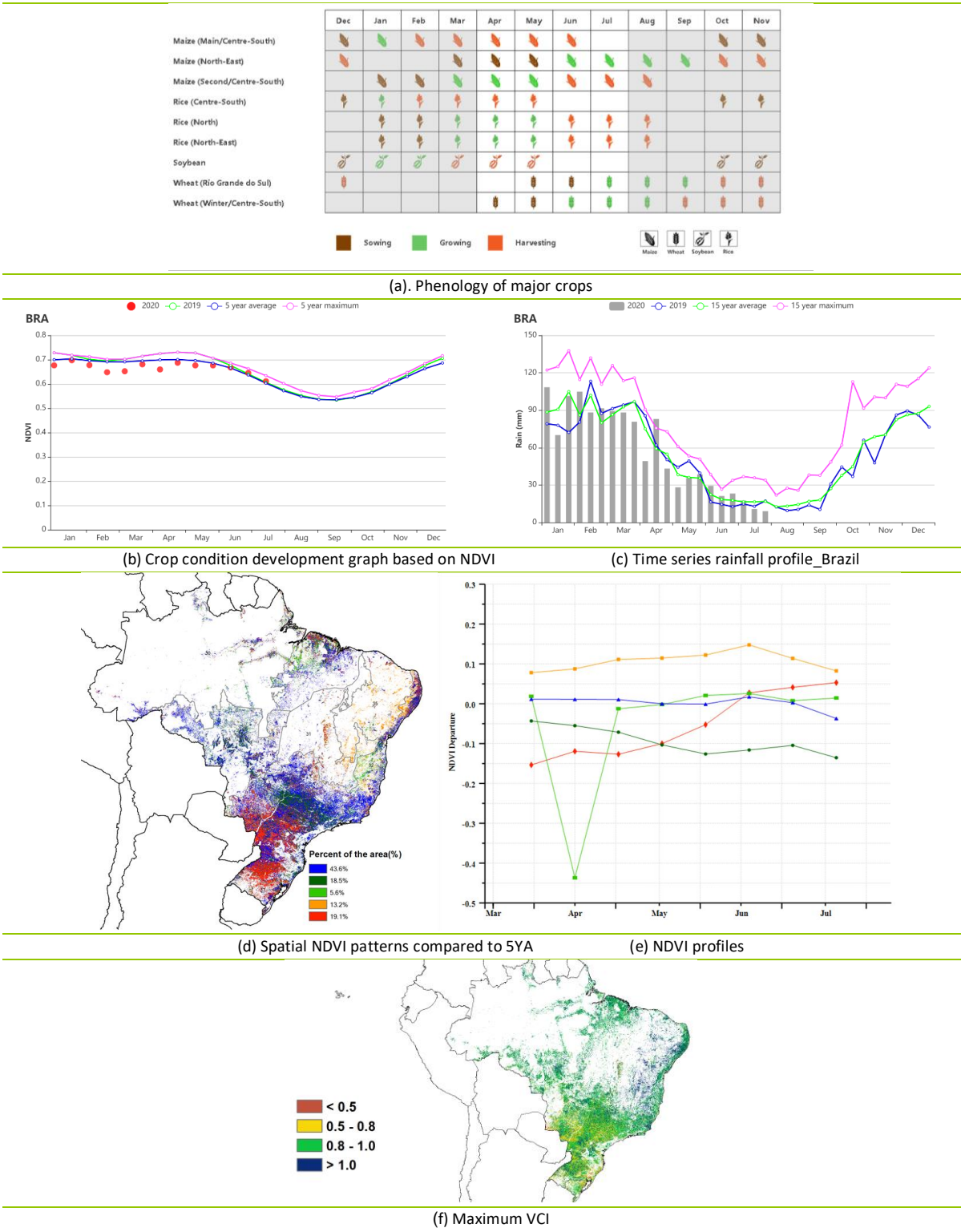
Considering the differences of cropping systems, climatic zones and topographic conditions, eight agro-ecological zones (AEZ) are identified for Brazil. These include the Central Savanna, the east coast, Parana river, Amazon zone, Mato Grosso zone, Southern subtropical rangelands, mixed forest, and farmland, and the Nordeste. Four zones received average rainfall, including Southern subtropical rangelands, Northeastern mixed forest and farmland, Amazonas, and Coast zones. Central Savanna (+20%) and Nordeste (+26%) received significant above average rainfall, while Parana Basin (-19%) and Mato Grosso (-9%) zone suffered from water shortage. The prolonged dry conditions in the Parana Basin and Mato Grosso zone was observed since the starting of the season in October of last year which hampered crop development and resulted in lower production. Parana Basin was also the zone with largest positive departure of radiation. Sunny weather further worsened the drought situations. Temperature for all eight zones was close to average with largest departure for the Northeastern mixed forest and farmland at 0.4°C above average. Large BIOMSS departures were found in Central Savanna (-3%) and Southern subtropical rangelands (+4%) when compared to the 15YA. BIOMSS for the other zones generally stayed at close to average levels.

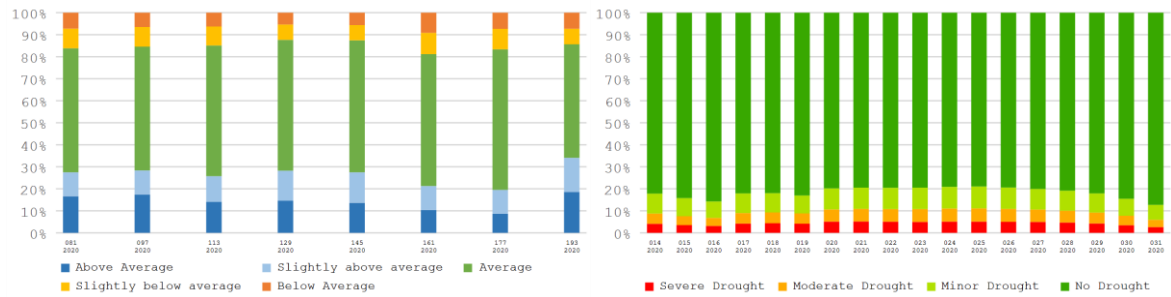
Favorable agro-climatic conditions in **Nordeste**, and **Central Savanna** resulted in significant above-average crop conditions as indicated by the NDVI-based crop development profiles in the two zones. Rice and late maize were the major crops grown during this monitoring period and the harvests were almost concluded by July. Due to favorable climatic conditions, cropped arable land fraction (CALF) in those two zones were 7% and 3% above the 5YA while all the other six zones remain at the 5YA level. VCIx of Nordeste was the highest among the zones, exceeded 1.0 and reached 1.06 indicating that crop conditions were better than during the the last five years. Rice and maize production are expected to be up from the 5YA.

Average or close-to-average crop conditions were observed in **Amazon**, **Coast**, **Northeastern mixed forest and farmland**, and **Mato Grosso** zones. Among those four zones, Mato Grosso is the only major agricultural zone with soybean and maize as the dominant crops. The First Maize and Soybean crops were already harvested by April while the harvesting of the Second Maize is still ongoing. Agro-climatic conditions generally remained at average levels except for Mato Grosso where a rainfall deficit was observed. Irrigation of the second season crop helped reduce the negative impact of drier-than-normal conditions on crop growth. Second maize output is projected at average levels.

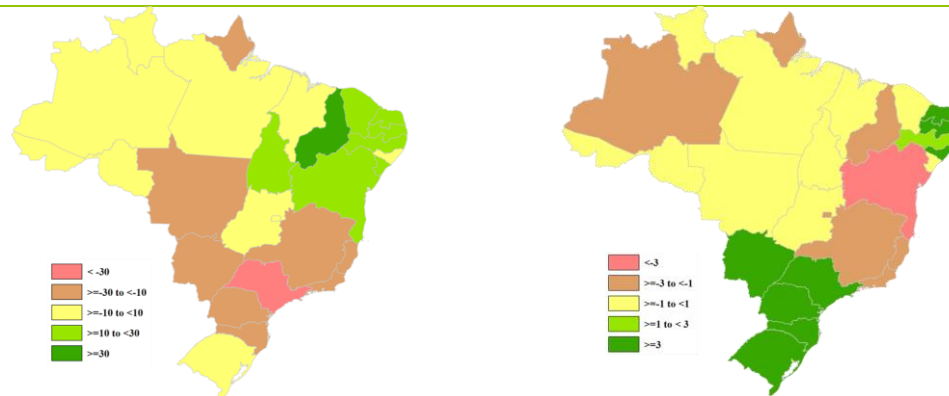
NDVI was significantly below average according to the NDVI-based development profiles in **Parana basin**, and **Southern subtropical rangelands**. The same phenomenon was reported in the previous bulletin mainly due to the continuous water shortages. During the current monitoring period, wheat is still in its early development, reaching heading stages in July, while most summer crops have been harvested already. The outputs of main maize and soybean in Parana basin are estimated at below-average levels. The continuously dry and hot weather in Southern subtropical rangelands adversely affected the sowing and growing stages of wheat as shown by delayed NDVI peak in early July which was supposed to have been reached one month earlier (Figure q). Wheat production is projected to be below average compared with the 5YA.

Figure 3.11 Brazil's crop condition, April - July 2020

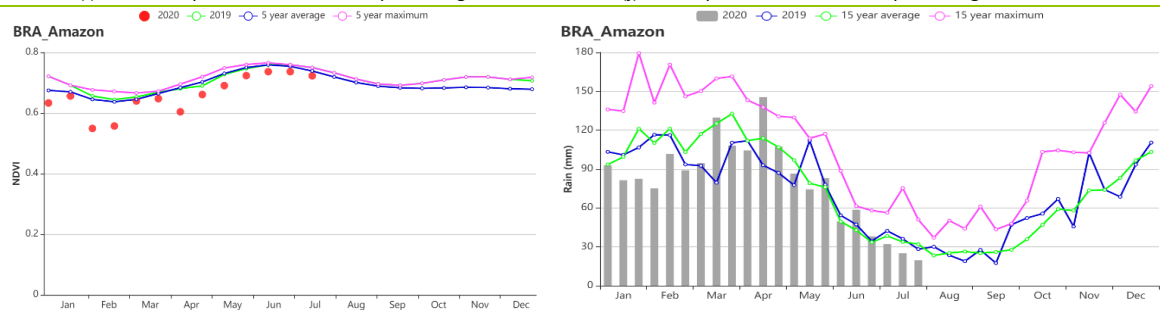




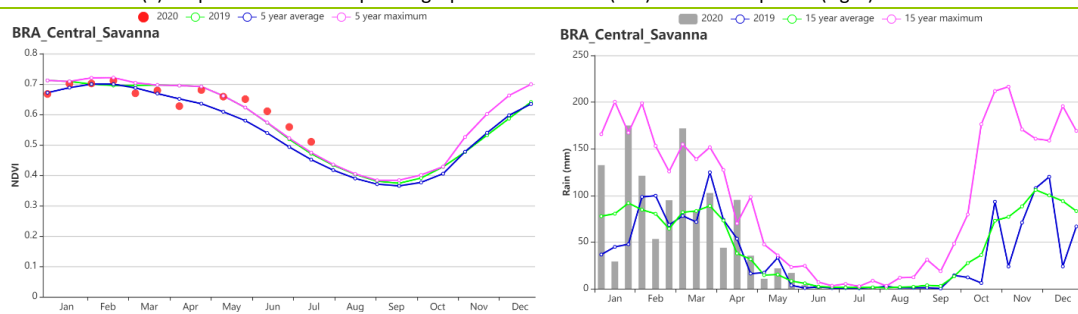
(g) Proportion of NDVI anomaly categories from April to July 2020 (h) Proportion of drought categories from April to July 2020



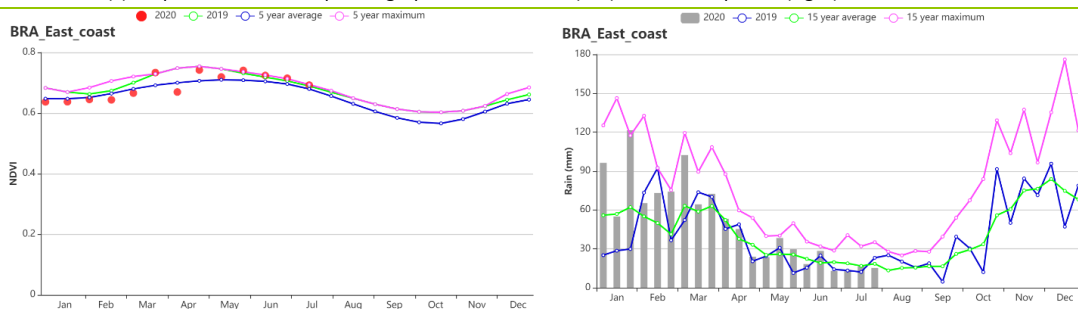
(i) Rainfall departure from 15YA in percentage for each state (j) PAR departure from 15YA in percentage for each state



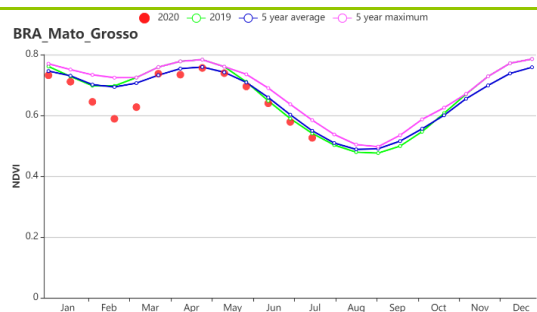
(k) Crop condition development graph based on NDVI (left) and rainfall profile (right) of Amazon



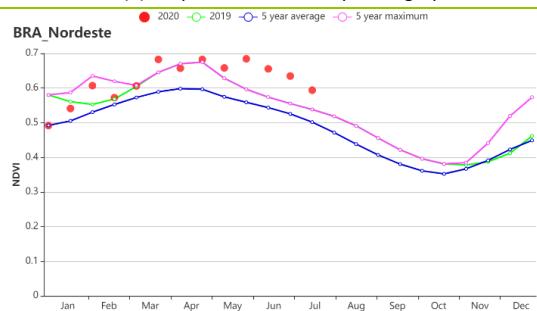
(l) Crop condition development graph based on NDVI (left) and rainfall profile (right) of Central Savanna



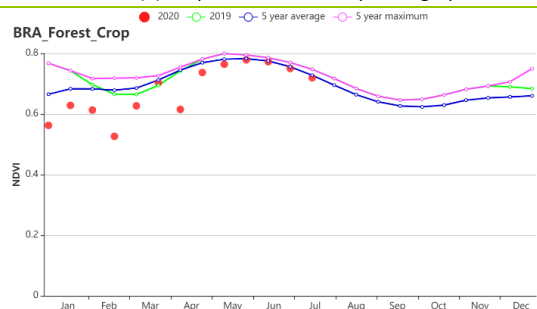
(m) Crop condition development graph based on NDVI (left) and rainfall profile (right) of East Coast



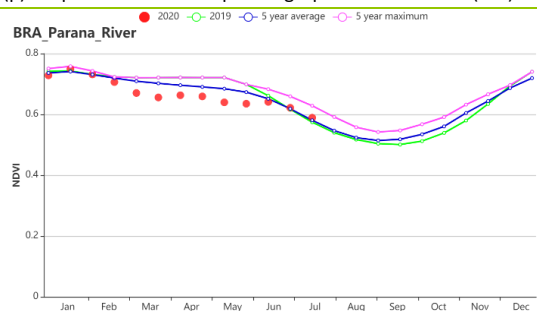
(n) Crop condition development graph based on NDVI (left) and rainfall profile (right) of Mato Grosso



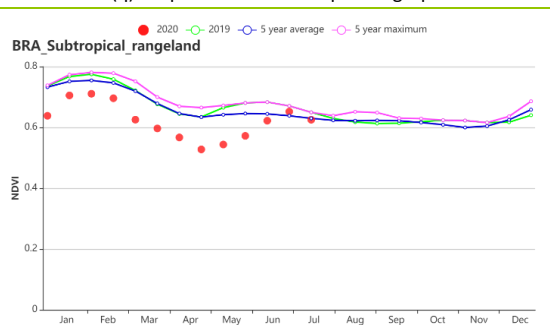
(o) Crop condition development graph based on NDVI (left) and rainfall profile (right) of Nordeste



(p) Crop condition development graph based on NDVI (left) and rainfall profile (right) of Northeastern mixed forest and farmland



(q) Crop condition development graph based on NDVI (left) and rainfall profile (right) of Parana River Basin



(r) Crop condition development graph based on NDVI (left) and rainfall profile (right) of Amazonas

Table 3.13 Brazil's agroclimatic indicators by regions, current values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m2)	Departure (%)	Current (gDM/m2)	Departure (%)
Amazonas	824	2	25.1	0.3	1079	-1	667	-1
Central Savanna	235	20	21.9	-0.3	1048	-3	476	-5
Coast	320	2	20.5	0	866	-2	487	-2
Northeastern mixed forest and farmland	586	-1	25.4	0.4	1139	0	668	-2
Mato Grosso	246	-9	23.7	0.3	1070	1	490	-1
Nordeste	257	26	23.7	-0.2	1030	-2	629	0
Parana basin	292	-19	18.4	0.1	885	5	391	2
Southern subtropical rangelands	530	-2	15.1	-0.1	642	4	263	4

Table 3.14 Brazil's agronomic indicators by regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Amazonas	100	0	0.97
Central Savanna	98	3	0.98
Coast	100	0	0.99
Northeastern mixed forest and farmland	100	0	0.97
Mato Grosso	100	0	0.94
Nordeste	100	7	1.06
Parana basin	100	0	0.87
Southern subtropical rangelands	98	0	0.81

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[CAN] Canada

During this monitoring period, the harvest of winter wheat was completed in July, while the sowing of the summer crops maize, soybean and spring wheat took place in April and May. According to agroclimatic indicators, Canada experienced wet and cool weather. Overall, crop conditions lagged behind average until mid-June, but then improved to average levels in the Saint Lawrence basin and to above-average levels in the Prairies. Overall, crop conditions are favorable.

The rainfall was above the 15-year average (RAIN, +8%) while the temperature (TEMP, -1.1°C) and radiation (RADPAR, -5%) were below average. Below-average temperatures and radiation led to a decrease in potential biomass (BIOMSS, -7%). The rainfall profile shows that the precipitation was slightly below average in April and Mid-June and above average for the rest of the period. The time-series of temperature depicts that they were below average in April and subsequently tended to stay slightly below average. The cold temperatures in early April may have delayed the sowing of the summer crops. The NDVI profile map shows that the crop conditions were below average until mid-June and improved to above average by the end of this monitoring period. The crop condition was best on 21.5% of the cropped area, concentrated in the south of Ontario and patches in Saskatchewan and Manitoba. The general negative deviation from the long-term average was due to the cooler-than-usual temperatures, so the crops developed more slowly. But conditions had recovered to normal or above normal by July. The national maximum VCI value was 0.96, and the CALF was slightly above the recent 5-year average (CALF, +1%).

The overall conditions of winter wheat in Canada are assessed as average, and the prospects for the summer crops, including spring wheat, are favorable.

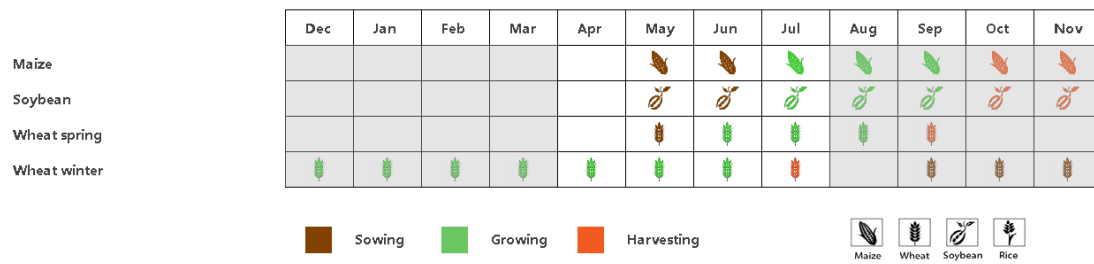
Regional analysis

The Prairies (area identified as 53 in the crop condition clusters map) and Saint Lawrence basin (49) are the major agricultural regions in Canada.

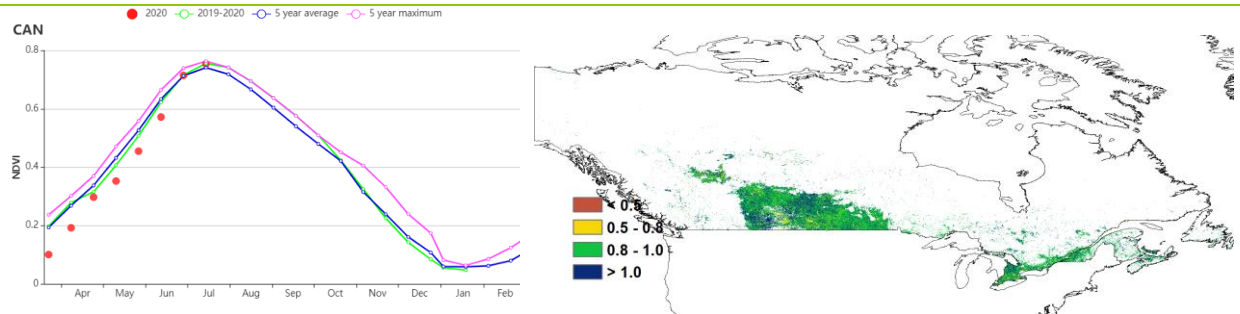
The rainfall in the Prairies, the main food production area in Canada, was above average (RAIN 452 mm, +30%), while the temperature (TEMP, -1.5°C) and radiation (RADPAR, -6%) was below average, leading to a decrease of potential biomass by 11%. The major crops in this region are winter wheat and spring wheat. According to the NDVI development graph and NDVI profile, crop condition were below average until June. Subsequently, they improved greatly. The negative departures were due to the delayed sowing of spring wheat. Nevertheless, crop conditions in the Prairies are favorable, mostly due to abundant rainfall.

The conditions in the Saint Lawrence basin differed from the rest of the country as rainfall (RAIN, -15%) was below average. Temperature (TEMP, -0.6°C) was also below average, while radiation did not deviate from the 15YA (RADPAR, 0%). This had led to an increase in potential biomass (BIOMSS, +1%). According to the NDVI development graph, crop conditions were slightly below average in May, and close to the average level thereafter. As in the Prairies, this was due to the delayed sowing of the summer crops. Crop conditions are favorable for this region.

Figure 3.12 Canada's crop condition, April - July 2020

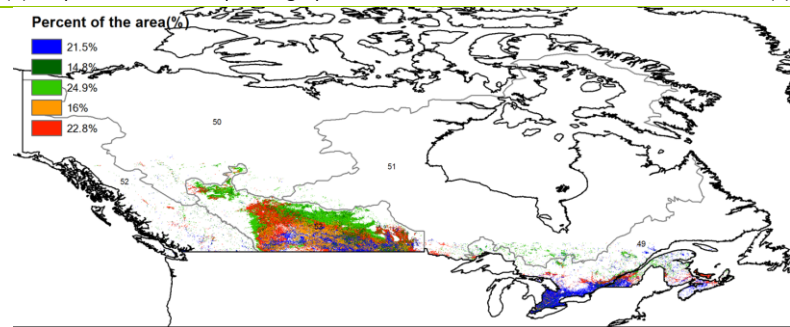


(a). Phenology of major crops

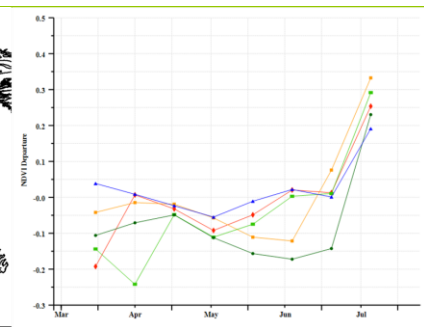


(b) Crop condition development graph based on NDVI

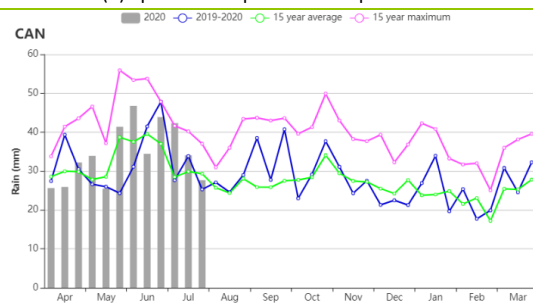
(c) Maximum VCI



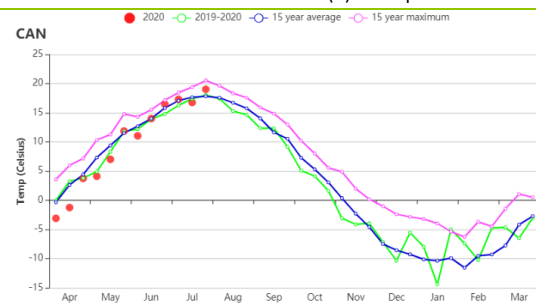
(d) Spatial NDVI patterns compared to 5YA



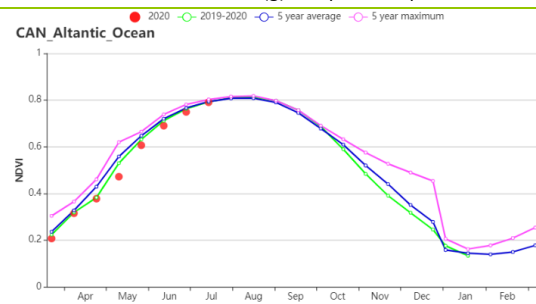
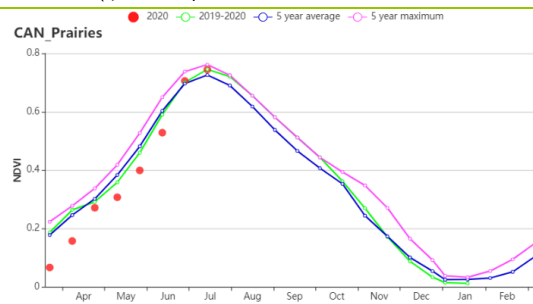
(e) NDVI profiles



(f) Rainfall profiles



(g) Temperature profiles



(h) Crop condition development graph based on NDVI (Canadian Prairies region (left) and Saint Lawrence basin region (right))

Table 3.15 Canada's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Saint Lawrence basin	379	-15	10.8	-0.6	1118	0	391	1
Prairies	452	30	10.3	-1.5	1168	-6	399	-11

Table 3.16 Canada's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Saint Lawrence basin	100	0	0.96
Prairies	99	2	0.96

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[DEU] Germany

This monitoring period covers the sowing of spring crops and the key growth of fall-sown and fall-harvested crops. Winter wheat and barley were at the late vegetative stages in late April and reached maturity in July. Based on the agroclimatic and agronomic indicators, the crop conditions in Germany were generally below the 5-year average between April and June in most regions, and even worse than in 2018. This applies to already harvested winter wheat and spring wheat.

At the national level, total precipitation was significantly below average (RAIN, -22%), temperature was slightly below average (TEMP, -0.4°C) and radiation above average (RADPAR, +2%). It can be seen from the time series rainfall profile for Germany that the precipitation was significantly below average during the monitoring period, except in early June, mid-June, and early July. The temporal and spatial distribution of precipitation shows that above-average precipitation occurred in most parts of Germany in early May and mid-June, and southeast of Bavaria, Hesse, north of Lower Saxony, Schleswig-Holstein and Mecklenburg-Western Pomerania in early June and early July. However, most parts of Germany experienced a precipitation deficit in mid- and late May and mid-July. Most of the country experienced cooler-than-usual conditions during this reporting period, except for April, mid-June and late June. The temporal and spatial distribution of temperature shows that the regions with significantly cooler-than-usual weather were mainly distributed in the northern part of Germany in mid-May and after July, and the southern part of Germany from early May to early June, and mid-July. Due to cooler-than-usual conditions and precipitation deficit, the biomass production potential (BIOMSS) is estimated to decrease by 4% nationwide as compared to the fifteen-year average.

As shown in the crop condition development graph and the NDVI profiles at the national level, NDVI values were below the 5YA and last year's average until mid-June, then close to average from late June to early July, and below average again after mid-July. These observations are confirmed by the clustered NDVI profiles: 87.6% of regional NDVI values were below average from mid-April to early June, then 71.3% of regional NDVI values were above average. These observations are also confirmed by lower VCI value area in the spatial distribution of maximum VCI map due to the effect of superimposed changes from precipitation and temperature. Overall VCIx for Germany was 0.91. CALF during the reporting period was the same as for the recent five-year average.

Generally, the agronomic indicators show unfavorable conditions for most winter and summer crops in Germany. More rain will be needed to ensure an adequate soil moisture supply for the reproductive phase of the summer crops.

Regional analysis

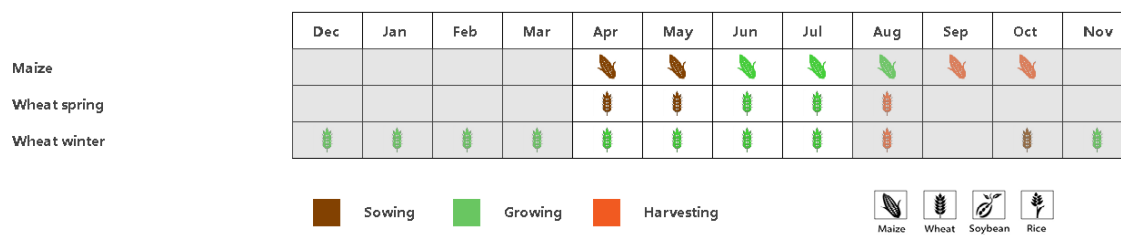
Based on cropping systems, climatic zones, and topographic conditions, six sub-national agro-ecological regions are adopted for Germany. They include: the Wheat Zone of Schleswig-Holstein and the Baltic coast, Mixed Wheat and Sugar beet Zone of the Northwest, Central Wheat Zone of Saxony and Thuringia, Sparse Crop Area of the East-German Lake and Heathland area, Western Sparse Crop Area of the Rhenish Massif and the Bavarian Plateau.

According to the CropWatch agroclimatic indicators, these six regions experienced the same trend of precipitation and temperature, compared to the average of the past 15 years. RAIN was below average by -27%, -25%, -13%, -14%, -28% and -21%, respectively; Temperature was below average by -0.7°C, -0.3°C, -0.6°C, -0.7°C, -0.2°C and -0.4°C, respectively; RADPAR was above average by 0%, +3%, +1%, +1%, +3% and +2%, respectively. Due to cooler-than-usual conditions and precipitation deficit, the biomass production potential (BIOMSS) in the six regions was below average by -6%, -2%, -7%, -7%, -1% and -4%, respectively.

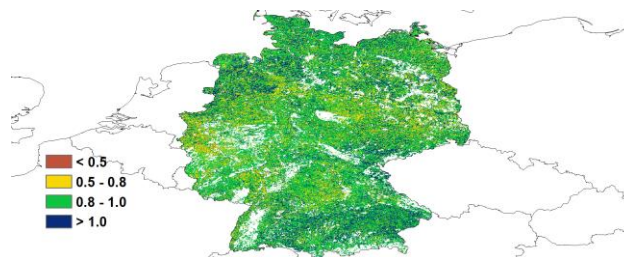
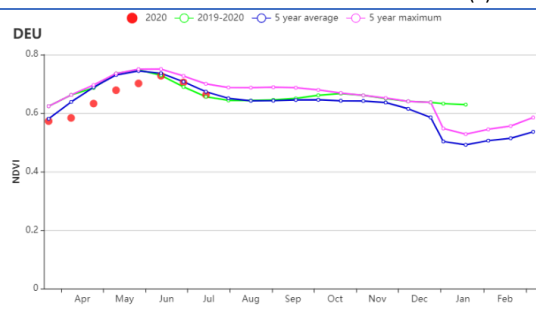
As shown in the crop condition development graph based on NDVI, all six regions had the same trend of change, that is, NDVI values were below average and last year until mid-June, then stayed close to average before they dropped to below average again.

CropWatch agronomic indicators show that CALF of all six regions reached 100%, with a zero departure from their 5YA. As mentioned above, they also recorded a favorable VCIx value at 0.92, 0.90, 0.89, 0.90, 0.89 and 0.93, respectively.

Figure 3.13 Germany's crop condition, April - July 2020

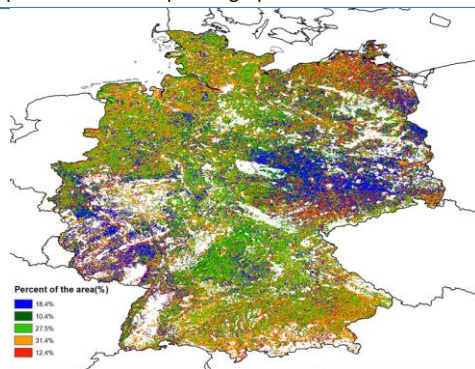


(a). Phenology of major crops

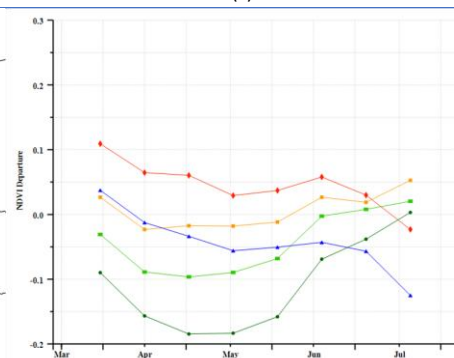


(b) Crop condition development graph based on NDVI

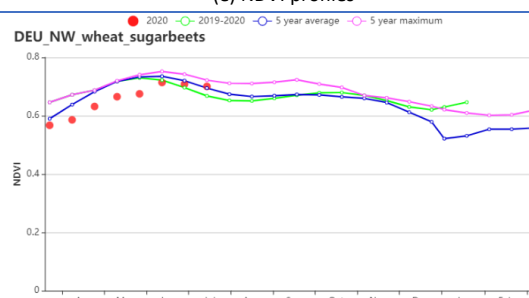
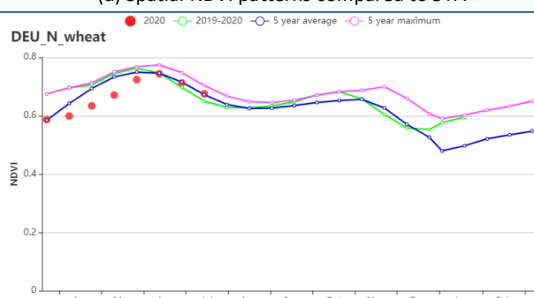
(c) Maximum VCI



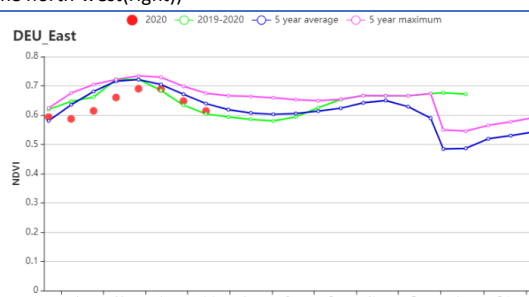
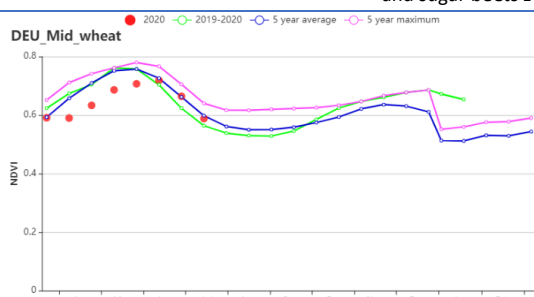
(d) Spatial NDVI patterns compared to 5YA



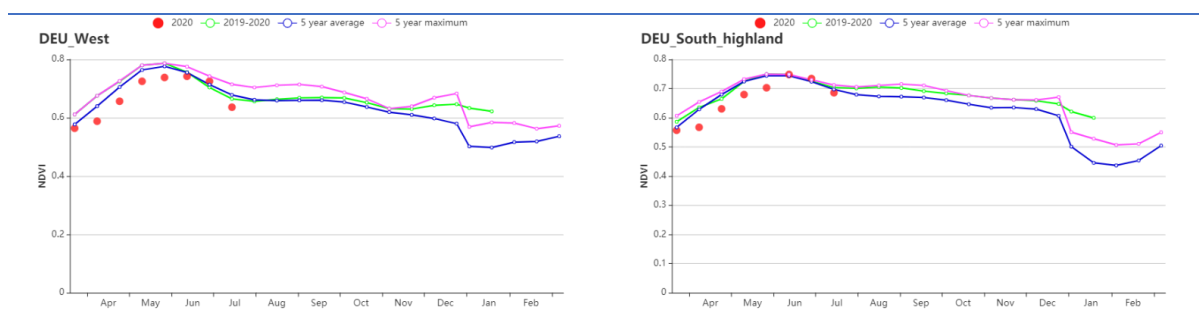
(e) NDVI profiles



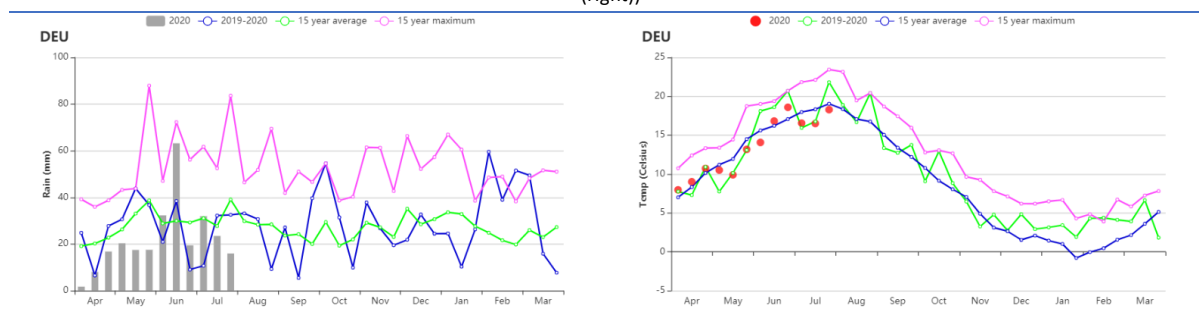
(f) Crop condition development graph based on NDVI (Wheat zone of Schleswig-Holstein and the Baltic coast (left) and Mixed wheat and sugar beets zone of the north-west(right))



(g) Crop condition development graph based on NDVI (Central wheat zone of Saxony and Thuringia(left) and Sparse crop area of the east-German lake and Heathland (right))



(h) Crop condition development graph based on NDVI (Western sparse crop area of the Rhenish massif (left) and Bavarian Plateau (right))



(f) Time series profile of rainfall

(g) Time series profile of temperature

Table 3.17 Germany agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Wheat zone of Schleswig-Holstein and the Baltic coast	210	-27	13.2	-0.7	1155	0	417	-6
Mixed wheat and sugarbeets zone of the north-west	216	-25	13.7	-0.3	1174	3	432	-2
Central wheat zone of Saxony and Thuringia	234	-13	13.5	-0.6	1202	1	441	-7
East-German lake and Heathland sparse crop area	253	-14	13.8	-0.7	1202	1	449	-7
Western sparse crop area of the Rhenish massif	208	-28	13.7	-0.2	1237	3	456	-1
Bavarian Plateau	365	-21	13.2	-0.4	1266	2	452	-4

Table 3.18 Germany's agronomic indicators by sub-national regions, current season's value and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Wheat zone of Schleswig-Holstein and the Baltic coast	100	0	0.92
Mixed wheat and sugarbeets zone of the north-west	100	0	0.90
Central wheat zone of Saxony and Thuringia	100	0	0.89
East-German lake and Heathland sparse crop area	100	0	0.90
Western sparse crop area of the Rhenish massif	100	0	0.89
Bavarian Plateau	100	0	0.93

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[EGY] Egypt

During this April - July monitoring period, winter wheat reached maturity and was harvested in April and May. It was followed by the planting of rice and maize. The cumulative rainfall reached 6 mm (-24%). The rainfall index graph shows that most of the rainfall fell during April and May. The average temperature reached 23.2°C (-0.3°C), and the photosynthetically active radiation was 1561 MJ/m² (-2.1%).

The NDVI spatial pattern shows that 50.4% of the cultivated area was above the 5-year average, 24.1% fluctuated around the 5-year average and 25.5% were below. The best Vegetation Condition Index (VCI) map shows that the conditions of the current crops, mainly maize and rice, are good. This agrees with the whole country VCI value (0.84). Overall, the crop conditions are favorable.

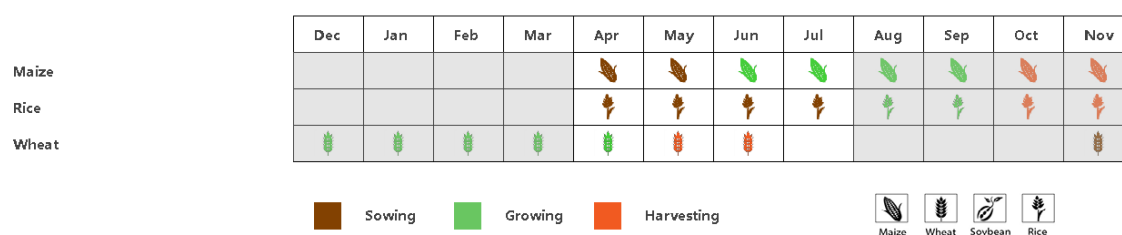
Regional Analysis

Based on crop planting systems, climate zones, and topographical conditions, Egypt can be divided into three agro-ecological zones (AEZs), two of which are suitable for crop cultivation, namely the **Nile Delta and the southern coast of the Mediterranean** and the **Nile Valley**.

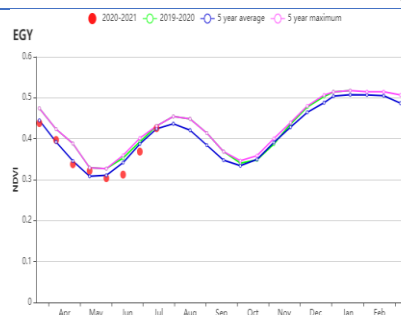
In the **Nile Delta and Mediterranean coast**, the average rainfall was 7 mm (-15%) and the temperature was 23.1°C, while in the **Nile Valley** the average rainfall recorded only 1 mm (-17%) and the temperature was 26.4°C.

Since virtually all crops in Egypt are irrigated crops, the impact of precipitation on crop yield is limited but additional precipitation is nevertheless always useful. Although the cumulative photosynthetically active radiation in both regions was slightly below the average (-2% in the Nile Delta and Mediterranean coastal strip and -1% in the Nile Valley), BIOMSS increased by 28% and 25% for the first and second regions respectively. The NDVI development graph shows that crop conditions fluctuated around the average in the Delta from April to May; in the Nile Valley, it was first close to but then fell below average and recovered to average levels by the end of this monitoring period.

Figure 3.14 Egypt's crop condition, April - July 2020



(a). Phenology of major crops



(b) Crop condition development graph based on NDVI



(c) Maximum VCI

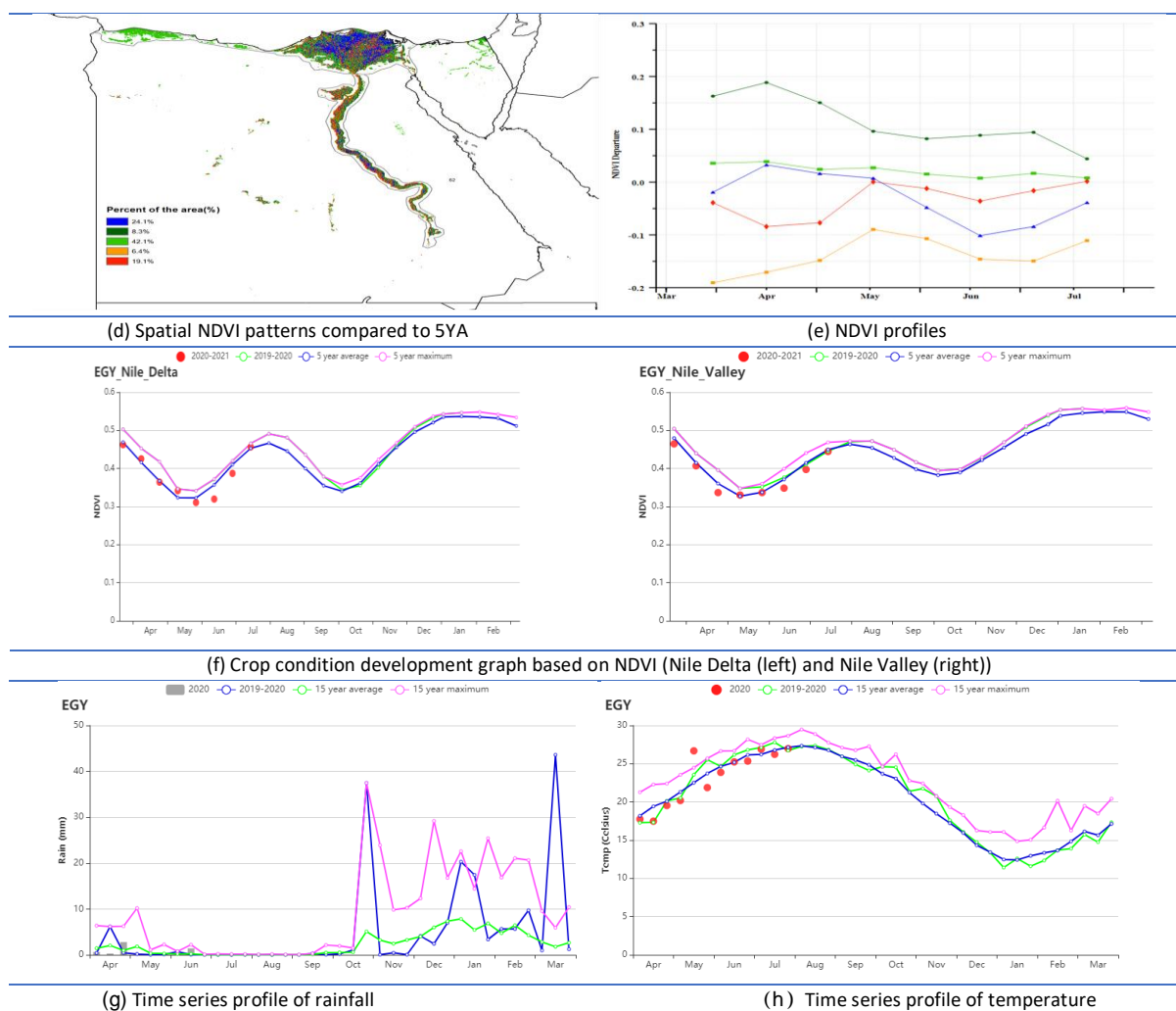


Table 3.19 Egypt's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Nile Delta and Mediterranean coastal strip	7	-15	23.1	-0.3	1556	-2	513	28
Nile Valley	1	-17	26.4	-.01	1610	-1	174	25

Table 3.20 Egypt's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Nile Delta and Mediterranean coastal strip	68	7	0.87
Nile Valley	72	8	0.84

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[ETH] Ethiopia

Ethiopia has two main agricultural seasons which are Belg (February to May) and Meher (June–October). This reporting period corresponds to the late Belg production time, as well as land preparation and sowing for Meher crops, which are maize (Meher), wheat, teff, and barley. At the national level, rainfall increased by 14%, but estimated biomass remained near the 15YA. According to the NDVI-based development graph, crop conditions were above the five-year average before mid-June before it started to drop below the average. A high maximum VCI value was recorded at 0.90. According to NDVI clusters and profiles, 30.8% of the country experienced favorable crop conditions. This positive NDVI cluster occurred around the central and northern parts of the country which is commonly known for Belg production. However, in other parts of the country such as northern Tigray, central Oromia and the eastern parts of the country the conditions were not favorable. In the Belg production regions, maximum VCI ranged from 0.8 to 1.0. Conditions were less favorable in the south, for which low VCI values were observed. In general, it is still too early to assess the outcome of the Belg crops in this reporting period, but the CropWatch indicators are favorable and the land preparation and sowing of Meher crops is taking place under favorable conditions.

Regional analysis

Based on agro-climatic patterns and cropping practices, CropWatch divided the country in the following regions: The semi-arid pastoral zone, southeastern Mendebo highlands, southeastern mixed-maize zone, western mixed maize regions, and central-northern maize teff highlands.

Semi-aridpastoral

The semi-arid pastoral zone is commonly known for its livestock production. In this zone, all the CropWatch agronomic and agroclimatic indicators were higher than the 15YA, except for RADPAR (-6%). The biomass in this region increased by 9% and cropped arable land fraction (CALF) increased to 63%, a large increase by 96% over the 5YA. The maximum VCI was recorded as 1.0 and the NDVI-based crop condition development graph was above average as well. The conditions were favorable.

South-eastern Mendebo highlands

The southeastern Mendebo highlands are major maize and teff producing areas. During the reported period, they received 757 mm, which was above-average (RAIN, 39%). Temperature (-0.4°C), RADPAR (-7%) and BIOMASS (-7%) were below the 15YA. The Cropped arable land fraction (CALF) increased by 1% as compared to the five-year average and the maximum VCI was at 0.95. The NDVI crop condition development graph was above the five years average from April to June, but sharply dropped in from June to July. In this highland zone, the crop conditions are promising. Crops will be harvested during the next reporting period.

South-eastern mixed maize zone

In this zone, the average rainfall was 773 mm, which was 66% above average. The temperature (-0.4°C) was slightly below average. RADPAR (-6%) and the total biomass production (-6%) were below average for this zone. The NDVI-based Crop condition development graphs was above its five years average. The maximum VCI value was at 1.04% and the CALF also increased by 7%. The crop conditions in this zone are favorable and average yields are expected.

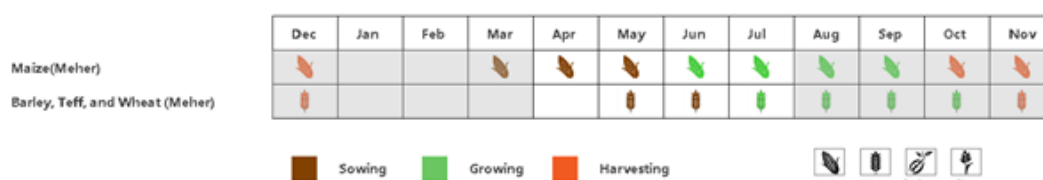
Western mixed maize zone

In this zone, maize is the most important crop grown during the Belg and early Meher seasons. At the end of this reporting period, Belg maize was still growing and early Meher maize was planted. The total amount of rainfall was recorded at 1216 mm, an increase by 2%. Temperatures were below average (TEMP -0.5°C) so was RADPAR (-4%). Total biomass production decreased by -2%. Overall, even though a maximum VCI at 0.97% is good, the NDVI-based Crop condition development graph was below the average of the past five years. All in all, crop conditions were favorable for the western maize zone.

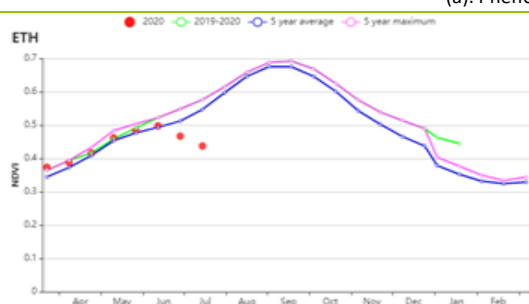
Central-northern maize-teff highlands

During this reporting period, the total rainfall was recorded at 800 mm (+12%). The total biomass production also increased by 3%. However, the total arable land fraction dropped (CALF, -6%). VCIx was at 0.86. The NDVI crop condition development graph indicates above-average conditions in April and May, and below-average conditions from mid May to July. Crop conditions are normal for this region, but yields will depend on favorable rainfall during the coming months.

Figure 3.15 Ethiopia's crop condition, April - July 2020

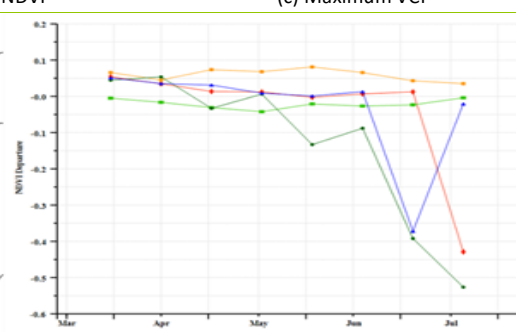
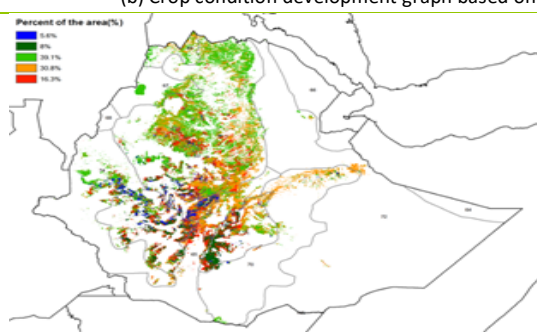


(a). Phenology of major crops



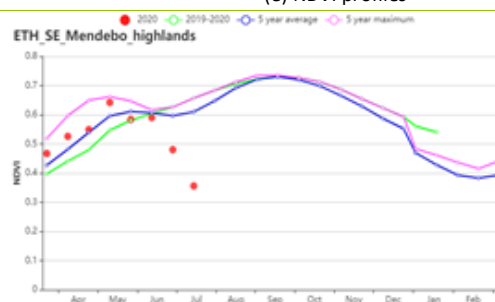
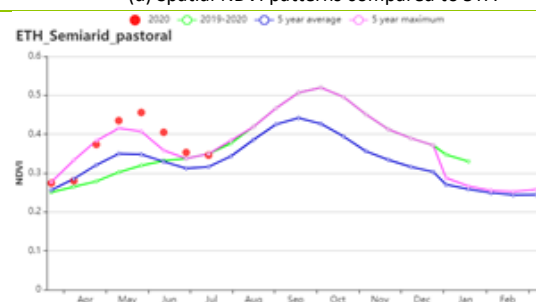
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

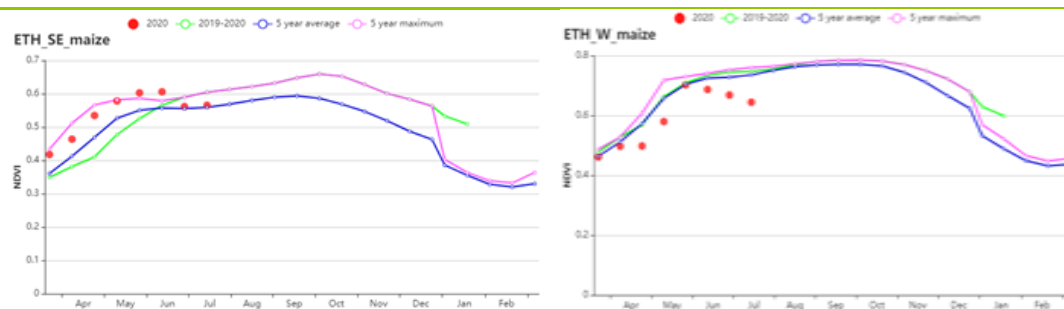


(d) Spatial NDVI patterns compared to 5YA

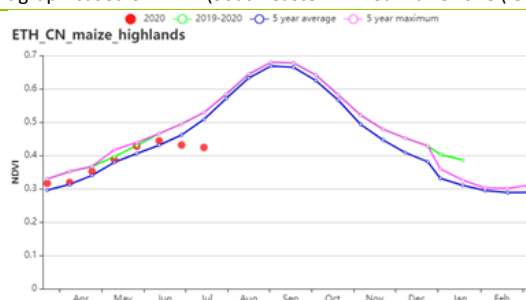
(e) NDVI profiles



(f) Crop condition development graph based on NDVI (Semi-arid pastoral (left) South-eastern Mendebo highlands (right))



(g) Crop condition development graph based on NDVI (South-eastern mixed maize zone (left) and Western maize zone (right))



(h) Crop condition development graph based on NDVI (Central-northern maize-Teff highlands)

Table 3.21 Ethiopia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Semi-arid pastoral	334	72	23.7	0.1	1313	-6	698	9
South-eastern Mendo highlands	757	39	15.3	-0.4	1101	-7	434	-7
South-eastern mixed maize zone	773	66	18.5	-0.4	1137	-6	557	-6
Western mixed maize zone	1216	2	21.1	-0.5	1076	-4	607	-2
Central-northern maize-teff	800	12	19.1	-0.4	1227	-6	571	3

Table 3.22 Ethiopia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		VCIx
	Current (%)	Departure (%)	Current
Semi-arid pastoral	63	96	1.01
South-eastern Mendo highlands	99	1	0.95
South-eastern mixed maize zone	99	7	1.04
Western mixed maize zone	100	0	0.97
Central-northern maize-teff highlands	78	-6	0.86

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[FRA] France

The monitoring period covers winter wheat, which had reached maturity by July. The planting of maize and spring wheat was completed in May. The harvest of the summer crops including rice, potatoes and sunflower, starts in July and extends into September.

CropWatch agro-climatic indicators show above-average temperature over the period, along with significantly lower RAIN in July as compared to 2019 and the 15YA. Dry conditions had already been observed for the previous reporting period.

Overall, the national-scale NDVI development graph shows that NDVI trended below last year's and the 5-year average. However, it recovered to close to average in July. All regions were affected, with the exception of the Mediterranean zone. This pattern is confirmed by VCIx, ranging from 0.8 to 0.96 across the regions.

Regional analysis

Considering cropping systems, climatic zones and topographic conditions, additional sub-national details are provided for eight agro-ecological zones. They are identified on the maps by the following numbers: (78) **Northern barley region**, (82) **Mixed maize/barley and rapeseed zone from the Center to the Atlantic Ocean**, (79) **Maize-barley and livestock zone along the English Channel**, (80) **Rapeseed zone of eastern France**, (75) **Massif Central dry zone**, (81) **Southwestern maize zone**, (76) **Eastern Alpes region** and (77) the **Mediterranean zone**.

In the Northern barley region, RAIN over the monitoring period was below average (-40%) while temperature and RADPAR were above average (0.7°C and 9%, respectively). Land was fully cropped and BIOMSS increased by 10%, but the regional NDVI was below the 5-year average across the entire season, indicating a below-average production.

In the Mixed maize/barley and rapeseed zone from the Center to the Atlantic Ocean, a slightly warmer (TEMP 0.7°C above average) but drier (RAIN 14% lower than average) period was observed, with RADPAR (4%) and BIOMSS (6%) slightly higher than the 15-year average. The regional NDVI profile recovered to average levels starting in late June.

The Maize-barley and livestock zone along the English Channel had less rain (-13%), increased temperature (0.7°C), increased RADPAR (6%) and BIOMSS (8%) and overall high VCIx (0.91), indicating close-to-average crop conditions. This is supported by the regional NDVI profile, which was close to average in July.

In the Rapeseed zone of eastern France, the NDVI profile had also recovered to close-to-average levels starting in June. Overall, RAIN in this period was 26% lower than the 15-year average, while TEMP increased by 0.5°C and RADPAR increased by 7%, indicating a relatively dry and warm season. BIOMSS was about 5% higher than average with a moderate VCIx level (0.86).

In the Massif Central dry zone, the VCIx was recorded at a high level (0.95) and the NDVI profile was showing an average level, indicating overall close-to-average crop conditions. The RAIN was 9% lower than the average, while TEMP and RADPAR increased slightly by 0.6°C and 4%, respectively. BIOMSS increased by 4% which is also indicating a normal cropping season in the region.

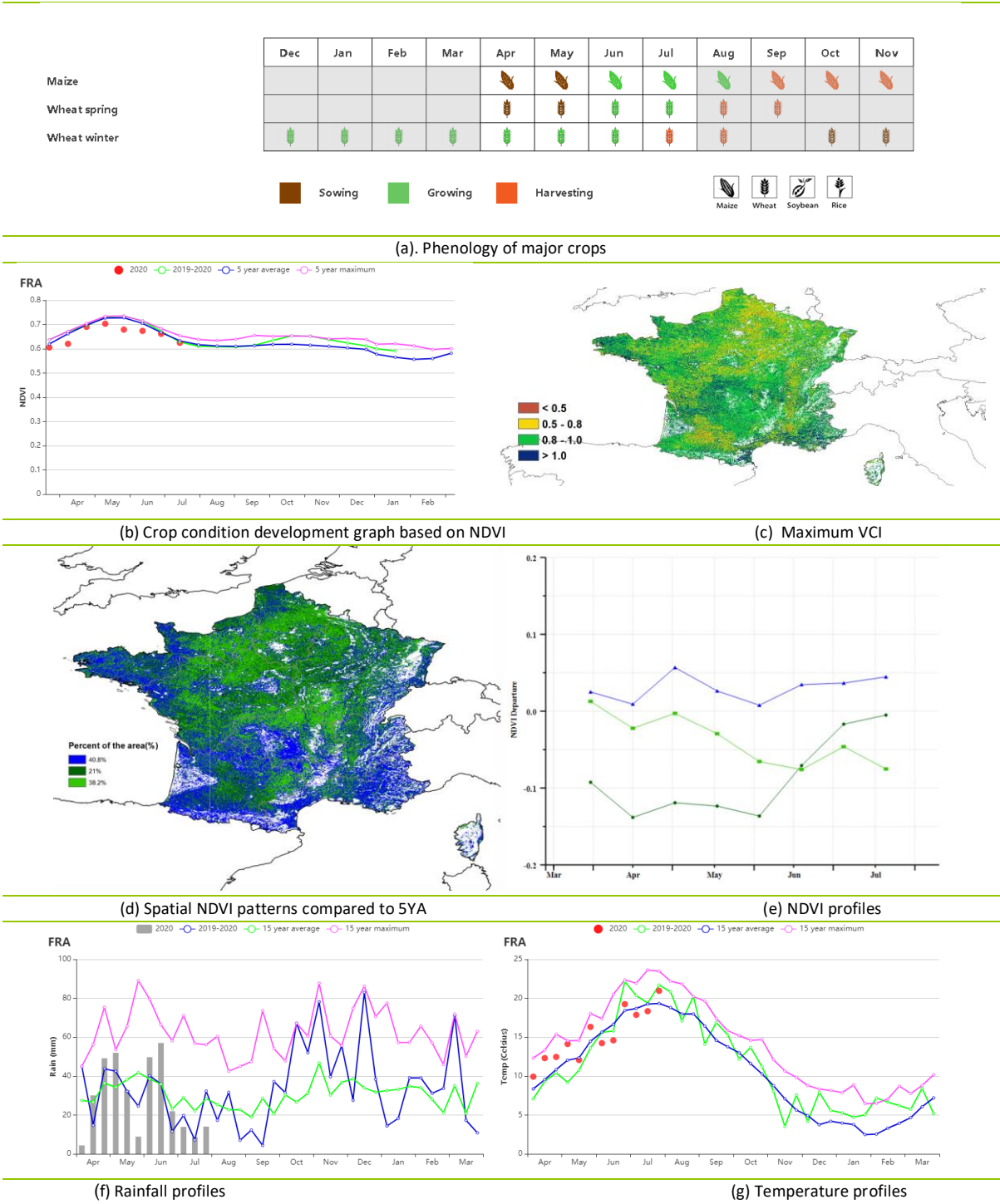
The Southwestern maize zone is one of the major irrigated maize regions in France. Overall favorable conditions were observed during the period, characterized by a slight increase in RAIN (9%), TEMP (0.7°C) and BIOMSS (4%). The regional NDVI profile presented an overall close-to-average trend and the VCIx was recorded at a relative high level (0.91), all indicating average crop conditions.

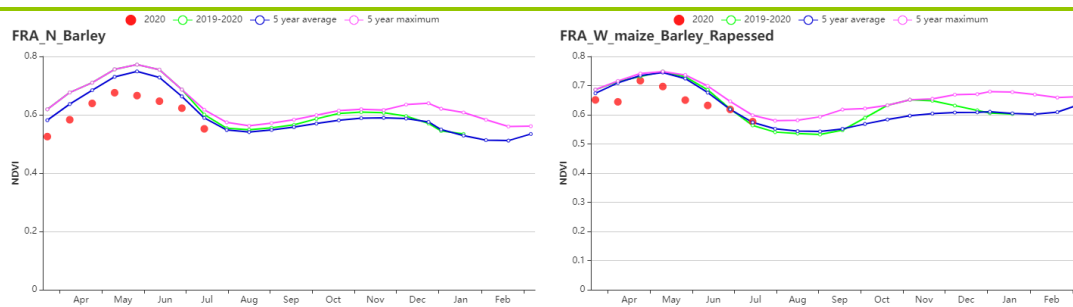
In the Eastern Alpes region, the NDVI profile presented overall close-to but below average trend. VCIx for the region was recorded at 0.89, indicating an overall average crop condition. RAIN in the region was 7% lower than average, while TEMP and RADPAR was 0.4°C and 2% higher than their averages. BIOMSS was slightly higher than the 15-year average (+1%).

The Mediterranean zone is the only region which recorded an overall above-average NDVI profile. The region also recorded high VCIx level (0.96). RAIN and TEMP were 18% and 0.2 oC higher than average, while RADPAR

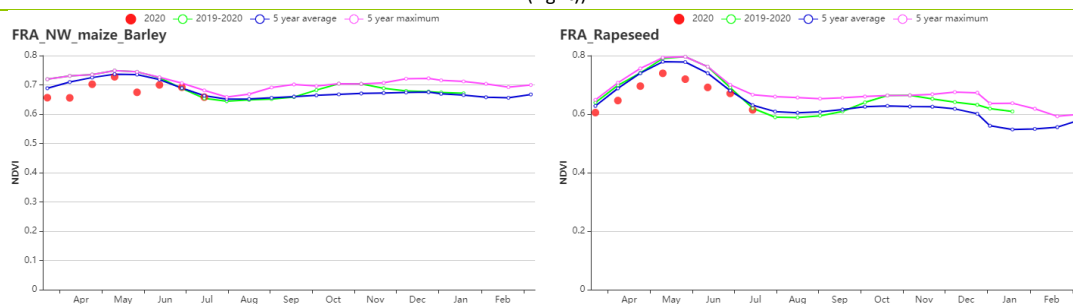
was slightly lower (-2%) than average. BIOMSS was equal to average. This region is showing average to above average crop conditions.

Figure 3.16 France’s crop condition, April - July 2020

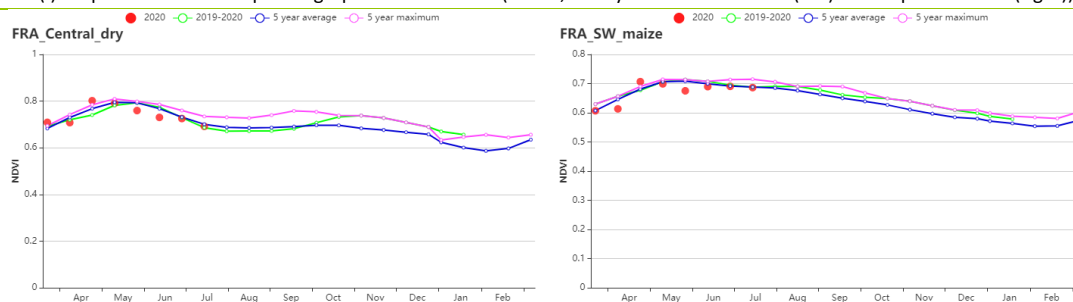




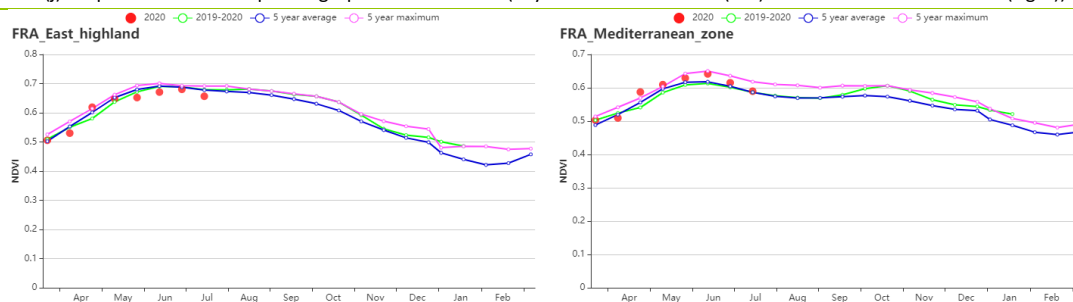
(h) Crop condition development graph based on NDVI (Northern barley region (left) and Mixed maize, Barley and Rapeseed zone (right))



(i) Crop condition development graph based on NDVI (Maize, barley and livestock zone (left) and Rapeseed zone (right))



(j) Crop condition development graph based on NDVI (Dry Massif Central zone (left) and Southwest maize zone (right))



(k) Crop condition development graph based on NDVI (Eastern Alps region (left) and Mediterranean zone (right))

Table 3.23 France's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Northern Barley zone	187	-40	15.0	0.7	1258	9	497	10
Mixed maize/barley and rapessed zone from the Centre to the Atlantic Ocean	278	-14	15.9	0.7	1250	4	531	6
Maize barley and livestock zone along the English Channel	248	-13	14.5	0.7	1223	6	470	8
Rapeseed zone of eastern France	317	-26	14.9	0.5	1288	7	508	5
Massif Central Dry zone	385	-9	14.6	0.6	1300	4	508	4
Southwest maize zone	455	9	16.2	0.7	1281	0	566	4
Alpes region	491	-7	13.9	0.4	1340	2	498	1
Mediterranean zone	408	18	15.3	0.2	1369	-2	571	0

Table 3.24 France's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Northern Barley zone	100	0	0.80
Mixed maize/barley and rapessed zone from the Centre to the Atlantic Ocean	100	0	0.87
Maize barley and livestock zone along the English Channel	100	0	0.91
Rapeseed zone of eastern France	100	0	0.86
Massif Central Dry zone	100	0	0.95
Southwest maize zone	100	0	0.91
Alpes region	98	0	0.89
Mediterranean zone	97	2	0.96

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[GBR] Kingdom

During this report monitoring period, winter wheat reached the flowering stage in early May. Subsequent grainfilling was completed by late June and harvest started in July. According to the crop condition development graph, crops experienced unfavorable conditions. NDVI values were below average from April to June and attained average values in July. Agro-climatic indicators show that rainfall was below average (RAIN, -18%), radiation was above average (RADPAR, +2%), temperature and BIOMSS were close to average. The seasonal RAIN profile presents overall below-average rainfall except for June and July.

The national average VCIx was 0.89. CALF (100%) was unchanged compared to its five-year average. The NDVI departure cluster profiles indicate that: (1) 31.9% of arable land, scattered around Scotland (South Ayrshire, East Ayrshire, Scottish Borders), Wales, South West England (Cornwall), South East England (East Sussex), experienced average crop conditions. (2) 5% of arable land experienced slightly below-average crop conditions from April to mid-July, mainly in the East of England (Norfolk). (3) 22.2% of arable land experienced slightly below-average crop conditions, mainly in South East England. (4) 40.9% of arable land experienced below-average crop conditions from April to June, then recovered to slightly above-average crop conditions, mainly in West Midlands, East Midlands and East of England. Altogether, the conditions for wheat in the UK are assessed as below average.

Regional analysis

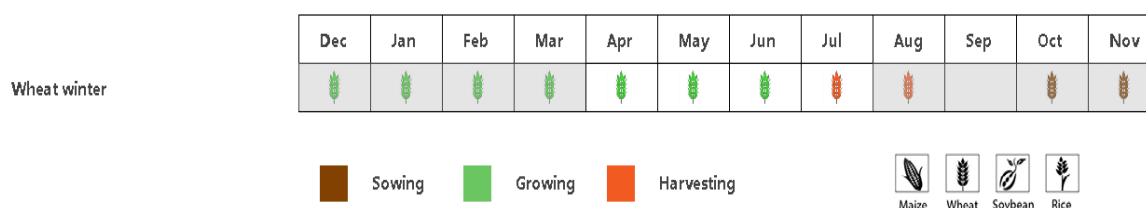
Based on cropping systems, climatic zones, and topographic conditions, three sub-national regions can be distinguished: Central sparse crop region, Northern barley region, and Southern mixed wheat and barley region. All three sub-regions were characterized by unchanged fractions of arable land (CALF) compared to the 5-year average.

The **Central sparse crop region** is one of the country's major agricultural regions in terms of crop production. Crop conditions were below the five-year average according to the NDVI development graph. Rainfall was below average (RAIN -13%) with close to average temperature and radiation. Biomass was below average (BIOMSS, -2%). The VCIx was at 0.92.

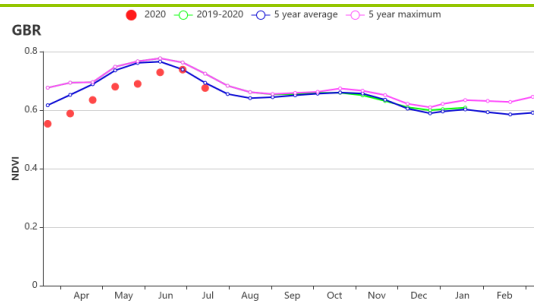
In the **Northern barley region**, NDVI was below average or close to average. Rainfall was below average (RAIN -14%) with average temperature and radiation. Biomass was below average (BIOMSS, -2%). The VCIx was at 0.95.

In the **Southern mixed wheat and barley zone**, NDVI was below average according to the crop condition graph. This region experienced the largest rainfall deficit (RAIN -26%), temperature was slightly above average (TEMP +0.2°C) and radiation was above average (RADPAR +4%). The above-average radiation and temperature resulted in the above-average biomass (BIOMSS +2%). The region had above-average VCIx (0.86).

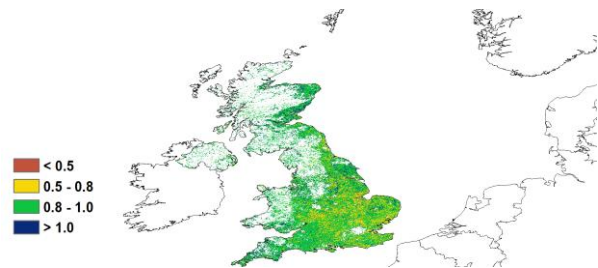
Figure 3.17 United Kingdom's crop condition, April - July 2020



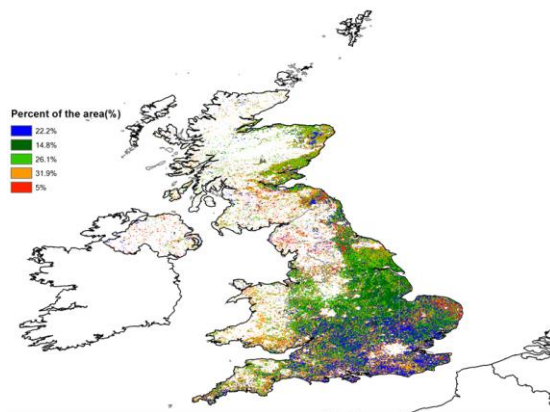
(a). Phenology of major crops



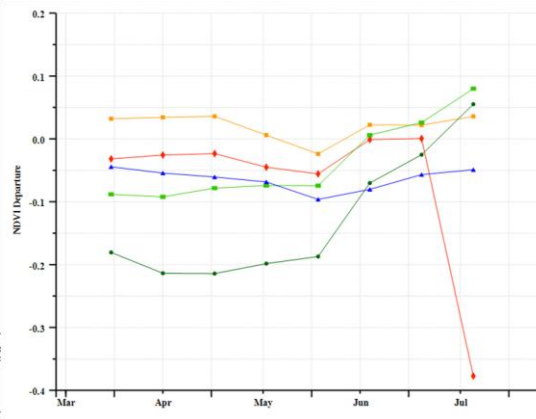
(b) Crop condition development graph based on NDVI



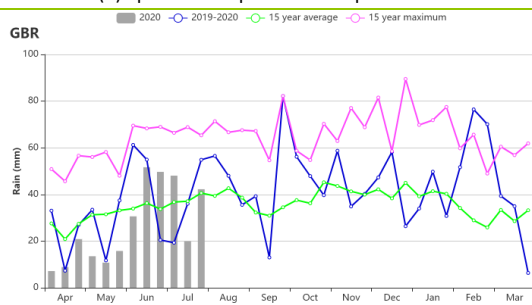
(c) Maximum VCI



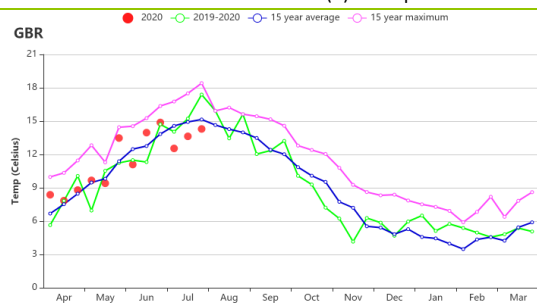
(d) Spatial NDVI patterns compared to 5YA



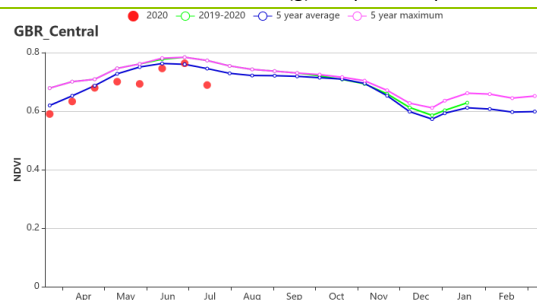
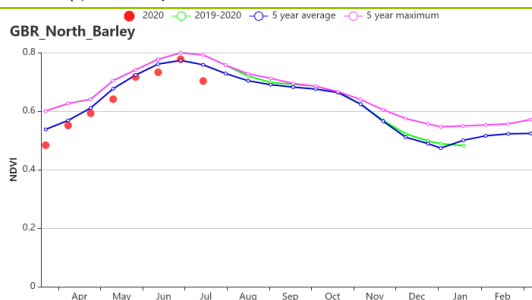
(e) NDVI profiles



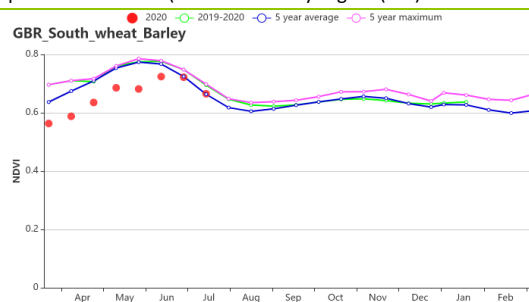
(f) Rainfall profiles



(g) Temperature profiles



(h) Crop condition development graph based on NDVI (Northern Barley region (left) and Central sparse crop region (right))



(i) Crop condition development graph based on NDVI (Southern mixed wheat and Barley zone)

Table 3.25 United Kingdom's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Northern Barley region (UK)	389	-14	10.0	0.0	906	0	266	-2
Central sparse crop region (UK)	355	-13	11.3	0.0	948	0	299	-2
Southern mixed wheat and Barley zone (UK)	242	-26	12.6	0.2	1076	4	370	2

Table 3.26 United Kingdom's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Northern Barley region (UK)	100	0	0.8
Central sparse crop region (UK)	100	0	0.5
Southern mixed wheat and Barley zone (UK)	100	0	0.9

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[HUN] Hungary

Summer crops were planted in April and May and winter wheat was harvested in June and July.

Accumulated rainfall was above average (RAIN +17%) while temperature and radiation were below (TEMP -1.2°C, RADPAR -2%), resulting in a decrease in biomass (BIOMSS -14%). According to the national NDVI development graphs, crop conditions were below average from April to mid-June, while from late June to July, they improved to be above but close to average. Some spatial and temporal detail is provided by NDVI clusters: NDVI was above average throughout the reporting period on 22.7% of arable land; 13.4% of cropland was above average from April to early June and below average from mid-June to July; About 20.3% of arable land was below average throughout the reporting period; 28.8% of cropland was below average from April to early June and above average from mid-June to July; 14.9% of cropland was below average from April to June and above average in July.

With the maximum VCI value at the national level reaching 0.92 and the cropped arable land fraction (CALF) at 100% (unchanged compared to the recent five-year average) crop conditions are assessed as favorable for the summer crops. However, the below-average crop conditions between April and mid-June indicate lower winter wheat yields, due to dry conditions observed in the spring.

Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, Hungary is divided into four sub-regions: North Hungary, Central Hungary, the Great Plain (Puszt) and Transdanubia. Specific observations for the reporting period are included for each region. All sub-regions are characterized by unchanged fractions of cultivated arable land (CALF) compared to average, i.e. 100%, indicating full cropping.

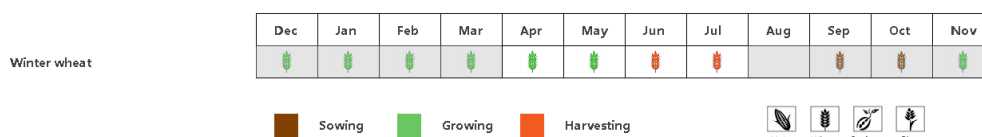
Central Hungary is one of the major agricultural regions in terms of crop production. A sizable share of winter wheat, maize and sunflower is planted in this region. The NDVI was below average from April to mid-June and above from late June to July. Agro-climatic conditions include below-average radiation (RADPAR -1.7%), temperature (TEMP -1.3°C), biomass (BIOMSS -14%) and above-average rainfall (RAIN, +27%). The VCIx was just fair at 0.92. CropWatch expects slightly unfavorable conditions

Northern Hungary is another important winter wheat region. During this reporting period, the crops showed the same patterns in the crop condition graph as **Central Hungary**. Temperature, radiation and biomass had negative departures (TEMP -1.4°C, RADPAR -1.6%, BIOMSS, -14%) while rainfall increased (RAIN +29%). The VCIx was favorable at 0.90. CropWatch expects normal production.

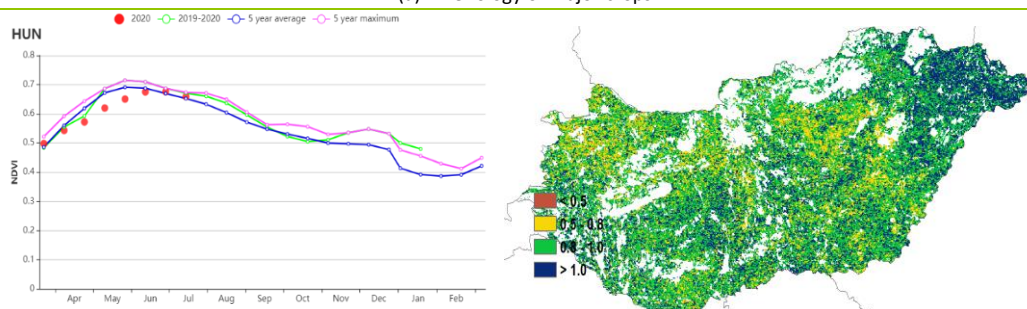
The Puszt region grows mostly winter wheat, maize and sunflower especially in the counties of Jász-Nagykun-Szolnok and Békés. The NDVI was below average from April to mid-June and above from late June to July. Temperature, radiation and biomass had negative anomalies (TEMP -1.4°C, RADPAR -2.0%, BIOMSS, -15%) while rainfall increased (RAIN +30%). The VCIx was favorable at 0.94. CropWatch expects normal production.

Southern Transdanubia cultivates winter wheat, maize, and sunflower, mostly in Somogy and Tolna counties. Crop conditions were generally below average from April to July in this region. All agro-climatic conditions were below average, including RAIN (-8%), TEMP (-0.9°C), RADPAR (-1.9%) and BIOMSS (-12%). The maximum VCI was favorable at 0.90. CropWatch expects slightly unfavorable conditions.

Figure 3.18 Hungary's crop condition, April - July 2020

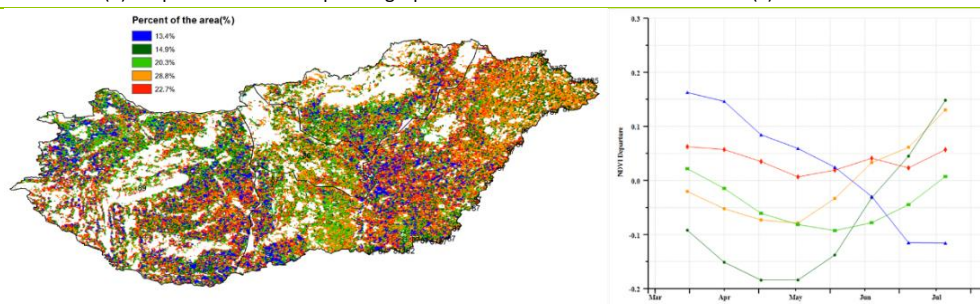


(a). Phenology of major crops



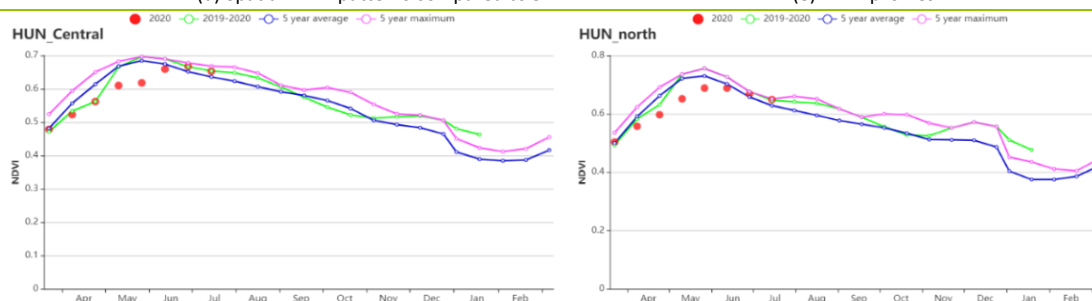
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

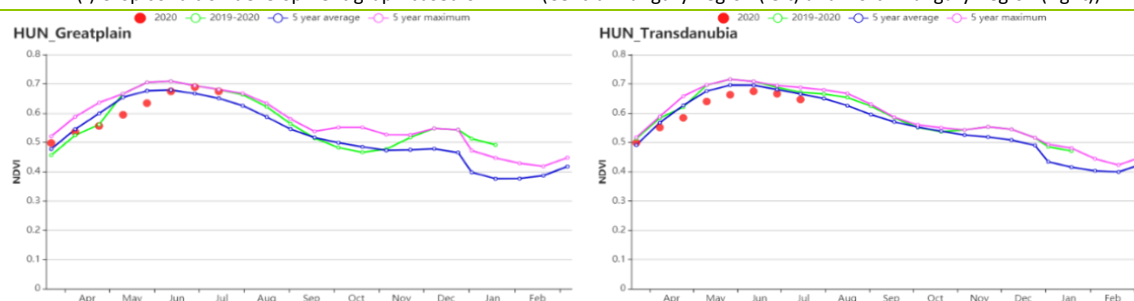


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



(f) Crop condition development graph based on NDVI (Central Hungary Region (left) and North Hungary Region (right))



(g) Crop condition development graph based on NDVI (Great Plain Region (left) and Transdanubia Region (right))

Table 3.27 Hungary's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Central Hungary	307	27	16.4	-1.3	1297	-1.7	545	-14
North Hungary	364	29	15.5	-1.4	1281	-1.6	511	-14
The Puszta	376	30	16.5	-1.4	1261	-2.0	545	-15
Transdanubia	214	-8	16.3	-0.9	1307	-1.9	548	-12

Table 3.28 Hungary's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Central Hungary	100	0	0.92
North Hungary	100	0	0.90
The Puszta	100	0	0.94
Transdanubia	100	0	0.90

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[IDN] Indonesia

During the monitoring period, the harvest of the main rice and maize crops was completed, and secondary rice and maize were planted in June and July.

RADPAR was near the average, whereas temperature (TEMP +0.2°C) and precipitation (RAIN +6%) were above the 15YA. This increased the potential cumulative biomass by about 1%. The NDVI growth curve shows that the crop conditions were below average, especially in June and July, during the sowing season of the second rice crop. According to the NDVI profiles, crop conditions on 57.4% of the arable land around the country were close to average. 22.7% of cultivated areas were below average at the beginning of the monitoring period and then improved to average in May. To the contrary, NDVI dropped to below average in June and July in 19.9% of the area. Almost all the arable land in Indonesia was cropped, and the maximum VCI value was 0.98.

Overall, the current agro-climatic indicators show favorable agro-climatic conditions in this region, especially for the growth period of main rice and maize crops.

Regional analysis

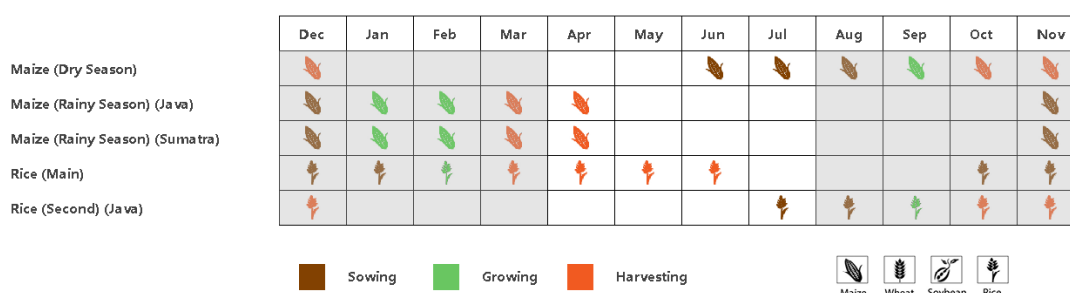
The analysis below focuses on four agro-ecological zones, namely **Sumatra** (92), **Java** (90), the main agricultural region in the country, **Kalimantan** and **Sulawesi** (91) and **West Papua** (93), among which the first three are relevant for crop production. The numbers correspond to the labels on the VCIx and NDVI profile maps. The NDVI tended to be slightly below average in all areas except for **Java** during this monitoring period.

The **Java** region recorded 586 mm of RAIN (-8%), with slightly higher average TEMP at 25.2°C (+0.4°C) and RADPAR of 1176 MJ/m² (+3%). In agreement with the slightly above-average NDVI values observed in the second half of this monitoring period, BIOMASS (+1%) was also slightly higher than the 5YA and crop prospects are favorable.

Precipitation (RAIN +8%) and temperature (TEMP +0.2°C) in **Kalimantan** and **Sulawesi** were above the 15-year average. RADPAR was the same as the average for the past 15 years. BIOMASS (+1%) was slightly higher than the average. The abundant precipitation helped create favorable conditions for the planting of the second season crops. However, the NDVI growth curve shows that the overall crop conditions were below average at the end of this monitoring period.

The **Sumatra** region recorded 1108 mm of RAIN (14% higher than the average) and 24.8°C of TEMP (+0.2°C). But RADPAR (-3%) was below the 15-year average during this monitoring period. BIOMASS (-2%) was slightly lower than the average. NDVI was also close to, but slightly below the 5YA for most of this monitoring period. Hence, the crop conditions were normal for this monitoring period.

Figure 3.19 Indonesia's crop condition, April - July 2020



(a). Phenology of major crops

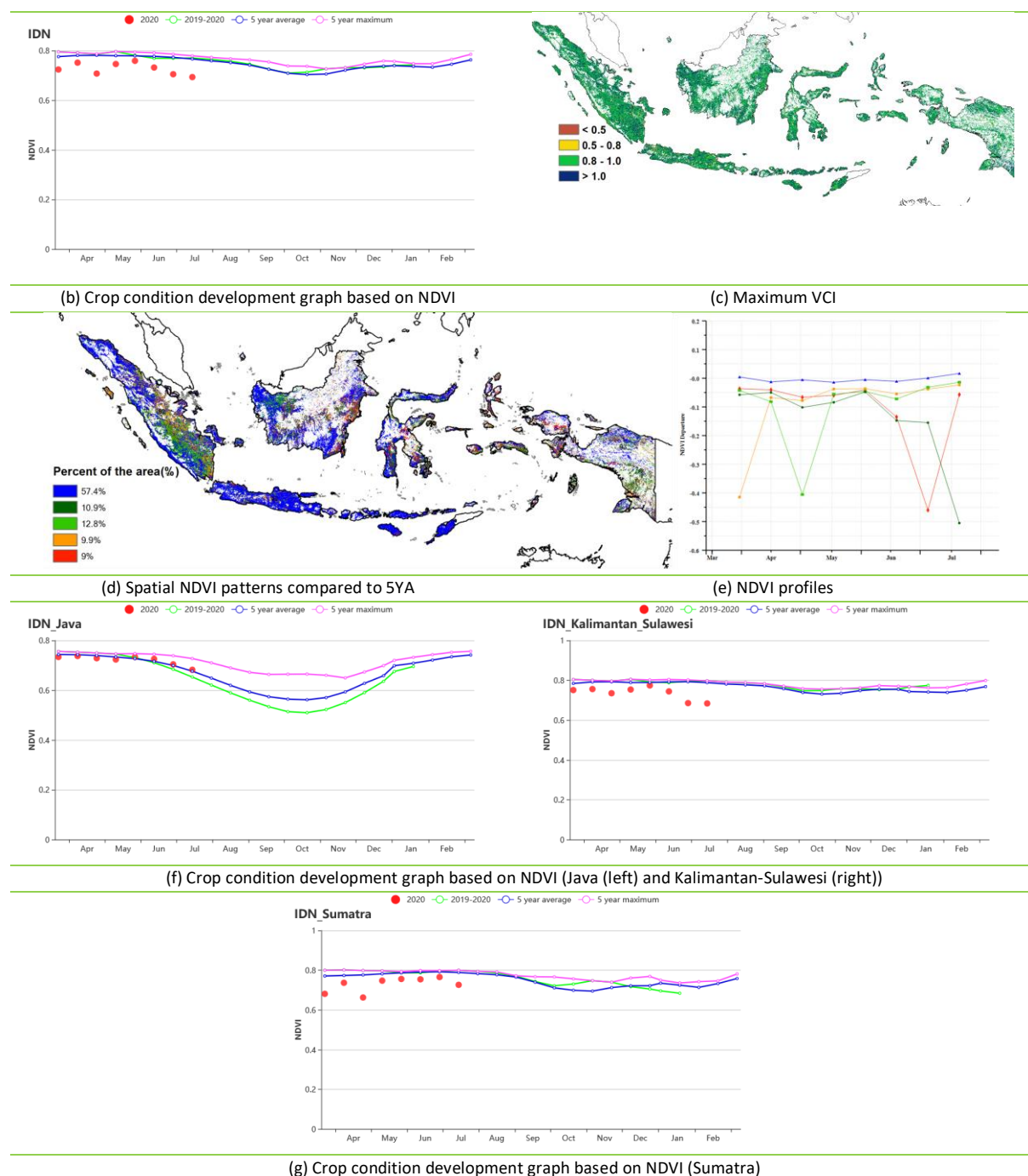


Table 3.29 Indonesia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Java	586	-8	25.2	0.4	1176	3	726	1
Kalimantan and Sulawesi	1252	8	24.6	0.2	1104	0	728	1
Sumatra	1108	14	24.8	0.2	1106	-3	734	-2
West Papua	1635	1	23.5	0.4	917	3	589	4

Table 3.30 Indonesia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Java	99	0	0.98
Kalimantan and Sulawesi	100	0	0.98
Sumatra	100	0	0.98
West Papua	100	0	0.98

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[IND] India

The current monitoring period covers the harvest of rabi rice and wheat in April and May, as well as the sowing of maize, kharif rice and soybean. The graph of NDVI development indicates that the crop conditions for rabi rice and wheat were favorable. Crop conditions were generally above average and even above the 5-year maximum during this reporting period, as indicated by the graph of NDVI development at the national level.

The CropWatch agroclimatic indicators show that nationwide TEMP and RADPAR were close to average (-0.5°C and -1%, respectively). India recorded abundant RAIN (+15%) after May, which exceeded the 15-year average for the same monitoring period, resulting in a BIOMSS increase by 11% compared with 15YA. Moreover, the overall VCIx was high, with a value of 1.05. As can be seen from the spatial distribution, only the South, Northeast and Northwest recorded values below 0.80. Most of India had high values in VCIx. These spatial patterns of VCIx were thus generally consistent with those of NDVI. Almost all areas experienced continuously above-average crop conditions until June. In July, 63% of the areas recorded below-average crop conditions in the Southwest and Northeast regions due to the heavy precipitation. CALF increased by 12% compared to 5YA. Crop production for this season is estimated to be above average.

The sown area of early spring crops in India increased by 9% from the same period last year. However, in May, India was affected by a second wave of locust plagues and some areas were hit by floods as well. Floods occurred mainly in the northeastern region which hampered crop conditions.

Regional analysis

India is divided into eight agro-ecological zones: the Deccan Plateau (94), the Eastern coastal region (95), the Gangetic plain (96), Assam and north-eastern regions (97), Agriculture areas in Rajasthan and Gujarat (98), the Western coastal region (99), the North-western dry region (100) and the Western Himalayan region (101).

The four agro-ecological zones of the Deccan Plateau, the Gangetic plain, Agriculture areas in Rajasthan and Gujarat, and the North-western dry region show similar trends in agricultural indices. Compared to the same period of previous years, RAIN had increased significantly, especially in the Gangetic plain (more than +30%). Although TEMP and RADPAR were lower, abundant rainfall compensated for their effects and caused BIOMSS to be much higher than the 15-year average. However, CALF showed different trends. The highest increases had been observed for the Deccan Plateau and agricultural areas in Rajasthan and Gujarat (more than +18%). The graph of NDVI development shows that the crop growth of these four agro-ecological regions during this monitoring period exceeded the 5-year maximum in most months. Generally, the crop production is expected to be above average.

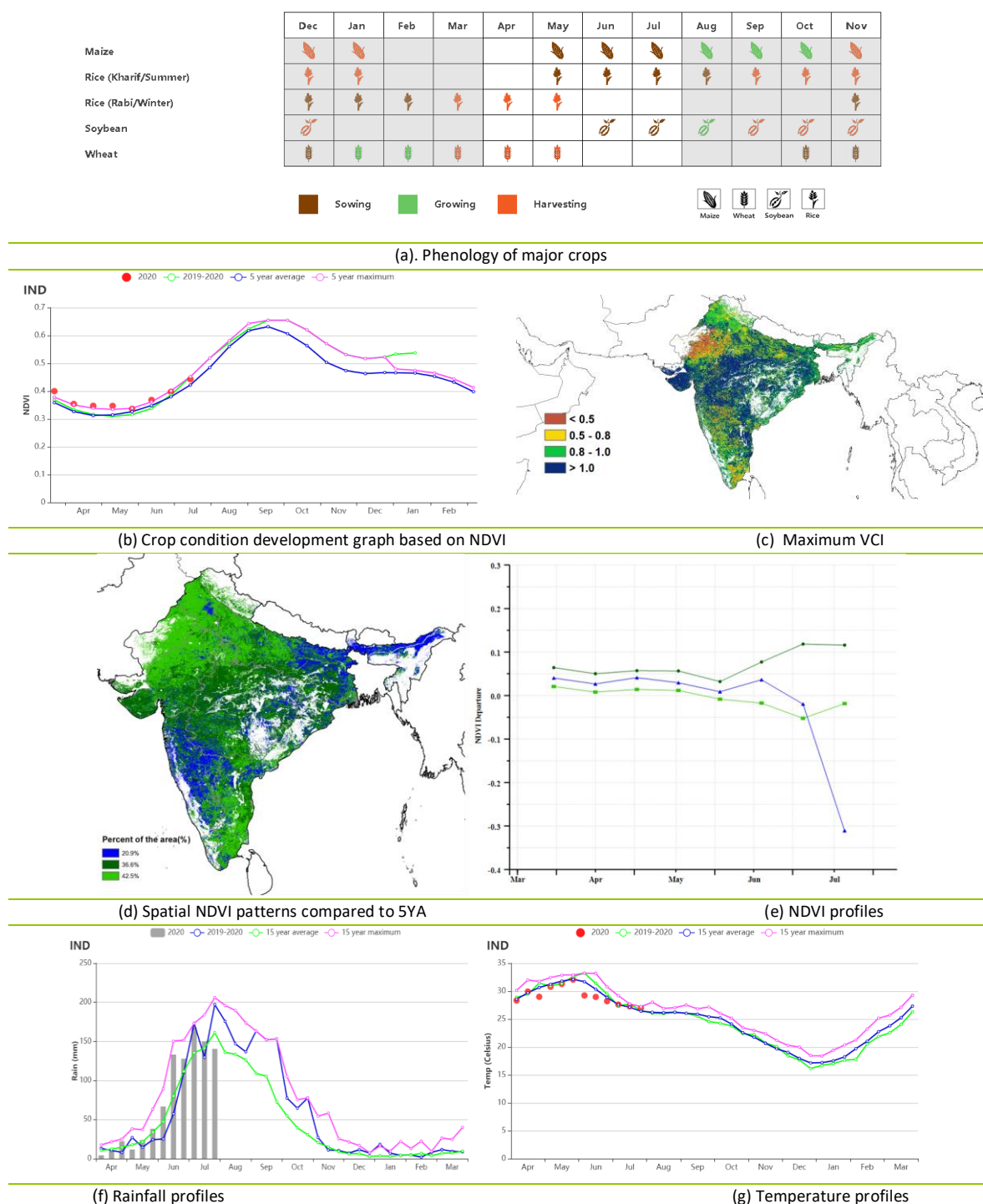
The Eastern coastal region and the Western coastal region recorded similar trends of agricultural indices in this monitoring period. Compared to the same period of previous years, RAIN had increased, especially for the Eastern coastal region (+25%). TEMP was slightly below average (-0.5°C) in the Eastern coastal region and near average (+0.4°C) in the Western coastal region. RADPAR was lower, but BIOMSS still increased. Both regions recorded increases of CALF (+16% and +19%, respectively). VCIx was higher than 1.02. The graph of NDVI development shows that the crop growth for the two regions exceeded the 5-year average. The crop production is expected to be above average.

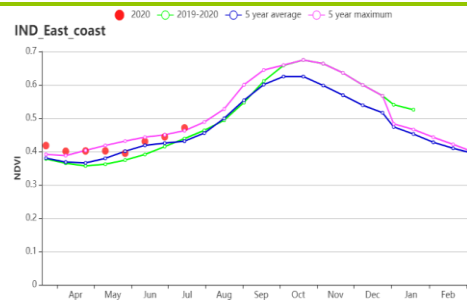
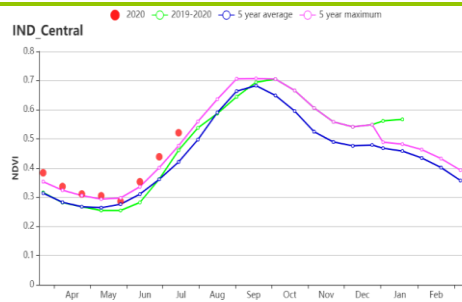
The Assam and Northeastern region recorded 2250.6 mm of RAIN (+14%), with lower average TEMP at 23.9°C (-0.5°C) and RADPAR of 1051.5 MJ/m² (-7%). BIOMSS was below the 5YA (-9%). Increased rainfall was not enough to compensate for reduced temperature and sunshine. CALF reached 95% which was as average, and VCIx was 0.92. The outlook of crop production in this region is unfavorable due to the heavy precipitation.

The Western Himalayan region recorded 343 mm of RAIN (-40% below average), with lower average TEMP at 19.1°C (-1.3°C) and RADPAR of 1461 MJ/m² (+1%). The BIOMSS was higher than the average

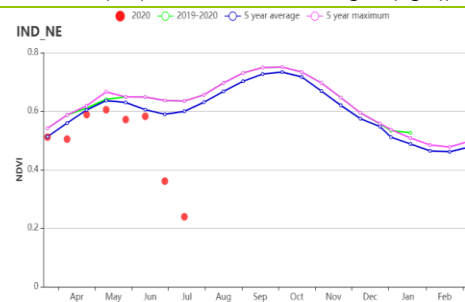
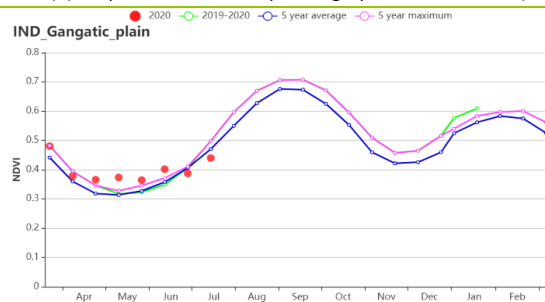
(+3%) due to more sunshine. CALF reached 98% and VCIx was 0.86. Crop condition as assessed by NDVI was above the 5-year average and even exceeded the 5-year maximum in April to May. Therefore, crop production conditions are favorable.

Figure 3.20 India's crop condition, April - July 2020

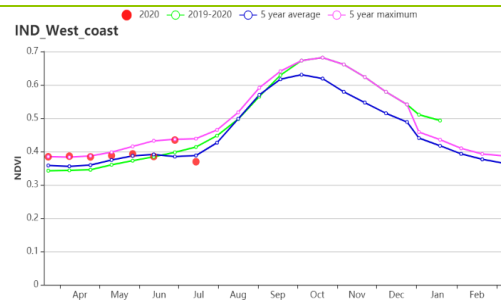
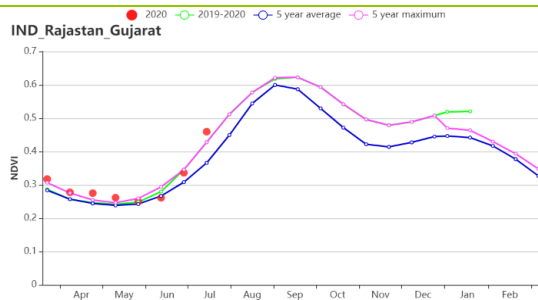




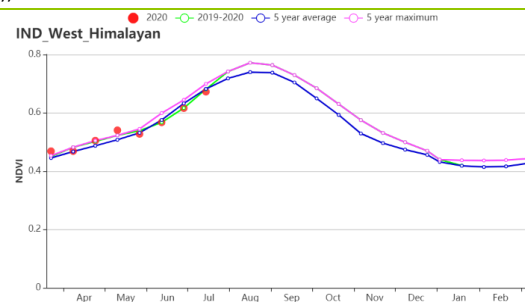
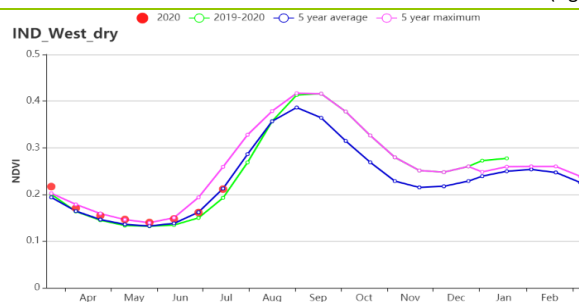
(h) Crop condition development graph based on NDVI (Deccan Plateau (left) and Eastern Coastal Region (right))



(i) Crop condition development graph based on NDVI (Gangetic Plains (left) and Assam and north-eastern regions (right))



(j) Crop condition development graph based on NDVI (Agriculture areas in Rajasthan and Gujarat (left) and Western Coastal Region (right))



(k) Crop condition development graph based on NDVI (North-western dry region (left) and Western Himalayan Region (right))

Table 3.31 India's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Deccan Plateau	701	18	31.0	-0.5	1293	3	728	
Eastern coastal region	689	25	30.0	-0.5	1238	1	744	
Gangetic plain	770	32	31.0	-1.4	1312	-3	814	
Assam and north-eastern regions	2251	14	24.0	-0.5	1051	-7	633	
Agriculture areas in Rajasthan and Gujarat	571	13	32.0	0.1	1356	0	646	
Western coastal region	991	2	27.0	0.4	1184	0	666	
North-western dry region	161	12	34.0	0.2	1454	-2	802	
Western Himalayan region	343	-41	19.0	-1.3	1462	1	595	

Table 3.32 India's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Deccan Plateau	86	25	1.19
Eastern coastal region	77	16	1.01
Gangetic plain	82	-2	0.99
Assam and north-eastern regions	96	0	0.92
Agriculture areas in Rajasthan and Gujarat	62	18	1.11
Western coastal region	69	19	1.02
North-western dry region	7	-42	0.86
Western Himalayan region	98	0	0.86

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[IRN] Iran

This monitoring period covers the grain filling period and harvest of winter wheat, as well as the planting and early establishment of the rice crop. According to the NDVI based crop condition development graph, the crop conditions in Iran during this whole monitoring period were better than the 5-year average, even better than 5-year maximum in late April. The cumulative rainfall was 117 mm, which was 33% above average. The average temperature was 21.0°C (0.3°C below average), whereas the photosynthetically active radiation was 1571 MJ/m² (down 4%). The potential biomass was 10% higher than the 15-year average. The national maximum vegetation condition index (VCIx) was 0.94, while the cropped arable land fraction (CALF) was 34% higher than the average of the past 5-years.

The NDVI spatial patterns show that from April to July, crop conditions in 58.5% of the cropped area were average or above the 5-year average (marked in light green, dark green and orange). 31.5% of the cropped areas (marked in red) experienced slightly below-average crop conditions until the end of the monitoring period, mainly located in west and northwest parts of Iran, including provinces of Khuzestan, Ilam, Lorestan, Kermanshah, Kordestan, and East Azarbaijan. 10% of the cultivated area suffered from below-average crop conditions until the end of the monitoring period, mainly located in northern and northwestern parts of Iran, including the provinces of West Azarbaijan, East Azarbaijan, Ardebil, Gilan, and Mazandaran. The abundant rainfall in April ensured favorable conditions for rice and wheat, as confirmed by the NDVI profiles. The spatial pattern of maximum Vegetation Condition Index (VCIx) was in accord with the spatial distribution of the NDVI profiles.

When it comes to the proportion of NDVI anomaly categories compared with 5-year average, the first four 16-day phases all had more than 20% of the cropped area with slightly below or below average crop conditions. During the 2nd and 6th phase, more than 10% of the cultivated area experienced slightly above or above average crop condition. As for the proportion of VHI categories compared with 5-year average, more than 90% of the cropped area had no drought at all during the first six weekly phases, then the ratio of cropped area suffering from moderate to severe drought rose gradually to more than 10% during the remaining weekly phases.

In general, crop growth conditions were favorable. All agronomic indicator values were positive.

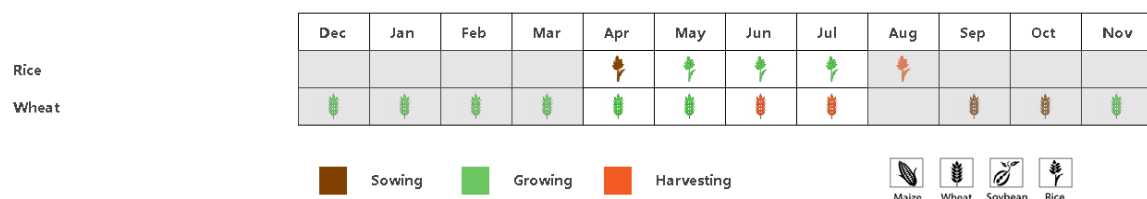
Regional Analysis

Based on farming system, climate, and topographic conditions, Iran can be subdivided into three regions, two of which are the main growing areas for crop production, namely the **semi-arid to the subtropical hilly region in the west and the north** and the **coastal lowland in the arid red sea plain area**.

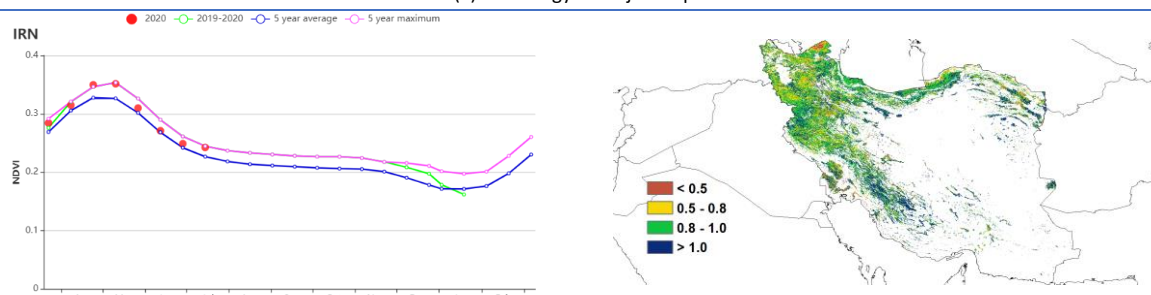
In the **Western and northern semi-arid subtropical hilly areas**, the cumulative precipitation during the monitoring period was 135 mm, 31% higher than average, while the temperature was 19.1°C (-0.4°C) and photosynthetically active radiation (-4%) were both below the 15YA. The potential biomass was 5% higher than average. Crop conditions were better than the 5-year average, even better than the 5-year maximum in late April. The proportion of cultivated land was 44%, which is 30% higher than the 5YA. The average VCIx for this region was 0.94, indicating favorable crop conditions.

In the **Coastal lowland and plain areas of the arid Red Sea**, the temperature was 0.1°C above average, while the accumulated precipitation was 6% below average and the photosynthetically active radiation (-2%) was also below average. The potential biomass was 33% higher than the 15-year average. Crop conditions were generally better than the 5-year average. During the monitoring period, CALF was 95% higher than the average of the last 5-years, and the VCIx was 0.93, also indicating a good crop prospect.

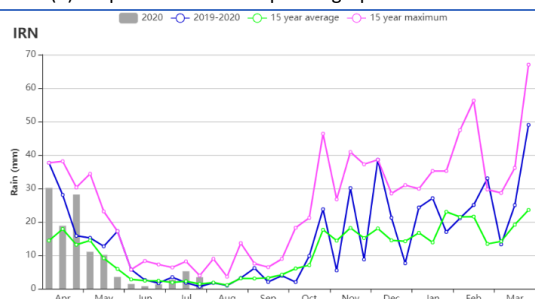
Figure 3.21 Iran's crop condition, April - July 2020



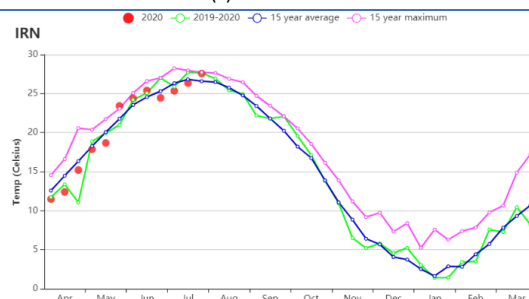
(a) Phenology of major crops



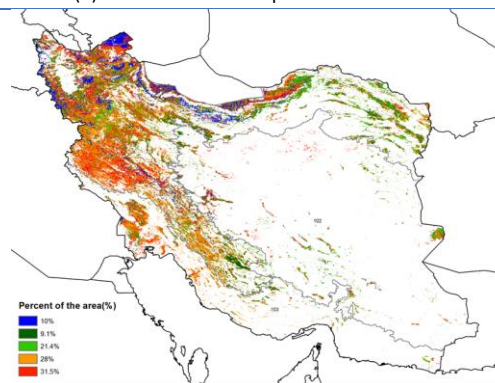
(b) Crop condition development graph based on NDVI



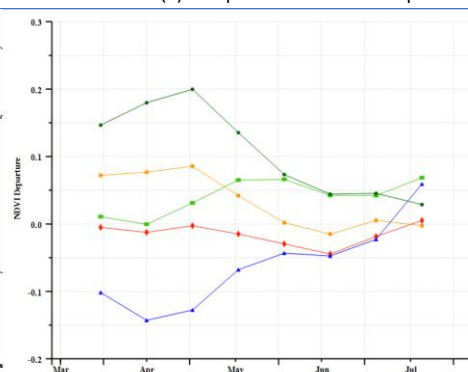
(c) Maximum VCI



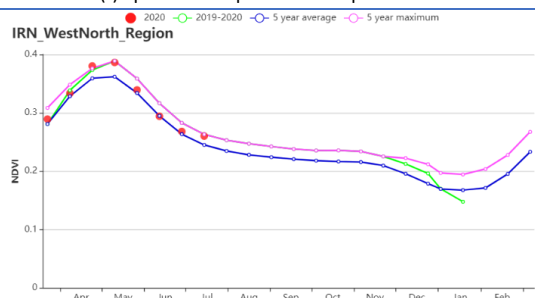
(d) Rainfall time series profile



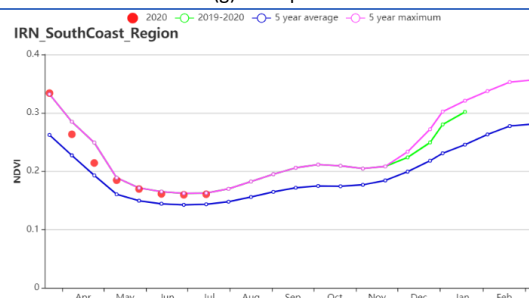
(e) Temperature time series profile



(f) Spatial NDVI patterns compared to 5YA



(g) NDVI profiles



(h) Crop condition development graph based on NDVI (Semi-arid to sub-tropical hills of the west and north region (left) and Arid Red Sea coastal low hills and plains region (right))

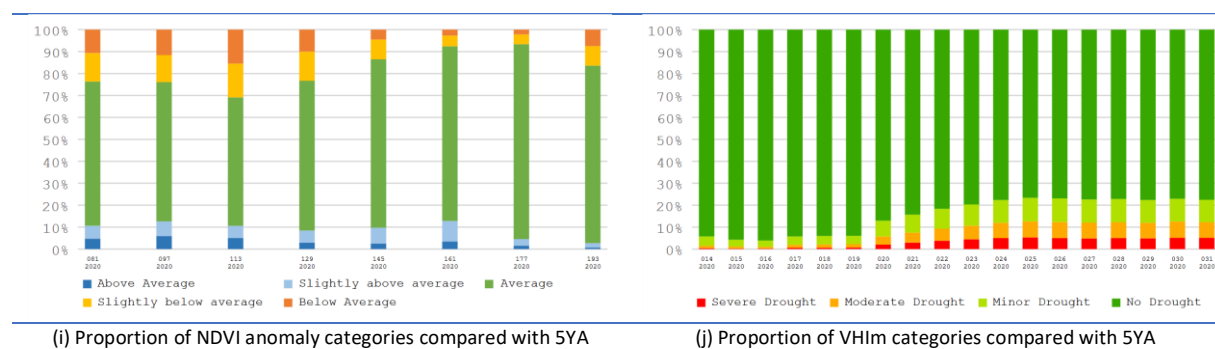


Table 3.33 Iran's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Semi-arid to sub-tropical hills of the west and north	135	31	19.1	-0.4	1555	-4	481	5
Arid Red Sea coastal low hills and plains	26	-6	31.8	0.1	1611	-2	416	33

Table 3.34 Iran's agronomic indicators by sub-national regions, current season's value and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure from 5YA (%)	Current
Semi-arid to sub-tropical hills of the west and north	44	30	0.94
Arid Red Sea coastal low hills and plains	18	95	0.93

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[ITA] Italy

During this reporting period, winter wheat was harvested in June and July while summer crops, especially maize, rice, sunflower and soybeans are still in the field. According to the NDVI development graph, crop conditions were below average in April and May and close to average in June and July.

Rainfall (-10%) and temperature (-0.2°C) were below and solar radiation (RADPAR +0.3%) above the 15YA. This resulted in a 5% reduction in potential biomass production. CALF was 99%, and VCIx was 0.90. The overall crop conditions during this period were near average.

About 19.4% of the crops, mainly located in the Po Valley in the Northwest, showed a positive departure from the 5-year trend. Another 30.6%, which trended near average, was predominantly concentrated in the hilly region, stretching from the north to the south along the center of the peninsula. About 16.1% of the area, located in the northeast, center, and east constantly stayed below average. The rice fields (12.2%) in the Po Valley are planted in late April or early May and the steady increase in NDVI depicts the growth of the rice crops. The wheat fields, which are followed by a summer fallow, are depicted by the curve representing 21% of the area. They are in the south of Italy.

Regional analysis

Based on cropping systems, climatic zones and topographic conditions, four sub-national regions can be distinguished for Italy. These four regions are East coast, Po Valley, Islands and Western Italy.

On **the East coast**, RAIN, TEMP and RADPAR were all below average (RAIN -8%, TEMP -0.5°C, RADPAR -2%). Biomass was the same as the 5YA. Overall conditions stayed close to average in this region: VCIx is 0.89 and high CALF (0.99) indicate full crop cultivation. According to the NDVI development graph, crop conditions were below but close to the 5YA average during this growth period. Crop production is expected to be near average.

Crop production in the **Po Valley** was mainly affected by low rainfall (RAIN -9%) and below average temperature (-0.2°C). RADPAR increased by 3% as compared to the 15YA, which resulted in a slight BIOMSS decrease (-2%). The NDVI curve closely followed the longterm average. The area has a high CALF (100%) and the VCIx of 0.90 for this region also shows favorable crop prospects. The output for winter wheat is expected to be average.

For the **Islands** warmer temperatures (+0.2°C) and less rainfall (RAIN -20%) were observed. Together with lower RADPAR (-2%), less biomass (BIOMSS -11%) was estimated. NDVI followed the average trend. The VCIx was 0.91 and CALF reached 0.98. Hence, near-average conditions were observed.

The situation in **Western Italy** is as follows: Rainfall (RAIN -12%) and temperature (TEMP -0.3°C) were below the 15YA. Accordingly, BIOMSS (-6%) was also lower. As in the other regions, the NDVI curve followed the average trend. The area has a high CALF (100%) and VCIx was 0.89. Crop conditions were normal.

Winter wheat production can be expected to be near average and the prospects for the summer crops also follow the long-term average.

Figure 3.22 Italy's crop condition, April -July 2020

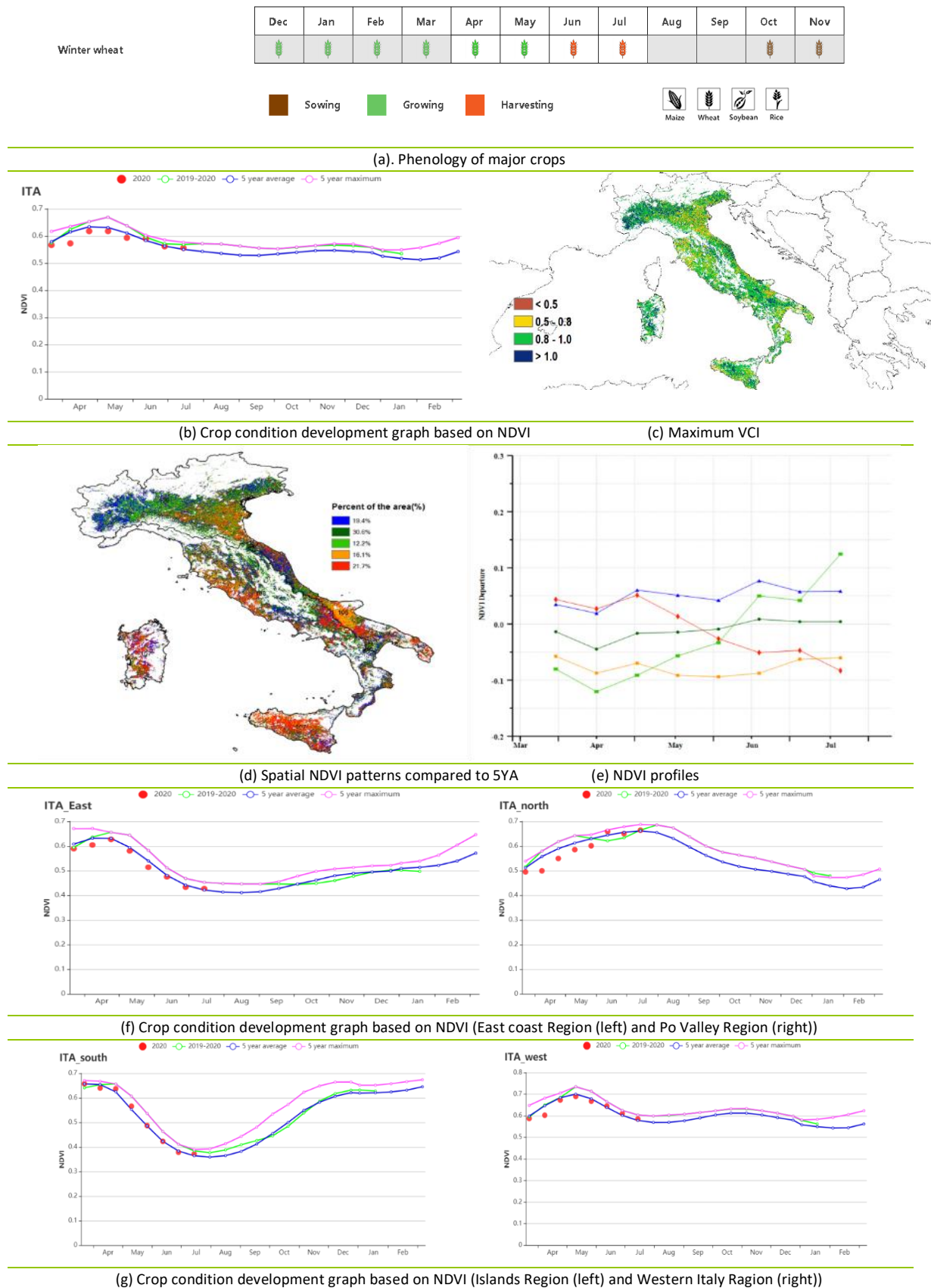


Table 3.35 Italy's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
East Coast	258	-8	17.4	-0.5	1406	-2	669	0
Po Valley	508	-9	15.4	-0.2	1366	3	553	2
Islands	93	-20	19.4	0.2	1508	-2	562	-11
Western Italy	263	-12	16.8	-0.3	1425	0	590	-6

Table 3.36 Italy's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
East Coast	99	0	0.89
Po Valley	100	0	0.90
Islands	98	0	0.91
Western Italy	100	0	0.89

[KAZ] Kazakhstan

The crop conditions were generally above or close to average from April to May, and then changed to below average from late June to July. This report covers the sowing and growth of spring wheat in Kazakhstan. In June, harvest of winter rye and winter wheat started in the southern regions of the country.

Compared to the 15-year average, accumulated rainfall and temperature were above average (RAIN +41%, TEMP +0.3°C), while radiation was close to average. Precipitation was above the 15-year maximum in late April and mid-May. The temperature fluctuated in the reporting period: above average from late April to May and mid-July, below average from mid-June to early July and late July. The agro-climatic conditions resulted in an increase in the BIOMSS index by 2%.

The national average maximum VCI index was 0.77, and the Cropped Arable Land Fraction (CALF) went down by 4% over the recent five-year average. The spatial VCIx map matched well with the national crop condition development graphs. Crop conditions on about 33.7% of croplands were below average from May to early July, mainly in most of Batysdy Kazakhstan, some parts of Kostanay, Soltustik Kazakhstan, Akmola, Pavlodar, and Almaty States. About 47.3% of croplands, which were distributed across the central northern region, and the south of Ongtustik Kazakhstan and Almaty States, experienced favorable crop conditions from late April to May and dropped to below average from June to early July. Remaining croplands (about 19%) experienced favorable crop conditions from late April to July, mainly in some patches of Kostanay, Soltustik Kazakhstan, Akmola, Shyghys Kazakhstan States. The negative deviation of NDVI from the 5YA starting in June indicates that conditions for spring wheat started to deteriorate and that its prospects are below average.

Regional analysis

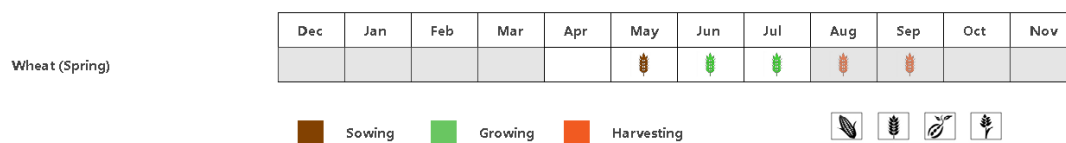
Based on cropping systems, climatic zones and topographic conditions, four sub-national agro-ecological regions can be distinguished for Kazakhstan, among which three are relevant for crop cultivation: the Northern region (112), the Eastern plateau and southeastern region (111) and the South region (110).

The **Northern region** is the main spring wheat production area. Accumulated rainfall (RAIN +48%) and temperature (TEMP +0.5°C) were above average, but RADPAR was close to average. The agro-climatic indicators resulted in an increase of the BIOMSS index by 4%. According to NDVI profiles, crop conditions were close to or above average from April to May, but dropped to below average from June to July. The average VCIx for this region was 0.75, and the proportion of cultivated land was 4% lower than the average. Production is estimated to be below average.

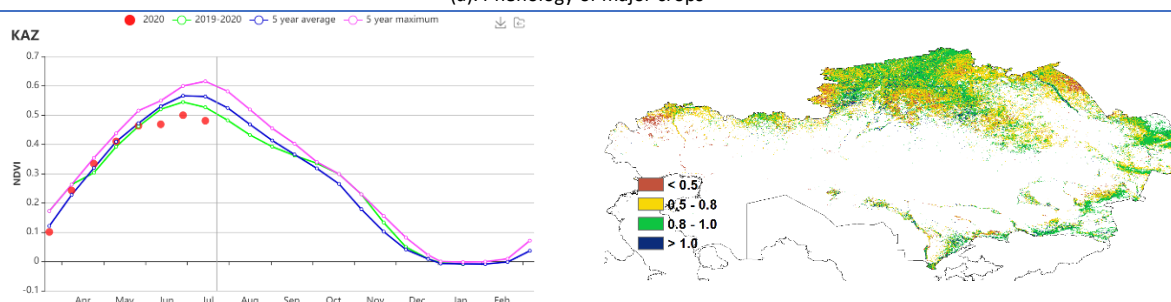
Crop conditions in the **Eastern plateau** and **Southeastern region** were mostly below average during this reporting period. The accumulated rainfall in the region was above average (32%), while radiation was below average (RADPAR -3%). The average VCIx for this region was 0.83, and CALF was below average by 4%. Outputs for spring wheat are expected to be below average.

The **South region** received 155 mm of rainfall, which was far above average (up 78%). Temperature and radiation were below average. The average VCIx for this region was 0.79. NDVI profiles show the poor crop condition from April to July.

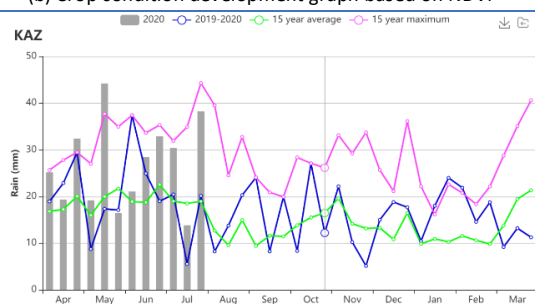
Figure 3.23 Kazakhstan's crop condition, April-July 2020



(a). Phenology of major crops

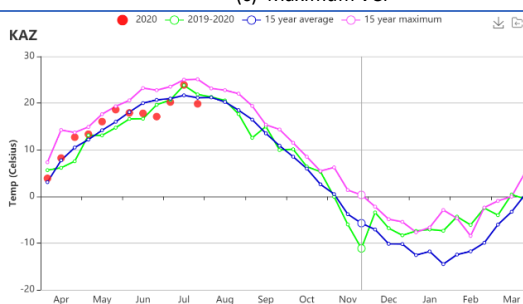


(b) Crop condition development graph based on NDVI

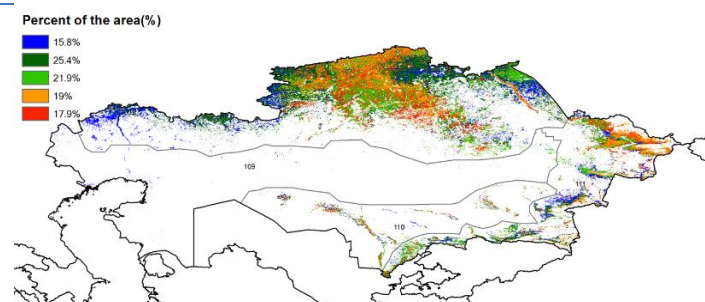


(d) Rainfall dex

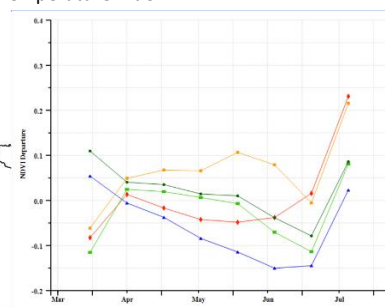
(c) Maximum VCI



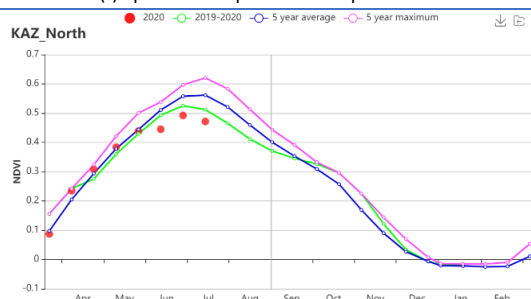
(e) Temperature Index



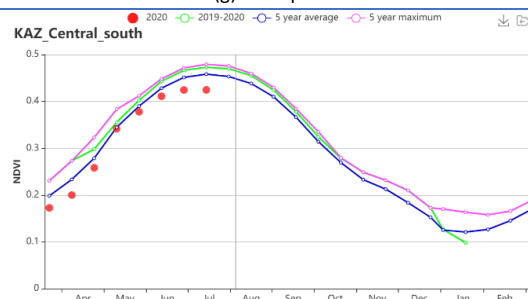
(f) Spatial NDVI patterns compared to 5YA



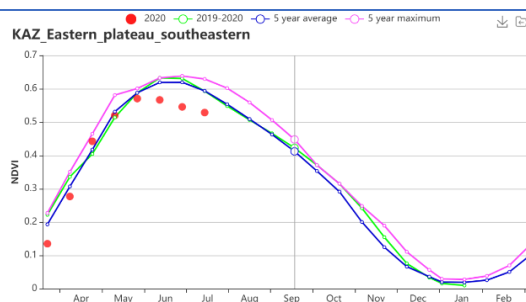
(g) NDVI profiles



(h) Crop condition development graph based on NDVI (Northern zone)



(i) Crop condition development graph based on NDVI (South zone)



(j) Crop condition development graph based on NDVI (Eastern plateau and southeastern zone)

Table 3.37 Kazakhstan agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m²)	Departure (%)	Current (gDM/m²)	Departure (%)
Northern region	299	48	15.6	0.5	1254	0	561	4
Eastern plateau and southeastern region	416	32	14.9	0.0	1376	-3	549	-1
South region	155	78	22.5	-0.1	1473	-3	685	-2

Table 3.38 Kazakhstan, agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Northern region	85	-4	0.75
Eastern plateau and southeastern region	91	-4	0.83
South region	61	0	0.79

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[KEN] Kenya

Kenya has a short- a long-rain season. The long-rain crops (mostly maize and wheat) are planted from March to April to be harvested in October and November. For this reporting period, the national total rainfall was recorded at 838 mm, which is above the 15YA by 41%. Both the temperature (TEMP, -0.5°C) and RADPAR (-4%) were below average. Estimated biomass production was 4% below the 15YA. The cropped arable land fraction remained constant and CALF increased by 5%. The NDVI development graph at the national level stayed above average during the entire monitoring period. According to the NDVI clusters and the map of NDVI profiles, 90.7% of the country experienced favorable crop conditions from April - July. The spatial NDVI patterns indicate that NDVI was above average in the central areas. This spatial pattern was only partially reflected by VCIx. Its national average had reached 0.99. It was slightly lower in the pastoral areas of the Rift Valley (Laikipia, Nakuru, and Trans-Nzoiia), where wheat is an important crop, but also in some western areas, for instance in Bungoma, where maize and cattle are the main-stays of the agricultural economy. All in all, the conditions were favorable.

Regional analysis

Considering the cropping system, climatic zones and topographic conditions we divided this country into four agro-ecological zones (AEZ): The Coast, Highland agriculture zone, Northern rangelands, and Southwest.

Coast

The Coast includes the districts of Kilifi, Kwale, and Malindi. During this reporting period the total amount of rainfall was 302 mm, 9% below average. This led to a slight drop in total biomass production (-3%). The temperature (+0.1°C) and RADPAR (-1%) were near average. The Cropped arable land fraction increased by 2%. The NDVI-based crop condition development was above average in the first part and then dropped to below average in June and July. The maximum VCI was 1.01. Overall, the coastal area had favorable conditions for livestock and crops.

Highland agriculture zone

In this zone, the total rainfall during the reporting period was recorded at 897 mm, 44% above average, whereas the temperature was below average (-0.4°C). Estimated biomass production decreased by 4%. The maximum VCIx value was recorded at 0.99. The NDVI-based Crop condition development graph shows that the NDVI profile was above the five years average during the entire monitoring period. Moreover, large parts of the arable land in this region have high VCIx values, indicating good crop conditions. Overall, crop conditions were favorable for this region.

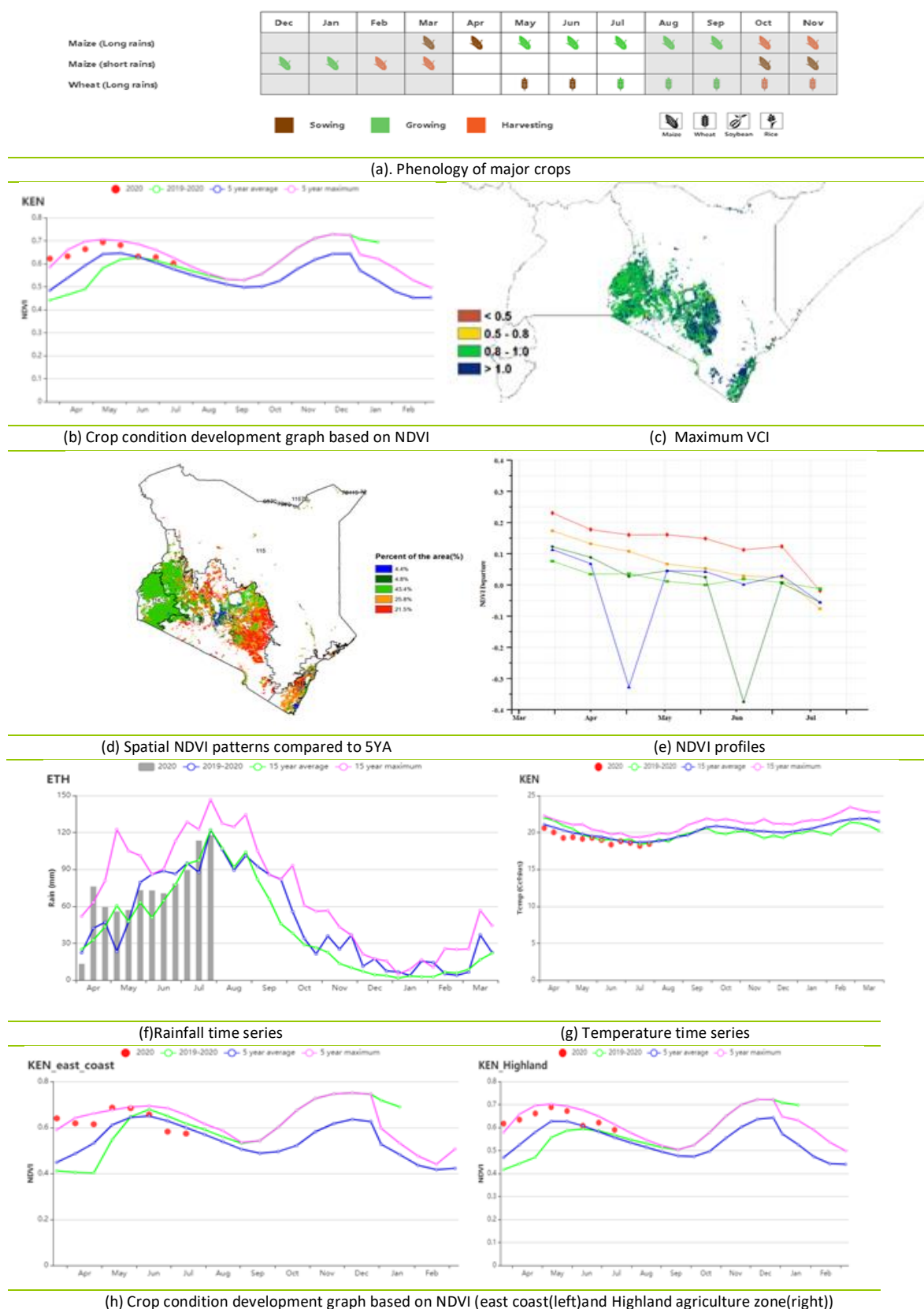
Northern rangelands

The Northern rangeland covers the districts Turkana, Samburu, and Baringo. Rainfall (+53%) was above average, whereas temperatures (-0.4°C) and solar radiation (-4%) were slightly below the 15YA. As a result, estimated biomass (-3%) was also slightly lower. The NDVI development curve stayed above the average of the last 5 years. The maximum VCI was at 1.06. The cropped arable land fraction rose by 25%. This region is mainly used by pastoralists. Conditions for livestock production were favorable.

South-west

The South-west districts include Kisumu, Migori, Siaya, and Busia. These districts are major producers of wheat and maize. In the costal area, the total amount of rainfall was high at 1375 mm (+44%). The other parameters, temperature (-1.1°C), RADPAR (-3%) and the estimated biomass (-9%) were below average. The Cropped arable land fraction remained constant. The NDVI development curve was above the 5YA throughout this monitoring period. The maximum observed VCI was 0.95. Overall, conditions are assessed as favorable.

Figure 3.24 Kenya's crop condition, April - July 2020



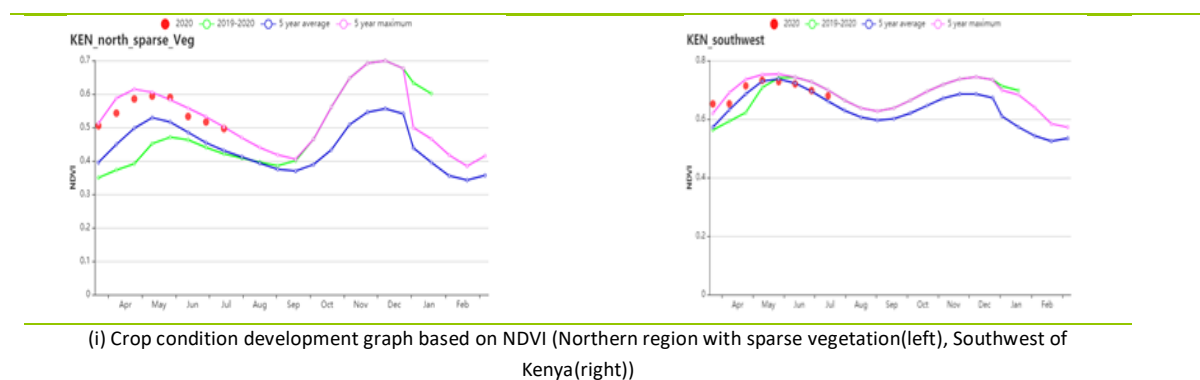


Table 3.39 Kenya's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Departure (%)	Current (°C)
Coast	302	-9	25.0	0.1	1129	-1	718	-3
Highland agriculture zone	897	44	17.8	-0.4	1042	-4	497	-4
Northern rangelands	646	53	22.2	-0.4	1148	-4	670	-3
South-west	1375	44	17.8	-1.1	1121	-3	523	-9

Table 3.40 Kenya's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

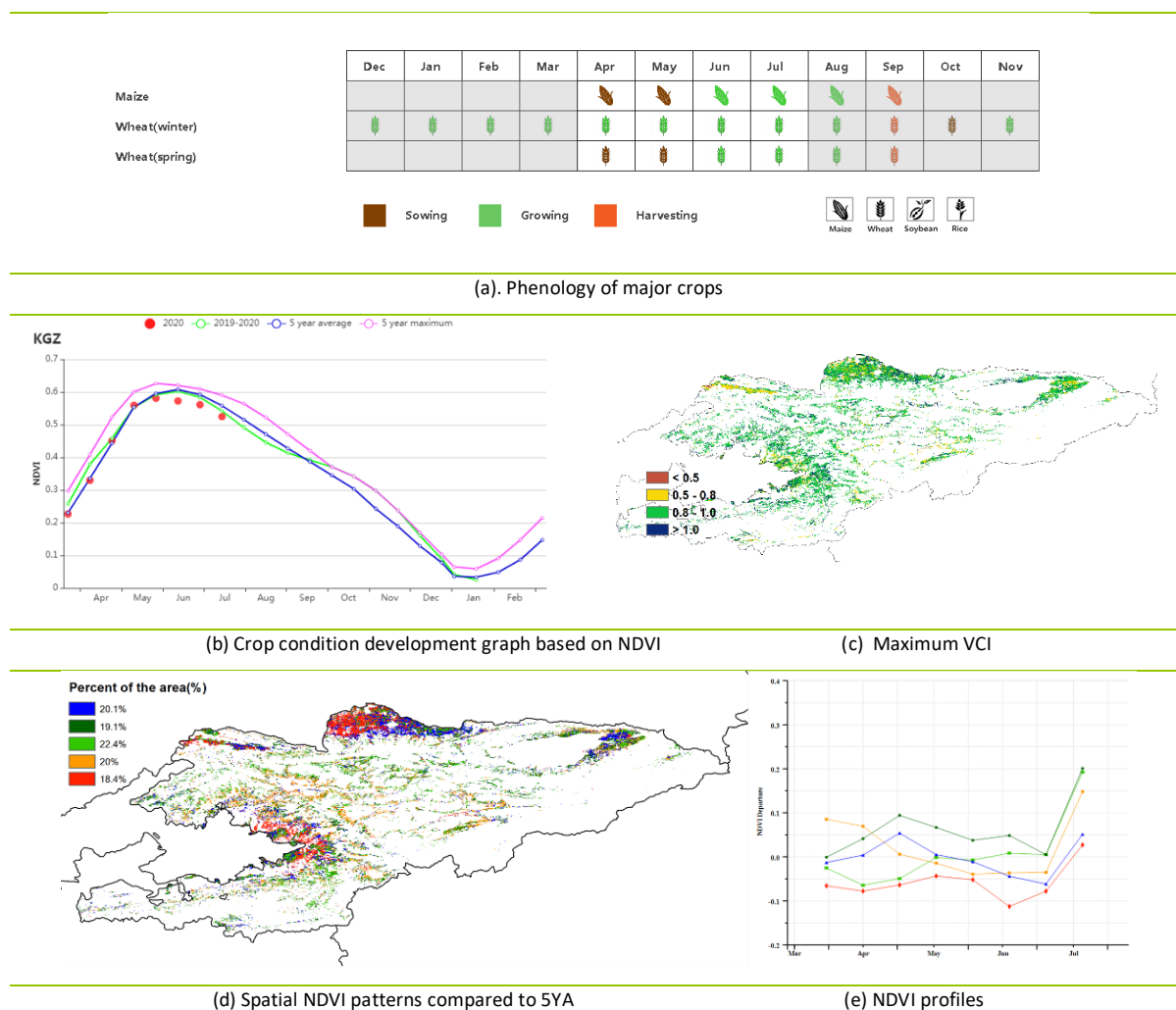
Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Coast	100	2	1.01
Highland agriculture zone	100	6	0.99
Northern rangelands	97	25	1.06
South-west	100	0	0.95

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PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF ZMB

[KGZ] Kyrgyzstan

The reporting period covers the sowing and growing stages of maize and the growth and harvest of wheat. Among the CropWatch agro-climatic indicators, RAIN (+29%) and RADPAR (+1%) were above average, while TEMP (-0.4°C) was slightly below average. The combination of the factors resulted in below average BIOMSS (-4%) compared to the 15YA. As we can see from the figure f, the precipitation for the analyzed period was higher than the 15-year average and the temperature (figure g) was lower than the 15-year average. The lower temperature was favorable for pastures, but due to the lack of heat, the glaciers were melting more slowly resulting in a hydrological drought caused by low water levels in the rivers. That influences irrigation and therefore, NDVI for June and July was slightly lower than the average of the last 5 years. The spatial NDVI clustering profile shows that in the northern region, the large area marked with red and blue color experienced a decrease from May to June, and an increase in July. In the eastern region, the area marked with dark green showed average or above average conditions. This situation is largely confirmed by the VCIx map which shows high values (>0.8) in the Chuy, Issyk-Kul, and Osh, Batken regions, while low values were observed in the Talas Region and the central part of Naryn Region. CALF increased by 1% and the nationwide VCIx average was 0.90, which is in line with the favorable NDVI trend. Crop conditions in Kyrgyzstan can be assessed as favorable. Good wheat yields can be expected and maize will be harvested in August.

Figure 3.25 Kyrgyzstan's crop condition, April - July 2020



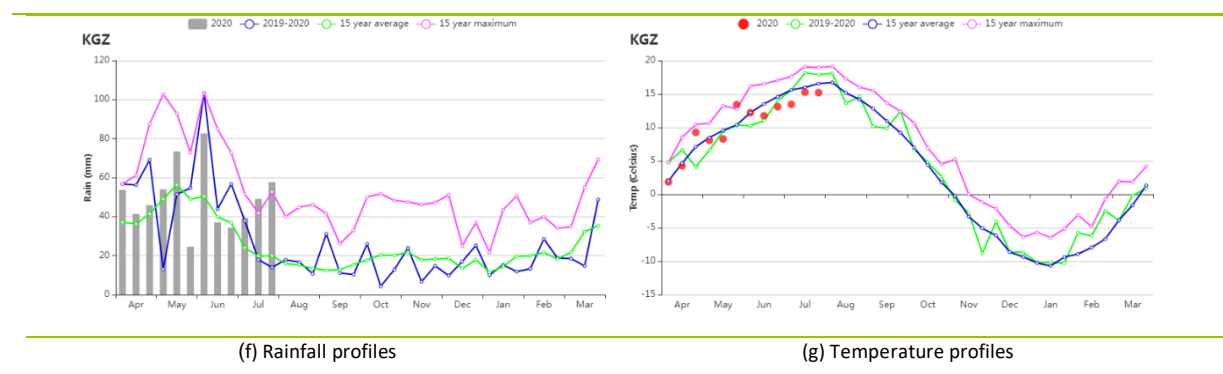


Table 3.41 Kyrgyzstan agro-climatic indicators, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Kyrgyzstan	592	29	10.5	-0.4	1419	-4	452	

Table 3.42 Kyrgyzstan agronomic indicators, current season's values and departure from 5YA, April - July 202

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Kyrgyzstan	98	1	0.90

AFG AGO ARG AUS BGD BLR BRA CAN DEU EGY ETH FRA GBR HUN IDN IND IRN ITA KAZ KEN KGZ **KHM** LKA MAR MEX MMR MNG MOZ NGA PAK
PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF ZMB

[KHM] Cambodia

The wet season in Cambodia usually lasts from May to October. Within this monitoring period, the Early Rice (dry season) and Dry Season Maize were harvested in the end of April. The beginning of the wet season governs the planting of the wide variety of rice that is grown in this country. Wet Season Maize and Early Season Rice are planted in May, followed by Floating Rice and Medium Rice. Wet Season Maize reached silking by the end of this monitoring period. Soybean reached maturity by late July.

The overall rainfall in this period was less than the average (RAIN -19%) while the temperature was 0.8°C above the 15YA. The rainfall deficit was mainly due to below-average rainfall in April, May and early June. It subsequently reached average levels. The drought conditions were exacerbated by the prolonged record low water levels of the Mekong River. The inflow of water from the Mekong River into the Tonle Sap Lake usually starts in May. This year, the reversed flow has not yet started as of August 3, 2020. The RADPAR was 4% above the 15YA. Estimated biomass for the country was 5% above the 15YA, but it was 2% below the 15YA for the important Tonle Sap Lake region.

The crop condition development graph based on NDVI for Cambodia reveals the poor crop conditions during the period from April to June. Conditions improved to average in July. VCIx nationwide reached 0.88. It varied greatly within the regions. The NDVI development curve stayed below the trend of the 15YA until the end of June. This is probably due to the delayed planting of Early Rice and Floating Rice. The NDVI departure clustering map and its development profiles reveal the noticeable changes of crop condition across regions and time. There are two main remarkable areas where the NDVI departure across the period was significant: As shown in Figure 8, the blue area has excellent crop conditions (12.8% of the area), where the NDVI departure was above the average and shows an increasing trend. The red and orange color region (36.7%) represents poor crop conditions.

The proportion of NDVI anomaly categories also shows the noticeable changes of crop conditions. It reveals that 25% of cropped land was below or slightly below average, while 30% of cropped land was above or slightly above the average. As seen in Figure 9, cropped land with poor conditions was mainly distributed around the Tonle Sap region and the southern part of the Mekong valley. The cropped land with above average crop conditions was mainly distributed in the eastern part of the Mekong Valley.

Drought conditions caused a delay in planting in May and slow crop development. Conditions returned to average by the end of July. It remains to be seen whether farmers were able to fully overcome the challenges posed by the lack of water and whether this will have an impact on rice production in Cambodia.

Regional analysis

Tonle-Sap region:

This region is mostly flat and is the main rice production region of Cambodia. The rainfall was 13% below average, temperature was 0.9°C above average and RADPAR was near average compared to the 15YA. Serious rainfall deficits occurred in April and May. The NDVI development profile reflects the impact of lack of rainfall and lack of water inflow from the Mekong River into the lake region. NDVI was far below the 5YA until mid June, but reached above-average levels by late July. During this period, 90% of arable land was cropped and the fraction of cropped land was only 1% below the average compared to the 5YA.

Northern Plain and Northeast:

This region is an area of hilly highland and mountains such as the Dangrek Mountains. It is mostly covered by forest and some major crops such as rubber, cassava, cashew nuts and avocado. During this period, the rainfall was 25% below the average while the temperature (+0.8°C) and RADPAR (+7%) were above the 15YA. Due to the serious deficit of rainfall in this monitoring period, crop conditions were below average as indicated by NDVI development profile. CALF was high, at 99%.

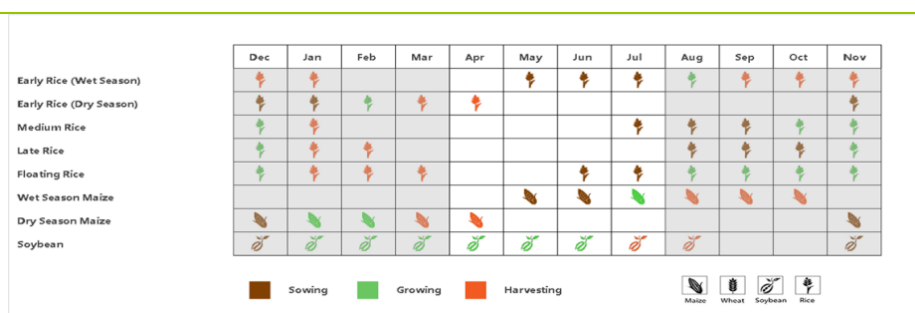
Mekong valley between Tonle-sap and Vietnam border:

This region mainly includes the Mekong Delta along the river. The area is generally flat and the major crop is rice. The rainfall was 14% below the average while temperature and RADPAR were 0.8°C and 2% above the 15YA. According to the NDVI development graph, the crop conditions were below the 5YA from April to the middle of June and recovered to last year's level by the end of July. During this period, 89% of arable land was cropped, near the 5YA.

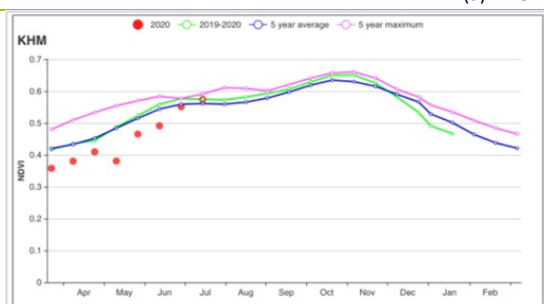
Southwest Hilly region:

This region contains a range of hills and mountains with forests that cover the Cardamom and Elephant Mountains. Various crops are grown, spices (pepper) and fruits (durian). The rainfall was 16% below average, while temperature (+ 0.8°C) and RADPAR (+6%) were above the 15YA. Due to the significant increase of RADPAR, the potential biomass was 7% above the 15YA. The NDVI development profile in this region indicates that crop conditions were generally below the 5YA, while they recovered to the 5YA by the end of July.

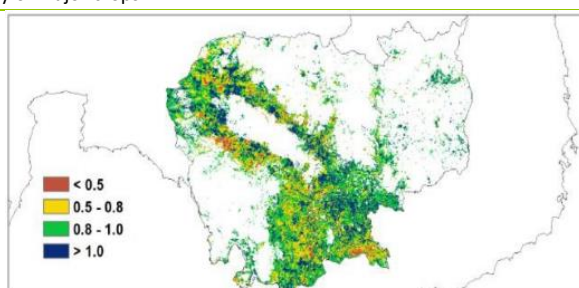
Figure 3.26 Cambodia's crop condition, April - July 2020



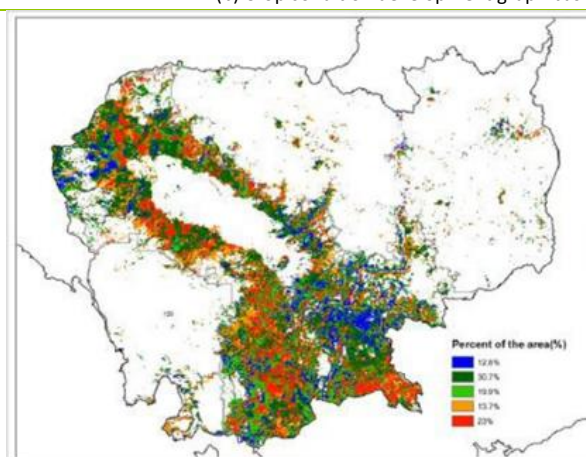
(a). Phenology of major crops



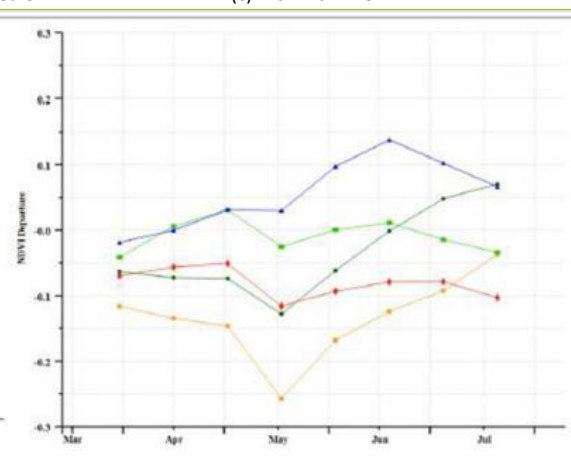
(b) Crop condition development graph based on NDVI



(c) Maximum VCI



(d) Spatial NDVI patterns compared to 5YA



(e) NDVI profiles

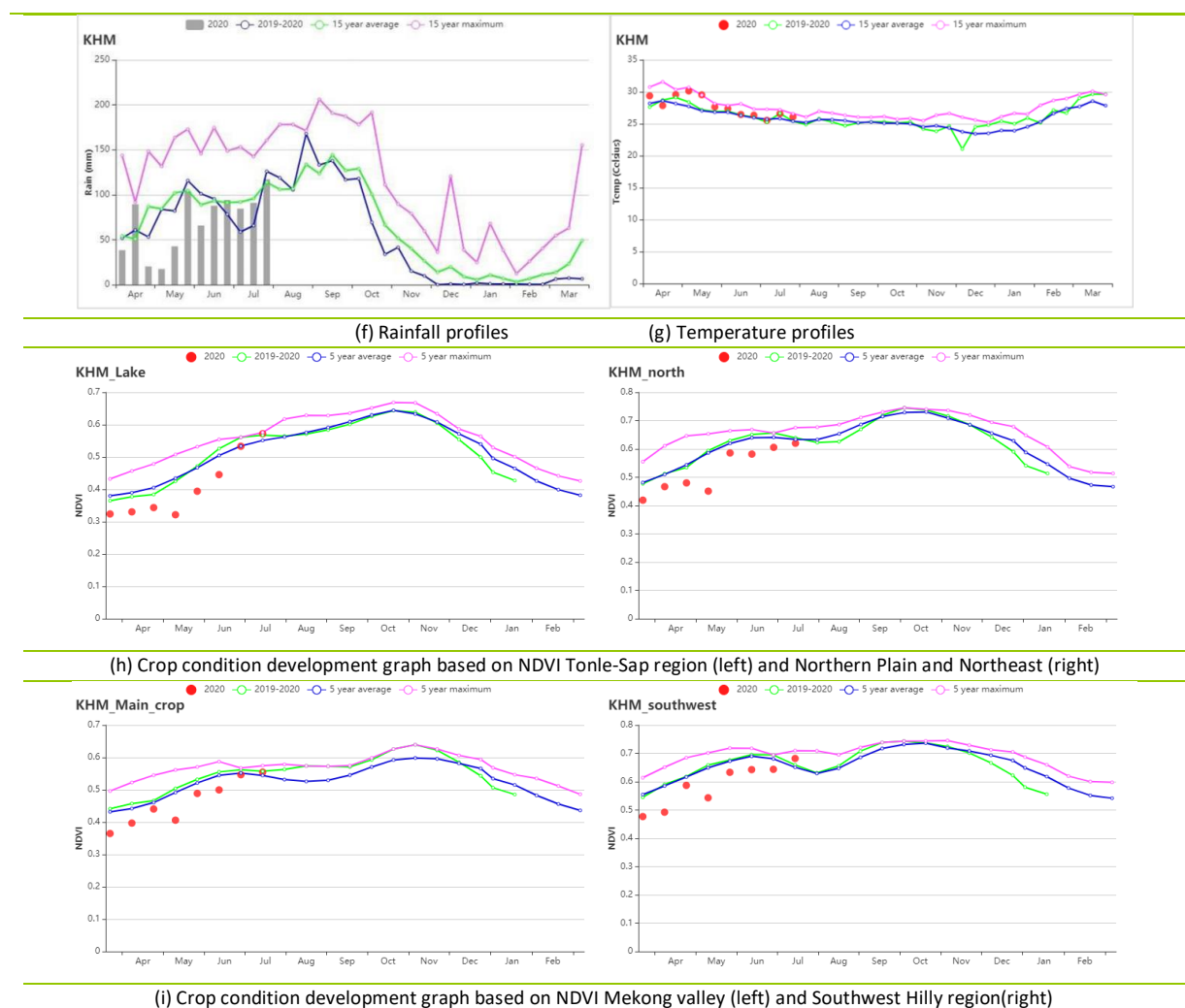


Table 3.43 Cambodia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Tonle-Sap	737	-13	28.0	0.9	1173	0	800	1
Mekong valley	832	-14	28.0	0.8	1198	2	819	3
Northern Plain and Northeast	914	-25	27.6	0.8	1209	7	813	7
Southwest Hilly region	869	-16	26.2	0.8	1251	6	864	7

Table 3.44 Cambodia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Tonle-Sap	93	-1	0.88
Mekong valley	89	0	0.88
Northern Plain and Northeast	99	0	0.89
Southwest Hilly region	99	0	0.92

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[LKA] Sri Lanka

This report covers the second season (Yala) sowing for rice and maize in June and July. According to the CropWatch monitoring results, crop conditions were normal for the period from April to July.

This period is dominated by the south-western monsoon, which is active between May and September. At the national level, precipitation (RAIN +9%) and temperature (TEMP +0.3°C) experienced a slight increase, while radiation decreased (RADPAR -4%) as compared to the 15YA. The increase in rainfall mainly happened in May. The fraction of cropped arable land (CALF) remained nearly comparable to the 5YA. BIOMSS was also comparable to the 15YA. As shown on the NDVI development graph, NDVI values were slightly below-average during April and were always near average from May to July. The below-average NDVI values in April can be regarded as a carry-over from the relatively poor crop conditions observed in the last monitoring period. The maximum VCI for the whole country was 0.98.

As shown by the NDVI clusters map and profiles, the trends were quite similar across the island. The whole country showed below-zero NDVI departure values in April. Nevertheless, most of the cropland showed better crop condition with NDVI departure values increasing and even above zero starting in May. 4% of cropland showed a large decline of NDVI values in early July, as well as the 12.5% of cropland in late July - although this may have been an outlier to due cloud cover. These croplands were distributed mainly in the southwest part of the country, including Western Province, west of Southern Province and south of Central Province. Moreover, 28.5% of cropland showed consistent below-zero NDVI departure values for the entire period. These croplands were distributed throughout the whole country except for the southwest region.

Regional analysis

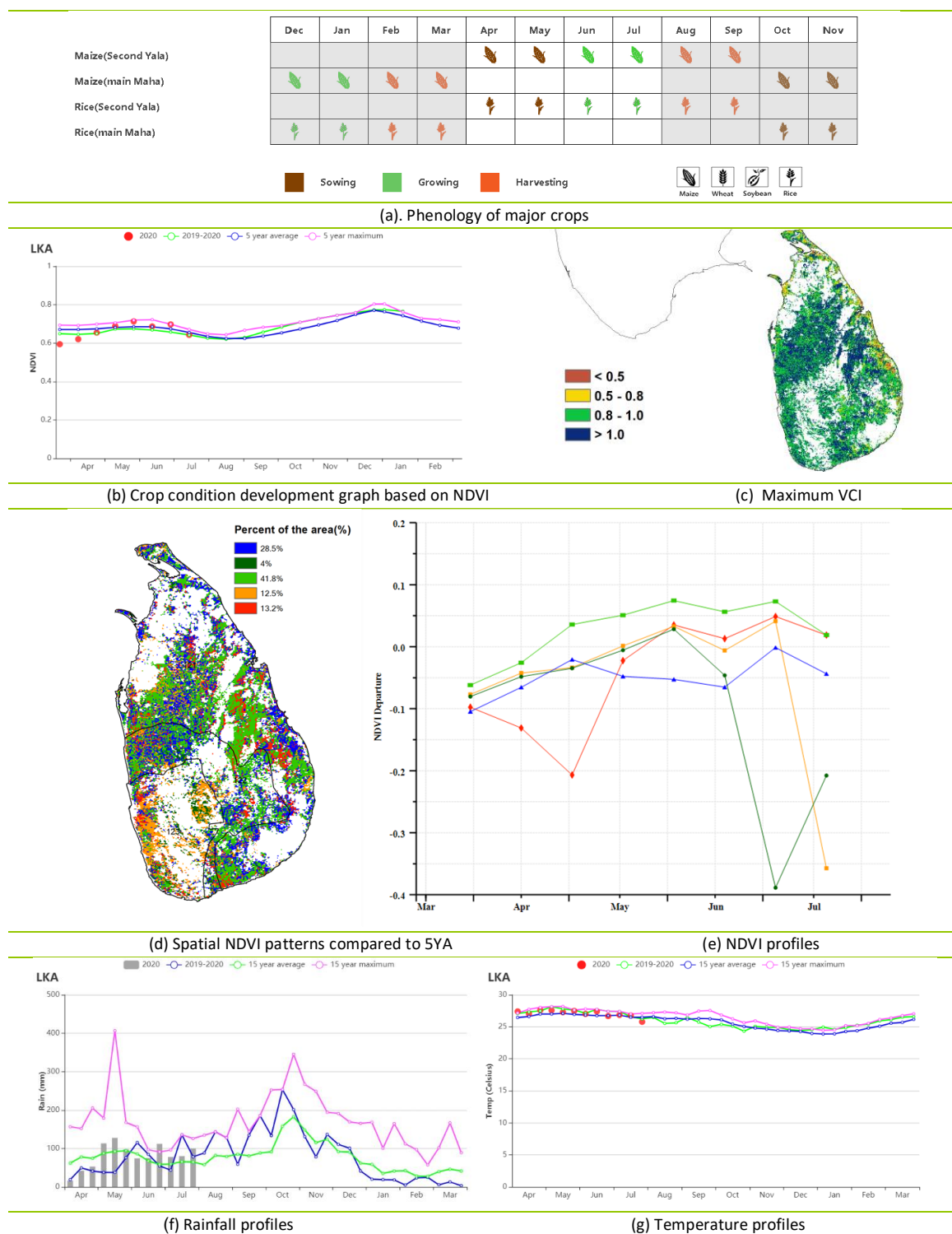
Based on the cropping system, climatic zones and topographic conditions, three sub-national agroecological regions can be distinguished for Sri Lanka. They are the Dry zone, the Wet zone, and the Intermediate zone.

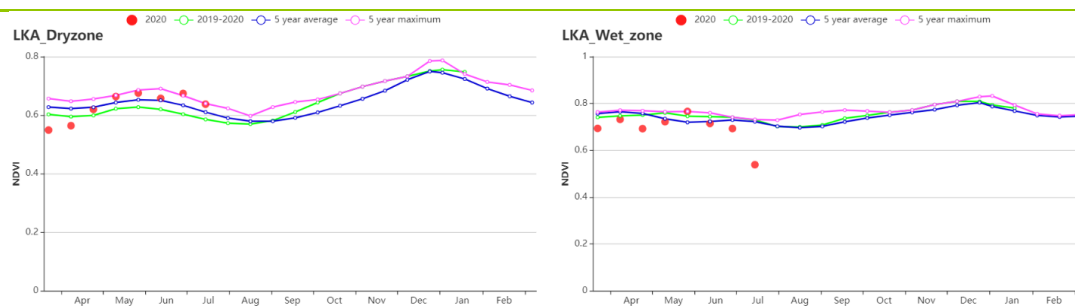
In the **Dry zone**, the recorded RAIN (440 mm) was 4% above average and amounted to more than 3 mm per day, which was close to the water demand of the growth of maize in this region. TEMP was 0.2°C above average with RADPAR down (-5%) and BIOMSS increased by 1% as compared to the 15YA. CALF was 1% up compared to the 5YA level and cropland was near fully utilized. NDVI followed a similar trend as the whole county. The VCIX for the zone was 0.96. Overall, crop conditions were average for this zone.

The **Wet zone** continued to go through the rainy season during this monitoring period. RAIN (2070 mm) was up by 11% as compared to the 15YA. TEMP (+0.5°C) was higher and RADPAR was near average. BIOMSS was comparable to the 15YA and cropland was fully utilized as usual. NDVI followed a similar trend as the whole county. The VCIX value was 0.99. Crop conditions were favorable for this zone.

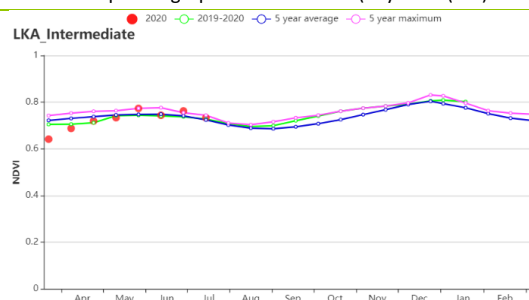
The **Intermediate zone** also experienced abundant rain (RAIN 1060 mm), 16% above the 15YA. This is more than 8 mm per day and is more than sufficient for rice and maize. TEMP was up by 0.1°C and RADPAR down by 5% compared to the 15YA. With full use of cropland, BIOMSS was 2% below average. The NDVI values fluctuated around the average. The VCIX value for the zone was 1. Condition of crops was assessed as average.

Figure 3.27 Sri Lanka crop condition, April 2020 - July 2020





(h) Crop condition development graph based on NDVI (Dry zone (left) and Wet zone (right))



(i) Crop condition development graph based on NDVI (Intermediate zone)

Table 3.45 Sri Lanka agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Dry zone	440	4	28.0	0.2	1249	-5	857	1
Wet zone	2070	11	25.2	0.5	1155	-1	784	0
Intermediate zone	1060	16	25.4	0.1	1136	-5	763	-2

Table 3.46 Sri Lanka agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Dry zone	97	1	0.96
Wet zone	100	0	0.99
Intermediate zone	100	0	1.00

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[MAR] Morocco

During this monitoring period, wheat, barley and maize reached maturity. Harvest typically takes place in early May.

As reported in the previous bulletin, Morocco suffered from a severe drought during the January to February period, which caused crop failures (mainly wheat and barley) in the southern regions of the country. The situation was slightly better in the north. As the rainfall improved in March, some farmers replanted their fields with short season legume crops.

Overall crop conditions in Morocco during the monitoring period (April - July) were unfavourable. The cumulative rainfall reached 115 mm, which was 36% above the 15-year average (15YA). The rainfall index graph shows that the rainfall was higher than the 15YA during April and May. The average temperature reached 20.6°C (0.3°C above the 15YA). The RADPAR was 1543 MJ/m² (3.5% below the 15YA).

The nationwide NDVI development graph indicates below-average crop conditions during the whole monitoring period. The NDVI spatial pattern shows that only 30.5% of the cultivated area was above the 5YA crop conditions and 69.6% were below. Estimated BIOMSS (-2%) was below average for this monitoring period. The VCIx value was just 0.58, indicating poor nationwide crop conditions. The CALF was below the 5YA by 30%, which can be attributed to the crop failures observed during the previous monitoring period.

Regional Analysis

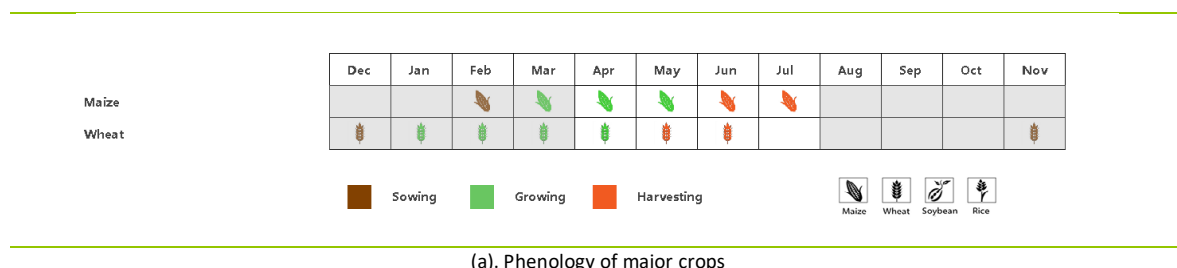
CropWatch delineates three agro-ecological zones (AEZs) relevant for crop production in Morocco: the Sub-humid northern highlands, the Warm semiarid zone, and the Warm subhumid zone.

Sub-humid northern highlands: rainfall was above the 15YA by 58%. The RADPAR reached 1500 MJ/m² (-5%) while the BIOMSS was near average. The NDVI profile confirms generally good crop conditions, as it was above the 5YA throughout the monitoring period. The CALF increased by 3% over the 5YA, and the average VCIx was 0.87, which confirms the near average conditions.

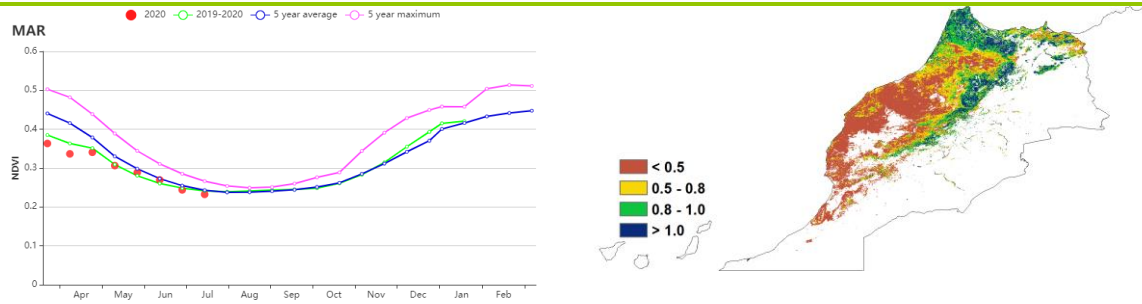
Warm semiarid zone: Rainfall was 16% higher than the 15YA; RADPAR was 3% below the 15YA. The resulting reduction in BIOMSS was 7%, mainly due to a reduction in RADPAR. CALF was 61% below the 5YA, which can be attributed to the severe drought observed in January and February. The maximum VCI for this zone was only 0.4, indicating below-average crop conditions. The NDVI profile confirms the generally poor crop conditions, as it was below the 5YA throughout the monitoring period.

Warm sub-humid zone: the average rainfall was 150 mm (43% above the 5YA). The RADPAR was 4% below 15YA, while the BIOMSS was 3% above the average. The CALF was below the 5YA average by 26%. The estimated VCIx was moderate (0.7). The crop condition development graph based on NDVI indicated below-average conditions until May, when the crops were harvested. Conditions were unfavorable for this zone.

Figure 3.28 Morocco's crop condition, April - July 2020

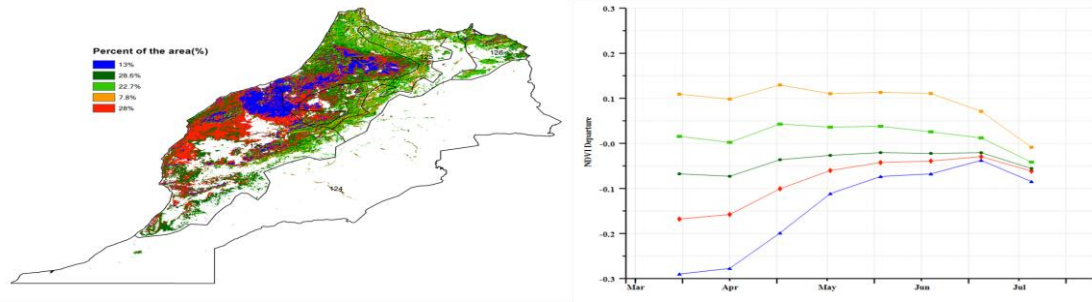


(a). Phenology of major crops



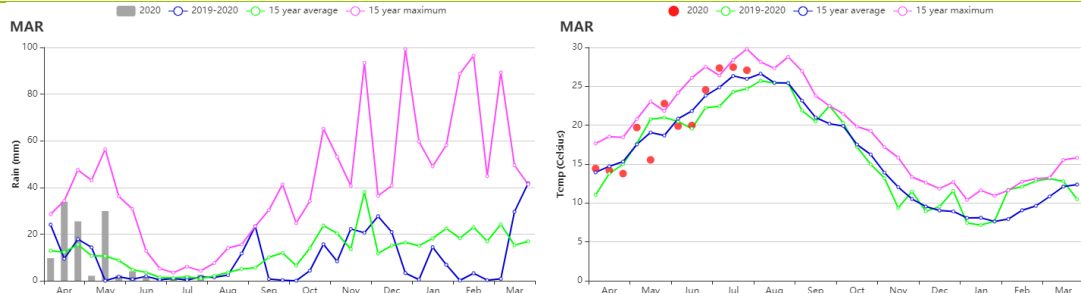
(b) Crop condition development graph based on NDVI

(c) Maximum VCI



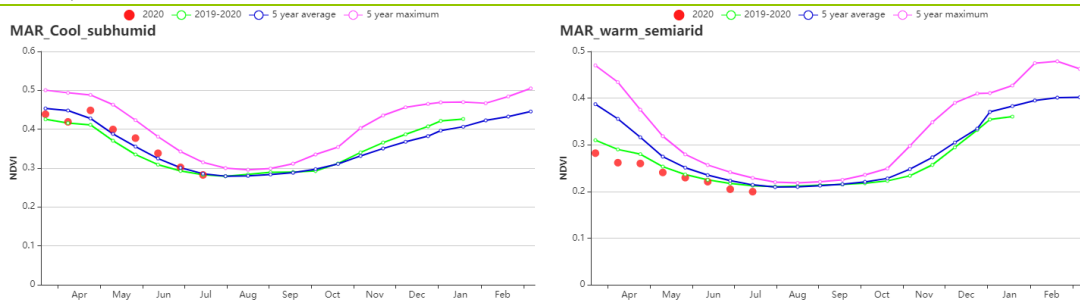
(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles

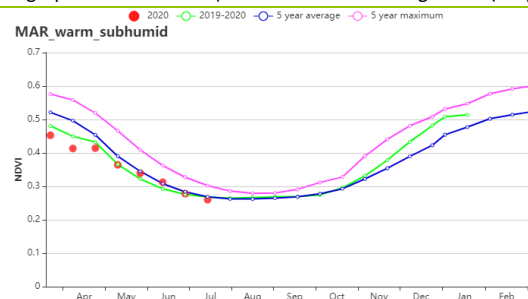


(f) Rainfall profiles

(g) Temperature profiles



(h) Crop condition development graph based on NDVI (Sub-humid northern highlands (left) and Warm semiarid zones (right))



(i) Crop condition development graph based on NDVI (Warm subhumid zones)

Table 3.47 Morocco's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Sub-humid northern highlands	184	58	20.0	0.0	1500	-5	633	0
Warm semiarid zones	68	16	21.0	0.0	1578	-3	590	-7
Warm sub-humid zones	150	43	20.0	0.0	1517	-4	679	3

Table 3.48 Morocco's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Sub-humid northern highlands	58	3	0.87
Warm semiarid zones	10	-61	0.40
Warm sub-humid zones	51	-26	0.70

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[MEX] Mexico

In Mexico, winter wheat harvest began in April. Maize and soybean planting started in May and will reach maturity by September/October.

The CropWatch agroclimatic indicators show that TEMP (+0.6°C) and RADPAR (-1%) were close to average and RAIN was slightly above the 15YA (+6%), which was beneficial for crop growth. Accordingly, BIOMSS increased by 5% as compared to the 15YA. However, VCIx was relatively low (0.76) and CALF decreased by 5% but still slight above the previous year. Reasons for this decline are not clear, but could be related to a negative impact of COVID-19 on the agricultural market. Crop conditions are mixed, ranging from slightly unfavorable to average.

At the national scale, the NDVI development graph trailed below average between April to July. But the conditions varied greatly across the country. According to its spatial pattern, the VCIx in the south was higher than that in the north. Very high values (greater than 1.0) occurred mainly in southeastern Mexico (including Veracruz, Tabasco and western Campeche), whereas extremely low values (less than 0.5) occurred in the drier north-east and center of the country (northwestern Coahuila, eastern Sonora, Sinaloa and eastern Coahuila). The VCIx in other regions of Mexico was moderate, with values between 0.5 and 1.0. As shown in the spatial NDVI profiles and distribution map, about 29.2% of the total cropped areas were below average during the entire monitoring period, mainly distributed in the west of Guerrero, west of Oaxaca, west of Michoacán, Tamaulipas, Veracruz, Nuevo León while 17.9% of the total cropped areas, mainly in Chihuahua and Sonora provinces, were just slightly above average. An area accounting for 35.1% of the total region changed little and was close to average.

Regional analysis

Based on cropping systems, climatic zones and topographic conditions, Mexico is divided into four agro-ecological regions. They include the Arid and semi-arid region (128), Humid tropics with summer rainfall (129), Sub-humid temperate region with summer rains (130) and Sub-humid hot tropics with summer rains (131). Regional analyses of crop conditions can provide more detail for the production situation in Mexico.

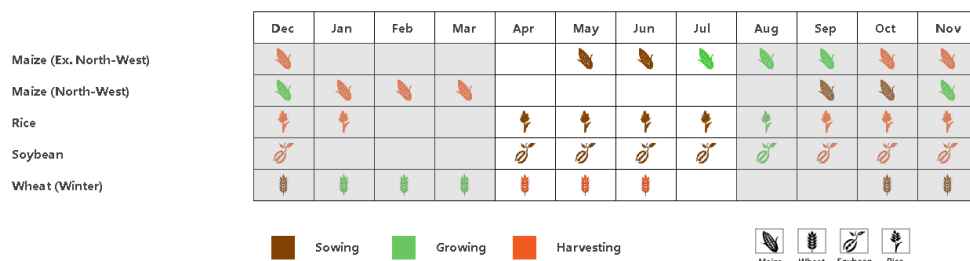
The Arid and semi-arid regions, located in northern and central Mexico, account for about half of planted areas in the country. According to the NDVI development graph, crop condition in this region was generally close to average during the reporting period. VCIx was relatively low with a value of 0.65 and CALF decreased by 13% compared with 5YA. RAIN and TEMP increased by 23% and 0.4°C respectively and RADPAR decreased by 3%, which all resulted in an increase of BIOMSS (+9%).

The region of Humid tropics with summer rainfall is located in southeastern Mexico. RAIN was significantly above average (+21%), TEMP was 0.6°C warmer and RADPAR near the fifteen-year average. As shown in the NDVI development graph, crop conditions were below average in April and closed to average from May to July. BIOMSS decreased by 3% and the VCIx (0.93) confirmed favorable crop condition in these regions.

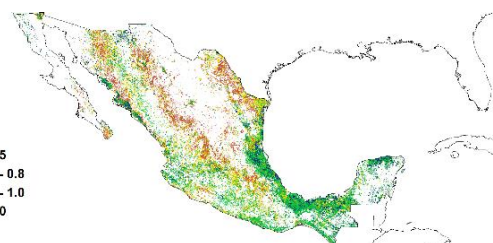
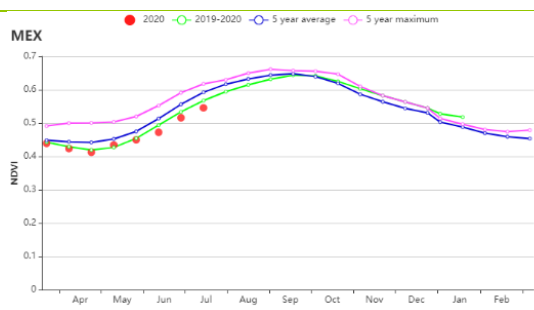
The Sub-humid temperate region with summer rains is situated in central Mexico. According to the NDVI development graph, crop conditions remained close to average in this region. The agro-climatic condition showed that RAIN decreased by 11% and TEMP increased by 0.7°C, respectively and RADPAR increased by 1% compared to average. BIOMSS also increased by 3% and CALF was 93%. The VCIx in these regions was low, only 0.73. The production of rice and soybean in the region is expected to decline.

The region called Sub-humid hot tropics with summer rains is located in southern Mexico. During the monitoring period, crop condition was below average since April, as shown by the NDVI time profiles. Agro-climatic conditions showed that RAIN was slightly below average (-6%) while TEMP and RADPAR were near average (+0.7°C and 0%). The VCIx in these areas were 0.84 and BIOMSS was near average.

Figure 3.29 Mexico's crop condition, April - July 2020

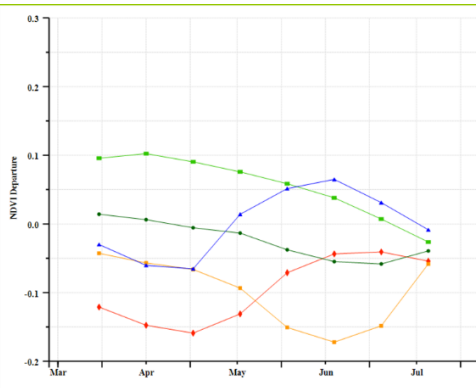
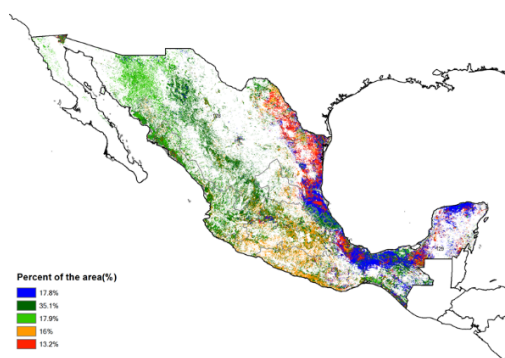


(a). Phenology of major crops



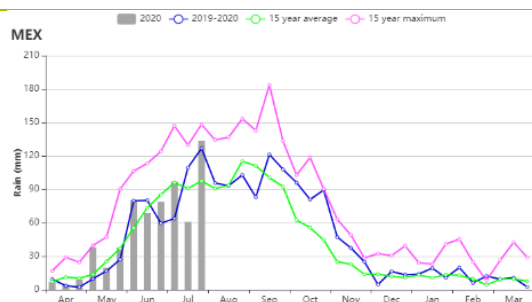
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

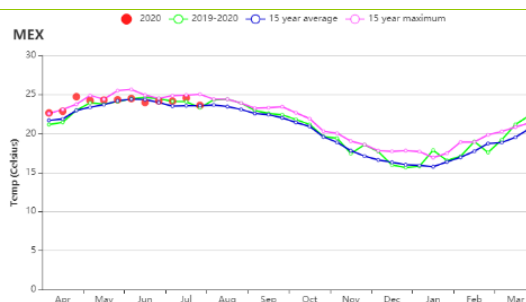


(d) Spatial NDVI patterns compared to 5YA

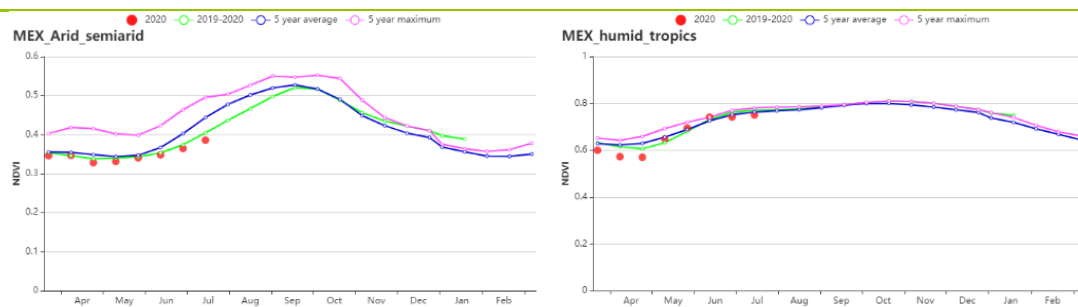
(e) NDVI profiles



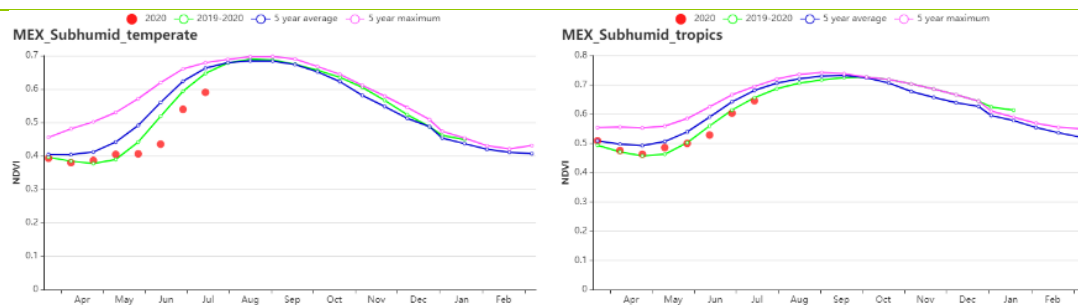
(f) Rainfall profiles



(g) Temperature profiles



(h) Crop condition development graph based on NDVI (Arid and semi-arid regions (left) and Humid tropics with summer rainfall (right))



(i) Crop condition development graph based on NDVI (Sub-humid temperate region with summer rains (left) and Sub-humid hot tropics with summer rains (right))

Table 3.49 Mexico's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Arid and semi-arid regions	441	23	23.5	0.4	1518	-3	736	9
Humid tropics with summer rainfall	1016	21	26.6	0.6	1368	0	845	-3
Sub-humid temperate region with summer rains	635	-11	21.3	0.7	1461	1	684	3
Sub-humid hot tropics with summer rains	628	-6	24.2	0.7	1459	0	744	3

Table 3.50 Mexico's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Arid and semi-arid regions	59	-13	0.65
Humid tropics with summer rainfall	100	0	0.93
Sub-humid temperate region with summer rains	93	-2	0.73
Sub-humid hot tropics with summer rains	95	-1	0.84

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[MMR] Myanmar

This monitoring period covers the pre-monsoon and beginning of the monsoon season in Myanmar. Harvesting of maize was completed in April, while the second rice (summer rice) was harvested between April and June. The planting of main rice (monsoon rice) started in May to June. However, the planting period varies according to region and weather conditions.

RAIN (-18%) was considerably lower than the 15YA, whereas TEMP (+0.4°C) and RADPAR (+4%) were above the 15YA. Potential cumulative biomass (BIOMSS) was close to average (+1%). 28.8% of cropland showed a positive NDVI departure, mostly located in the Delta and Southern Coast region including Yangon, Bago, Ayeyarwady, part of Magwe, Sagaing, Thanintaryi and Shan State during June and July. Only 9.6% of the cropland, mainly in the Hills regions showed a negative NDVI departure throughout the monitoring period. The VCIx was less than 0.5 in the central dry zone. Higher values were observed in the other regions. There were large differences among the regions and the conditions vary from below average (Central Plain) to favorable (Delta and Southern Coast).

Regional analysis

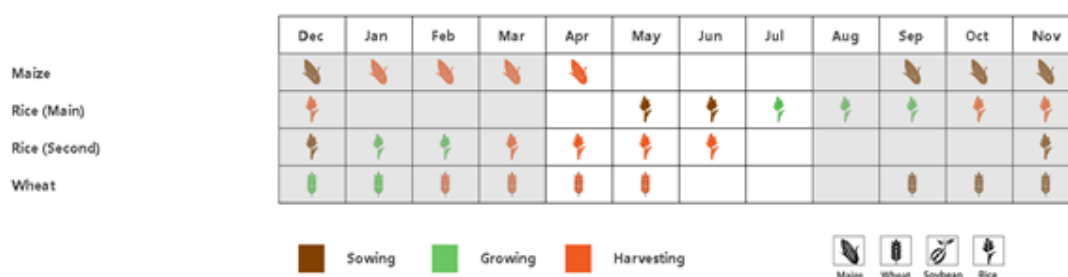
Three sub-national agro-ecological zones (AEZ) can be distinguished for Myanmar based on the cropping system, climatic zones and topographic conditions. They are the Central plain, the Hills and the Delta and Southern Coast regions.

The Central Plain had a rainfall deficit (RAIN -35%), while TEMP (+ 0.8°C) and RADPAR (+7%) were above the 15YA. The resulting BIOMSS was higher than the 15YA by 4%, which was the largest departure among the three sub-national regions. CALF (76%) was far away from full utilization, and 8% below the 5YA. NDVI was slightly below the 5YA level during the whole period. The crop condition is assessed as below the 5YA level.

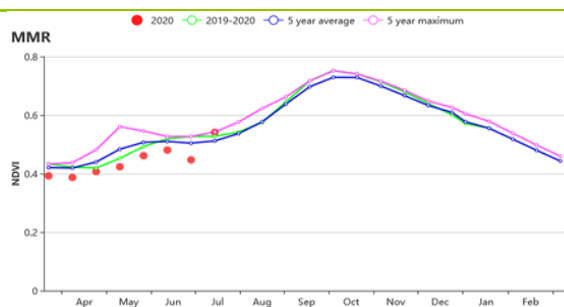
The Hills region had the highest RAIN (1473 mm) compared with the other two sub-national regions, but it was 4% below the 15YA, while TEMP was close to average and RADPAR was increased by 2%. As a result, the BIOMSS was at the same level as the 15YA. The cropland was almost fully used (CALF 95%). The development of NDVI was better than in the other regions and reached average levels in June. The VCIx was 0.92. The crop condition for this region is normal.

The Delta and Southern Coast region experienced a dry pre-monsoon season, with RAIN (-41%) far below the 15YA. TEMP and RADPAR increased by 0.7°C and 6%, respectively. BIOMSS was slightly higher (+1%) than the 15YA. The vast majority of cropland in this region is irrigated. Therefore, the lack of rainfall had a limited negative impact on crop growth and NDVI development. CALF was 14% above the 5YA and VCIx at 1.02. Hence, crop conditions in this region can be assessed as favorable.

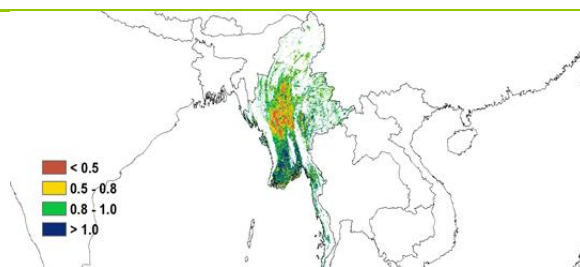
Figure 3.30 Myanmar's crop condition, April- July 2020



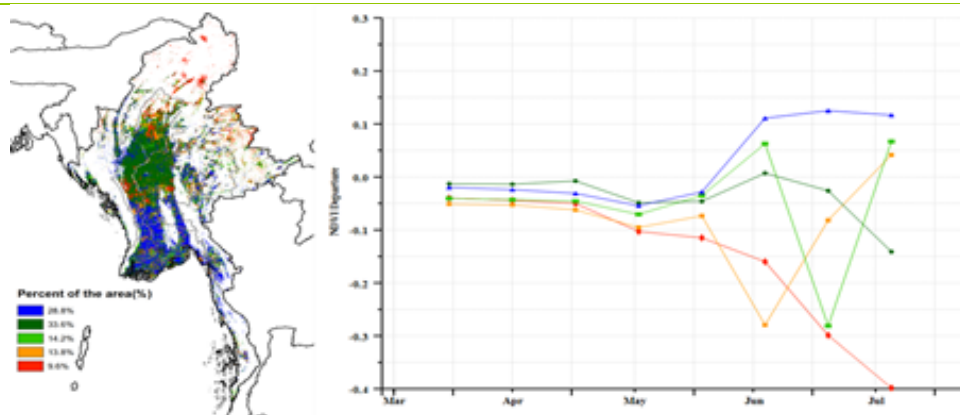
(a). Phenology of major crops



(b) Crop condition development graph based on NDVI

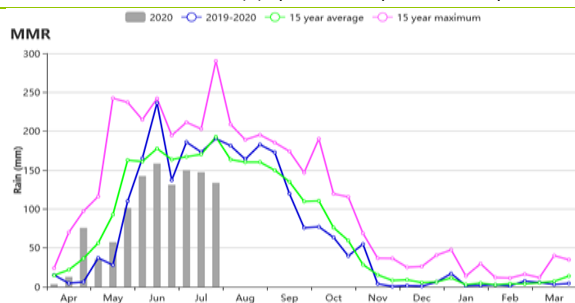


(c) Maximum VCI

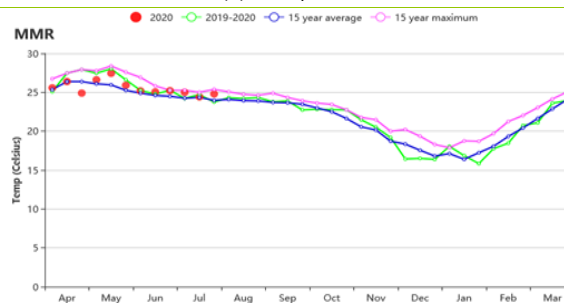


(d) Spatial NDVI patterns compared to 5YA

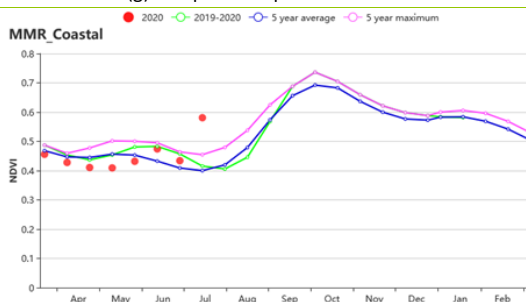
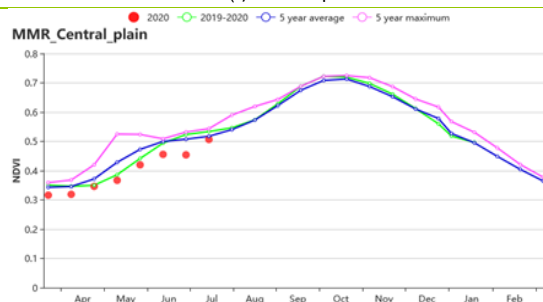
(e) NDVI profiles



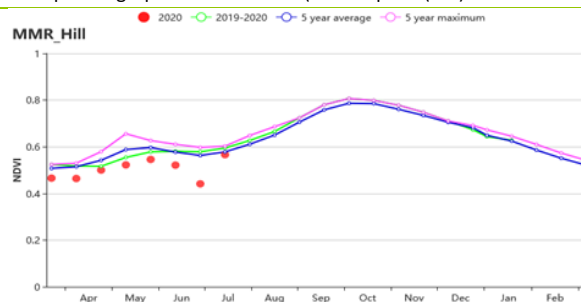
(f) Rainfall profiles



(g) Temperature profiles



(h) Crop condition development graph based on NDVI (central plain (left) and delta and southern coast (right))



(i) Crop condition development graph based on NDVI (Hills region)

Table 3.51 Myanmar's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Central plain	602	-35	27.1	0.8	1263	7	767	4
Hills region	1473	-4	23.8	0.0	1154	2	678	0
Delta and southern coast	1062	-41	28	0.7	1285	6	761	1

Table 3.52 Myanmar's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April- July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Central plain	76	-8	0.80
Hills region	95	1	0.92
Delta and southern coast	88	14	1.02

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[MNG] Mongolia

This monitoring period covers the dry spring and wet summer season in Mongolia from April to July. Wheat, which is the main cereal crop, is sown in early May.

The agroclimatic indicators for this 4-month period show a large increase in rainfall (RAIN, +93%), slight increase in temperature (TEMP, +0.1°C) and a decrease in radiation (RADPAR, -5%). The decline in solar radiation caused a reduction in estimated biomass by 7% as compared to the 15YA. The recorded crop arable land fractions (CALF, 98%-100%) and maximum vegetation condition index (VCIx, 0.83-0.94) were favorable. The crop condition development graph based on NDVI for the entire country indicates that crop conditions were close to the average of the past five years from April to June and surpassed the average in July.

The maximum VCIx map shows that relatively poor crop conditions (around 40%) were observed in the west of the Selenge-Onon region, and the middle and southern part of the Hangai Khuvsgul region. The eastern part of Selenge-Onon had favorable conditions and the northern part of Hangai Huvsgul slightly less favorable conditions. However, the conditions for almost all of the arable land improved at the end of June. Generally, crop conditions can be assessed as favorable in Mongolia.

Regional analyses

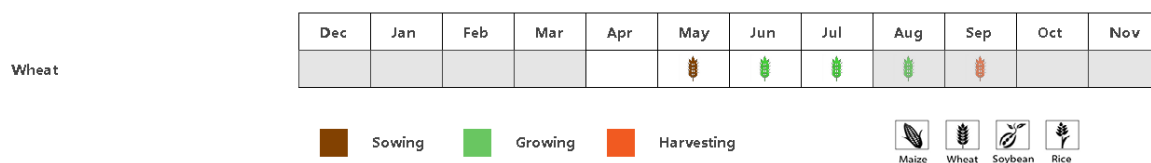
Taking into consideration the climate, vegetation, altitude, soil, and farming systems, Mongolia is divided into five agro-ecological zones (AEZ). Three of them (Selenge-Onon Region, Central, and Eastern Steppe, and Hangai Khuvsgul Region) are cultivated as cropland, and two (Altai and Gobi Desert) are non-agriculture land.

In the Selene-Onon region, RAIN was 107% above average, but temperature and radiation were below average (TEMP -0.1°C; RADPAR -0.6%). Estimated BIOMSS decreased by 9%, and the cropped arable land fraction was up by 4%. The maximum VCIx for this region was 0.94. The crop condition development graph indicates that the crop conditions gradually improved overtime and surpassed the 5YA in June and reached record levels in July.

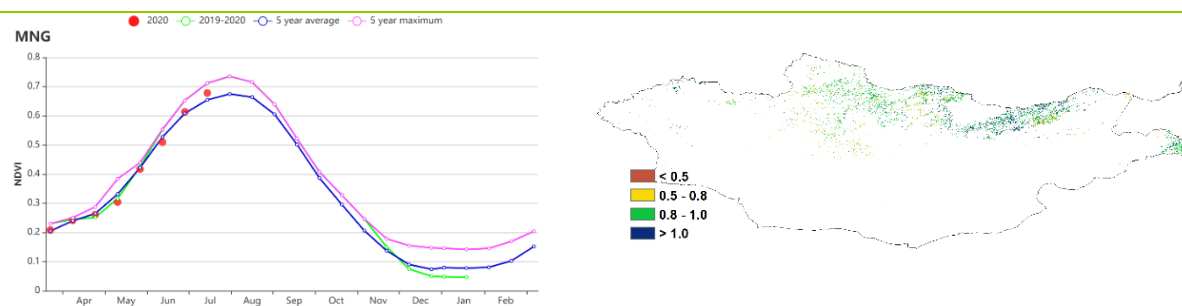
RAIN and TEMP in the Hangai Khuvsgul region increased by 72% and 0.5% respectively, while the RADPAR was slightly lower (-2%). Accordingly, BIOMASS declined by 2% from the fifteen-year average. VCIx (0.83) was just average, and CALF was elevated by 1%. Even though most of the agroclimatic indicators show favorable conditions, the overall conditions were below average in this region based on the NDVI profile, as it stayed below the 5YA. However, conditions were more favorable in the northern part of this region.

For the first three months, crop conditions were below the five-year average, but improved in July in the Central and Eastern Steppe region. This region also received above-average rainfall (RAIN, +88%). Temperatures (TEMP -0.1°C) and radiation (RADPAR -7%) were below average. CALF increased by 2%, and regional VCIx was 0.90. Estimated BIOMSS decreased by 8%. The Central and Eastern Steppe region has only a small fraction of cropland. Most of it experienced slightly unfavorable conditions between April and June, but the situation improved in July.

Figure 3.31 Mongolia's crop condition, April - July 2020

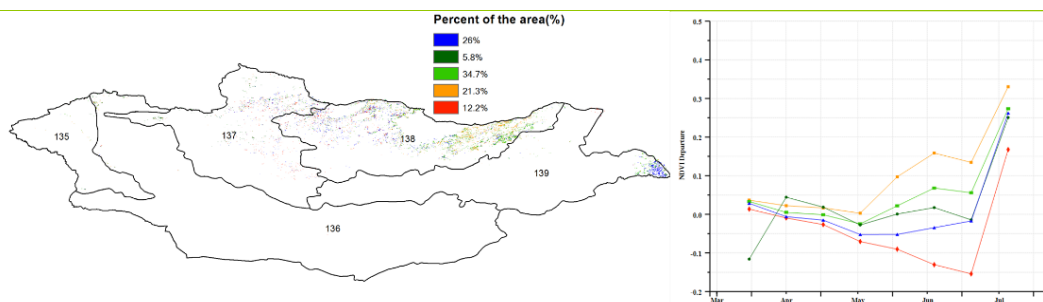


(a). Phenology of major crops



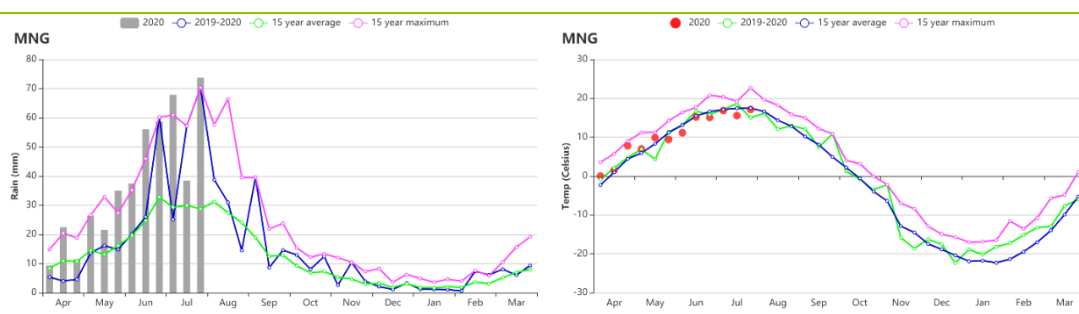
(b) Crop condition development graph based on NDVI

(c) Maximum VCI



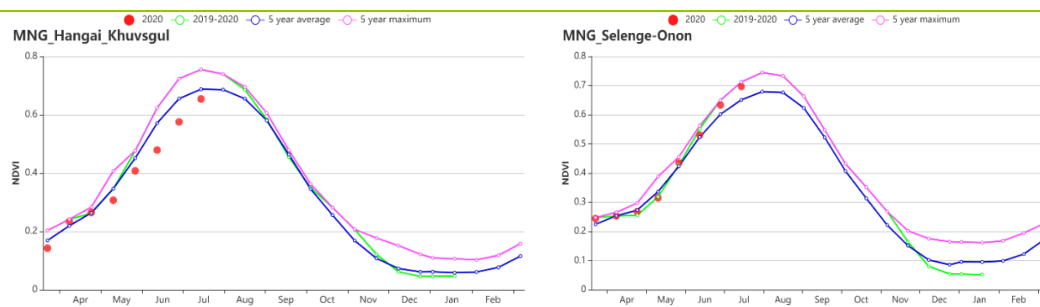
(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles

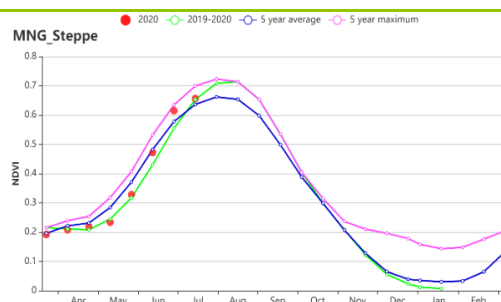


(f) Rainfall profiles

(g) Temperature profiles



(h) Crop condition development graph based on NDVI (Hangai Khuvsgul Region (left) and Selenge-Onon Region (right))



(i) Crop condition development graph based on NDVI (Central and Eastern Steppe)

Table 3.53 Mongolia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Hangai Khuvsgul Region	457	72	8.4	0.4	1365	-2	369	
Selenge-Onon Region	483	107	11.1	-0.1	1293	-6	418	
Central and Eastern Steppe	370	88	13.5	-0.1	1265	-7	488	

Table 3.54 Mongolia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Hangai Khuvsgul Region	99	1	0.83
Selenge-Onon Region	100	4	0.94
Central and Eastern Steppe	98	2	0.9

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[MOZ] Mozambique

The April-July 2020 reporting period covers the late grainfilling phases of maize and rice in the northern region. Harvest took place in April and May. It also covers the main growing season for wheat, which was harvested by July. The effect of below-average soil moisture combined with below-average rainfall and the early cessation of rains in the southern and central regions could negatively impact the ongoing second season, which is mainly used for vegetable production.

At the national level, rainfall was 24% below average (99 mm). The recorded temperature was 19.9°C (0.1°C below the 15YA). Radiation decreased by about 3%. Altogether (rainfall, temperature and radiation) contributed to the decrease in biomass by about 2%. CALF was near average. Based on the NDVI graph, crop conditions were below average during the entire period. The NDVI clustering reveals that crop conditions in 6.2% of the area in Mozambique were above the five-year average, especially along the Limpopo and Zambezi riverbanks where VCIx was close to 1.

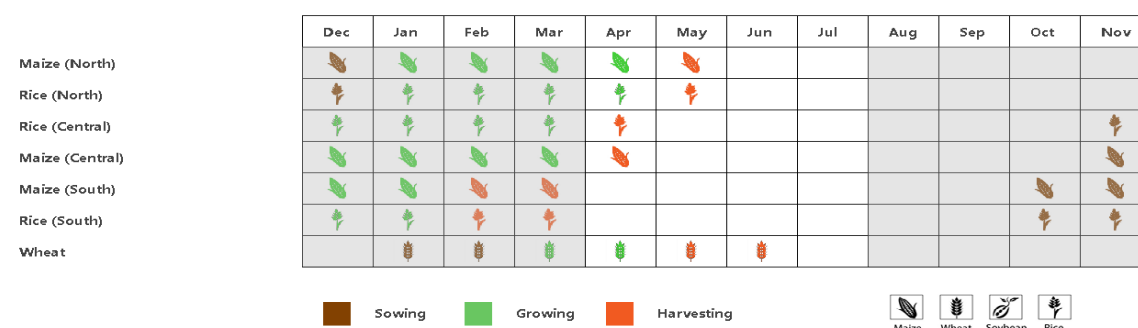
The favorable VCIx conditions observed in these regions correspond to the ongoing second season which is mainly used for vegetables and irrigated rice. Meanwhile, 14.3% of the country recorded far below average crop conditions, mostly in the Tete, Zambézia, and Nampula provinces. The national average maximum VCIx was recorded at 0.81. Mixed crop conditions were observed throughout the country with the overall conditions being below the 5-year average.

Regional analysis

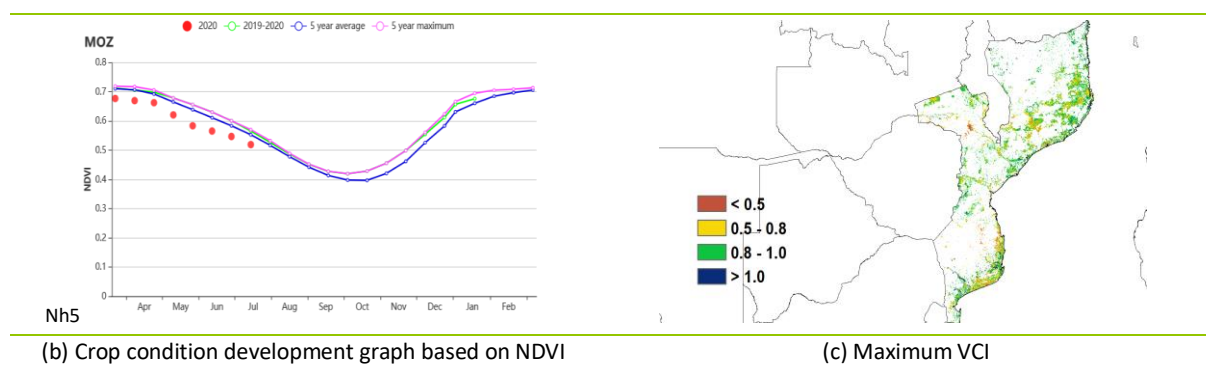
According to the cropping system, topography and climate, CropWatch has subdivided Mozambique into five agro-ecological zones (AEZ): (1) Buzi Basin, (2) Northern High-altitude Areas, (3) Low Zambezi River Basin, (4) Northern Coast, and (5) Southern Region.

During the reporting period, all the agro-ecological regions recorded significant decreases in rainfall when compared to the past fifteen years-average. The Northern high-altitude areas and the Northern coast zone recorded the highest reductions by about 44% and 30%, respectively. The temperature was below average in the Buzi basin (-0.4°C), Northern high-altitude areas (-0.3°C) and Southern region (-0.2°C). With the exception for Northern high-altitude areas, radiation and biomass were also lower in the remaining zones. About average CALF was verified in the Buzi basin, Northern high-altitude areas, and Northern coast, while in the Low Zambezi river basin CALF decreased by 2%. With maximum VCIx varying from 0.79 to 0.89, the crop development graph based on NDVI indicates below-average crop conditions during the entire monitoring period in all agro-ecological zones.

Figure 3.32 Mozambique's crop condition, April-July 2020

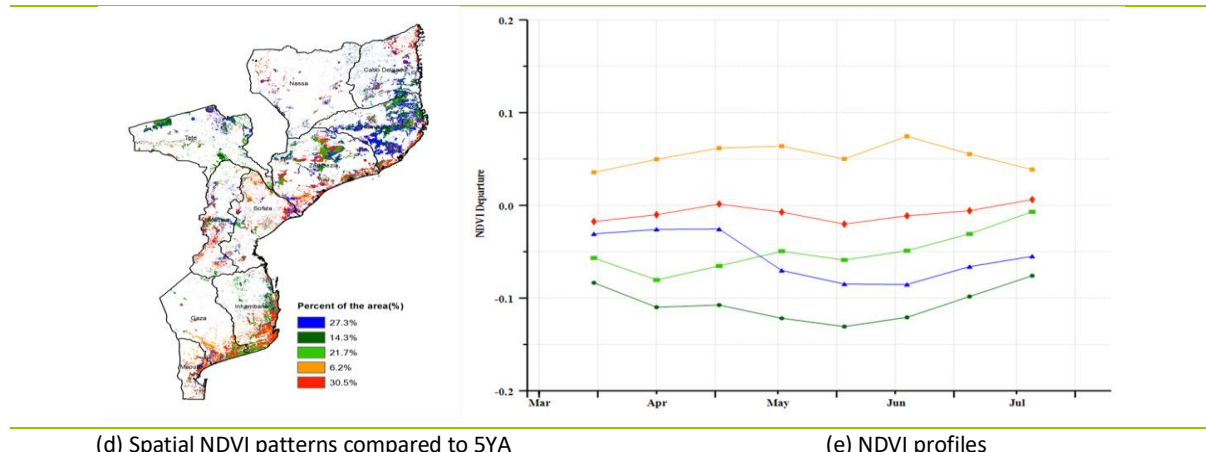


(a) Phenology of major crops



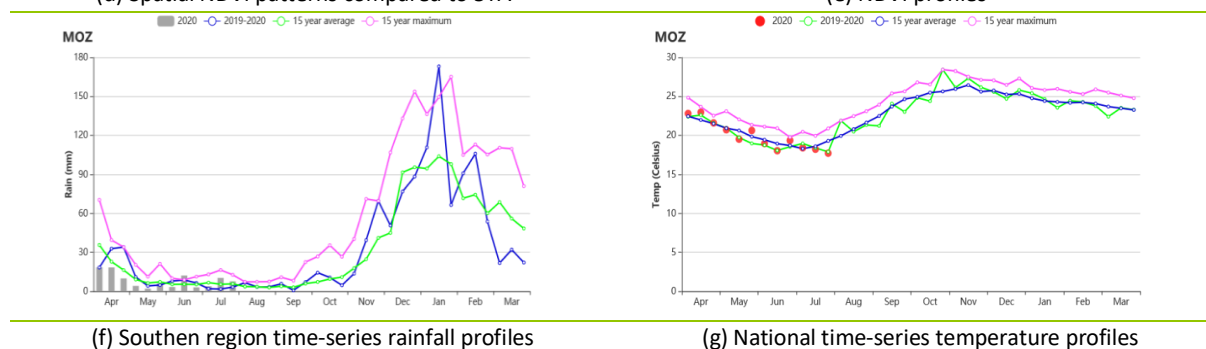
(b) Crop condition development graph based on NDVI

(c) Maximum VCI



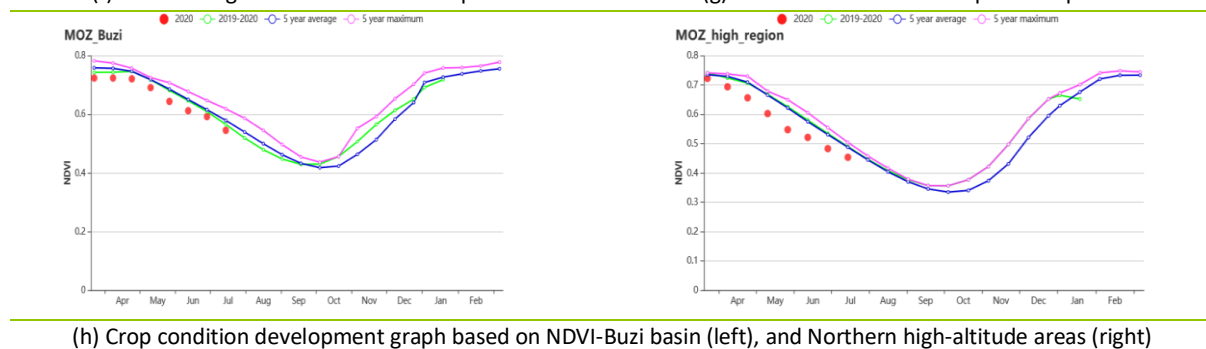
(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles

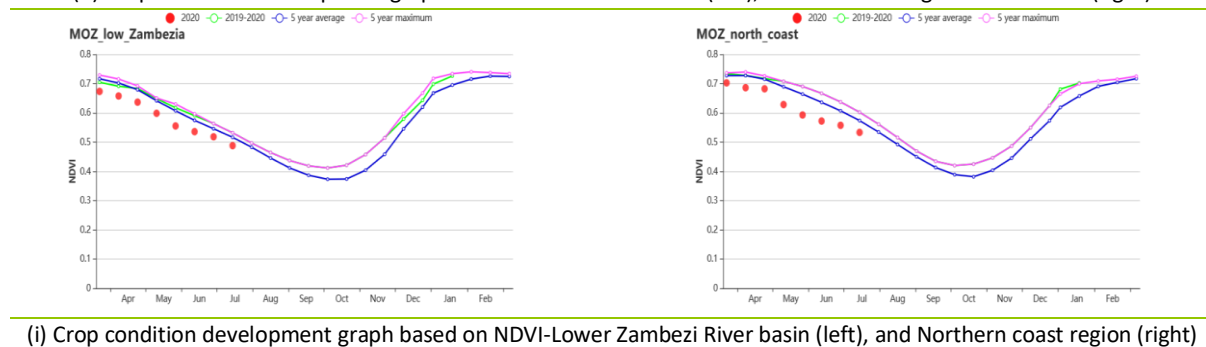


(f) Southern region time-series rainfall profiles

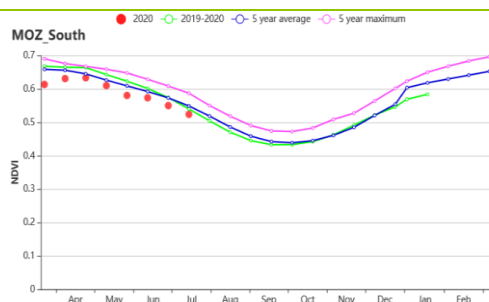
(g) National time-series temperature profiles



(h) Crop condition development graph based on NDVI-Buzi basin (left), and Northern high-altitude areas (right)



(i) Crop condition development graph based on NDVI-Lower Zambezi River basin (left), and Northern coast region (right)



(j) Crop condition development graph based on NDVI- Southern region

Table 3.55 Mozambique's agro-climatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Buzi basin	89	-16	17.0	-0.4	961	-4	417	-2
Northern high-altitude areas	66	-44	19.2	0.0	996	0	503	0
Low Zambezi River basin	110	-9	19.4	-0.3	924	-4	463	-2
Northern coast	119	-30	21.0	0.0	964	-2	553	-1
Southern region	91	-10	20.3	-0.2	861	-4	454	-2

Table 3.56 Mozambique's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2020

Region	CALF		Maximum VCI
	Current (%)	Departure (%)	Current
Buzi basin	100	0	0.85
Northern high-altitude areas	100	0	0.89
Low Zambezia River basin	96	-2	0.80
Northern coast	100	0	0.82
Southern region	99	1	0.79

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[NGA] Nigeria

The current period from April to the end of July was marked by the start of the rainy season in April. In the South, the harvest of maize took place, as well as the planting of rainfed and irrigated rice. In the north, the sowing of cereals like millet, sorghum and maize started in May. Security, hampering crop production, is still a challenge for the northern part of the country.

At the national level, precipitation was 24% below the 15YA. Average temperatures were 0.5°C above the 5YA and radiation was also 2% higher. As a result, biomass production potential was slightly higher (+1%). Cropped land was reduced by 4%, and the vegetation condition was at 0.83. NDVI fell below the 5YA starting in June. Crop conditions are unfavorable.

Regional analysis

The analysis covers the four main agro-ecological zones; zone sudano-sahel in the north which is the driest zone, Guinea savanna and derived savanna zone in the center and the humid forest zone in the south.

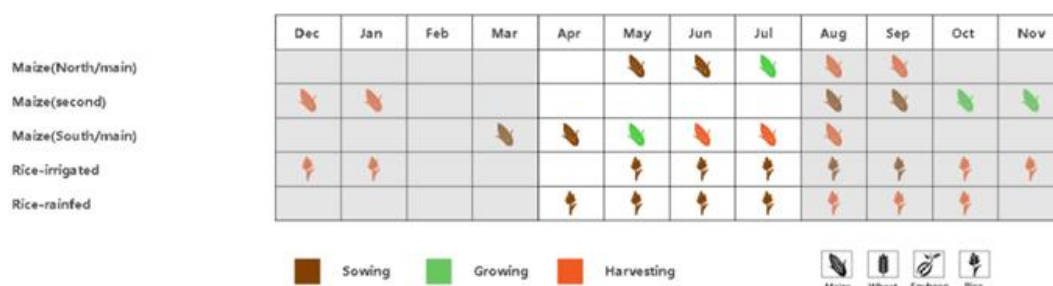
In the north, The Sudano-Sahelian zone recorded a reduction of 54% in rainfall, with a 0.7°C increase in temperature and average radiation as compared to the 15YA. These conditions bring the biomass to 643 gDM/m² (-1% of departure from 15YA). Cropped land amounted to 50%, a 9% decrease while the VCIx was at 75. The NDVI graph shows that the NDVI values were slightly above the average till mid-May when they dropped to below-average levels. By the end of July, they were back to the 5YA.

For the Guinean savanna, precipitation dropped by 40% from the 15 YA, temperature increased by 0.6°C and radiation up by 2%. Consequently, the biomass was 767 gDM/m² (+ 2%). In this period the cropped land was reduced by -4% from 15YA. Vegetation condition index was at 0.85. On the NDVI development graph, the values were close to average until late May, when they started to drop to below average levels, indicating unfavorable conditions.

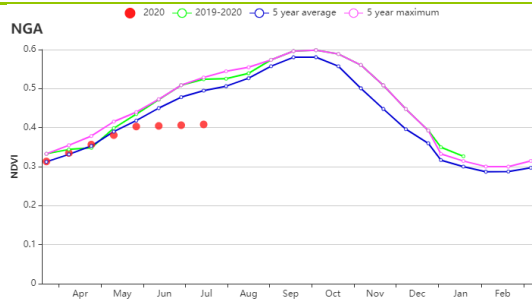
For the Derived savanna, rain was reduced by 29%, temperature increased by 0.5°C and the radiation was also higher (+3%) as compared to the 15 YA. These agro-climatic conditions resulted in an increase of potential biomass by 3%. The cropped land area was reduced by 2%, and the vegetation condition index was at 0.90. Vegetation conditions were relatively good till May when the NDVI profile graph started to sharply drop.

In the south, humid forest zone rainfall was 4% below the 15YA. Temperature was 0.2°C warmer and the radiation was 2% above the 15YA. These indicators increased the biomass by 2% and the cropped land fraction (CALF) was 99% with zero departure from 5YA. The vegetation condition index (VCIx) was at 0.95. As in the other regions, the NDVI profile started to drop to below-average levels in May.

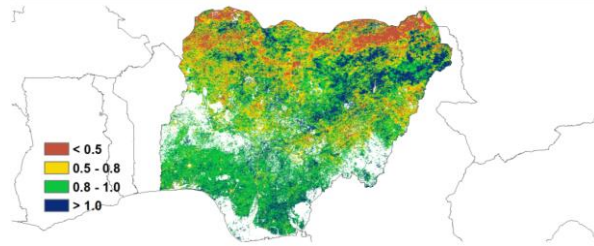
Figure 3.33 Nigeria's crop condition, April 2020 - July 2020



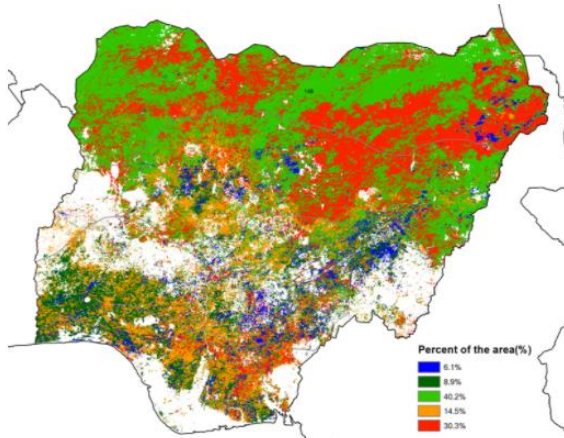
(a). Phenology of major crops



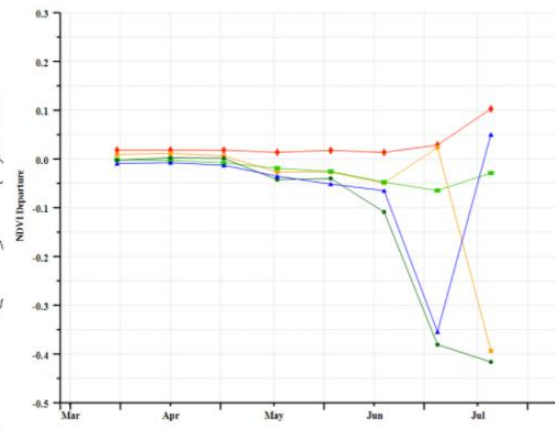
(b) Crop condition development graph based on NDVI



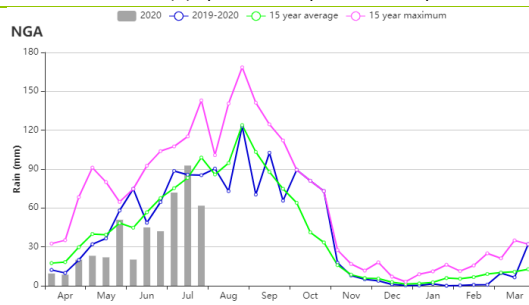
(c) Maximum VCI



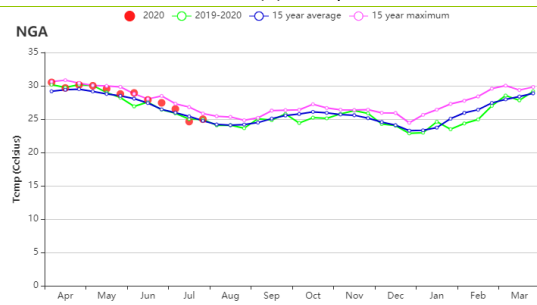
(d) Spatial NDVI patterns compared to 5YA



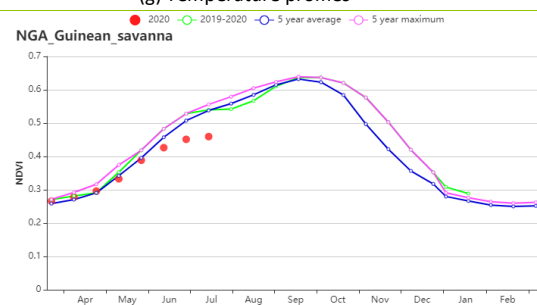
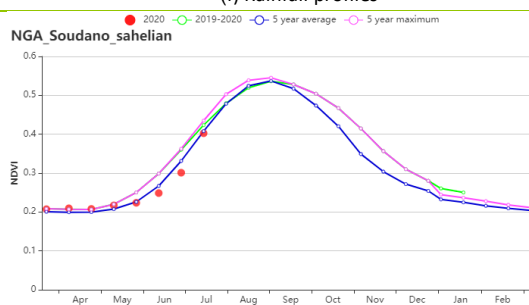
(e) NDVI profiles



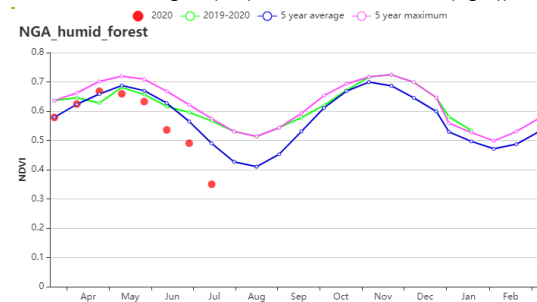
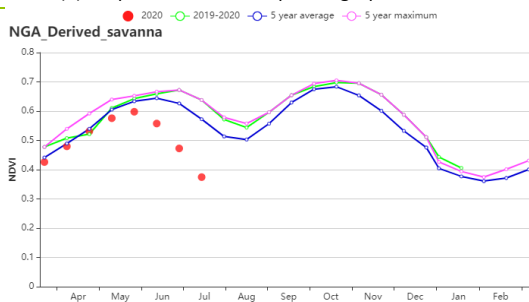
(f) Rainfall profiles



(g) Temperature profiles



(h) Crop condition development graph based on NDVI (Soudano-Sahelian region (left) and Guinean savanna (right))



(i) Crop condition development graph based on NDVI (derived Savanna (left) and Humid forest zone (right))

Table 3.57 Nigeria's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April 2020 - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Derived_savanna	506	-29	27.0	0.5	1194	3	787	3
Guinean_savanna	265	-40	28.6	0.6	1267	2	767	2
Humid_forest	1136	-4	25.8	0.2	1092	2	738	2
Soudano_sahelian	88	-54	31.7	0.7	1330	0	643	-1

Table 3.58 Nigeria's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April 2020 - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Derived_savanna	97	-2	0.90
Guinean_savanna	88	-4	0.85
Humid_forest	99	0	0.95
Soudano_sahelian	50	-9	0.75

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[PAK] Pakistan

This reporting period covers the harvest of winter wheat and the planting of summer maize and rice. Crop conditions were generally favorable.

At the country level, RAIN was 8% above average, while TEMP (-1.2°C) and RADPAR (-3%) were below. The combination of all the agro-climatic indicators resulted in BIOMSS exceeding the 15YA by 18%. Precipitation varied greatly in time and space. Local heavy rainfall caused floods and unfavorable conditions during the harvest period of wheat, for instance in Karachi and Pakhtunkhwa. About 20% of the crop areas experienced drought caused by insufficient rainfall in July, as shown in the VHIn graph. So far, summer maize and rice have benefited from the generally favorable weather conditions, and the fraction of cropped arable land (CALF) increased significantly by 9% compared with 5YA, which may have a positive effect on the summer crop production.

At the national level, the NDVI development graphs indicated favorable conditions during the previous reporting period, which continued in this period until the end of June, when they started to drop to below average levels, presumably due to a rainfall deficit starting in June. The spatial NDVI patterns and profiles show that 69% of the cropped areas were average or above average, whereas only 7% were consistently below average during the monitoring period. The below average areas were scattered throughout the country and not concentrated in any particular region. However, the trends showed a general decrease in July for 46% of the crop areas. The sowing of maize benefitted from favorable conditions in Punjab. The Indus river basin (the rice producing areas) has reached average or above average NDVI after transplanting in June. Though below-average crop conditions were observed in the three main agricultural areas in July, above-average rainfall in the Northern Highland (+22%) and Punjab (+30%) regions, together with irrigation of lower Indus river basin might help sustain favorable crop conditions for the remainder of the growing season.

Regional analysis

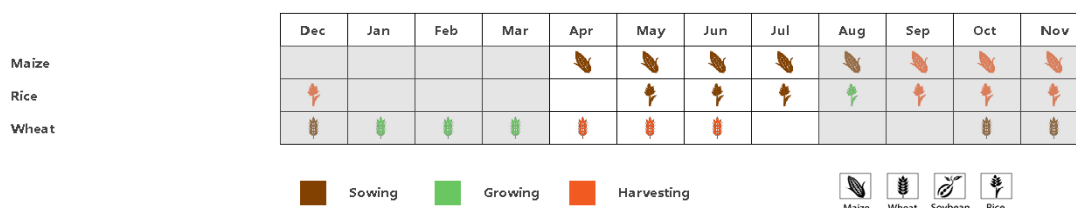
For a more detailed spatial analysis, CropWatch subdivides Pakistan into three agro-ecological regions based essentially on geography and agro-climatic conditions: the Northern highlands, Northern Punjab region and the Lower Indus river basin in South Punjab and Sind.

The NDVI development graph of **Northern highlands** shows above average crop condition from April to early July. RAIN was 22% above average. RADPAR and TEMP were below average (-4% and -1.9°C respectively) between April and July. The resulting BIOMSS exceeded the fifteen-year average by 2%. The region achieved a rather low CALF of 63%, but it is a large increase by 14% over the 5YA and VCIx is 1.04. Wheat conditions were satisfactory but the harvest may have suffered from heavy rainfall or storms; weather was generally favorable for the establishment of maize.

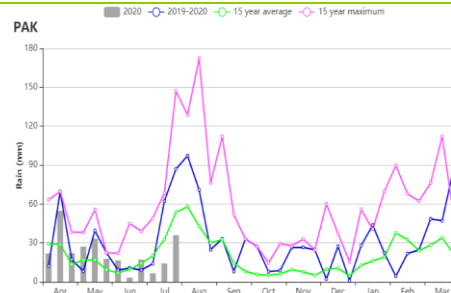
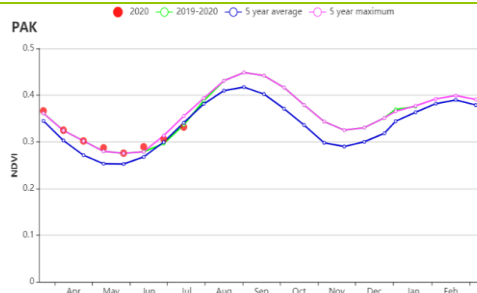
The **Northern Punjab**, the main agricultural region in Pakistan recorded abundant RAIN (30% above average). TEMP was below average by 1.9°C, and the RADPAR departure was -2%. The estimated BIOMSS departure of +14% as compared to the fifteen-year average is probably not so relevant, since this period covers the harvest of wheat and the establishment of maize and rice crops. Wheat had above average NDVI values during the entire growth period, which resulted in high yields. Together with the large VCIx (0.89) and high CALF (79% with an increase of 13%), crop conditions are favorable.

In the **Lower Indus river basin** in south Punjab and Sind, RAIN was above average by 13%, while RADPAR and TEMP were below average by -2% and 0.4°C respectively. Estimated BIOMSS was 35% higher than the last fifteen-year average. The VCIx was at 0.88, which is normal for this period between the harvest of wheat and the establishment of the new crops. Considering that the vast majority of land in this region is irrigated, prospects for the newly established crops are promising. CALF was rather low (43%), but still 5% higher than 5YA, which indicates an increase in production due to a larger area planted.

Figure 3.34 Pakistan's crop condition, April-July, 2020

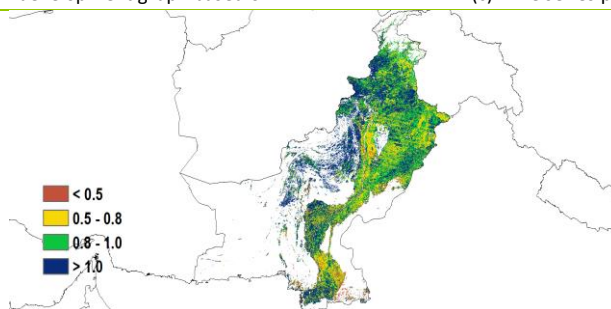


(a). Phenology of major crops

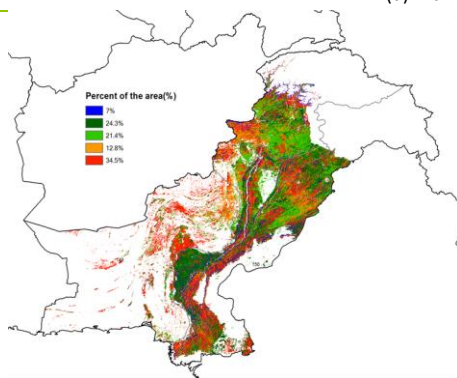


(b) Crop condition development graph based on NDVI

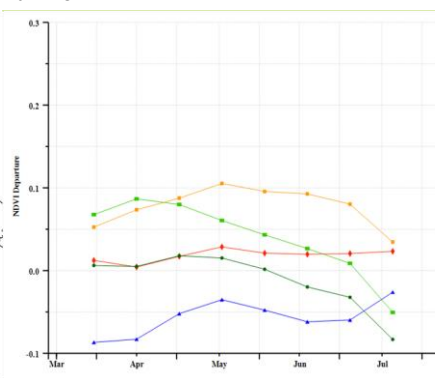
(c) Time series precipitation profile



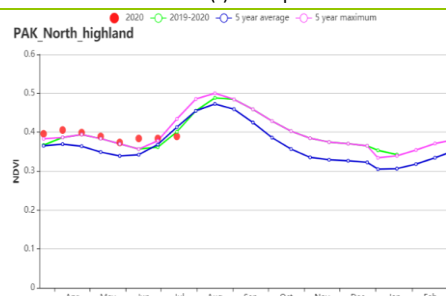
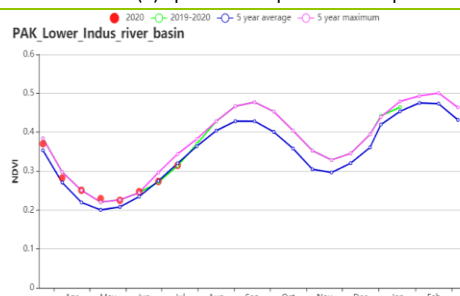
(d) Maximum VCI



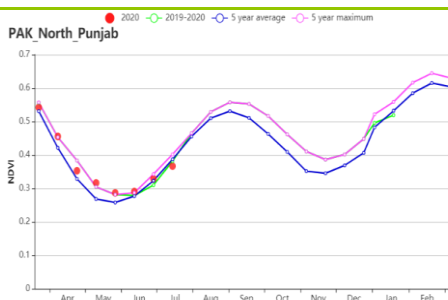
(e) Spatial NDVI patterns compared to 5YA



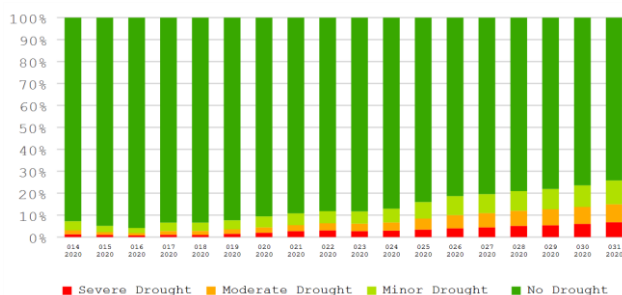
(f) NDVI profiles



(g) Crop condition development graph based on NDVI in Lower Indus river basin in south Punjab and Sind (left) and Northern Highlands (right)



(h) Crop condition development graph based on NDVI in Northern Punjab



(i) Proportion of VHI categories compared with 5YA

Table 3.59 Pakistan's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Lower Indus river basin in south Punjab and Sind	76	13	34.4	-0.4	1532	-2	842	35
Northern highlands	422	22	19.6	-1.9	1492	-4	691	2
Northern Punjab	250	30	31.1	-1.9	1481	-2	996	14

Table 3.60 Pakistan's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Lower Indus river basin in south Punjab and Sind	43	5	0.88
Northern highlands	63	14	1.04
Northern Punjab	79	13	0.89

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[PHL] Philippines

The reporting period covers the sowing to early harvesting stage of main maize and the sowing to early growth stage of main rice. The harvest for the second maize was concluded by the end of May and for the second rice by the end of April. The NDVI for the country was below average until late June and close to average in July. The maximum departure for NDVI from average was in the middle of May. Generally, crop conditions in the Philippines were close to or below average compared to the previous five years.

Compared to the average values of the past 15 years, the precipitation (RAIN, -16%) for the country was lower and the temperatures (TEMP, +0.5°C) were slightly warmer. However, the radiation (RADPAR, +6%) was higher than the average of the previous 15 years. The variation of values for agro-climatic indicators mentioned above resulted in an above-average potential biomass production (BIOMASS, +6%). At the same time, the cropped arable land fraction (CALF) for the country was almost 100% and the maximum VCI value was at 0.96.

According to spatial patterns of NDVI profiles, about 47.3% of the crop land, mainly located in the area of the west of Luzon island, the south of Mindoro and the north of Naga, had a stable NDVI, which was close to average conditions. For around 30.4% of the crop land, NDVI decreased before May and increased gradually after that time. This was mainly in the middle of Luzon island and the middle of Mindanao island. The NDVI there was lower than average before the end of June and it was higher than average in July. An anomaly for the NDVI was observed in some scattered areas, about 8.8% of the crop land, which dropped dramatically up to 0.4 NDVI units in early May but recovered before June. This drop was due to cloud cover as shown in the satellite images. From the maximum VCI graph, most parts of the country had a high maximum VCI value (VCIX > 0.8), however, about 52.7% of the crop land experienced a sub-average NDVI for most of the time. So the prospected production of maize and second rice is close to or below average.

Regional analysis

Based on the cropping systems, climatic zones and topographic conditions, three main agro-ecological regions can be distinguished for the Philippines. They are the Lowlands region (northern islands), the Hilly region (Island of Bohol, Sebu and Negros), and the Forest region (mostly southern and western islands). All the regions had a stable (almost 100%) cropped arable land fraction and a high maximum VCI value (VCIX > 0.94).

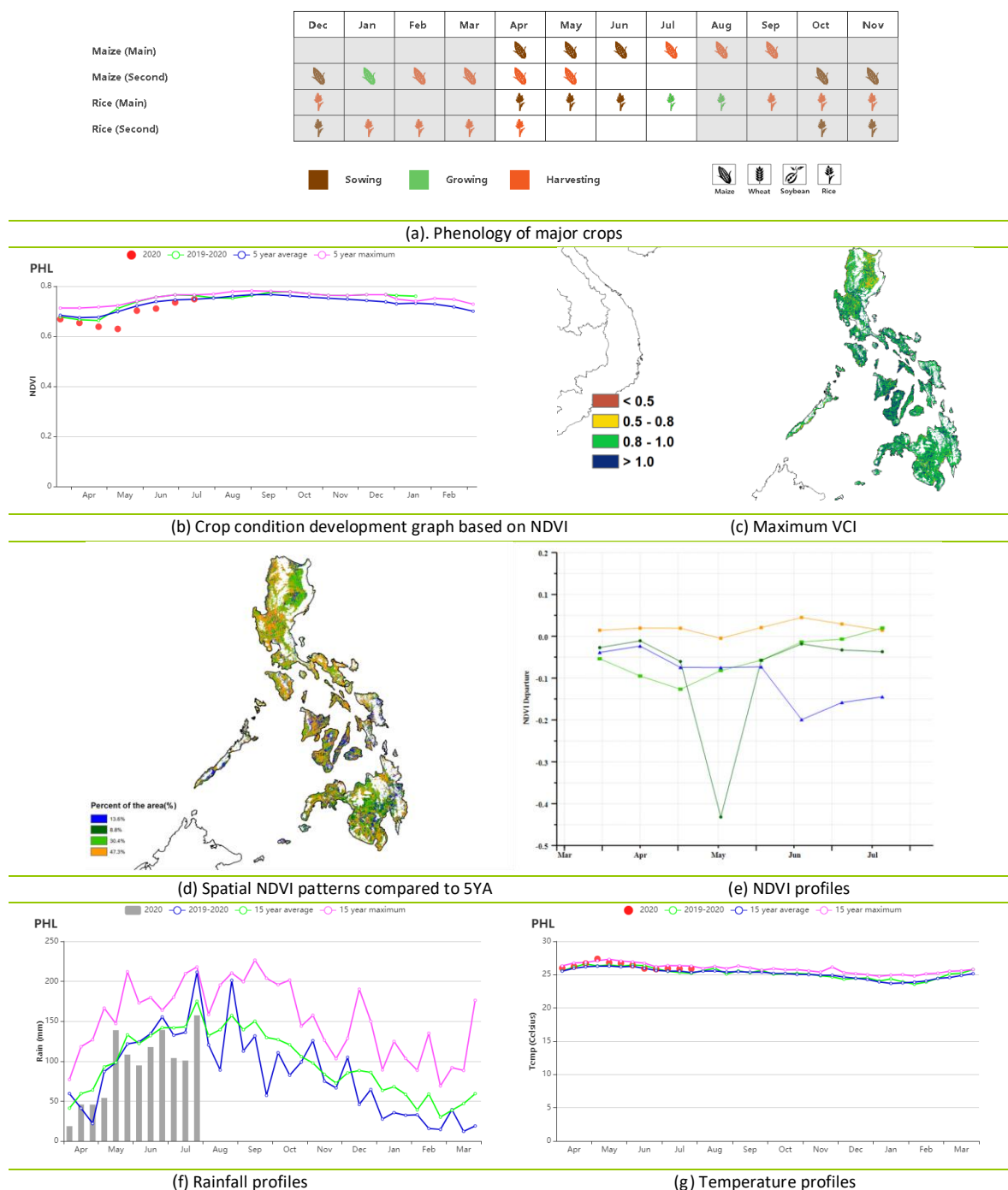
The **Lowlands region** experienced above-average temperature (TEMP +0.5°C), radiation (RADPAR, +7%) and potential biomass production (BIOMASS, +6%). However, the rainfall (RAIN, -22%) for the region was below average. As the NDVI profile shows, the NDVI was lower than average before the end of May and it was close to average in June. The above-average NDVI values in July indicate that the main rice experienced favorable conditions.

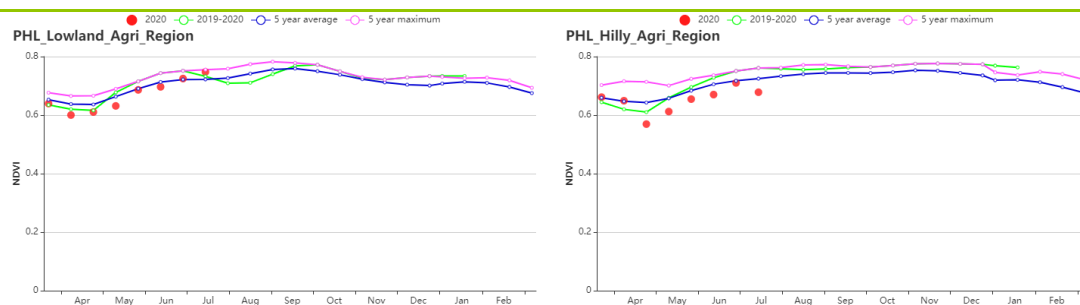
Compared to the previous 15 years, the **Negros and central Visayas Islands region** experienced less precipitation (RAIN, -9%), relatively higher temperatures (TEMP, +0.6°C) and above-average radiation (RADPAR, +5%). The potential biomass production (BIOMASS, +5%) for the region was higher than the 15YA. The regional maximum VCI value (VCIX) was at 0.99. According to the NDVI profile, the NDVI for the region was close to average before the middle of April and then it was below average for most of the time except for the early July when NDVI was close to average as well. Considering the regional NDVI, the prospected production of main maize and the crop condition of main rice are below average.

The **Forest region** had an above-average temperature (TEMP, +0.4°C) and above-average radiation (RADPAR, +5%). The potential biomass production (BIOMASS) for the region was above average by 5% and the rainfall (RAIN, -11%) was lower than average. The NDVI profiles for the region show that it was close to average before the middle of April and it was below average after that time. The maximum departure of NDVI from average condition appeared in the middle of May and it was close to 0 during

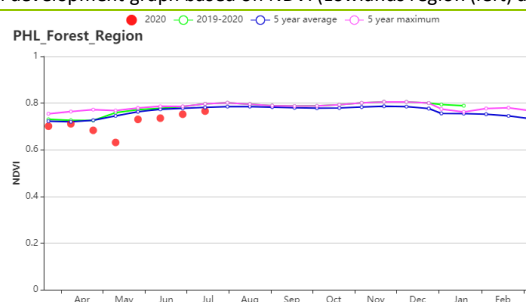
July, which means the production of second maize in this region was below average and the crop conditions of the main maize and the main rice were stable and close to average.

Figure 3.35 Philippines' crop condition, April - July 2020





(h) Crop condition development graph based on NDVI (Lowlands region (left) and Hills region (right))



(i) Crop condition development graph based on NDVI (Forest Region)

Table 3.61 Philippines' agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Forest region	1155	-11	25.8	0.4	1314	5	887	5
Hilly region	1154	-9	27.8	0.6	1391	5	951	5
Lowland region	1083	-22	26.6	0.5	1394	7	934	6

Table 3.62 Philippines' agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Forest region	100	0	0.96
Hilly region	100	0	0.99
Lowlands region	100	0	0.94

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[POL] Poland

This monitoring period covers the planting of spring wheat and maize, which was concluded in May. Winter wheat started to reach maturity in late July.

Compared to the average of the last 15 years, precipitation increased by 13%, average temperatures were 1.0°C lower and RADPAR was near average during this monitoring period. Potential biomass levels were 7% lower due to low temperatures. In terms of agricultural conditions, the percentage of cultivated land was close to 100%, which is comparable to the average of the last 5 years, and the VCIx reached 0.96.

As shown in the development graphs, the NDVI levels were below average until June, which was presumably due to cooler temperatures in May. NDVI recovered to average values in June and reached maximum values in July, but then started to drop to the 5-year average in late July. This indicates that the spring crops benefitted from the favorable moisture conditions in June and early July. However, rainfall was generally low in the second half of July, which may have caused the drop in NDVI. The dry conditions in late July may have benefitted wheat harvest.

Due to the ongoing drought in the northwest, the 11.4% of the country's arable land area where NDVI was consistently below average during the monitoring period was mainly located in that part of the country. However, by the end of the current monitoring period, NDVI rose to above-average levels. VCIx for almost the entire country was above 0.8.

In general, agronomic conditions were generally favorable for the growth and harvest of winter wheat, as well as for the other crops.

Regional analysis

The country was divided into four zones according to agro-ecological characteristics, including: (a) the Northern oats and potatoes areas covering the northern half of West Pomerania, eastern Pomerania and Warmia-Masuria, (b) the Northern-central wheat and sugar-beet area (Kuyavia-Pomerania to the Baltic sea), (c) the Central rye and potatoes area (Lubusz to South Podlaskie and northern Lublin), and (d) the Southern wheat and sugar-beet area (Southern Lower Silesia to southern Lublin and Sub-Carpathian along the Czech and Slovak borders).

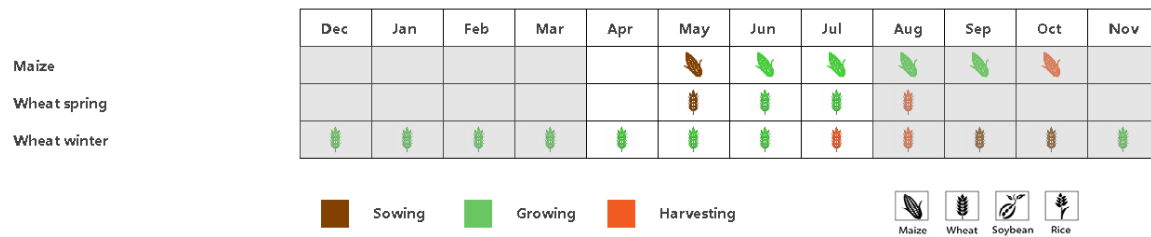
Precipitation, average temperature, and radiation were all below the 15-year average (RAIN, -3%; TEMP, -0.9°C; RADPAR, -1%) in **Northern oats and potatoes areas**, resulting in a potential biomass decrease by 6%.

In **Northern-central wheat and sugar-beet area** and **Central rye and potatoes area** similar trends were observed: Precipitation was both above average by 5%, temperatures were below (1.0°C and 0.9°C respectively), and RADPAR was close to average. BIOMSS was below average by 6% in both regions.

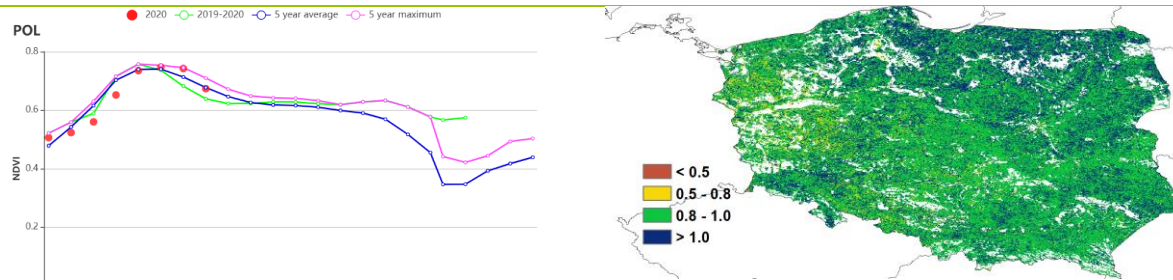
Precipitation in the **Southern wheat and sugar-beet area** was significantly above average, with an increase by 31%. Temperature was 1.1°C below average and radiation near-average. Although precipitation was abundant, potential biomass was 10% lower due to lower temperatures.

In all the four subregions, NDVI was below average until June due lower temperatures and drought in the early spring. After precipitation in May returned to normal, and temperature rose in June, NDVI was higher than average from early June, and by the end of July, NDVI dropped to average again. CALF in all four zones was about 100%, and VCIx in four zones reached 0.95 and more.

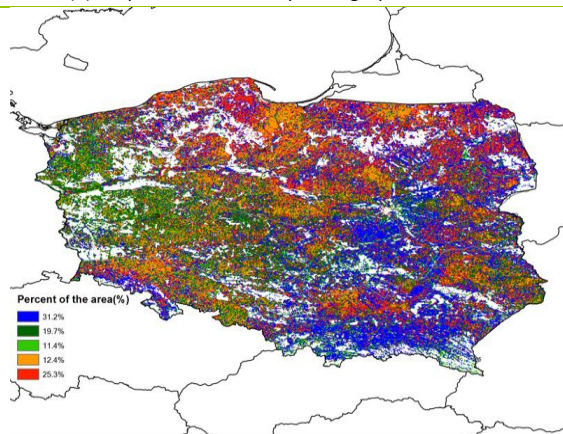
Figure 3.36 Poland's crop condition, April - July 2020



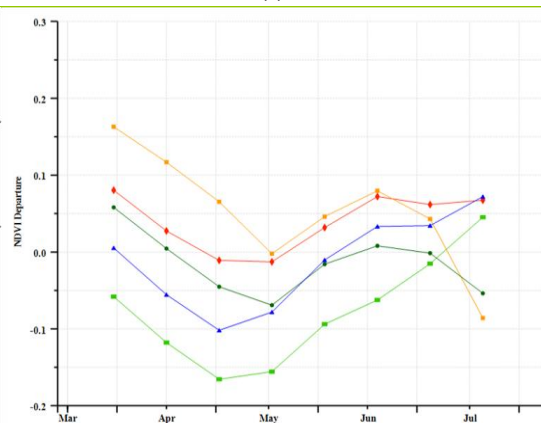
(a). Phenology of major crops



(b) Crop condition development graph based on NDVI

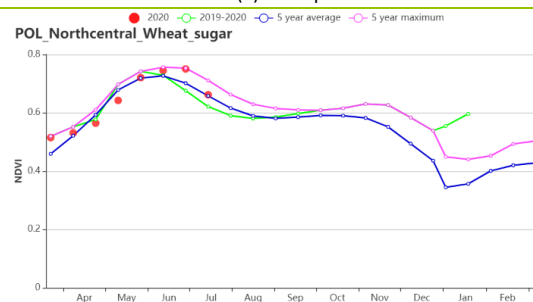
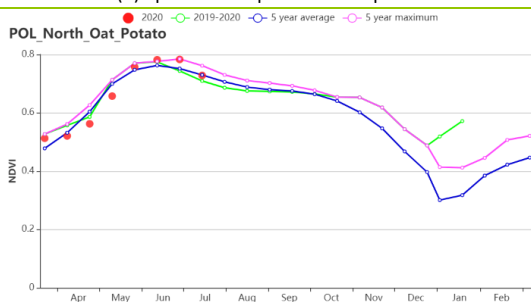


(c) Maximum VCI



(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



(f) Crop condition development graph based on NDVI, Northern oats and potatoes area (left) and Northern-central wheat and sugar beet area (right).

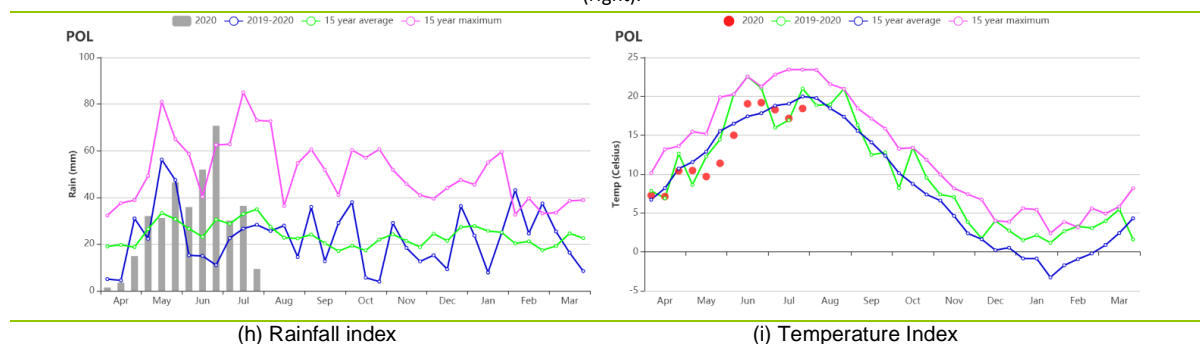
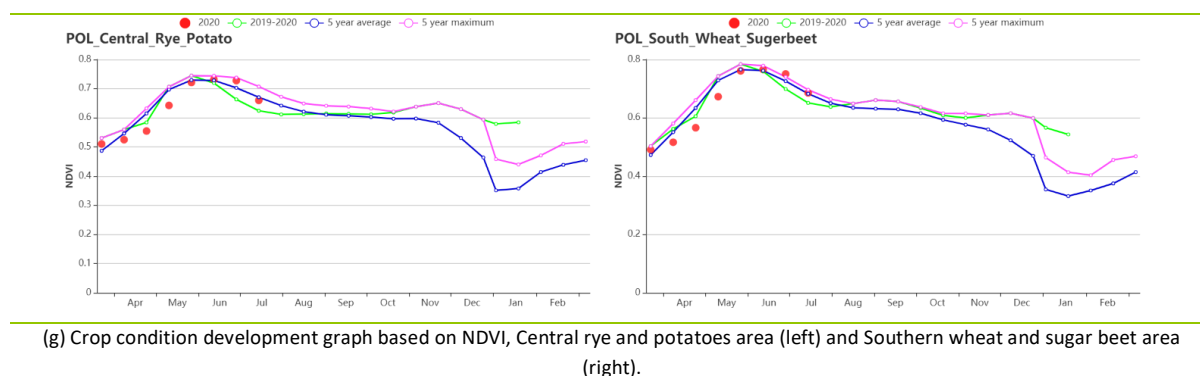


Table 3.63 Poland's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Northern oats and potatoes areas	317	-3	13.0	-0.9	1133	-1	414	-6
Northern-central wheat and sugarbeet area	310	5	13.4	-1.0	1154	0	428	-6
Central rye and potatoes area	319	5	14.1	-0.9	1163	1	448	-6
Southern wheat and sugarbeet area	460	31	13.4	-1.1	1177	0	429	-10

Table 3.64 Poland's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current	Departure (%)	
Northern oats and potatoes areas	100	0	1.00
Northern-central wheat and sugarbeet area	100	0	0.98
Central rye and potatoes area	100	0	0.95
Southern wheat and sugarbeet area	100	0	0.96

[ROU] Romania

During this reporting period, maize and spring wheat were sown, while winter wheat was harvested in July. At the national level, rainfall was 6% above average, average temperature was 0.9°C lower and radiation was slightly below average (-1%). With lower temperature and radiation, biomass decreased by 9%. The CALF of Romania remained unchanged (100%) and current maximum VCI is at 0.88, which is fair for production. The rainfall time series shows that it was far below average in April, close to average in May and far above average in June, while temperature was around average. The VHI map shows that at the beginning of the reporting period, drought conditions were observed in April and May, until heavy rainfall occurred in June. According to the NDVI development curve, crop conditions were below average during April to June and reached close to average levels in July. Crop conditions are assessed as generally unfavorable.

Regional analyses

More details are provided below for three main agro-ecological zones: the **Central mixed farming and pasture Carpathian hills** (160), the **Eastern and southern maize, wheat and sugar beet plains** (161) and the **Western and central maize, wheat and sugar beet plateau** (162).

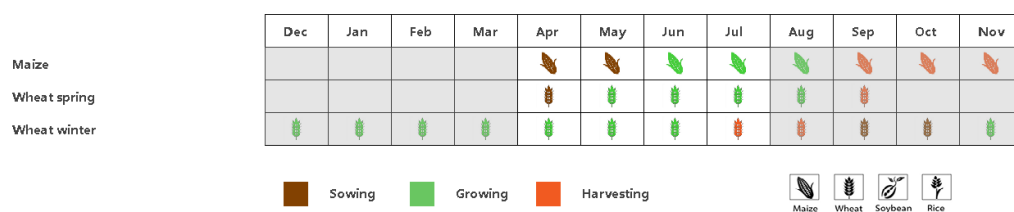
For the Central mixed farming and pasture Carpathian hills, compared to the 15YA, rainfall increased by 6%, while temperature and radiation were both down (TEMP -1.0°C, RADPAR -3%) and BIOMSS decreased by 12%. According to the NDVI development, crop conditions were below the average from April to June but improved and were above average in July. The regional average VCI maximum was 0.97. The NDVI spatial distribution shows that the NDVI was decreasing in April to May and increased since June. As this region occupies only a small part of cropland in Romania, the low biomass is not significant for Romania's crop production.

For the Eastern and Southern maize, wheat and sugar beet plains all weather-related parameters decreased: Rainfall (-1%), temperature (-0.6°C), radiation (-1%). This resulted in a reduced estimate of biomass (-4%). The NDVI development graph shows that crop conditions dropped to below average starting in April. The VCI max value of this region was 0.84, much lower than the other two sub regions. According to the distribution map, the light green NDVI profile line region in the southeast (counties of Tulcea and Constanta) dropped largely in April to May and increased in June and July, meanwhile the VCI maximum values in this area were very low, some even below 0.5. Spatial NDVI patterns show that the NDVI values in most areas of the Eastern and Southern maize, wheat and sugar beet plains were decreasing since April (red line), which indicates unfavorable crop conditions.

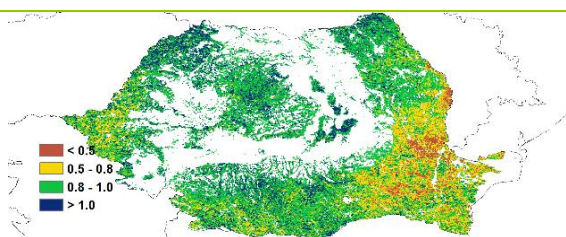
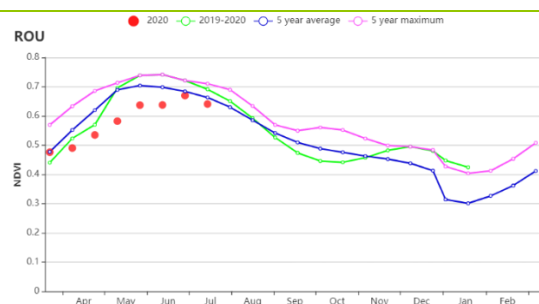
For the Western and central maize, wheat and sugar beet plateau, rainfall was higher than average by 16%, temperature lower than average by 1.3°C, radiation was a bit lower (RADPAR -3%) and biomass decreased by 15%. Maximum VCI of this region was 0.94 and the spatial distribution was between 0.5 and 1.0, a bit better than the Eastern and Southern maize, wheat and sugar beet plains. Spatial NDVI pattern shows that NDVI slightly increased during May to July (yellow and blue line), which indicates that crop conditions were improving for this region.

Overall, crop conditions were not satisfactory in Romania during this reporting period, as indicated by the low biomass and VCI. Currently, the outlook is unfavorable for the 2020 winter wheat, but rather promising for the maize crops.

Figure 3.37 Romania's crop condition, April - July 2020

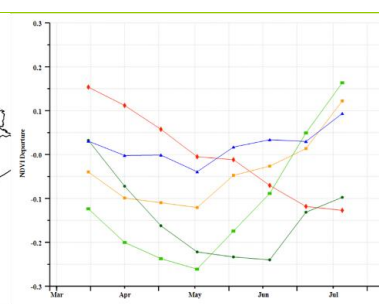
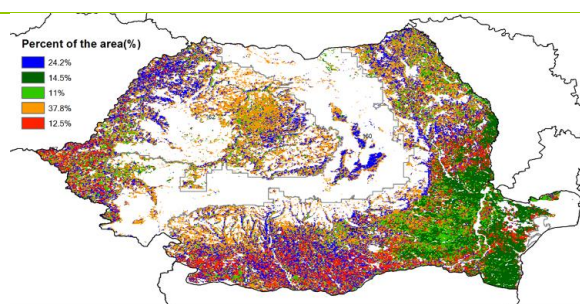


(a). Phenology of major crops



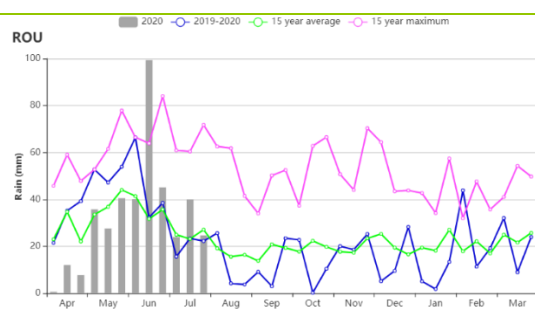
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

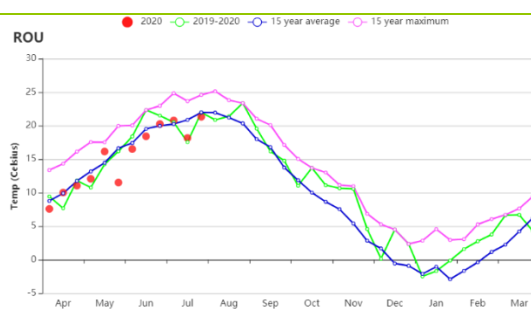


(d) Spatial NDVI patterns compared to 5YA

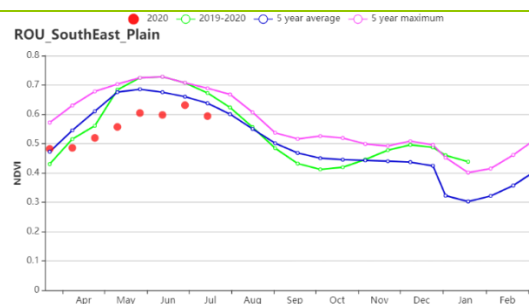
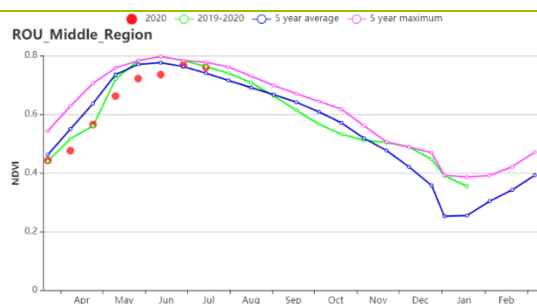
(e) NDVI profiles



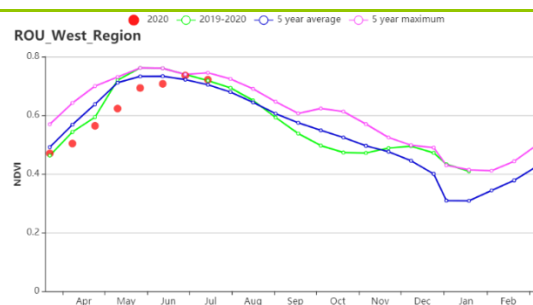
(f) Rainfall profiles



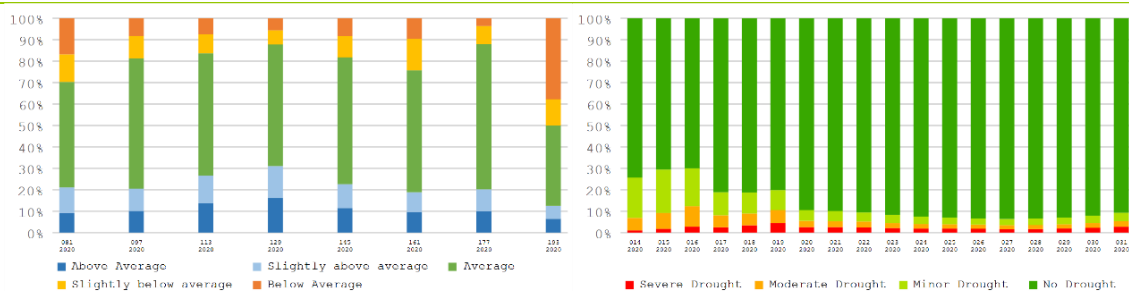
(g) Temperature profiles



(h) Crop condition development graph based on NDVI (Central mixed farming and pasture Carpathian hills (left) and Eastern and southern maize, wheat and sugar beet plains (right))



(i) Crop condition development graph based on NDVI (Western and central maize, wheat and sugar beet plateau)



(j) Proportion of NDVI anomaly categories compared with 5YA

(k) Proportion of VHI categories compared with 5YA

Table 3.65 Romania's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Central mixed farming and pasture Carpathian hills	473	6	13.1	-1	1255	-3	443	
Eastern and southern maize wheat and sugarbeet plains	337	-1	16.6	-0.6	1325	1	591	
Western and central maize wheat and sugarbeet plateau	440	16	14.5	-1.3	1282	-3	486	

Table 3.66 Romania's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Central mixed farming and pasture Carpathian hills	100	0	0.97
Eastern and southern maize wheat and sugarbeet plains	99	0	0.84
Western and central maize wheat and sugarbeet plateau	100	0	0.94

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PHL POL ROU **RUS** THA TUR UKR USA UZB VNM ZAF ZMB

[RUS] Russia

In Russia, the period from April to July is the time of active crop growth. At the end of July, winter crops are harvested in many regions, while spring crops reach the peak of their growth.

NDVI was equal to its 5-year average until mid-May. From mid-May and mid-June, it was at the level of the 5-year maximum, but by mid-July, it had dropped below the level of the previous year and the 5-year average.

During the period from April to June, rainfall was mainly above the 15-year average. From April to the beginning of June, rainfall exceeded the 15-year maximum. From mid-June to mid-July, the amount of precipitation was close to the 15-year average and mainly below the level of the previous year. By the end of July, rainfall exceeded the 15-year average and reached the level of the previous year.

From April to mid-June the temperature in Russia was close to the level of the previous year and the 15-year average. At the end of June, it fell below both these levels. At the beginning of July, temperature increased and reached the 15-year maximum. However, it dropped to the level of the previous year by the end of the month.

Main regions of winter crop production showed different NDVI departures and VCIx. South and North Caucasus showed mainly negative NDVI departure with VCIx varying from <0.5 to 0.8-1. Central and Central Black Soils region as well as Middle Volga showed mainly positive NDVI departure with VCIx from 0.8-1 to >1.

In the regions with positive NDVI departures the yield of winter crops is expected to be at the level of the previous year or above. While in the regions with negative NDVI departure, the yield of winter crops is likely to be below the level of the previous year. Overall, crop conditions are favorable.

Regional analysis

In **South Caucasus region**, rainfall was 2% below the 15-year average. Temperature decreased by 0.2°C compared to the 15-year average. RADPAR was above the 15-year average by 1% and BIOMASS increased by 1%. VCIx was 0.96. CALF was at the level of the 5-year average (100%). During this period, NDVI was mainly below the level of the previous year and the 5-year average. The yield of winter crops is likely to be lower than in the previous year in this region.

In the **North Caucasus**, rainfall was below the 15-year average by 2%. The temperature was also below the 15-year average (-0.7°C). RADPAR decreased by 1%. Unfavorable agroclimatic conditions resulted in a decrease in BIOMASS value by 3%. VCIx was 0.84 - the lowest value for Russia. CALF was 4% below the 5-year average. NDVI in the period from April to May was below the 5-year average and the value of the previous year. In early June, NDVI reached the 5-year average, but then dropped below the level of the previous year and the 5-year average. The yield of winter crops is likely to be lower than in the previous year in this region.

In **Central Russia**, rainfall was above the 15-year average by 31%. The temperature decreased by 1.3°C compared to the 15-year average. RADPAR decreased by 9% relative to the 15-year average. BIOMASS dropped by 14%. VCIx value was 0.98. CALF was at the level of the 5-year average (100%). In April and May, NDVI was mainly below the 5-year average and the level of the previous year. In June, NDVI reached the 5-year average. The yield of winter crops is expected to be close to or slightly above the level of the previous year.

Central Black Soils region experienced the highest rainfall, which was 36% above the 15-year average. The temperature decreased by 1.3°C. RADPAR decreased by 6% relative to the 15-year average. BIOMASS decreased by 10% relative to the 5-year average. VCIx was 0.99. CALF was equal to the 5-year average (100%). In April and May, NDVI was equal to the level of the previous year and 5-year average. In June it increased and reached a 5-year maximum. In mid-July NDVI dropped below the 5-year average to the level of the previous year. The yield of winter crops is likely to be slightly higher than in the previous year.

In **Middle Volga region** rainfall exceeded the 15-year average by 28%. Temperature was 0.8°C below the 15-year average. RADPAR decreased by 3% compared to the 15-year average. BIOMASS decreased by 5%. VCIx was 0.93. CALF was at the level of the 5-year average (98%). From mid-April to the end of May, NDVI stayed at the level of the previous year and the 5-year average. In June, it increased to the 5-year maximum. Then it dropped below the 5-year average. The yield of winter crops is likely to be slightly higher than in the previous year.

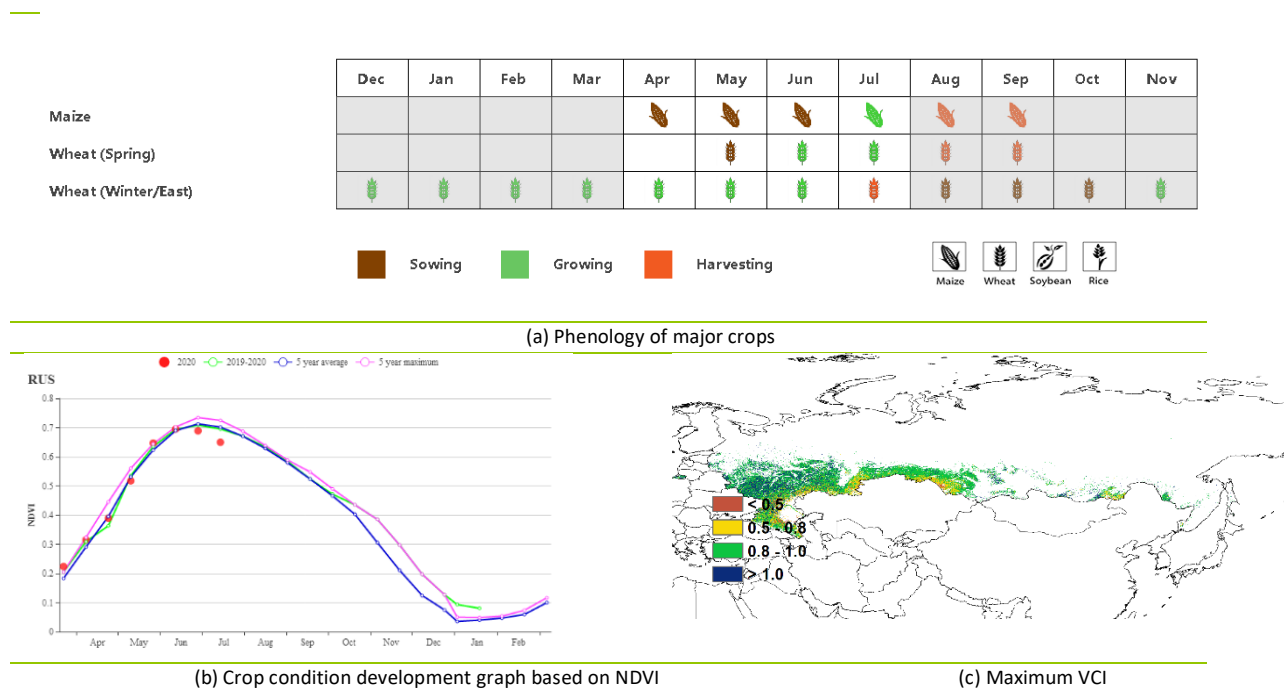
In **Ural and Western Volga region** rainfall was above the 15-year average by 3%. Temperature exceeded the 15-year average by 0.4°C. RADPAR was below the 15-year average by 1%. BIOMASS increased by 3%. VCIx was 0.87. CALF was at the level of the 5-year average (99%). From April till mid-May NDVI was at the level of previous year and 5-year average. By the end of May it increased up to the 5-year maximum, which indicated that the vegetation progressed faster than in the previous year. At the beginning of June NDVI came back to the level of the previous year and the 5-year average. Then it dropped below these levels. The winter crops yield is expected to be lower than in the previous season.

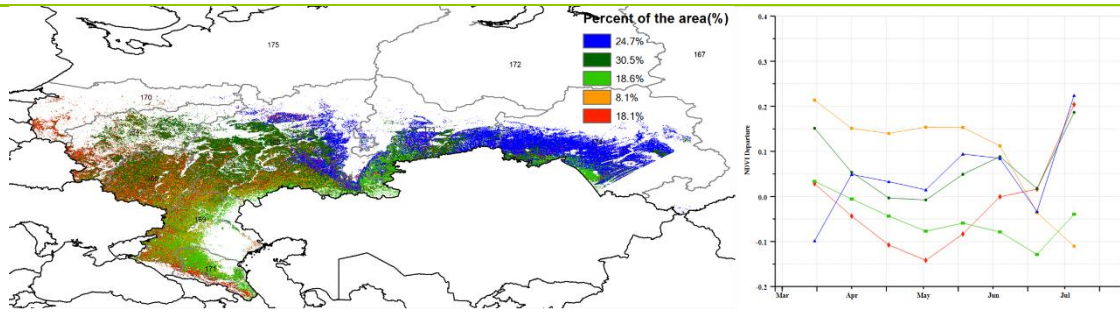
In **Western Siberia** rainfall exceeded the 15-year average by 25%. Temperature was above the 15-year average by 1.2°C. RADPAR was by 4% below the 15-year average. BIOMASS increased by 3%. VCIx was 0.87. CALF was at the level of the 5-year average (99%). From April till the end of May, NDVI was at the level of the 5-year maximum. Then it dropped to the level of the previous year and the 5-year average. In June and July, it stayed below the level of the previous year and the 5-year average. The spring and summer crops status is likely to be worse than in the previous year.

In **Middle Siberia**, rainfall increased by 33% relative to the 15-year average. Temperature increased by 0.7°C compared to the 15-year average. RADPAR was below 15-year average by 4%. BIOMASS decreased by 2%. VCIx was 0.92 and CALF increased by 4% relative to the 5-year average. NDVI between April and May was equal to the 5-year average and the value of the previous year. It subsequently reached a 5-year maximum in July. The status of spring and summer crops is close to the long-term average.

In **Eastern Siberia**, rainfall decreased by 9% relative to the 15-year average. Temperature was below the 5-year average by 0.4°C. RADPAR decreased by 4% relative to the 15-year average. BIOMASS decreased by 8%. CALF was equal to 100%. VCIx was 0.98. From April to May, NDVI value was below the level of the previous year, but equal to the 5-year average. In June and July, there were some fluctuations. NDVI stayed mainly below the 5-year average and the level of the previous year. The spring and summer crops status is likely to be slightly below average.

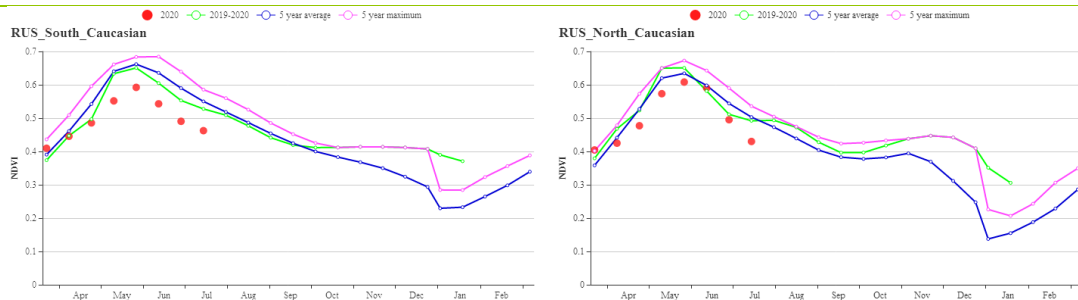
Figure 3.38 Russia's crop condition, April - July 2020



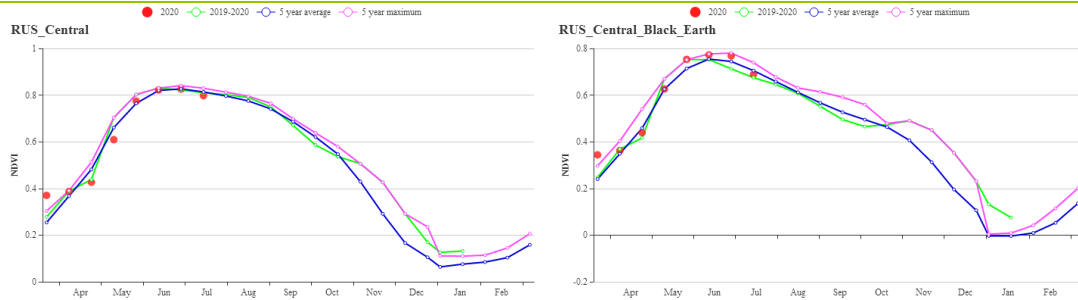


(d) Spatial NDVI patterns compared to 5YA

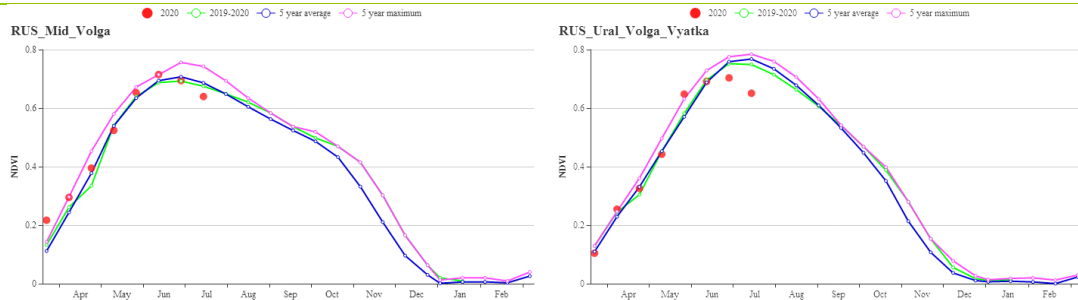
(e) NDVI profiles



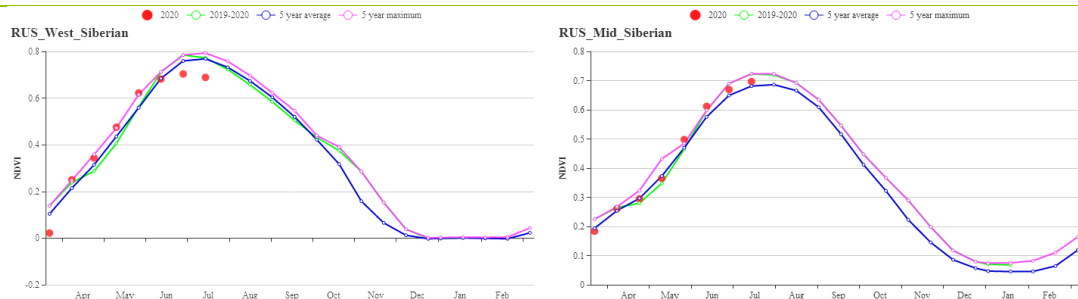
(f) Crop condition development graph based on NDVI (Southern Caucasus (left) and Northern Caucasus (right))



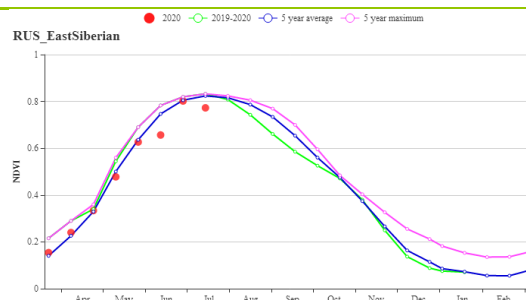
(g) Crop condition development graph based on NDVI (Central Russia (left) and Central black soils area (right))



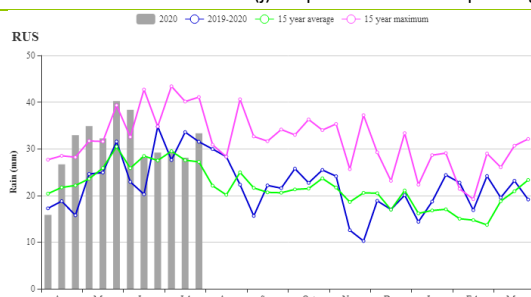
(h) Crop condition development graph based on NDVI (Middle Volga (left) and Ural and western Volga region (right))



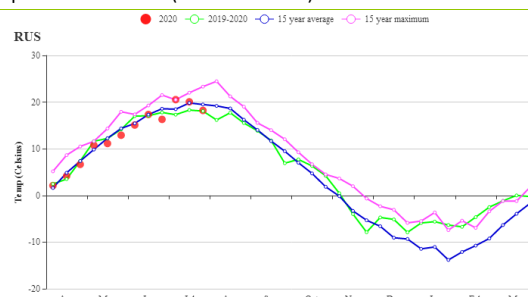
(i) Crop condition development graph based on NDVI in the Western Siberia (left) and the Middle Siberia (right)



(j) Crop condition development graph based on NDVI (Eastern Siberia)



(k) Rainfall index



(l) Temperature index

Table 3.67 Russia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Amur and Primorsky Krai	370	6	13.0	-0.4	1194	-1	455	-3
Central Russia	435	31	11.6	-1.3	994	-9	359	-14
Central black soils area	406	36	13.4	-1.3	1111	-6	447	-10
Eastern Siberia	403	-9	11.1	-0.4	1093	-4	370	-8
Middle Siberia	366	33	11.1	0.7	1212	-4	402	-2
Middle Volga	379	28	12.7	-0.8	1107	-3	443	-5
Northwest Region including Novgorod	329	6	11.1	-1.1	1039	-3	360	-7
Northern Caucasus	285	-2	17.0	-0.7	1303	-1	617	-3
Southern Caucasus	495	-2	14.9	-0.2	1311	1	559	2
Ural and western Volga region	296	4	12.9	0.4	1088	-1	430	3
Western Siberia	355	25	13.8	1.2	1100	-4	446	3
West subarctic region	366	21	9.3	-1.1	930	-5	299	-10

Table 3.68 Russia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Amur and Primorsky Krai	100	0	0.96
Central Russia	100	0	0.98
Central black soils area	100	0	0.99
Eastern Siberia	100	0	0.98
Middle Siberia	98	4	0.92
Middle Volga	98	0	0.93
Northwest Region including Novgorod	100	0	0.99
Northern Caucasus	95	0	0.84
Southern Caucasus	94	-4	0.79
Ural and western Volga region	99	0	0.87
Western Siberia	99	0	0.87
West subarctic region	100	0	0.98

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PHL POL ROU RUS **THA** TUR UKR USA UZB VNM ZAF ZMB

[THA] Thailand

This report covers the harvest of Second Season Rice in June. Planting of Main Season Rice started in May, while maize sowing started a bit earlier, in April. Crop conditions during this reporting period were generally below the 5-year average (5YA) in April-June mainly due to the rainfall shortage in April and May. However, by July, the crop conditions improved to close to the 5-year maximum, as indicated by the graph of NDVI development at the national level.

The drier-than-normal weather Thailand has been experiencing gradually improved to close-to-average conditions. Rainfall from April to July was recovering to just 7% below the 15YA (compared to -40% in the previous January - April period in 2020, or -23% for the same April-July period in 2019). Although the rainfall in May was significantly below last year's and the 15YA, it improved to close to the 15YA in July. According to provincial rainfall conditions, the deficit was more pronounced in some northern and central region provinces (Chiang Rai, Phayao, Nan, Prae, Uttaradit, Phitsanulok, Kamphaeng Phet, Phichit, Nakorn Sawan, Uthai Thani, Chai Nat, Supanburi and Ang Thong), where the deficit exceeded 30% as compared to the 15YA. Also, the temperature (+0.7°C) and radiation (+4%) were above average, which led to an increase in biomass production potential (BIOMSS) by 5%.

The spatial NDVI pattern (figure 1.5) shows that some patches in central and mostly north-eastern provinces, i.e., Ratchaburi, Kamphaeng Phet, Sakon Nakorn, Bueng Kan, Khon Kaen, Kalasin, Amnat Charoen, Ubon Ratchathani, Nakon Ratchasima, Surin, and Sri Sa Ket, have above-5YA crop conditions, covering 31.7% of total arable land. The crop conditions in the remaining areas stayed below average until early June. The areas in the north-eastern provinces having above-average crop conditions were also confirmed by the VCIx map.

Overall, considering the favorable national VCIx of 0.93, most provinces VCIx were higher than 0.8. Lowest values were observed for Sing Buri (0.67) and Ang Thong (0.64). Combined with a CALF of 99% which was 1% above average, the crops in the country recovered to mostly satisfactory conditions.

The agricultural information is corroborated with several techniques such as a list frame survey, crop cutting experiments, forecasting and Geo-informatics. We compare the CropWatch indicators with the reports from regional offices and forecasting divisions and focus on rice only.

In 2020, the harvested area is forecasted to be up by 2.4% at the country level over the last year. The increase of rice harvested area and production is consistent with the increase in precipitation when compared with last year. In addition, the rice selling price is rather high, which is an incentive for farmers to plant more rice. Rice yields are forecasted to increase from last year but are still below average levels. The main constraints are the dry spells that occurred during the rice growing season. When looking at the regional scale, the rice cultivated area in the north is estimated to increase when compared to the previous year. The Thai Meteorological Department forecasted that the total precipitation would be less; however, so far, the rainfall has been higher than last year. In the northeast, the rice area is expected to increase because farmers in some provinces switched to rice instead of growing sugarcane (e.g. Surin, Buriram, Mahasarakham, Roiet, Kalasin, Khon Khan, Chaiyaphum, and Nakhon Ratchasima). Similarly, as in the north, rice yield in the northeast is estimated to increase from 2019, but will be below the 15YA due to dry spells during the growing season. In some areas of the central region, which is the main rice cultivation region and mostly irrigated, it is possible to plant a second rice crop during the wet season. If the average rainfall conditions and high prices persist over the remainder of the rainy season, farmers will take advantage of planting a second rice crop. Good yields can be expected from the current crop and the increase in area may result in an increased rice production in the central region as compared to the previous year.

Yields of Dry Season Rice in 2020 had decreased because water supply for the crops was not adequate. There was a severe water shortage for these dams and reservoirs: Mae Mok (Lampang province), Ubonrat (Khon Khan province), Chulaphon (Chaiyaphum province), Lam Pra Pleng, Upper Moon dam and

Lam Sang (Nakhon Ratchasima province). Government had to restrict outflow, which in turn led to drought conditions and yield reductions for dry season rice, especially in the northeast region. Due to the lack of water, poor grain quality of rice resulted and some paddies were unable to survive until the reproductive stage. Pests and diseases were an issue as well. These are the main causes for the reduction of dry season rice yield for Thailand in 2020.

Sub-National Analysis

There are four agro-ecological zones (AEZ) defined within Thailand based on its cropping systems, climatic zones and topographic conditions. These are the central double and triple-cropped rice lowlands; single cropped rice north-eastern; western and southern hill; and south-eastern horticulture.

In terms of NDVI, all zones except the western and southern hill areas produced below-15-year-average NDVI until June. Afterwards, NDVI levels recovered to average levels in July, with the north-eastern region improving to significantly above-average NDVI levels.

Central double and triple-cropped rice lowlands

The change in rainfall patterns from deficit to excess has been especially extreme for the central double and triple-cropped rice lowlands (figure 2.4a). The nation-wide drought experienced since the start of the year continued in central areas for almost a month longer than in the other AEZs. When the recovery came, it was also extreme in the other direction. At the end of April, rainfall levels suddenly rebounded back to 50-100 mm per dekad. These levels were above the 15YA. Apart from a brief drop in mid-May, which occurred for all Thai regions, rainfall continued to exceed the 15YA into July. On the other hand, temperature and radiation received by central lowlands terms remained normal. The temperature closely followed its yearly pattern of gradual decrease from +30°C down to 25°C except for a small uptick in mid-May, when a nation-wide drop in rainfall was observed. Meanwhile, photosynthetically active radiation (PAR) fluctuated between 90 to 120 W/m² which is at or slightly above the 15YA.

Overall, the carry-over effect of the water-shortage in the previous months impacted rice cultivation during the April-June period. This was likely reflected in the delay of the annual NDVI upturn normally associated with the beginning of the wet-season. As seen in figure 2.3a, the upturn that should have happened rapidly in May according to the 15YA had instead become a gradual rise that reached normal levels in July only. Quarterly values of CALF and VCIx also painted a similar picture of drought and recovery. For the past ten years, central areas have always had around 98% CALF regardless of season, but it dropped to 63% in the second quarter of this year (figure 2.5a). This was likely the result of the government issuing a request earlier in the year for farmers to refrain from planting second-season rice. As for VCIx, its value of 0.84 shown in table 2.2 indicates that the plants are recovering in the central areas, but not to as good conditions as in the other areas of Thailand. The Central areas can expect substantially reduced yield from second-season rice and slightly reduced yield from the main-season rice.

South-eastern horticulture area

The South-eastern horticulture area has seen its rainfall index decrease by 15% from the 15YA, temperature increased by 0.5°C and PAR increased by 4% (table 2.1). Despite a considerable reduction in rainfall, the region received 907 mm rainfall which may still have been sufficient for the early growth of main-season rice. Thanks to the 4% increase of PAR, the BIOMASS index was estimated to have increased by 5% (table 2.1). As for the crop conditions, the low NDVI (figure 2.3b) in late May to early June was possibly due to the lower rainfall (figure 2.4b) observed during that period as compared to the 15YA. Since mid-June, the region received 80 - 100 mm rainfall every ten days which accelerated the rice development. Crop conditions recovered to average level by the end of July. Overall, the lowered rainfall in the early period of this bulletin does not appear to have significantly affected the crop conditions as reflected by a relatively high VCIx value ranging from 0.8 to over 1.0 (South-eastern horticulture area in figure 1.6). The CALF value in the area was 99% which was 1% above the 5YA (table 2.2).

Western and southern hill areas

Most indicators of the western and southern hill areas stayed close to their 15YA, with the notable exception of NDVI which dropped below its 5YA until it recovered to just about average in July (figure 2.3c). The NDVI pattern is consistent with rainfall levels which also showed a delayed start of the rainy season in mid-April followed by a recovery to above 15YA in July (figure 2.4c). Major crops of this area

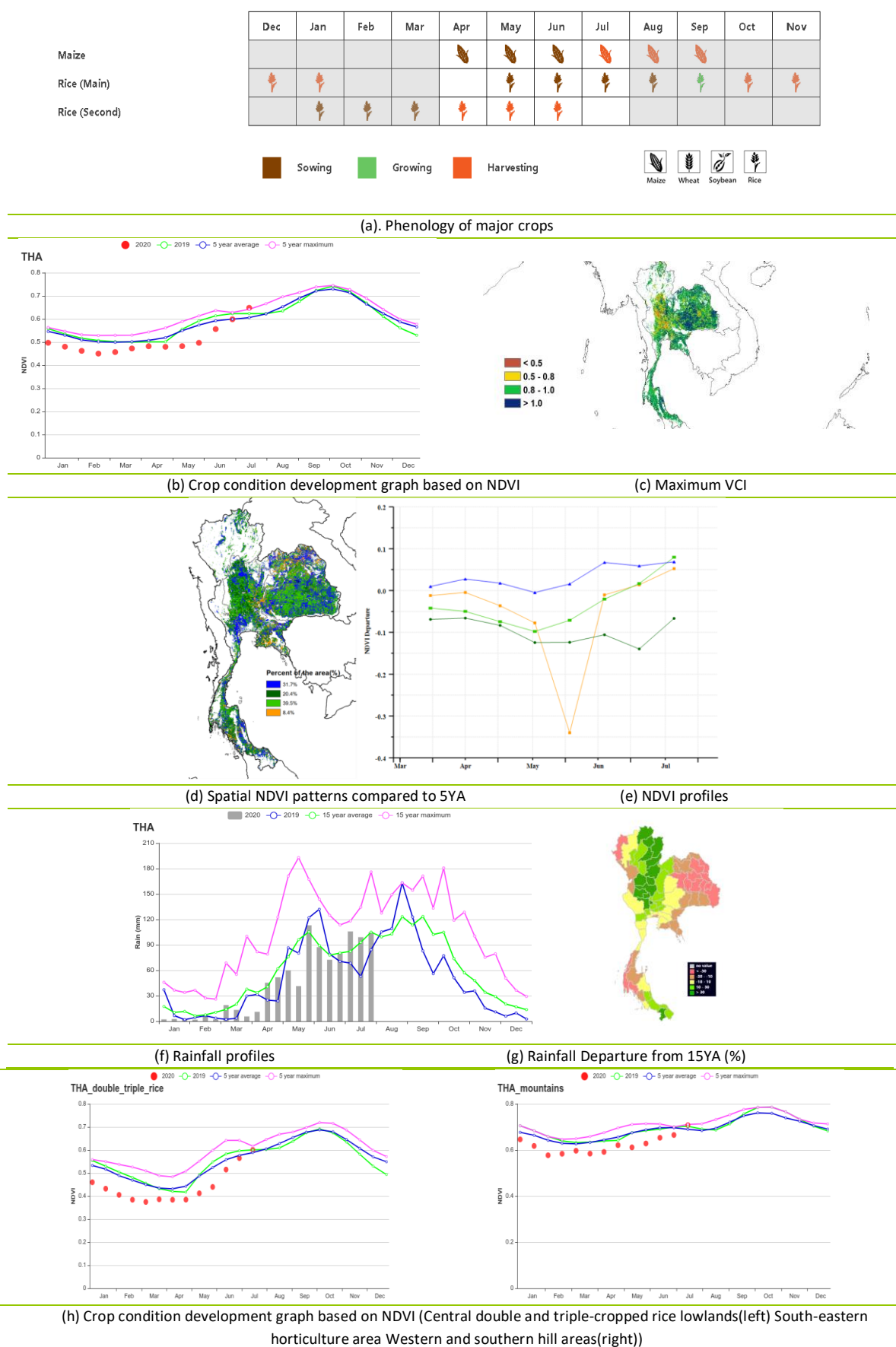
are Pará rubber, palm, coconut, and longan. All of these crops can be harvested all year round except longan which can only be harvested during July and August. Since the cumulative rainfall during April-July was just about average (table 2.1), the dry condition early in the year likely didn't leave a lasting impact on these crops. This is reflected in VCIx and CALF which are measured to be 0.94 and 99% respectively during the second quarter of 2020, representing good vegetation conditions.

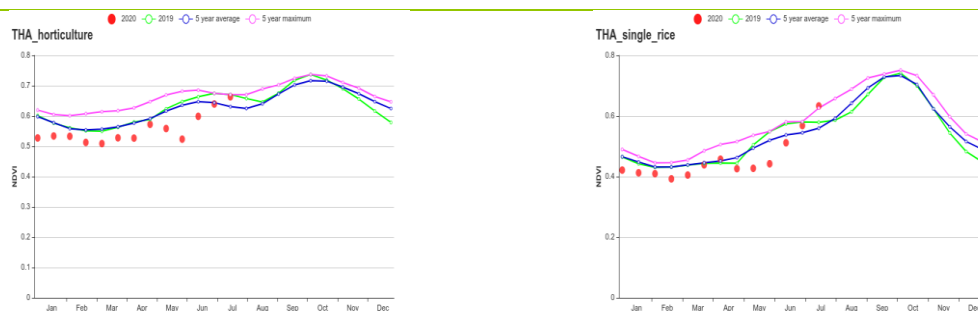
Single-cropped rice north-eastern region

For the north-east, dominated by Single-rice cultivation, rainfall (-22%) was below and PAR (+7%) above the 15YA as listed in table 2.1. More specifically, precipitation was below average throughout the period except for a few, isolated peaks in late May and early July (figure 2.4d). Meanwhile, PAR was mostly average until mid-June and then increased to distinctly above average from June onwards. In total, while rainfall dramatically declined compared with 15YA, the above average radiation benefitted biomass accumulation as potential biomass was measured to be 8% higher than 15YA (table 2.1).

For agronomic indicators, overall NDVI stayed below average except for July when the NDVI rose above the 5YA average (figure 2.3d). The significantly below average NDVI from April to June was mainly due to the rainfall shortage during that period. The rise of NDVI in July could have been a result of higher rainfall in the wet-season which helped mitigate the drought observed earlier in the year. Moreover, VCIx across north-eastern Thailand was 0.97, which represents good vegetation conditions. The CALF value was back to 100% (table 2.2) which indicated that farmers are cultivating all of their land.

Figure 3.39 Thailand's crop condition, April-July 2020





(i) Crop condition development graph based on NDVI (South-eastern horticulture area Western and southern hill areas(left) Single-cropped rice north-eastern region(right))

Table 3.69 Thailand's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Central double and triple-cropped rice lowlands	919	28	28	0.5	1208	4	808	4
South-eastern horticulture area	907	-15	28	0.5	1279	4	879	5
Western and southern hill areas	932	2	26	0.5	1226	2	802	3
Single-cropped rice north-eastern region	790	-22	29	1	1214	7	827	8

Table 3.70 Thailand's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Central double and triple-cropped rice lowlands	98	1	0.84
South-eastern horticulture area	99	1	0.95
Western and southern hill areas	99	0	0.94
Single-cropped rice north-eastern region	100	2	0.97

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[TUR] Turkey

This monitoring period covers the sowing and growth of maize and rice, while the harvest of wheat was almost concluded by the end of July. Nationwide, RAIN was close to average (+1%), and both TEMP (-0.4°C) and RADPAR (-1%) were slightly below the 15YA. BIOMSS was 5% below the average. High temperatures in mid-May accelerated the maturity of winter crops and may have affected yield formation.

The NDVI-based crop condition development graph indicates slightly below-average crop conditions during the whole monitoring period. The national average VCIx was 0.85. The southeastern, southern, and western provinces, such as Sanliurfa, Mardin, and Adana, experienced very promising VCIx values above 1.0, indicating that crops in those regions outperformed the best recent conditions. Low VCIx (< 0.5), which indicates below average crop conditions, was mainly observed for the central provinces such as Ankara, Yozgat, and Kayseri.

In terms of the NDVI spatial departure clustering map, the results confirmed the spatial pattern described above. Regarding the proportion of NDVI anomaly categories compared with the 5-year average, the first seven 16-day phases shared almost the same pattern. However, the last phase had slightly below to below average anomalies in around 50% of the cropped areas. This might have been due to heavy rainfall and the impact of local floods on the crops. As shown by the VHIIn graph, some areas went through dry conditions in early April. Overall, most areas experienced favorable conditions throughout this monitoring period. Crop production is generally expected to be close to normal.

Regional analysis

The regional analysis includes four agro-ecological zones (AEZ): **the Black Sea area, Central Anatolia, Eastern Anatolia** and **Marmara Aegean Mediterranean lowland zone**.

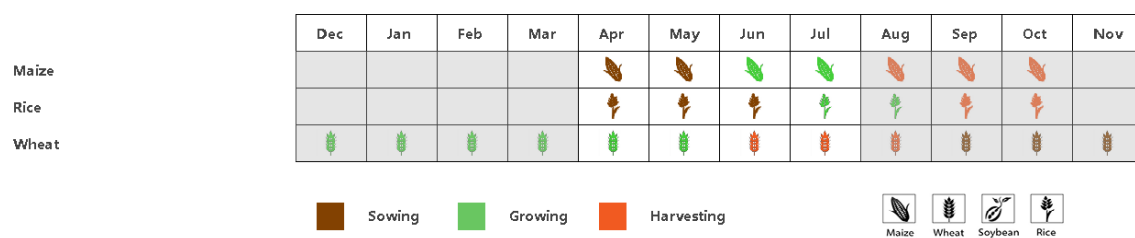
In the **Black Sea zone**, crop conditions were generally below but close to average. The rainfall was slightly above average (RAIN, +3%), while the temperature (TEMP) decreased by 0.4°C. The cropped arable land fraction was 98%, 1% below average. The average value of VCIx was high at 0.9, the highest among all four AEZs of Turkey. The crop conditions are assessed to be close to normal.

During this monitoring period, the crop conditions were also close to average in the **Central Anatolian plateau**. This AEZ is the only one which experienced below-average rainfall (RAIN, -13%) during this monitoring period. TEMP (-0.3°C) and RADPAR (-1%) were both below the 15YA, resulting in a slight decrease of the BIOMSS index (-1%). The average VCIx for this region was 0.8. The cropped land area slightly decreased (CALF -2%). Crop conditions are assessed as slightly below average.

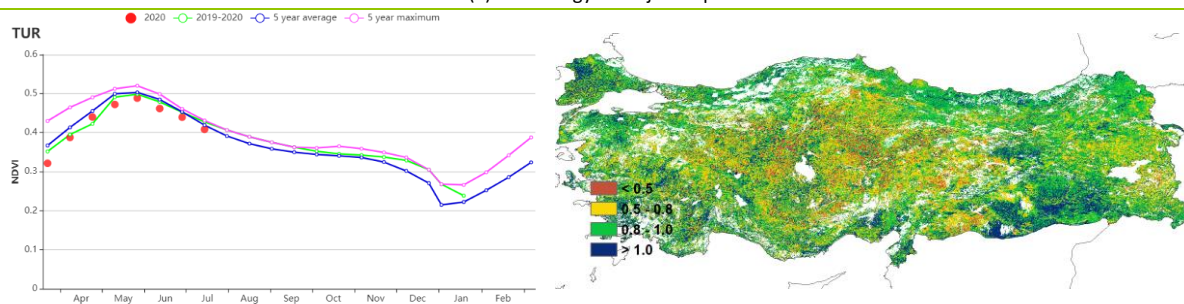
In **Eastern Anatolia**, crop conditions were generally below average until late July. TEMP and RADPAR were 0.4°C and 3% below the average, respectively, while the rainfall was above average (RAIN +10%). The relatively abundant rainfall led to the increase of biomass by 11%. The CALF increased slightly (+1%) compared to the average. With VCIx at 0.88, crop output is assessed to be average.

As indicated by the NDVI profile, in the **Marmara Aegean Mediterranean lowland zone**, the crop conditions were better than the 5YA during April, then slid to below average. RAIN was 3% above the average. The temperature was slightly below average (TEMP -0.5°C). VCIx was 0.89, and CALF is up 4%, which is the largest increase among the four AEZs. Production in this region is expected to be near average.

Figure 3.40 Turkey's crop condition, April-July 2020

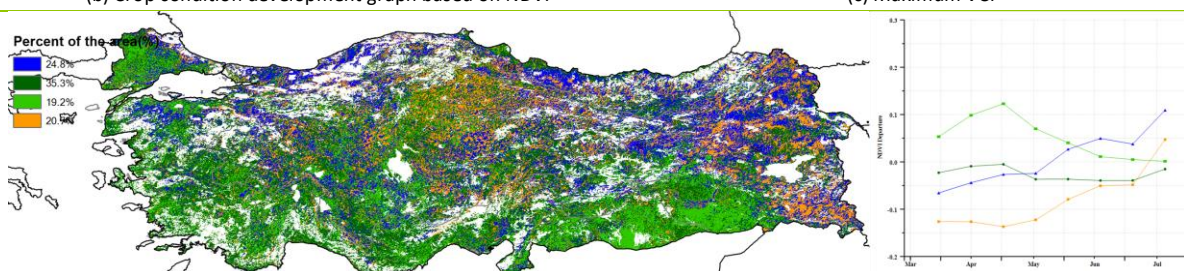


(a). Phenology of major crops



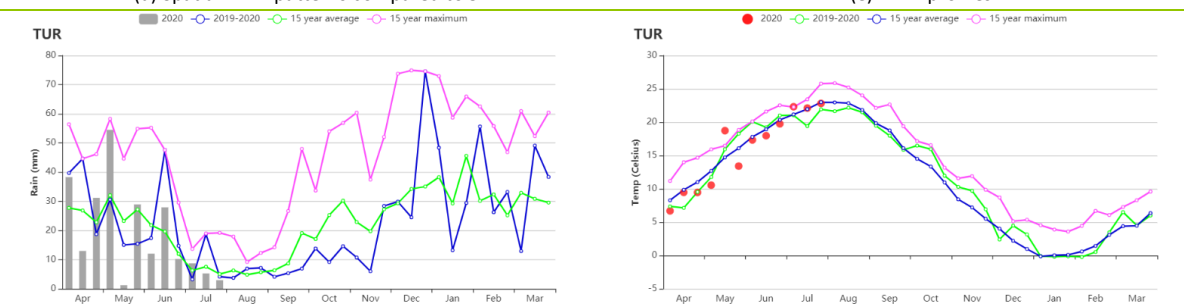
(b) Crop condition development graph based on NDVI

(c) Maximum VCI



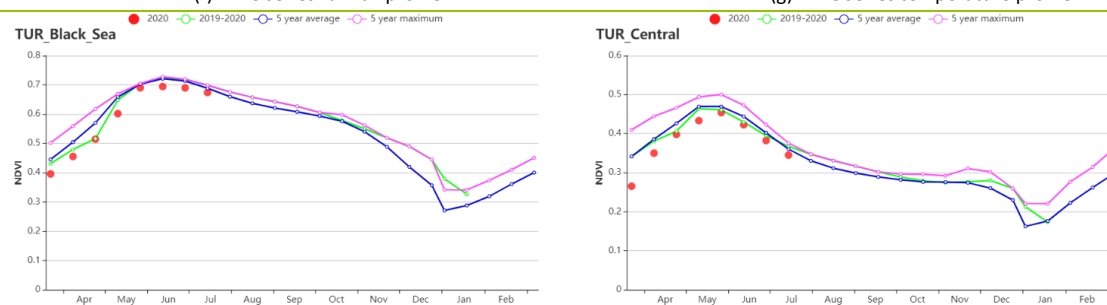
(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



(f) Time series rainfall profile

(g) Time series temperature profile



(h) Crop condition development graph based on NDVI (Black Sea region (left) and Central Anatolia region (right))

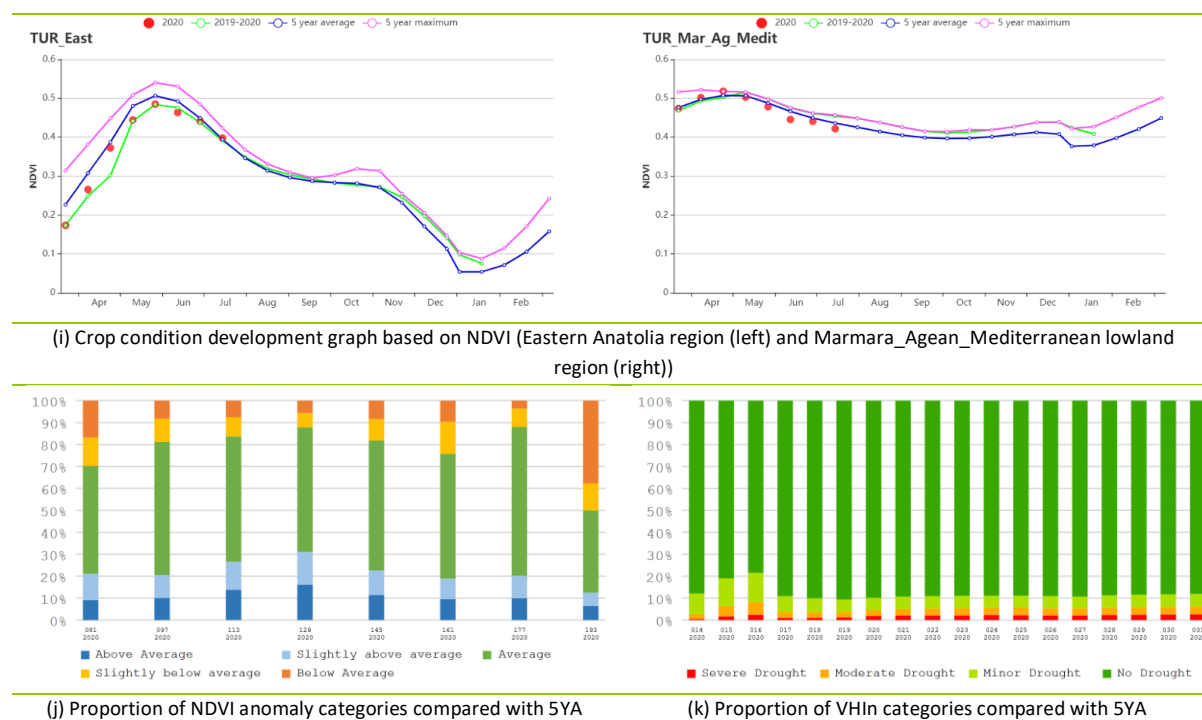


Table 3.71 Turkey's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Black Sea region	380	3	12.6	-0.4	1316	-1	475	-4
Central Anatolia region	187	-13	15.1	-0.3	1470	-1	524	-7
Eastern Anatolia region	332	10	13.9	-0.4	1472	-3	516	11
Marmara Agean Mediterranean lowland region	181	3	18.4	-0.5	1519	-1	521	-12

Table 3.72 Turkey's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current	Departure (%)	Current
Black Sea region	98	-1	0.90
Central Anatolia region	65	-2	0.80
Eastern Anatolia region	83	1	0.88
Marmara Agean Mediterranean lowland region	82	4	0.89

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[UKR] Ukraine

In Ukraine, maize, winter wheat and canola were the major crops in the field during this monitoring period. Maize was planted in May and winter wheat harvest began in July.

After drier-than-normal conditions in late winter, rainfall was abundant starting in May. In the course of this monitoring period, it reached 356 mm (+19%). Temperatures were colder than average (TEMP, 15°C, -1°C) with normal RADPAR (1225 MJ/m², -1%). Based on the agroclimatic conditions, CropWatch predicts that the potential biomass is 6% below the 5YA, mainly due to the dry conditions observed during April and the cold weather conditions in May, when temperatures were more than 6°C below the 15YA. Almost all cropland was cultivated (CALF, 99%) and the maximum vegetation condition index (VCIx) reached 0.90, which was favorable.

At the national level, NDVI was below the 5-year-average until late June. NDVI on 23.6% of the cropland, concentrated in southern areas, especially in Odessa and Crimea experienced a significant depression before July, consistent with the low VCIx (mainly between 0.5 and 0.8 with some below 0.5), indicating crop conditions were not favorable in this area. This was due to drought conditions observed during the previous monitoring period from which winter wheat could not fully recover. Crop development in other areas was generally good and VCIx (above 0.8) indicates favorable prospects for the summer crops.

In summary, drought conditions during the early spring had a negative impact on winter wheat, which explains the below average development of NDVI from April to June. The maize crop was off to a better start and reached maximum levels in July. Hence, conditions were sub-optimal for wheat, but favorable for maize.

Regional analysis

Regional analyses are provided for four agro-ecological zones (AEZ) defined by their cropping systems, climatic zones and topographic conditions. They are referred to as **Central wheat area** with the Poltava, Cherkasy, Dnipropetrovsk and Kirovohrad Oblasts; **Northern wheat area** with Rivne; **Eastern Carpathian hills** with Lviv, Zakarpattia and Ivano-Frankivsk Oblasts and **Southern wheat and maize area** with Mykolaiv, Kherson and Zaporizhia Oblasts.

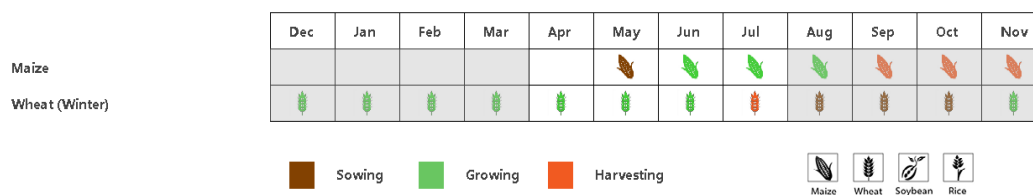
The **Central wheat area** had sufficient rainfall (324 mm, +20%) while temperature (-1.1°C) and radiation (-1%) were below the 15YA. The BIOMASS (525g DM/m²) is estimated to be 7% lower than the 5YA. The agronomic indicators show a very good CALF (100%) and VCIx (0.95). The NDVI development profile also confirmed unfavorable conditions until June, when they started to surpass the 5YA. Conditions for the summer crops are favorable.

The **Northern wheat area** received 370 mm of rainfall (+14%) and TEMP (14.1°C, -1.2°C) and RADPAR (1159 MJ/m², -2%) were lower than the 15YA. Because of cooler temperatures and less sunshine, the BIOMASS indicator reached 464g DM/m², 9% below average. The CALF was 100% and maximum VCIx was 0.96. NDVI was above the 5YA starting in July, overall crop conditions were unfavorable until June and greatly improved in July.

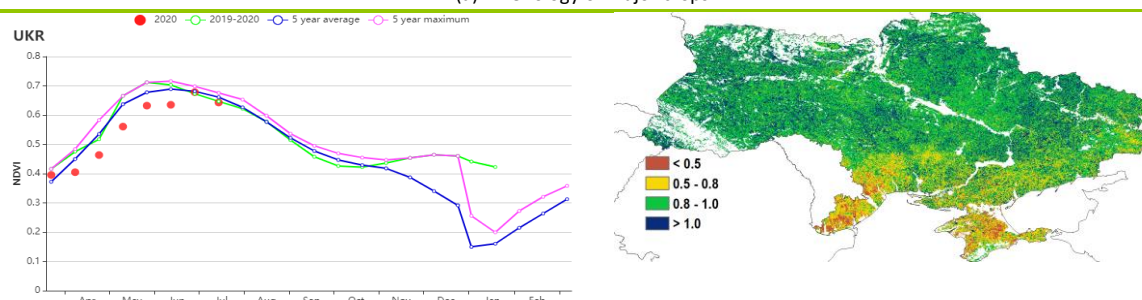
The conditions in the **Eastern Carpathian hills** showed a similar pattern as the other regions: abundant rainfall (538 mm, +26%), cooler temperatures (13.2°C, -1.3°C) and low RADPAR (1182 MJ/m², -3%) resulted in decreased potential BIOMASS (422 g DM/m², -14%). High CALF (100%) and VCIx at 0.97, as well as NDVI, indicate favorable conditions for the summer crops.

The **Southern wheat and maize area** also received more rainfall (+24%) and experienced cooler temperatures (-1°C) and slightly higher radiation (+1%). CALF (99%) was high, but VCI (0.85) was fair. Accordingly, NDVI stayed below the 5YA throughout this monitoring period. Crop conditions were below average.

Figure 3.41 Ukraine's crop condition, April- July 2020

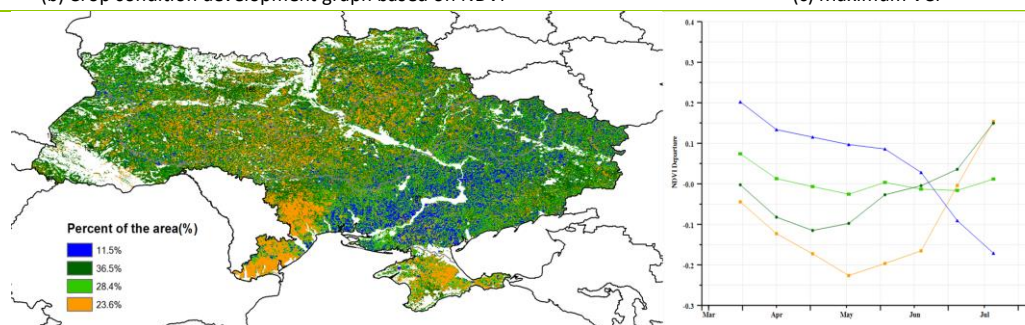


(a). Phenology of major crops



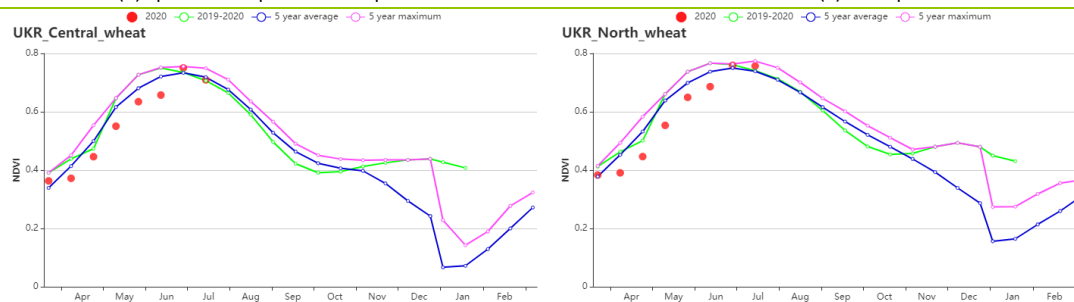
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

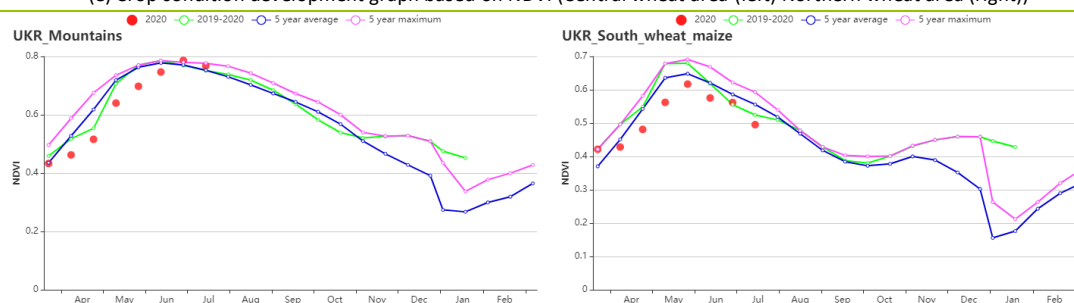


(d) Spatial NDVI patterns compared to 5YA

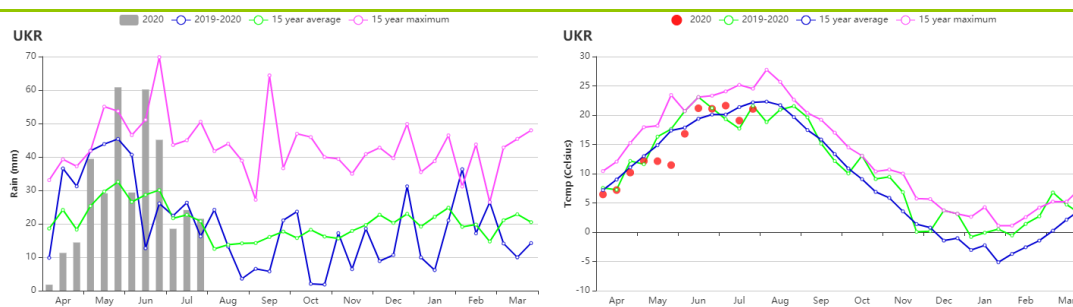
(e) NDVI profiles



(e) Crop condition development graph based on NDVI (Central wheat area (left) Northern wheat area (right))



(f) Crop condition development graph based on NDVI (Eastern Carpathian hills (left) Southern wheat and maize area (right))



(g) Rainfall profile (left) and temperature profile (right)

Table 3.73 Ukraine's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Central wheat area	344	20	15.1	-1.1	1231	-1	525	-7
Eastern Carpathian hills	538	26	13.2	-1.3	1182	-3	442	-14
Northern wheat area	370	15	14.1	-1.2	1159	-2	464	-9
Southern wheat and maize area	302	25	16.5	-1.0	1294	1	596	-3

Table 3.74 Ukraine's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Central wheat area	100	0	0.95
Eastern Carpathian hills	100	0	0.97
Northern wheat area	100	0	0.96
Southern wheat and maize area	99	0	0.85

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[USA] United States

This report covers the period from April to July 2020. Winter wheat had reached maturity in June and July. Maize and soybean planting started in April and finished in May. Maize reached the silking stage and soybean was in the bloom and pod setting stage by late July. In general, the crop conditions were generally favorable nationwide.

Slightly more humid and cooler weather was observed in this monitoring period with rainfall 6% above average, temperatures 0.5°C below average and PAR 2% lower as compared to the 15YA. At the national scale, biomass was estimated to be 2% below the 5YA, due to lower PAR. Significantly above average rainfall occurred in Illinois (12%), Iowa (14%), Missouri (15%), Alabama (7%), Georgia (7%), Florida (18%), Washington (10%), and South Carolina (19%). On the contrary, the northeastern region of the United States and the eastern part of the Corn Belt suffered from a light precipitation deficit. This includes Pennsylvania (-11%), Vermont (-13%), Indiana (-15%), Ohio (-4%), Michigan (-5%). The rainfall time series show that it fluctuated around the long-term average, and no prolonged dry spell was observed. Temperatures in the eastern United States and northern Great Plains were 0.5-1.5°C lower than average. In mid-April, a cold wave had swept across the central and southern United States, causing significantly below-average temperatures and delaying the planting of maize. With the exception of some states located in the Northeast and North Plains, most areas of the United States experienced lower PAR than usual, such as Illinois (-5%), Iowa (-4%) and Missouri (-5%).

The USA encompasses a wide range of agro-climates. Nationwide, VCIx was at 0.88, indicating generally favorable conditions, but there were some differences in crop conditions in major food producing areas of the United States. In the southern Great Plains, VCIx was below 0.5, whereas it was higher than 1 in the western Corn Belt. Using the spatial clustering method, our analysis divides the mainland of the United States into five categories based on the NDVI anomaly dataset. In the Southern Great Plains, drier than normal conditions prevailed over most of the monitoring period, causing a negative departure of NDVI. But the crop conditions improved significantly in July. From April to the end of May 2020, the crop conditions in the corn belt suffered from wet and cold conditions, which caused some delays in planting and early crop development. As in the south, the conditions improved greatly in July. From April to July 2020, crop conditions in the southeastern United States remained at a relatively favorable level, and the NDVI anomalies remained positive. At the end of July, 90% of arable land was cropped, which was 1% below the 5YA.

In short, with the exception of some areas in the Southern Great Plains, crop conditions in most major crop producing areas in the United States were favorable. In the next monitoring period, all spring and summer crops will enter the grain filling stage and reach maturity.

Regional analysis

Corn Belt

This is the most important corn and soybean producing area in the United States. It includes Illinois, Iowa, Minnesota, Wisconsin, Ohio and Michigan. Compared with the 15YA, the agro-climatic conditions in the area during the monitoring period were slightly more humid and cooler. Precipitation was 5% higher, while temperature and PAR were 1°C and 2% below average. The crops developed more slowly than usual, which explains the slightly below-average NDVI values in May and June. However, the crops recovered to average levels by July. The VCIx value of 0.93 also indicates favorable crop growth in the region and the outlook for the soybean and maize crops is favorable.

Lower Mississippi

This is the most important rice producing area and an important soybean producing area in the United States. It includes Arkansas, Louisiana, Mississippi and Missouri. Rice reached the heading stage in July.

The agro-climatic conditions in the lower Mississippi were close to the average with average rainfall (+3%) and temperature (-0.7°C), while the average PAR was 3% lower than 15YA. In early May and June, the deficit in precipitation in the area resulted in below average crop conditions. By July, the crop conditions returned to close to average. The VCIx value reached 0.91, which also indicates favorable crop growth conditions in this region.

NorthWest

This is an important winter wheat producing area in the United States, including Washington and Idaho. Winter wheat reached maturity and was mostly harvested by the end of July. Compared with the 15 YA, rainfall was 9% above average, temperature was 0.4°C below average, and PAR was 4% below average. The precipitation time series show that the rainfall in the northwestern region was lower than average in early and mid-April, and subsequently gradually recovered to above-average levels. The NDVI development profile indicates that the crop conditions were below average in April and May, but subsequently returned to average levels. The below average conditions in the early part of this reporting period can be attributed to below average rainfall in April, which also impacted CALF (-4%). By the end of July, crop conditions were generally favorable

Northern Plains

This is the most important spring wheat and sunflower producing area in the United States and the second most important corn and soybean producing area. It includes North Dakota, South Dakota, Nebraska and Montana. This monitoring period covers the planting, germination, silking and dough stages of corn; the sowing, emergence, heading and grain filling stages of spring wheat; the sowing, emergence, flowering and pod-setting stages of soybean. Compared with the 15 YA, the northern plain had experienced nearly average weather conditions, with rainfall 4% higher and temperature (-0.7°C) and PAR (-1%) lower than the 15YA. After sowing and emergence, the spring and summer crops in July all entered silk (corn), flowering (soybean) and heading (spring wheat) stages. Cooler and wetter conditions in North and South Dakota delayed the timely planting of the spring crops. However, by the end of July the crops had caught up and their NDVI reached slightly higher than average levels, especially in South Dakota and Montana. A VCIx value as high as 0.95 also indicates favorable crop growth in this region

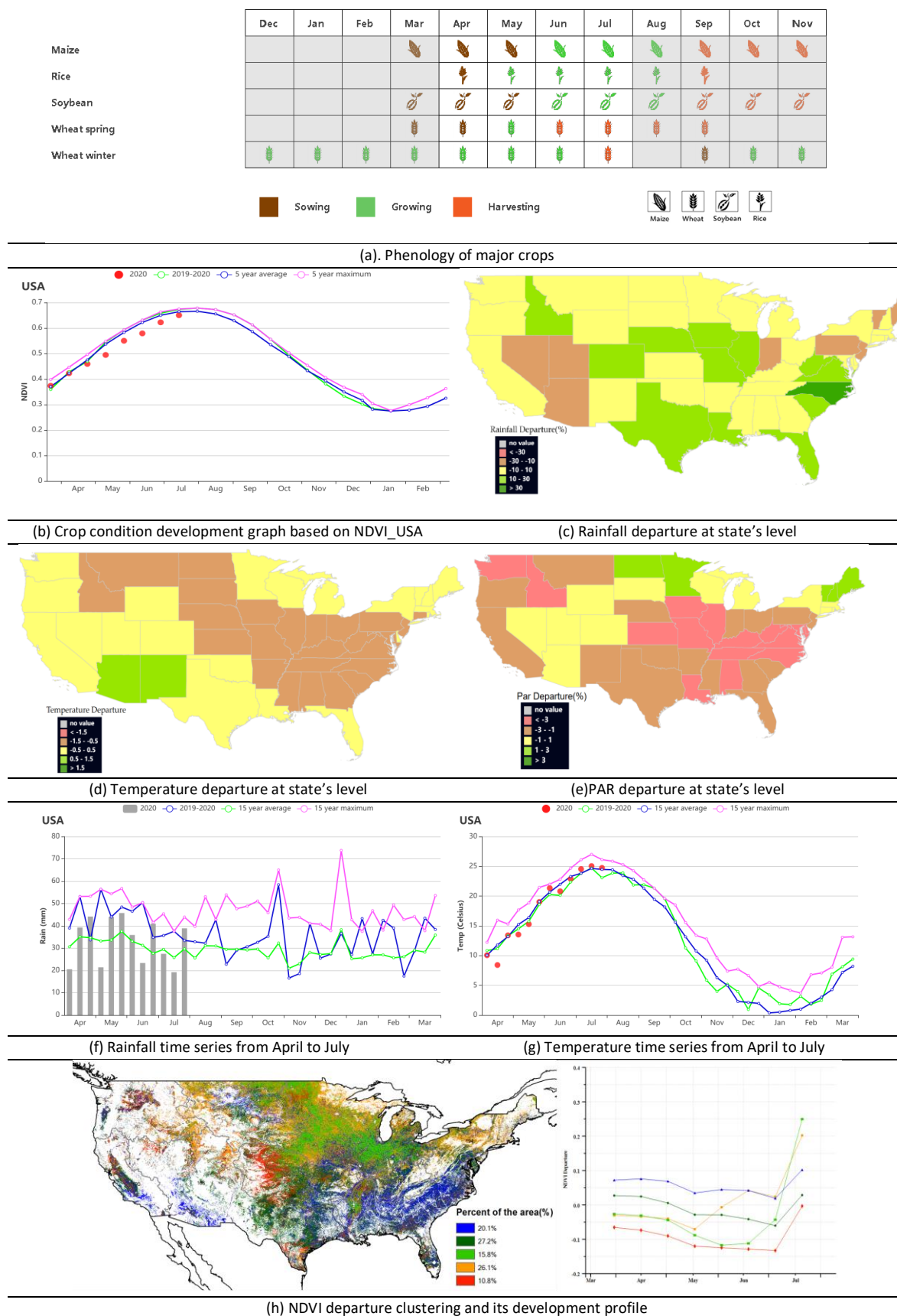
Southeast

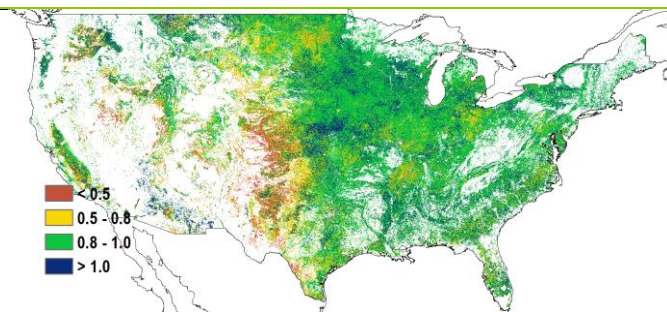
This is an important cotton production area in the United States, including Georgia, Alabama and North Carolina. During the monitoring period, the agro-climatic conditions in this region were favorable. Compared with the 15 YA, rainfall was 16% higher, temperature 0.6°C lower and PAR 3% below average. Abundant rainfall helped sustain vigorous crop growth, although rainfall in July was far below average. The VCIx value, which reached 0.93, also indicates favorable crop growth in the region

Southern Plains

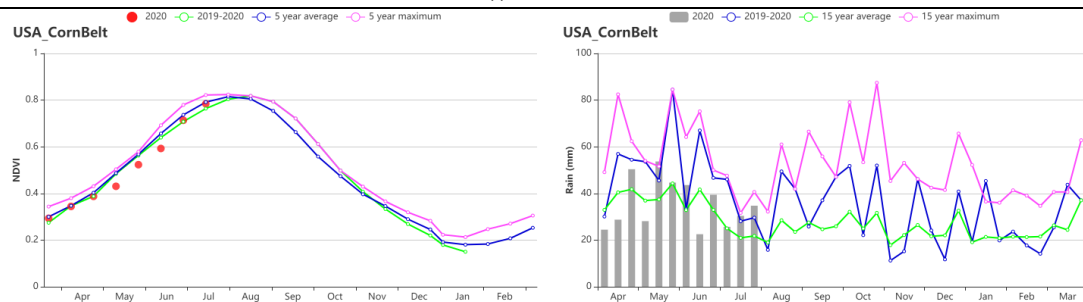
This is the most important winter wheat, sorghum and cotton producing area in the United States. It includes Kansas, Oklahoma, Texas, and eastern Colorado. Texas is the largest cotton producing state and Kansas the largest winter wheat producing state in the United States. During this monitoring period, the southern plain experienced a slightly wetter season than normal: Compared to the 15YA, rainfall was 9% higher, temperatures 0.3°C below average and PAR 2% below average. The monitoring period covers the grain filling and harvesting stages of winter wheat and the planting, square and boll fixing stages of cotton. The development profile of NDVI shows that the crop conditions were significantly below average in May and June, however, they improved in July. At the same time, the proportion of cultivated land has dropped by 4% compared to the 5YA. All in all, crop conditions were slightly below average by the end of this monitoring period

Figure 3.42 United States' crop condition, April - July 2020

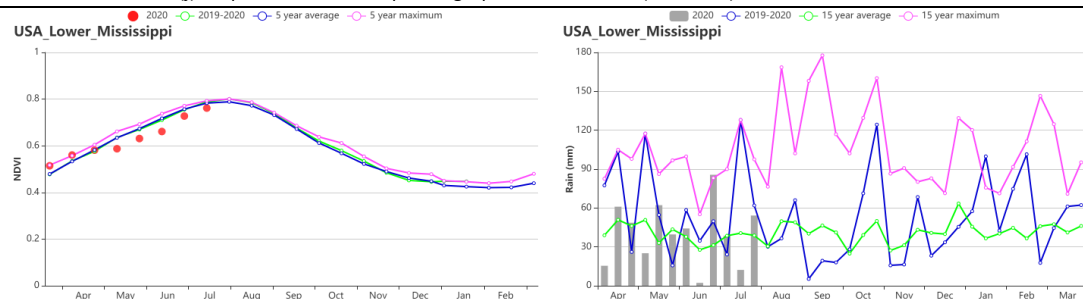




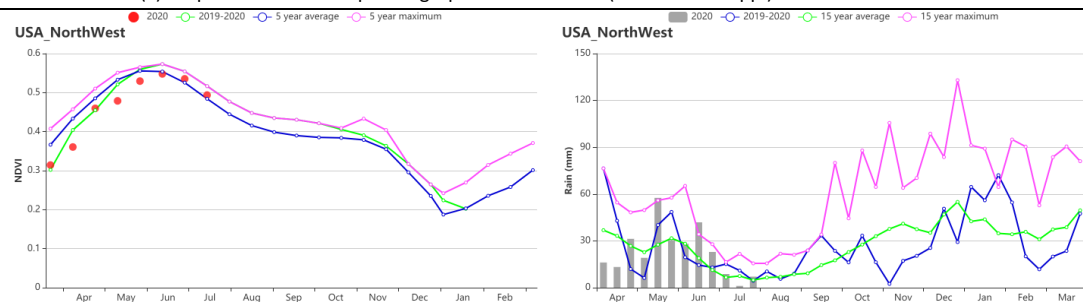
(i) Maximum VCI



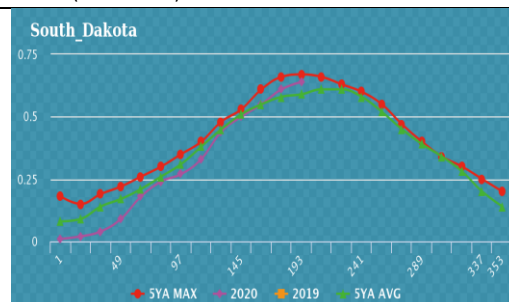
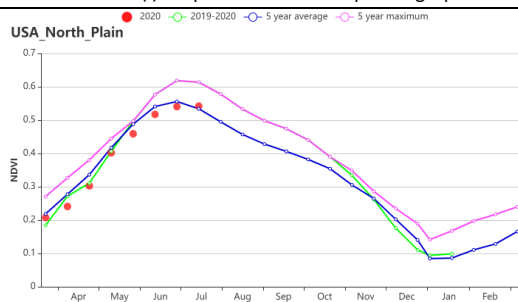
(j) Crop condition development graph based on NDVI (Corn Belt) and Rainfall time series



(k) Crop condition development graph based on NDVI (Lower Mississippi) and Rainfall time series



(l) Crop condition development graph based on NDVI (NorthWest) and Rainfall time series



(l) Crop condition development graph based on NDVI (North Plain(left) and South Dakota(right))

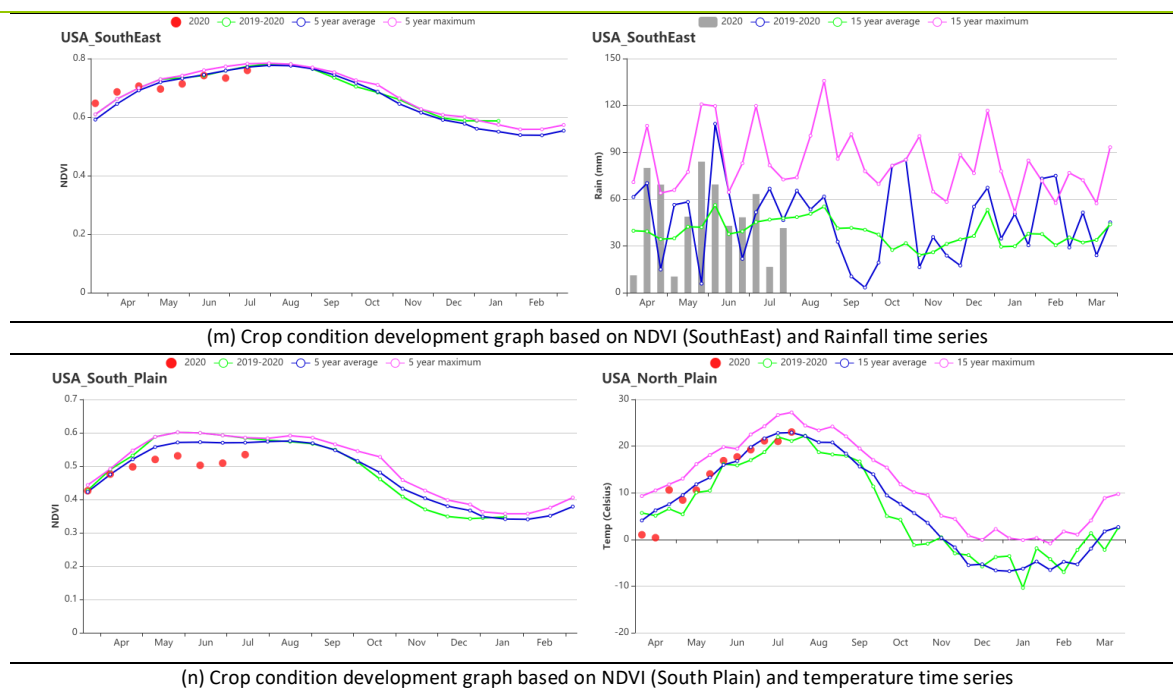


Table 3.75 United States' agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
California	100	-10	17.4	0.3	1599	-1	419	-13
Corn Belt	426	5	16.3	-0.7	1268	-2	603	-1
Lower Mississippi	489	3	22.9	-0.7	1350	-3	788	-5
North-eastern areas	425	-2	15.5	-0.7	1226	-2	548	-1
Northwest	278	9	11.8	-0.4	1346	-4	439	-10
Northern Plains	350	4	13.7	-0.7	1376	-1	561	-3
Southeast	585	16	22.5	-0.6	1361	-3	793	-4
Southwest	175	-6	18.4	0.5	1588	0	634	6
Southern Plains	370	9	22.6	-0.3	1401	-2	806	0
Blue Grass region	457	4	18.9	-1.1	1311	-4	676	-7

Table 3.76 United States' agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
California	81	9	0.86
Corn Belt	100	0	0.93
Lower Mississippi	100	0	0.91
North-eastern areas	100	0	0.95
Northwest	82	-4	0.87
Northern Plains	91	5	0.86
Southeast	100	0	0.93
Southwest	40	-6	0.79
Southern Plains	83	-5	0.8
Blue Grass region	100	0	0.93

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[UZB] Uzbekistan

This report covers the cultivation and harvest of wheat and the sowing and early growth period of maize in Uzbekistan.

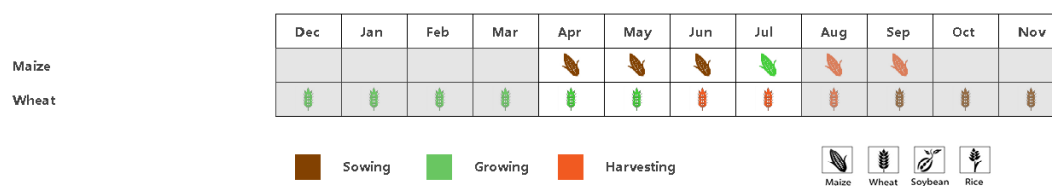
The crop conditions for the whole country were generally favorable. The national average VCIx was 0.88, and the cropped arable land fraction increased by 30%. Among the CropWatch agroclimatic indicators, TEMP and RADPAR were slightly below average (-0.5°C and -4%), while RAIN increased by 62%. Especially April and May were wetter than normal. This resulted in an increased BIOMSS (+5%) compared to the recent fifteen-year average. As shown by the NDVI development graph, crop conditions were above or near average in the whole period except for June. The NDVI cluster graphs and profiles showed that most areas across Uzbekistan experienced favorable crop conditions during this monitoring period. About 35% of the cropland had above average conditions from April to July, covering most provinces of Samarkand, Kashkadarya, Surkhadarya, Jizzakh, and some small parts of Nawoiy, Sirdaryo, Tashkent, Namangan, Ferghana and Andijon provinces. In contrast, about 15% of the arable land was below the five-year-average NDVI, mainly in the Karakalpakstan, Khorezm, and Bukhoro provinces. Overall, the crop conditions are estimated to be favorable.

Regional analysis

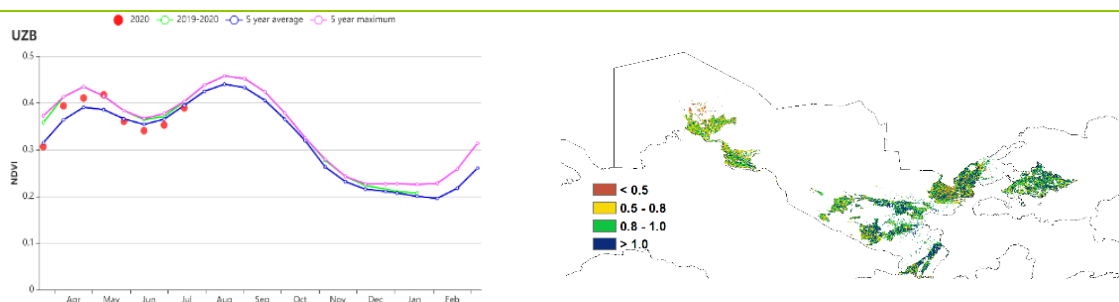
In the rainfed Eastern hilly cereals zone, NDVI was above average from April to mid May and near average from the end of May to the end of July. RAIN was above average (+63%), and RADPAR and TEMP were below average (-4% and -0.6°C). The combination of the factors resulted in a BIOMSS increase (+12%) compared to the five-year average. The maximum VCI index was 0.95, while the cropped area increased by 19% compared to the five-year average. Overall, crop prospects in this region are good.

In the irrigated Aral Sea cotton zone, the crop conditions, after a favorable start in April, dropped to below the 5YA starting in late May. Accumulated rainfall (RAIN -29%) was below the 15YA, RADPAR (-1%) was slightly below and temperatures were higher (TEMP $+0.5^{\circ}\text{C}$) than average. The BIOMSS index decreased by 17% compared to the fifteen-year average. The maximum VCI index was 0.81, while the cropped arable land decreased by 3%. Overall crop prospects are slightly unfavorable.

Figure 3.43 Uzbekistan's crop condition, April - July 2020

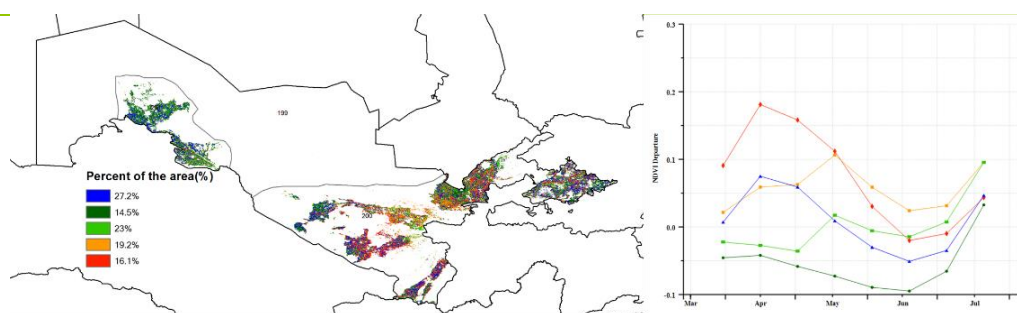


(a). Phenology of major crops



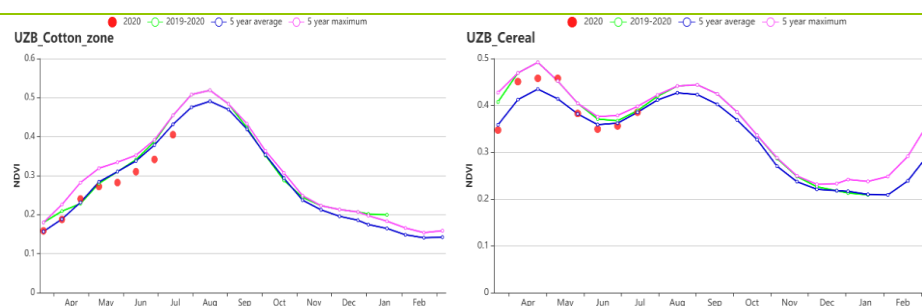
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

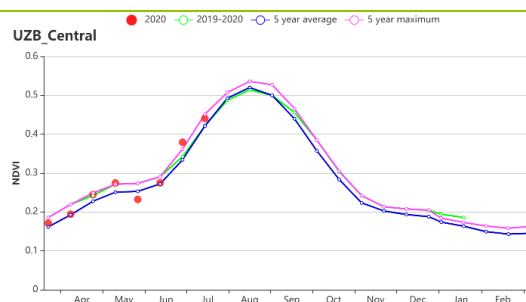


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



(f) Crop condition development graph based on NDVI Aral Sea cotton region (left) Eastern hilly cereals region (right)



(g) Crop condition development graph based on NDVI Central region with sparse crops

Table 3.77 Uzbekistan's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April – July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Aral Sea cotton zone	19	-29	25.5	0.5	1517	-1	523	-17
Eastern hilly cereals zone	224	63	21.4	-0.6	1500	-4	617	12
Central region with sparse crops	71	72	25.1	0.1	1519	-2	536	-8

Table 3.78 Uzbekistan's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April – July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Aral Sea cotton zone	65	-3	0.81
Eastern hilly cereals zone	84	19	0.95
Central region with sparse crops	75	14	0.87

[VNM] Vietnam

This report summarizes the rice production conditions over Vietnam and in its main agro-ecological zones including North Central Coast, North East, Red River Delta, South East, South Central Coast, North West, Central highlands and Mekong River Delta from April to July, 2020. This monitoring period fully covers the duration from sowing to harvesting of summer rice in the Central Part, while the north and the south were in the last stages of their winter-spring rice and summer-autumn crops, respectively. Spring-winter rice production in the Mekong Delta and Southeast region started in July.

Precipitation over the nation decreased nearly 21% as compared to the 15-year average. Shortages of rainfall occurred in May, early June, early and late July. The North Central Coast (-39%) and Red River Delta (-37%) are the two regions encountering the highest lack of precipitation. Apart from precipitation, temperature (+0.3°C) and radiation (+5%) were slightly above average. The moderate climate conditions led to a 4% gain in biomass at the national scale.

Crop condition development based on NDVI was significantly lower than the 5YA. The NDVI trend in the northern part of Vietnam tended to be below average levels, while the region from central to southern Vietnam (nearly 57% area) had a similar pattern of NDVI, which was close to the average. When it comes to VCIx, most parts of Vietnam had a value over 0.8, except for South Central Coast and the coastal provinces of the Mekong Delta where VCIx was very low. According to prior knowledge of our research team, these two zones suffered from drought and salinity intrusion. This considerably affected the health of the crops. The CALF was stable as compared to the recent five-year average.

Overall, the output of rice production from April to July is estimated as poor, due to unfavorable weather conditions.

Regional analysis

Based on cropping systems, climatic zones and topographic conditions, several agro-ecological zones (AEZ) can be distinguished for Vietnam: North Central Coast (202), North East (203), Red River Delta (204), South East (205), South Central Coast (206), North West (207), Central highlands (208), Mekong River Delta (209).

During this reporting period, the summer-autumn rice crop cultivation in the North Central Coast passed through 3 phases: sowing, growing and harvesting. The average rainfall was about 571 mm, 39% below average, while the temperature was 25.3°C, an increase by 0.5°C as compared to the 15YA. RADPAR was above average (+7%). Despite the substantial reduction in rainfall, BIOMASS was above average (+6%). The crop conditions were below average from April to July. Overall, VCIx was 0.95 and CALF was close to average, indicating moderate conditions in this region. The output of summer and autumn rice in this region is estimated to be slightly lower than in 2019.

The period from April to May is the last stage of rainy season rice in the North West. In this region, the average rainfall was 4% above average while temperatures dropped 0.2°C compared to the 15YA. Radiation was also slightly higher than average (+6%). In general, the climate condition pattern had a small departure from the 15-year baseline. The potential biomass was above average (+2%) and the VCIx was in the range of 0.8 -1. The NDVI profiles in the region showed spatial variations, and the values of this indicator decreased between June and July. The CALF reached 100% and was stable compared to 5-year average. Generally, the output of the rainy season crop in the North West would be average thanks to good weather conditions.

In the Red river Delta, the average rainfall was 674 mm and it was 37% lower than the 15YA. The temperature was up by 0.1°C and the VCIx was 0.95. RADPAR (1%) and BIOMSS (0%) did not change significantly from the 15-year average. The crop condition development graph based on NDVI fluctuated greatly from 0.3 to 0.7. CALF increased by 1%. Overall, this region has moderate prospects for summer-autumn rice.

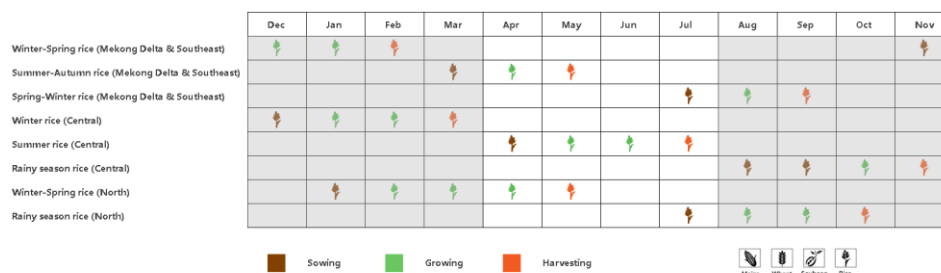
During this reporting period, the summer-autumn rice crop in the South East entered the growing and harvesting phases. It was followed by the planting of the spring-winter rice crop in July. Total rainfall in this reporting period was about 902 mm, 24% below 15YA. Temperature was 27.2°C, up by 0.7°C as compared to the 15YA. RADPAR was higher than average (+5%). BIOMASS was above average (+3%). The crop condition graph based on NDVI presented below-average values. Rainfall deficit might be the reason for negative NDVI departure. Overall, VCIx (0.9) and CALF (94.11%) indicated moderate conditions in this region. The outputs of summer-autumn rice and spring-winter rice crop can be expected to be slightly lower than in 2019.

During this reporting period, the summer-autumn rice crop in the South Central Coast passed through 3 phases: sowing, growing and harvesting. The average rainfall was about 721 mm, 24% below average while TEMP was 24.6°C, up by 0.3°C over the 15YA. RADPAR was above average (+7%). Despite the big reduction in rainfall, BIOMASS was above average (+2%). The crop condition was below average from April to July. VCIx (0.86) and CALF (+1%), in combination with the other CropWatch indicators, presented a generally unfavorable yield prospect for summer-autumn rice.

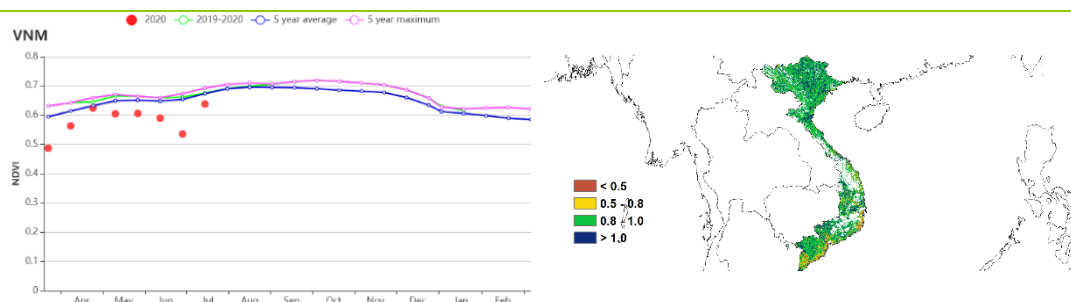
The summer-autumn rice crop in the Central Highlands passed through all 3 phases: sowing, growing and harvesting. The average rainfall in the Central Highlands was about 884 mm and it was 26% below average, while TEMP was 24.4°C, an increase by 0.6°C, as compared to the 15YA. RADPAR was above average (+12%). Despite the big reduction in rainfall, BIOMASS was above average (+10%). The crop conditions were below average from April 1 to early July, and then above average in late July. Overall, high VCIx (0.94) and stable CALF indicated moderate conditions in this region. The output of summer-autumn rice is estimated to be poor.

During this reporting period, the summer-autumn rice crop in Mekong River Delta had completed the growing and harvesting phases. Spring-winter rice planting started in July. Total rainfall in this reporting period was about 944 mm, and it was 11% below the 15YA. Average temperature was 28.5°C, 0.6°C higher than the 15YA. PAR (RADPAR) was slightly higher than average (1%). BIOMASS was above average (+2%). The crop condition graph based on NDVI presented below-average values over the entire monitoring period. Rainfall deficit as well as record-low flow levels of the Mekong river are the likely causes for the negative NDVI departure. VCIx (0.87) and CALF (83%) indicated moderate conditions in this region. The outputs of summer-autumn rice and spring-winter rice crop are forecasted to be lower than in 2019.

Figure 3.44 Vietnam's crop condition, April-July 2020

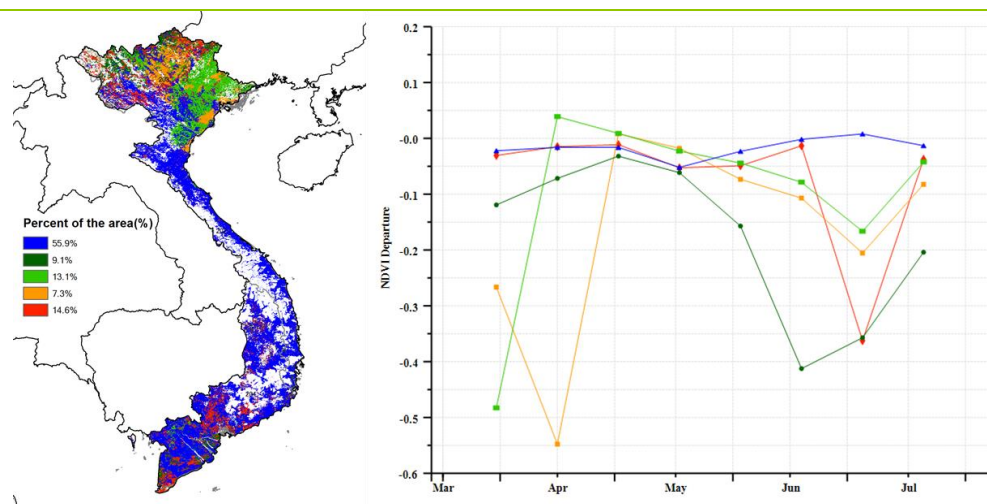


(a). Phenology of major crops



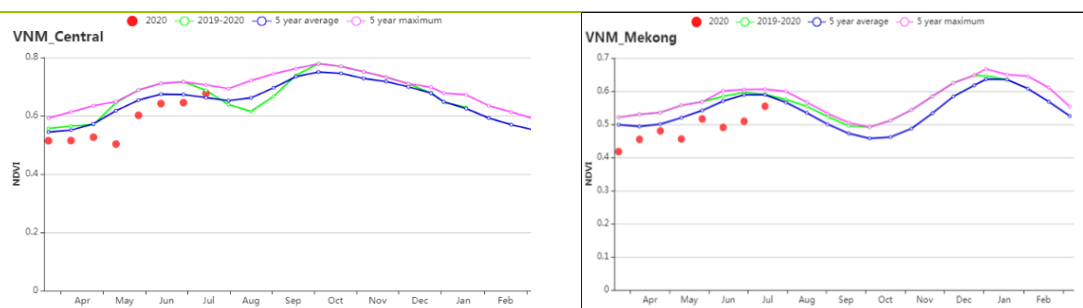
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

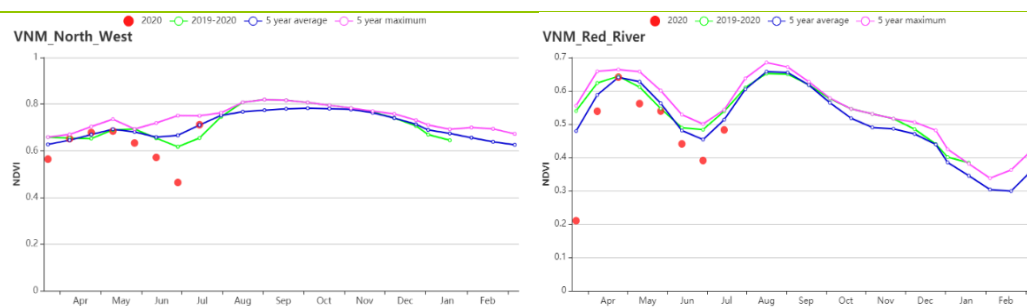


(d) Spatial NDVI patterns compared to 5YA

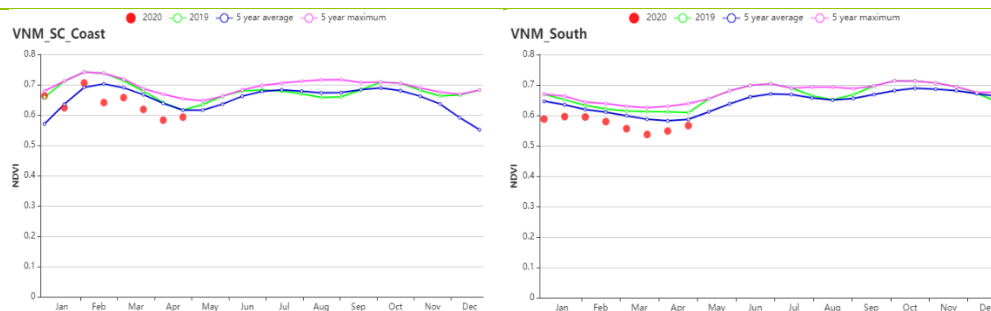
(e) NDVI profiles



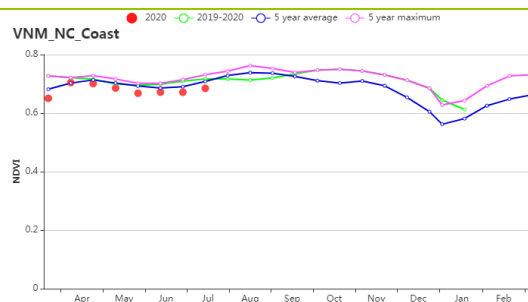
(f) Crop condition development graph based on NDVI Central Highlands Vietnam (left), and Mekong River Delta (right).



(g) Crop condition development graph based on NDVI North West Vietnam (left), and Red River Delta (right).



(h) Crop condition development graph based on NDVI South Central Coast Vietnam (left), and South East Vietnam (right).



(i) Crop condition development graph based on NDVI North Central Coast Vietnam

Table 3.79 Vietnam's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (gDM/m ²)	Departure (%)	Current (MJ/m ²)	Departure (%)
Central Highlands	884	-26	24.4	0.6	1260	12	782	10
Mekong River Delta	944	-11	28.6	0.6	1270	1	877	2
North Central Coast	571	-39	25.3	0.5	1262	7	808	6
North East	1223	-14	23.8	-0.1	1192	3	755	3
North West	1167	4	22.8	-0.2	1246	6	760	6
Red River Delta	674	-37	27	0.1	1195	1	806	0
South Central Coast	721	-24	24.6	0.3	1270	7	770	2
South East	902	-23	27.2	0.7	1271	5	834	3

Table 3.80 Vietnam's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current	Departure (%)	Current
Central Highlands	98	1	0.77
Mekong River Delta	84	-2	0.83
North Central Coast	99	0	0.94
North East	83	-1	0.87
North West	99	0	0.95
Red River Delta	100	0	0.96
South Central Coast	100	0	0.95
South East	98	1	0.95

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[ZAF] South Africa

Most crops, such as maize, sorghum, soybeans, rice and groundnuts reached maturity in May or June. Wheat planting started in May.

As compared to the 15-year average, the precipitation decreased by 23%, the temperature was 0.7°C below average and RADPAR was 2% higher. The decrease in precipitation and temperature affected the potential biomass which was reduced by 17% as compared to the 15YA. The fraction of cropped land increased by 9% compared to the 5YA.

Based on the NDVI profile, it was noticed that from April to July, the crop conditions were fair: NDVI values remained close to the 5-year average for the whole period. According to the map depicting spatial NDVI patterns, 6.1% of the area, mostly in Western Cape, had a rising NDVI departure beginning in mid-May, because wheat had started to emerge at around that time. The graph also shows that 42% of the area (in Eastern State, KwaZulu Natal, Free State, Mpumalanga, and North West) had positive NDVI departures until the end of June. 51% of the area in these provinces had negative NDVI departures which can be explained by the harvesting period. The maximum VCIx was at 0.89.

Regional analysis

CropWatch considers three main crop production zones in South Africa, namely The Mediterranean zone, Humid Cape Fold Mountains and Dry Highveld and Bushveld maize areas.

In the Mediterranean zone, the precipitation decreased by 3% (from the 15YA), temperature remained close to average (+0.1°C), while the radiation increased by 6% as compared to the 15YA. In this zone which is known for its wheat cultivation, the slight reduction in rainfall did not affect the potential biomass, as a 2% increase over the 15YA was estimated. The cropped land increased by 3% over the 5YA and the vegetation condition index was at 0.86. According to the NDVI graph the crop conditions were above the 5YA average starting in June and reached a maximum in July. Conditions for wheat are promising in this region.

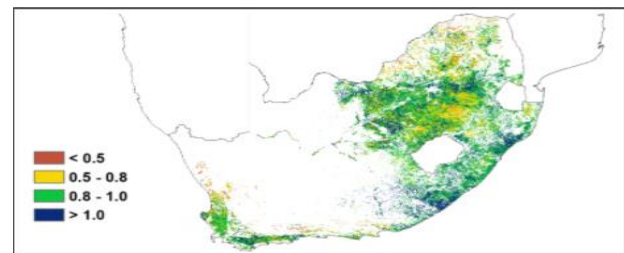
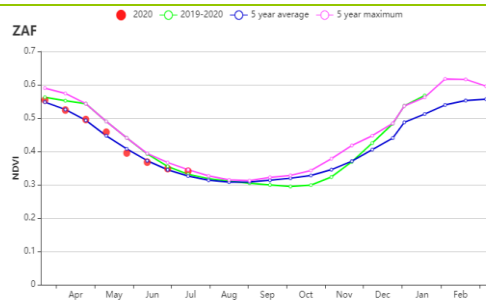
In the Humid Cape Fold Mountains, the precipitation dropped by 31% compared to the 15YA, and the region was cooler by 0.4°C while the radiation increased by 3% from 15YA. Hence, the current biomass estimate was reduced by 6%. CALF increased 2% as compared to the 5YA. The NDVI values closely followed the 5-year trend. Maximum vegetation condition index was at 93. The crop conditions were average for this region.

In the Dry Highveld and Bushveld maize areas, the rainfall departed by -26% from the average, temperatures were also below average (-0.9°C) and radiation was 2% higher as compared to 15YA. In this main production zone, estimated biomass was reduced by 24% compared to 15YA. Regarding the cropped area land fraction (CALF), it had increased by 11% above the 5YA and VCIx was at 0.89. From April up to July, the NDVI profile for this semi-arid region was close to average. Crop conditions were average for this region.

Figure 3.45 South Africa's crop condition, April - July 2020

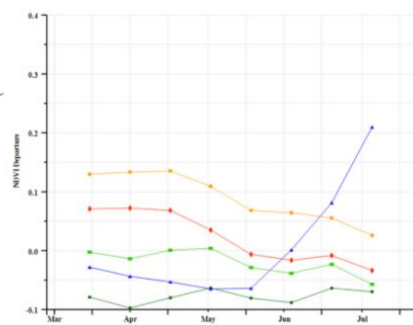
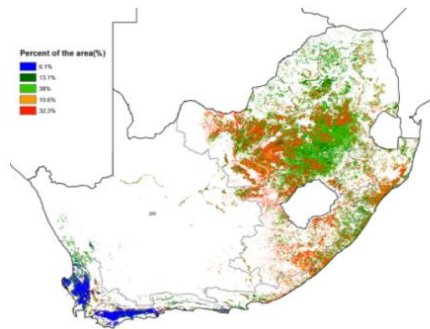


(a). Phenology of major crops



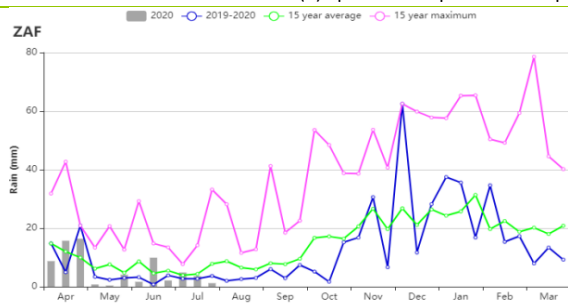
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

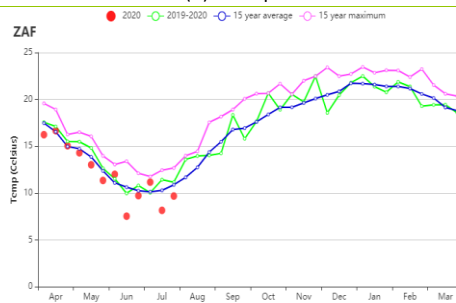


(d) Spatial NDVI patterns compared to 5YA

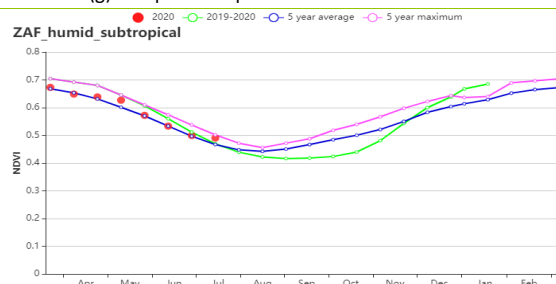
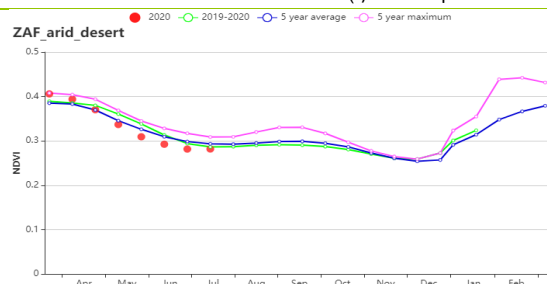
(e) NDVI profiles



(f) Rainfall profiles



(g) Temperature profiles



(h) Crop condition development graph based on NDVI Arid desert (left) and Humid sub-tropical (right)

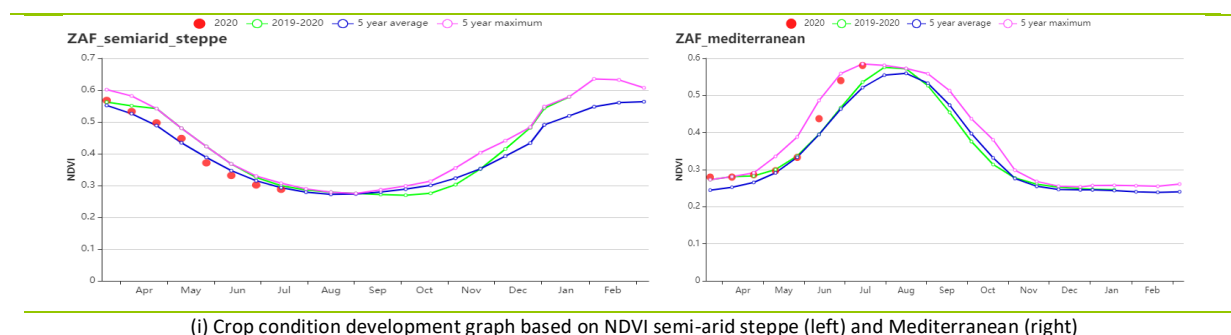


Table 3.81 South Africa's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Humid Cape Fold Mountains	95	-31	14.3	-0.4	812	3	278	-6
Mediterranean Zone	245	-3	13.5	0.1	721	6	257	2
Dry Highveld and Bushveld	51	-26	11.5	-0.9	933	2	190	-24

Table 3.82 South Africa's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Humid Cape Fold Mountains	97	2	0.93
Mediterranean Zone	85	3	0.86
Dry Highveld and Bushveld	88	11	0.89

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PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF **ZMB**

[ZMB] Zambia

This reporting period covers the end of the harvest period for the rainfed crops and the onset of the irrigated season mainly for winter wheat and horticultural crops. The harvest of the 2020 cereal crops started in April and concluded in July. A delay in the start of the seasonal rains had affected crop establishment, however precipitation stabilized and was generally conducive to normal crop growth.

During this period the average rainfall received was 43 mm with the highest in the Northern High Rainfall zone (86 mm, 15Yr Dep. -16%) and lowest in Western Semi arid zone (10 mm, 15Yr Dep. -74%). Generally, the CALF was above 98% in all the zones and VCIx above 0.82. BIOMSS production varied from 155 to 380 gDM/m² during this reporting period, which was below average due to low rainfall. Drier-than-normal conditions also negatively affected NDVI, which was below the 5-year average, but slightly better than years conditions.

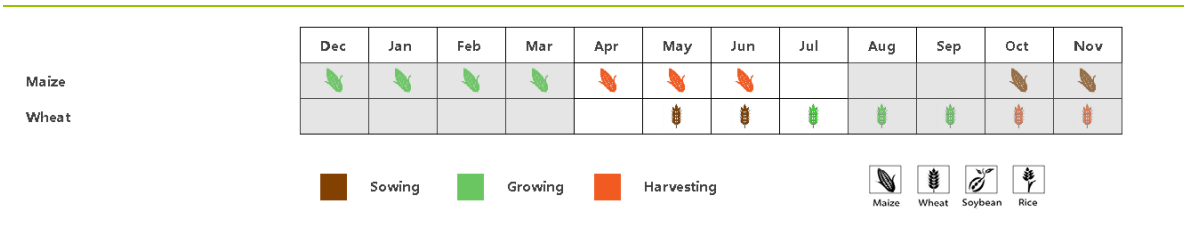
Variable spatial-temporal patterns of rainfall in some parts of the Southern and Western provinces caused localized floods and drought, which in turn negatively impacted crop production. Cereal production was estimated slightly above average at 3.220 million metric tonnes. The COVID-19 pandemic may trigger an increase in the prevalence of malnutrition as a result of a reduction in economic activities and associated income losses, and a knock-on effect on local market supplies.

Regional analysis:

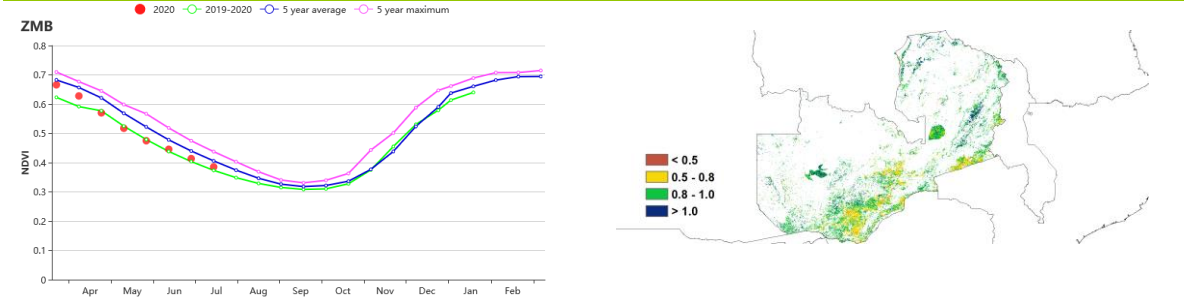
Luangwa and Zambezi Valleys and the Western Semi-Arid Plain received less than 15 mm rainfall representing more than a 65% decrease from the 15-year average. In the Northern High Rainfall Zone, conditions were better. It received 86 mm, which was a 16% decrease from the 15Yr average. The Cropped Arable Land Fraction (CALF) was above 98% in all the AEZs. It was highest in the Northern high rainfall zone, where the Maximum Vegetation Condition Index (VCIx) reached 0.93, while Luangwa and Zambezi Valleys had the lowest VCIx (0.82). Based on a country-wide analysis, the southern, central, Lusaka and eastern provinces had a relatively lower VCIx than the other regions of the country.

The CropWatch indicators show better conditions than in 2019, however, some shortfalls are expected in the southern and western areas of Zambia. About 15% of the area planted with maize in the southern and central provinces were also affected by Fall Armyworm (FAW), which, together with the COVID-19, may cause hunger and malnutrition for the poor.

Figure 3.46 Zambia’s crop condition, April - July 2020

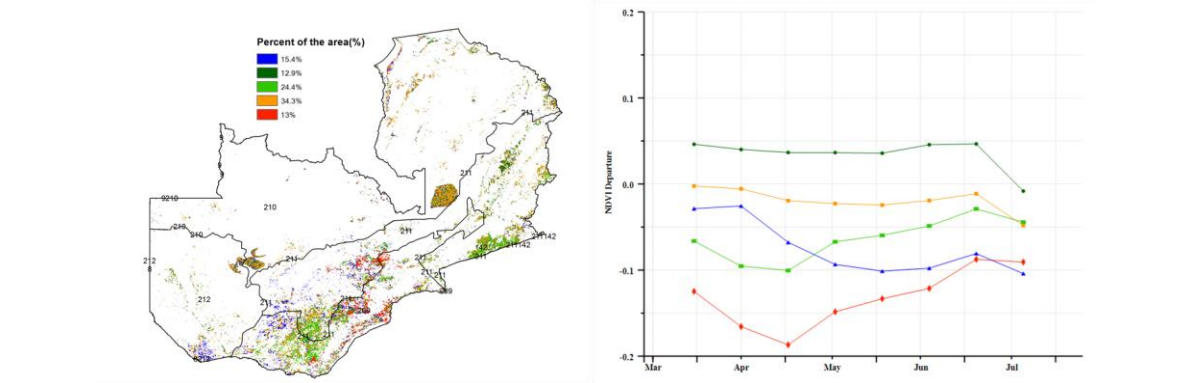


(a). Phenology of major crops



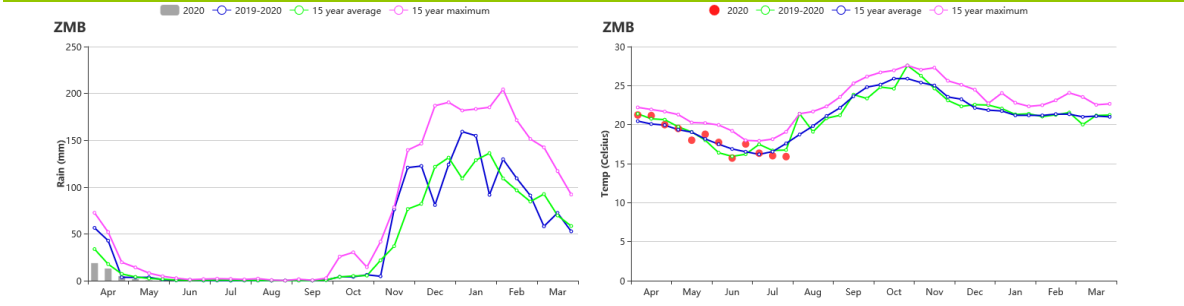
(b) Crop condition development graph based on NDVI

(c) Maximum VCI



(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



(f) Rainfall profiles

(g) Temperature profiles

Table 3.83 Zambia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2020

Region	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)	Current (gDM/m ²)	Departure (%)
Luangwa-Zambezi Rift Valley	14	-66	18.1	-0.1	1096	-2	264	-20
Western Semi-arid zones	10	-74	18.5	-0.2	1180	0	155	-25
Central-Eastern Plateau	21	-65	18.1	0.1	1075	-2	362	-9
Northern High Rainfall Zone	86	-16	18.1	0.0	1153	-2	380	-2

Table 3.84 Zambia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2020

Region	Cropped arable land fraction		Maximum VCI
	Current (%)	Departure (%)	Current
Luangwa-Zambezi Rift Valley	98	2	0.82
Western Semi-arid zones	100	1	0.93
Central-Eastern Plateau	99	1	0.86
Northern High Rainfall Zone	100	0	0.93