Chapter 3. Main producing and exporting countries

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 30 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

3.1 Overview

Among the major agricultural countries, Argentina generally experienced above-average rainfall (RAIN, +48%) that benefited winter crops, although sunshine was abnormally low (RADPAR, -10%). In Brazil, the slight RAIN deficit (-3%) results from a large disparity of state-level conditions. In the northern hemisphere, Russia (RAIN, +19%) and India (+17%) had generally favorable rainfall for the early stages of their summer crops. Mixed conditions occurred in Canada (RAIN, -8%), China (+9%), Kazakhstan (+12%), and the United States (+21%, but dry in the north). Generally poor conditions are reported for France (RAIN, -23%) and Ukraine (-17%), with the shortfall occurring over most of the territory of both countries. The same observation applies to much of Western Europe west of Albania to Belgium. France had abnormally high temperatures throughout the country but close to normal sunshine.

Rainfall

Wet areas

At the national scale, the largest positive rainfall anomalies (>50%) occurred in the wide area already identified in Chapter 1 that extends from Senegal to central Asia, with especially high departures in Sudan (+65%), Niger and Mauritania (+66% and +87%, respectively), and Jordan (+145%). Other countries with high positive rainfall departures include Egypt and Libya, but given their very low rainfall expectations, the increase is not particularly meaningful. Namibia (RAIN, +65%) in southern Africa is now past the agricultural season, and average rainfall was just 38 mm over the four months of the reporting period); nonetheless, the rainfall is welcome for the predominantly livestock-based agriculture. Haiti (RAIN, +56%), which is part of the wet area that includes the Caribbean and neighboring continental north and central America, still struggles with the aftermath of hurricane Matthew. The country is mentioned among those that suffered floods in the section on disasters in Chapter 5.

Dry areas

The severest rainfall deficit (RAIN, -67%, that is 118 mm instead of 358 mm) affected the island of São Tomé and Príncipe in West Africa; here, the reporting period corresponds to the peak of the second rainy season, and the potential damage to agriculture is significant, particularly considering that the country also had a marked deficit in sunshine of 8%. A situation with about half of the expected rainfall (RAIN about -50% and less) occurred as well in Rwanda (RAIN, -58%), while neighboring Burundi (-48%) suffered as well. Both are part of the general climatic and geopolitical ensemble that is the Horn of Africa, and both are currently struggling with refugee movements. In both countries the shortage has affected the

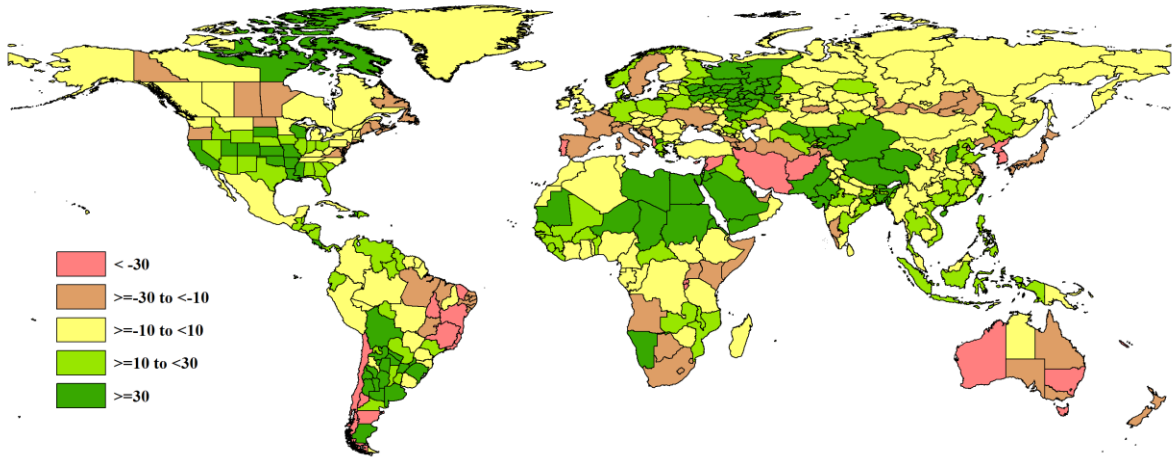
end of the growing season and may worsen a tense humanitarian situation. It is interesting to compare Ethiopia (RAIN, -4%, nationwide) and Kenya (RAIN, -30% nationwide).

The rainfall deficit area that was identified over a broadly defined Mediterranean area includes Portugal (1) in the west (RAIN, -51%, affecting winter crops), Albania and Montenegro in the northern central Mediterranean (-36% and -33%, respectively), as well as Lebanon (-38%) and Syria (-32%) in the east. Armenia (-16%), Georgia (-20%), Iran (-34%), and Afghanistan (-42%) may be added to the east of this set of countries.

It is worth noting that, next to floods in Haiti, the islands of Dominica (eastern Caribbean) and Trinidad and Tobago (part of South America) recorded poor rainfall (RAIN, -53% and -33%, respectively).

Finally, the worst precipitation in Asia and Oceania affected the island of New Caledonia (RAIN, -49%), the Democratic People's Republic of Korea (-40%), and Australia (-34% nationwide). In Australia, the deficit affects most areas to varying degrees, from RAIN at -13% in the southeastern wheat zone to -57% in the southwestern wheat zone.

Figure 3.1. Global map of April-July 2017 rainfall (RAIN) by country and sub-national areas, departure from 15YA (percentage)



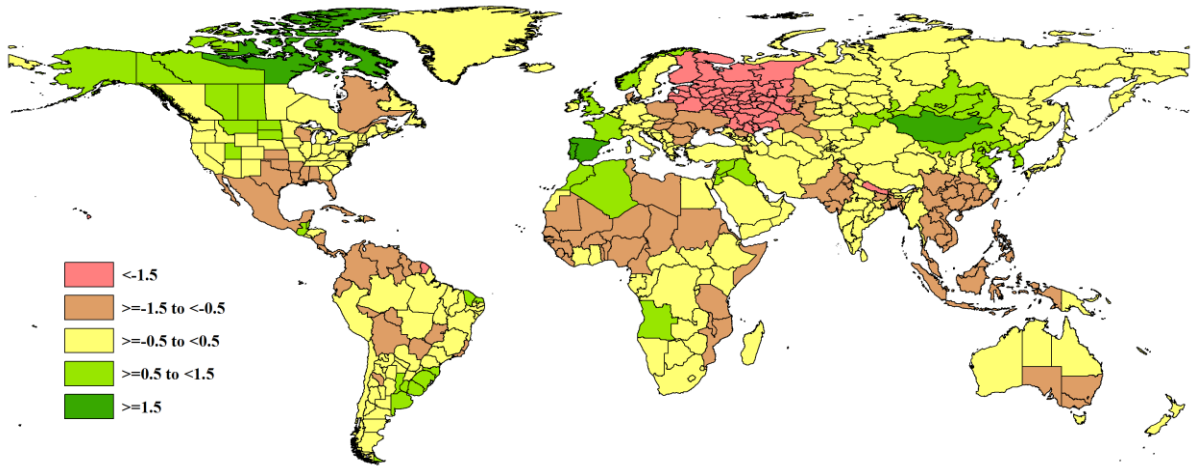
Temperature

A striking block of below average temperature occurred in northeastern Europe, extending south into central Europe (TEMP: Poland, -1.3°C to Bulgaria, -0.6°C) and east as far as the Ural mountains in Russia (Oblasts of Sverdlovsk, -1.1°C; Kurgan, -1.1°C; and Chelyabinsk, -1.5°C) and Kazakhstan (Kustanay, -1.2°C; Kyzylord and Aktubinsk Oblasts). The lowest temperatures occurred in the Baltic and neighboring states: Estonia, -2.4°C; Latvia, -2.2°C; Lithuania, -1.9°C; Finland, -1.6°C; Belarus, -1.6°C; and Russia itself with -1.4°C.

The largest positive temperature departures occurred in the western Mediterranean countries, of which several were already mentioned for their deficit in rainfall, including Spain (+3.9°C), Portugal (+2.8°C), Morocco (+1.3°C), France (+1.2°C), and Algeria (+1.0°C).

On other continents high temperatures were more localized, as in Africa (Angola, +1.2°C), Central and South America (Belize, +1.3°C; Guatemala, +1.0°C; and Uruguay, +1.4°C) and Asia (Mongolia, +1.5°C).

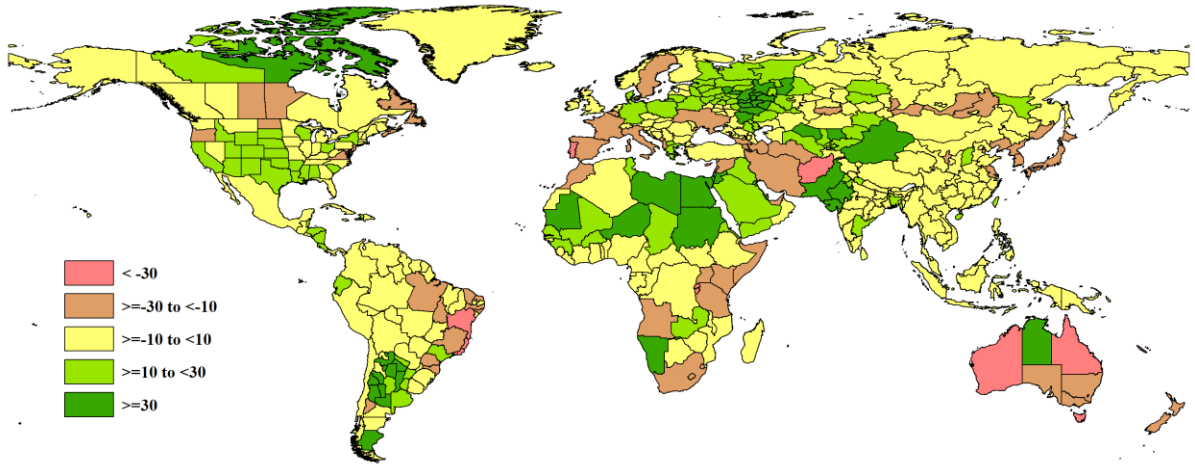
Figure 3.2. Global map of April-July 2017 temperature (TEMP) by country and sub-national areas, departure from 15YA (degrees)



Sunshine (RADPAR)

Very large sunshine deficits occurred in Argentina (RADPAR, -10%, already mentioned above), in two high-latitude countries (RADPAR -9% in both Norway and New Zealand), and in several southern and southeast Asian countries (Indonesia and Malaysia, -8%; Bangladesh and Brunei, -7%; and Vietnam, -6%). The United Kingdom and Ireland both recorded a sunshine deficit of 7%, although their temperature and precipitation were close to normal.

Figure 3.3. Global map of April-July 2017 PAR (RADPAR) by country and sub-national areas, departure from 15YA (percentage)



Biomass accumulation potential

The BIOMSS indicator refers only to the five recent years, as it is assumed that farming adapts quickly to recent climate changes. However, the variations of the indicator are generally comparable with those of the other CropWatch indicators. The following observations for the BIOMSS indicator are worth mentioning: Mauritania +61%, Niger +38%, and Sudan +43%, indicating an early and favorable start of the cropping season in three semi-arid African countries. In Jordan (BIOMSS, +136%), Egypt (+101%) and Libya (+91%), the high values may have contributed to improving late winter crops, with additional water available for mostly irrigated crops.

1: Strictly, Portugal is not a Mediterranean country as it borders the Atlantic.

Figure 3.4. Global map of April-July 2017 biomass (BIOMSS) by country and sub-national areas, departure from 15YA (percentage)

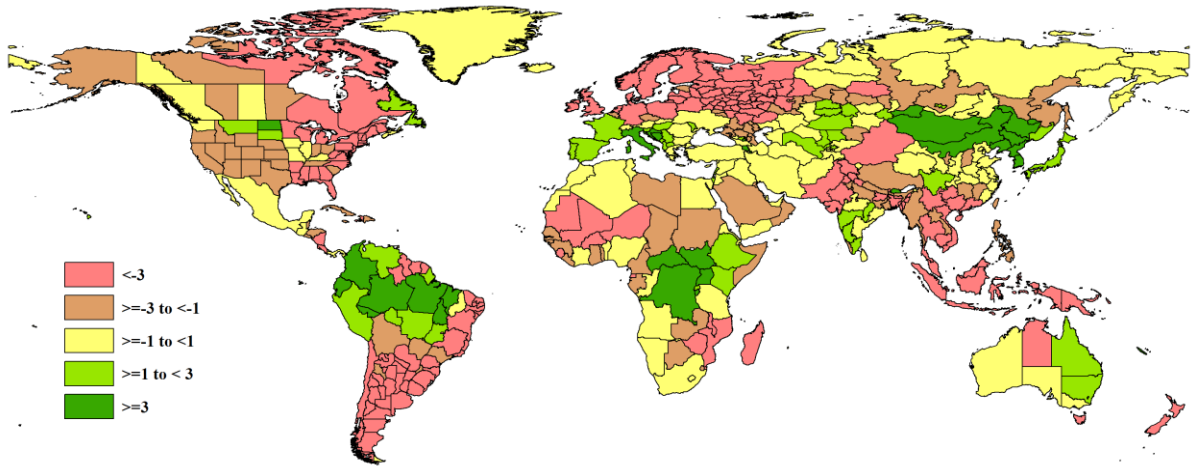


Table 3.1. CropWatch agroclimatic and agronomic indicators for April-July 2017, departure from 5YA and 15YA

Country	Agroclimatic Indicators				Agronomic Indicators	
	Departure from 15YA (2002-2016)				Departure from 5YA (2012-2016)	Current
	RAIN (%)	TEMP (°C)	RADPAR (%)	BIOMSS (%)	CALF (%)	Maximum VCI
Argentina	48	0.3	-10	29	2	0.43
Australia	-34	-0.4	1	-28	1	0.32
Bangladesh	46	-1.1	-7	15	-2	0.93
Brazil	-3	-0.2	0	-9	0	0.90
Cambodia	7	-1.3	-4	3	7	0.96
Canada	-8	0.1	-3	-1	0	0.91
China	9	-0.3	-1	1	-2	0.75
Egypt	110	-0.1	0	101	1	0.76
Ethiopia	-4	-0.2	1	-4	-5	0.88
France	-23	1.2	1	-17	0	0.91
Germany	14	-0.4	-5	11	0	0.94
India	17	-0.4	-1	8	-18	0.83
Indonesia	21	-0.7	-8	7	0	0.95
Iran	-34	0.3	1	-28	-15	0.70
Kazakhstan	12	-0.3	0	8	8	0.87
Mexico	10	-0.5	0	4	-1	0.80
Myanmar	3	-0.5	-3	-1	4	0.92
Nigeria	9	-0.9	-1	9	-3	0.92
Pakistan	44	-0.5	-3	37	-5	0.69
Philippines	15	-0.7	-3	9	0	0.94
Poland	21	-1.3	-6	19	0	0.96
Romania	-2	-0.8	1	2	0	0.95
Russia	19	-1.4	-5	13	1	0.96
S. Africa	-21	0.4	0	-22	13	0.78
Thailand	16	-1.1	-3	6	1	0.93
Turkey	2	0.0	-1	-4	0	0.83
Ukraine	-17	-1.2	-1	-11	0	0.91
United Kingdom	6	0.8	-7	0	0	0.94
United States	21	-0.3	-3	9	1	0.89
Uzbekistan	13	-0.1	1	16	5	0.87
Vietnam	12	-0.8	-6	1	1	0.94

Note: No sign means a positive (+) departure.

3.2 Country analysis

This section presents CropWatch analyses for each of thirty key countries (China is addressed in Chapter 4). The maps refer to crop growing areas only and include: (a) Graph for the phenology of major crops; (b) Crop condition development graph based on NDVI average over crop areas at national scale, comparing the April-July 2017 period to the previous season and the five-year average (5YA) and maximum; (c) Maximum VCI (over arable land mask) for April-July 2017 by pixel; (d) Spatial NDVI patterns up to July 2017 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 regions within the country, again comparing the April-July 2017 period to the previous season and the five-year average (5YA) and maximum.

In addition, please see also Annexes A and B for additional information about indicator values and production estimates by country. Country agricultural profiles are posted on www.cropwatch.com.cn.

Figures 3.5-3.34. Crop condition for individual countries ([ARG] Argentina- [ZAF] South Africa) including sub-national regions during April-July 2017.

[ARG] Argentina

In Argentina over the reporting period, most of late maize has been harvested while most winter crops were planted. The main crops (soybean and maize) are in their fallow period.

For the country as a whole, rainfall (as measured with the RAIN indicator) was 48% above average, while radiation (RADPAR) was 10% below. Temperature (TEMP, +0.3°C) was slightly above, and the biomass production potential indicator (BIOMASS) was 29% above average. Precipitation was also above average for Argentina's 13 provinces where agriculture is relevant, with RAIN increases ranging from 14% to 152%. Temperature was lower than average for central and northwestern provinces (including Salta, Tucumán, Chaco and San Luis), and positive for the others. RADPAR was lower than average for the 13 provinces (varying between -2.5% and -13%), while BIOMSS was above average for all provinces except Misiones in the northeast.

The NDVI based crop condition development graph for the country is very close to its five-year average, with NDVI on some dates even above last year's values. Chaco, the Pampas mountains, and the Tropical highland regions (see also the regional analysis below) all showed profiles similar to average. In the Andes mountain area and Pampas region, NDVI profiles were similar to the maximum NDVI, while in Mesopotamia profiles were slightly above average.

In the spatial NDVI patterns and profiles, both Chaco and Mesopotamia present uniformity, while high variability is observed for the Pampas region, with situations of above-average values, as well as near-average profiles recovering from negative anomalies (in central parts of the Pampas region). This might be associated with fields still recovering from the flooding connected to last season's heavy rains.

Low VCIx values in the central Pampas could reflect the reduction in soybean planted area (with later maturity dates than maize) that was observed last season, or represent reductions in wheat planted area or the persistence of flooded areas. High VCIx values observed in the south of Buenos Aires province, a main wheat producing area with low inter-annual changes in planted area, can be more accurately associated with a good crop condition.

In summary, the only crop growing over the reporting period was wheat, and growing conditions are good. The heavy rains, however, that occurred in this and the previous reporting periods could still affect the future development of wheat and the planting of summer crops. In addition, changes in the planting area of main crops (planted in a rotational system over the same land) have been occurring in recent years, and the effect of these activities on the interpretation of the satellite indicators needs to be considered.

Regional analysis

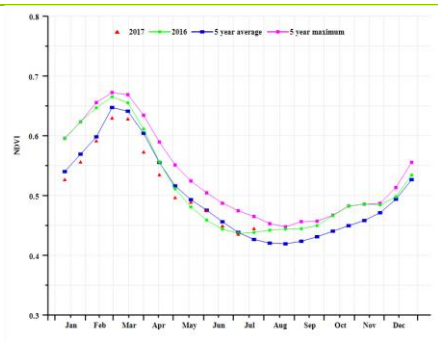
Based on cropping systems, climatic zones, and topographic conditions, eight sub-national regions can be distinguished for Argentina, among which six are relevant for crops cultivation. These six regions are the Andes mountain region, Chaco region, Pampas region, Mesopotamia region, Pampas mountains region, and a Tropical highland region.

All regions received well above average rainfall (RAIN at least 33% above the fifteen-year average). Correspondingly, the departure of RADPAR for the regions ranges from -1% to -12%. Favorable conditions altogether benefited the crops as indicated by above average BIOMSS values. The Cropped Arable Land Fraction in all regions was above its five-year average. A large positive departure of in the Cropped Arable Land Fraction was observed in the Andes mountain and the Pampas mountain regions.

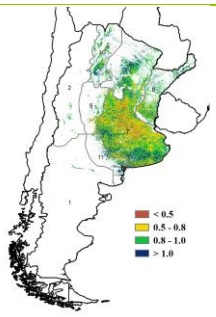
According to the NDVI profiles by region, crop condition in northern Argentina, including the Chaco, Mesopotamia, and Tropical highland regions, is above 5YA over the growing of the last season, while NDVI was close to average for the other three regions. VCIx for the Andes mountain regions, the Pampas region, and the Pampas mountain regions were relatively low because it was outside the growing season for crops

Figure 3.5. Argentina crop condition, April-July 2017

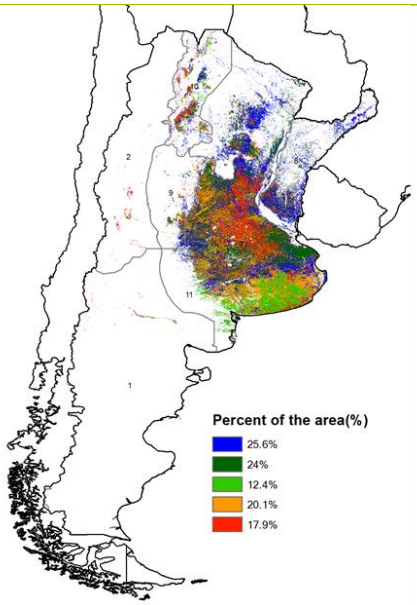
(a). Phenology of major crops



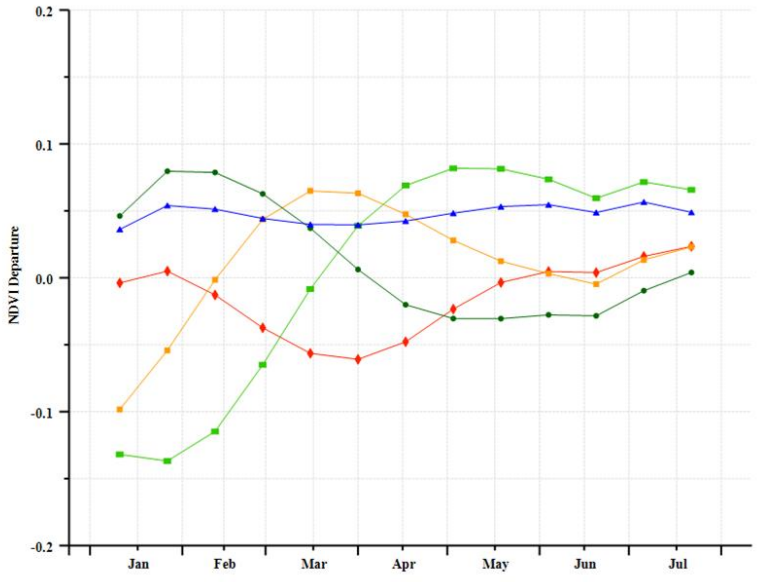
(b) Crop condition development graph based on NDVI



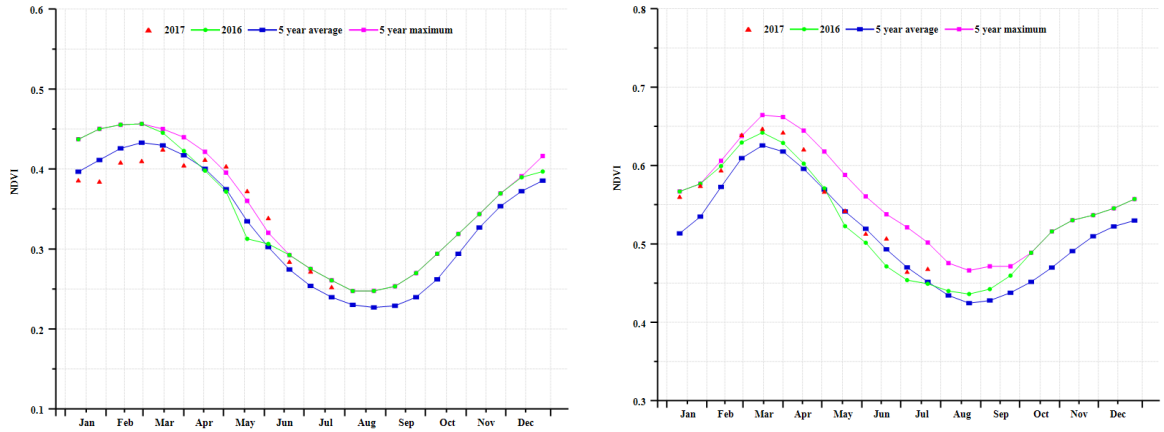
(c) Maximum VCI



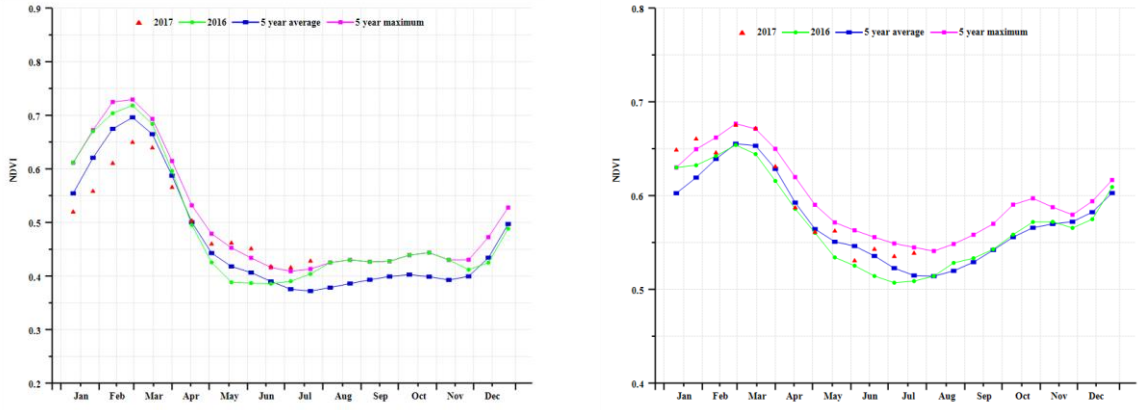
(d) Spatial NDVI patterns compared to 5YA



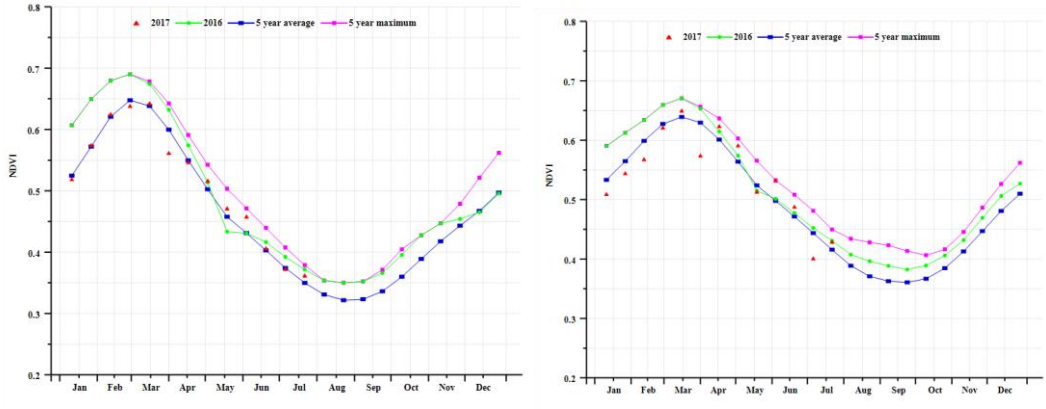
(e) NDVI profiles



(f) Crop condition development graph based on NDVI (Andes mountain region (left) and Chaco region (right))



(g) Crop condition development graph based on NDVI (Pampas region (left) and Mesopotamia region (right))



(h) Crop condition development graph based on NDVI (Pampas mountain region (left) and Tropical highland region (right))

Table 3.2. Argentina agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Andes mountain region	87	81	7.7	-0.1	853	-1
Chaco region	365	57	17.9	0.0	621	-10
Pampas region	260	33	13.2	0.6	549	-12
Mesopotamia	630	49	17.1	0.5	624	-8
Pampas mountains	152	71	12.0	-0.4	624	-10
Tropical highland	121	98	16.3	-0.3	667	-9

Table 3.3. Argentina agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2017

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Andes mountain region	347	76	74	18	0.66
Chaco region	950	42	100	0	0.92
Pampas region	777	18	94	1	0.23
Mesopotamia	1331	20	99	1	0.86
Pampas mountains	570	69	91	10	0.58
Tropical highland	332	50	100	3	0.95

Table 3.4. CropWatch-estimated maize, rice, wheat, and soybean production for Argentina in 2017 (thousand tons)

Crops	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Maize	25710	-2.9	20.0	29946	16.5
Rice	1695	4.3	0.0	1769	4.4
Wheat	11630	-2.8	0.3	11338	-2.5
Soybean	51080	-0.8	0.9	51116	0.1

[AUS] Australia

The main crops of Australia are wheat and barley, which are planted mainly from the end of April to July to be harvested from October to January. During the monitored time period, the national NDVI profile shows generally average condition, with above average values in April and May, and average values in June and July, compared to the five-year average.

Also compared with average conditions, Australia was deficient in rainfall (about 34% countrywide) with close to average temperature (TEMP, -0.4°C) and sunshine (RADPAR, +1%). The Cropped Arable Land Fraction (CALF) attained 90%, 1% above the five-year average. The VCIx was around 0.32 during the planting season of wheat and barley. Western Australia shows below average condition due to poor rainfall (RAIN, -58%), with close to average temperature (TEMP, -0.2°C) and radiation (RADPAR, 0%). The resulting BIOMSS drop is 51%. The southeastern part of South Australia also shows below average condition, while the other regions experienced overall above average weather, including southeastern New South Wales and western and northern Victoria. The efficient irrigation infrastructure in Australia has made up for the decreased rainfall.

On the whole, CropWatch estimates the production of Australia will decrease a bit by 6% in 2017 with a yield decrease of 6.4% and an area increase of 0.4%, compared with 2016.

Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, five sub-national regions can be distinguished for Australia, which are relevant for crops cultivation. These five regions are the Southeastern wheat zone, Southwestern wheat zone, Arid and semi-arid zone, Wet temperate and subtropical zone, and Subhumid subtropical zone.

Southeastern wheat zone

The crop condition in the Southeastern wheat zone was moderate throughout the monitored period: above average in April and May but below average in June and July. This region recorded a 13% deficit in rainfall with a temperature drop of 0.8°C and stable RADPAR, resulting in BIOMSS being 8% below the recent average. CALF has increased by 3.3%, which is the largest departure among the country's five sub-national regions.

Southwestern wheat zone

The southwestern wheat zone shows apparently below average condition reflected by the regional NDVI profile. The region received 57% below average rainfall and 0.2°C below average temperature, with stable radiation. The weather based potential biomass was 52% below the five-year average. The region is the only one in the country where CALF decreased (-1.8%). The situation is confirmed by the NDVI cluster maps in the Western Australia region.

Arid and semi-arid zone

The crop condition in the country's arid and semi-arid zone displays average values. The regional NDVI profile was above the five-year maximum in April and stayed above average until the end of May, dropping slightly below average from June. RAIN, TEMP, and RADPAR were about average, and the potential biomass was only 9% below average. CALF was 77%, and VCIx reached 0.76, indicating that slightly lower rainfall has not adversely affected the crops.

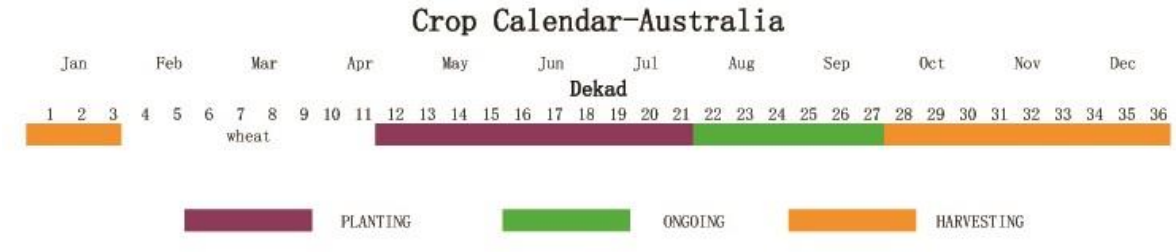
Wet temperate and subtropical zone

The crop condition in the wet temperate and subtropical zone appears above average and above the five-year maximum according to the regional NDVI profile. The region was 35% deficient in rainfall with below average temperature (TEMP, -0.3°C) and stable radiation. BIOMSS was 30% below average. The area had high CALF (99%) with moderate VCIx (0.42), indicating a high cropped area but moderate prospects.

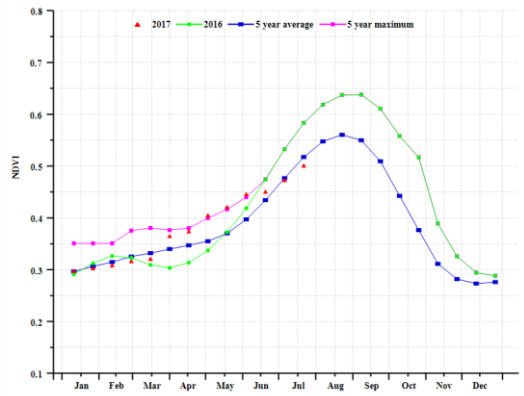
Subhumid subtropical zone

The crop condition in Australia's subhumid subtropical zone showed generally average condition during the monitored period, with above average NDVI from April to May, but below average NDVI from June to July. The rainfall shortage reached 46% with normal temperature and RADPAR, while BIOMSS fell 38%. The area had a high CALF (70%) as well as VCIx (0.64), indicating an average cropped area and crop prospects for this sub region.

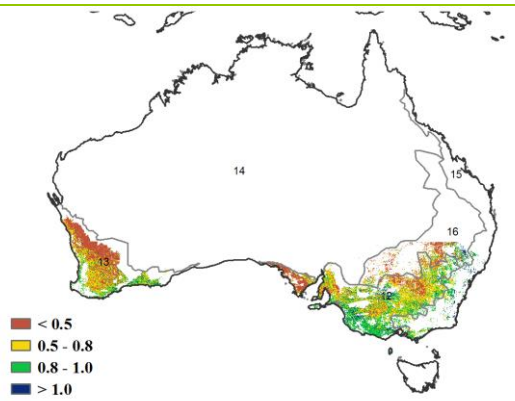
Figure 3.6. Australia crop condition, April-July 2017



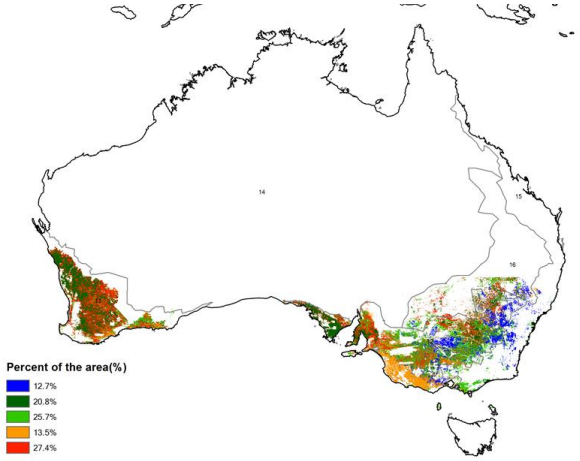
(a). Phenology of major crops



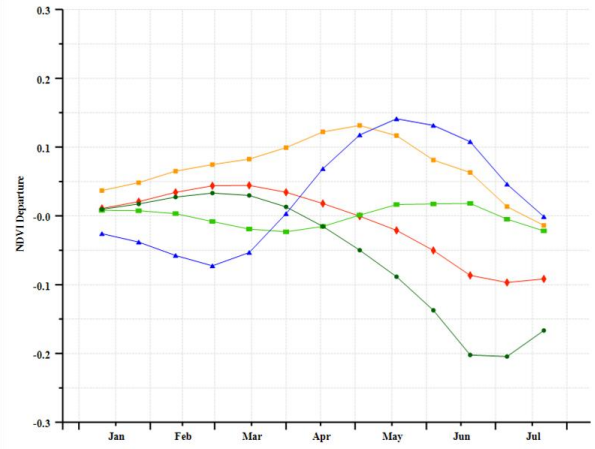
(b) Crop condition development graph based on NDVI



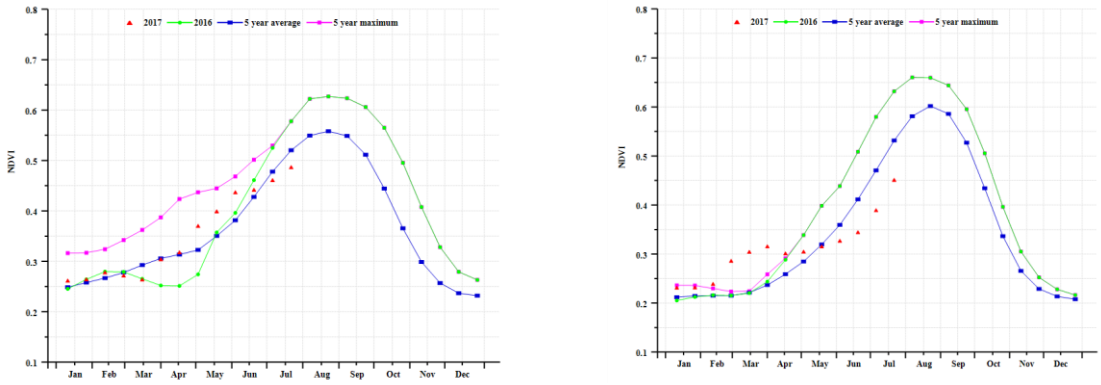
(c) Maximum VCI



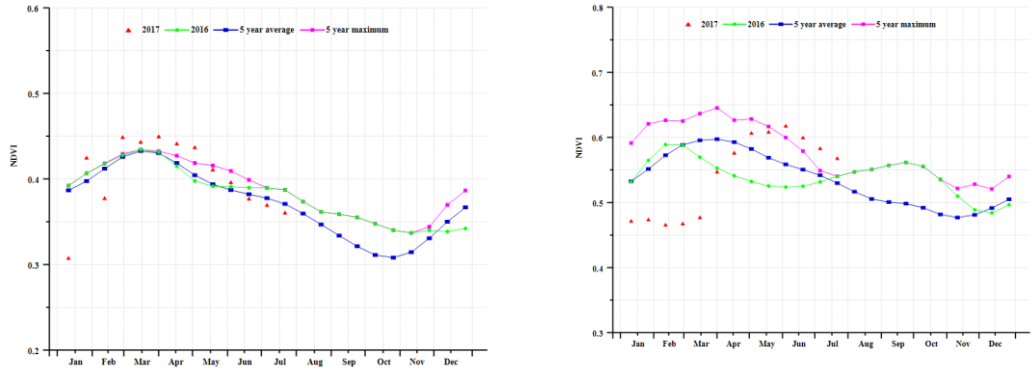
(d) Spatial NDVI patterns compared to 5YA



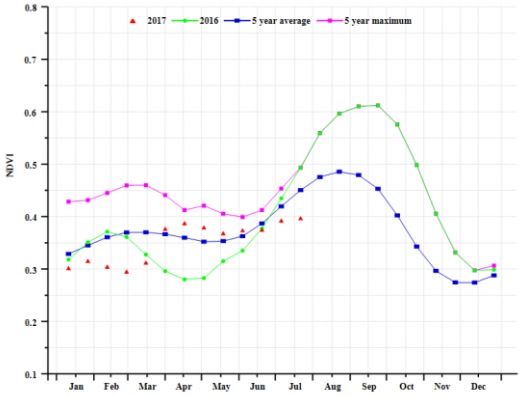
(e) NDVI profiles



(f) Crop condition development graph based on NDVI (Southeastern wheat zone (left) and Southwestern wheat zone (right))



(g) Crop condition development graph based on NDVI (Arid and semi-arid zone (left) and Wet temperate and subtropical zone (right))



(h) Crop condition development graph based on NDVI (Subhumid subtropical zone)

Table 3.5. Australia agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Southeastern wheat zone	143	-13	11.2	-0.8	620	1
Southwestern wheat zone	93	-57	13.8	-0.2	669	0
Arid and semiarid zone	78	-19	23.5	-0.1	1052	-1
Wet temperate and subtropical zone	136	-35	13.5	-0.3	700	1
Subhumid subtropical zone	65	-46	14.3	-0.1	825	

Table 3.6. Australia agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2017

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Southeastern wheat zone	589	-8	0.97	3	0.13
Southwestern wheat zone	362	-52	0.85	-2	0.39
Arid and semiarid zone	290	-9	0.77	1	0.76
Wet temperate and subtropical zone	511	-30	0.99	1	0.42
Subhumid subtropical zone	300	-38	0.70	1	0.64

Table 3.7. CropWatch-estimated wheat production for Australia in 2017 (thousand tons)

Crops	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Wheat	31600	-6.4%	0.4%	29719	-6.0%

[BGD] Bangladesh

The current bulletin covers the planting of Aman rice, the growing period of Aus rice, and the harvesting of dry season irrigated Boro rice as well as wheat. Over the reporting period, the country received rainfall amounting to 2089 mm, which is 46% higher than average. The temperature was cooler by 1.1°C, and radiation was near normal. The favorable conditions are reflected in an increase in the potential biomass accumulation of 15% compared to its average value for the most recent five years. Agronomic indicators including NDVI show marginally lower values compared with average, resulting from a delayed arrival of the monsoon. VCIx exceeds 0.8 in most of the country, indicating good crop health.

Regional analysis

Based on the topography and climatic variability, Bangladesh is divided in four regions, which are the Coastal region, Gangetic region, Hill region and Sylhet region. This agroclimatic variability has an impact on the choice of crops as well as crop distribution patterns. Regional crop prospects for the reporting period are described below.

Coastal Region

The Coastal Region of Bangladesh received 1739 mm rainfall, or 39% above average for the period. Temperature and radiation were conducive to crop growth, resulting in a 15% BIOMSS increase. Persistent cloud cover during the rice planting period has affected the NDVI profile, meaning that the NDVI and NDVI-based indicators are less reliable than expected. A VCIx above 0.8 and 84% values for CALF indicate good crop prospects.

Gangetic Region

In the Gangetic Region, with 48% higher than average rainfall, favorable temperature of 29°C (-1.3°C) and RADPAR has shown increased BIOMSS by 21%. VCIx in this area is consistently high above 0.9, while the Cropped Arable Land Fraction is 97%, indicating very good crop prospects.

Hill Region

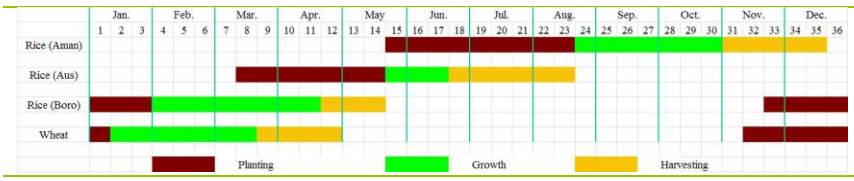
The largest rainfall excess of more than 50% was recorded in the Hill region. Here, RADPAR was average and temperature was relatively low at 27.4°C (-1.2°C); the BIOMSS indicator was 10% above average. In combination with low NDVI, high VCIx (0.92) and CALF at 97%, the agroclimatic indicators are indicating moderate to good crop prospects for the region.

Sylhet Basin

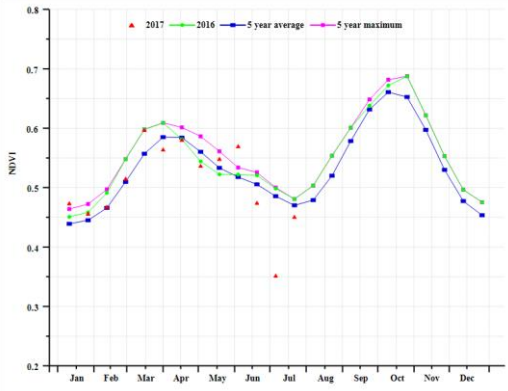
Finally, the eastern region of the Sylhet Basin recorded excess rainfall (+45%), cool temperatures (-0.9°C), and significantly lower than average RADPAR (-9%). CALF is above 90%, and VCIx is mostly high (0.92) for this-region (except for a patch in the northern part), it is indicative of good crop prospects.

Overall crop prospect for the country are good, however it will be important to watch the agronomic indicators in the forthcoming period.

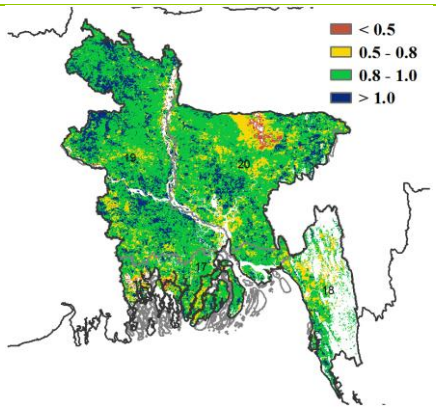
Figure 3.7. Bangladesh crop condition, April – July 2017



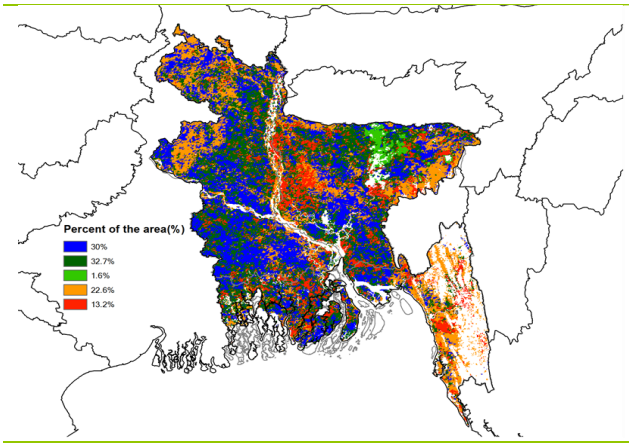
(a). Phenology of major crops



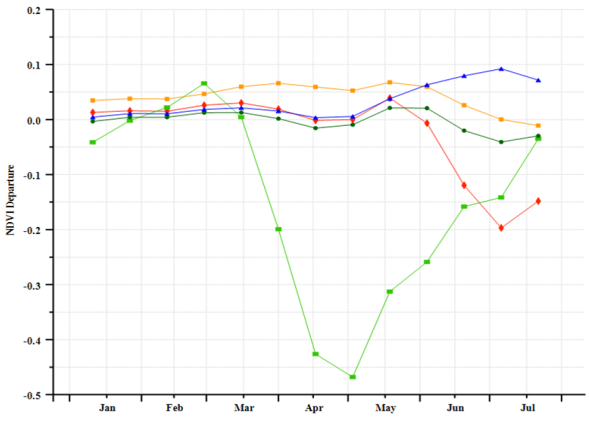
(b) Crop condition development graph based on NDVI



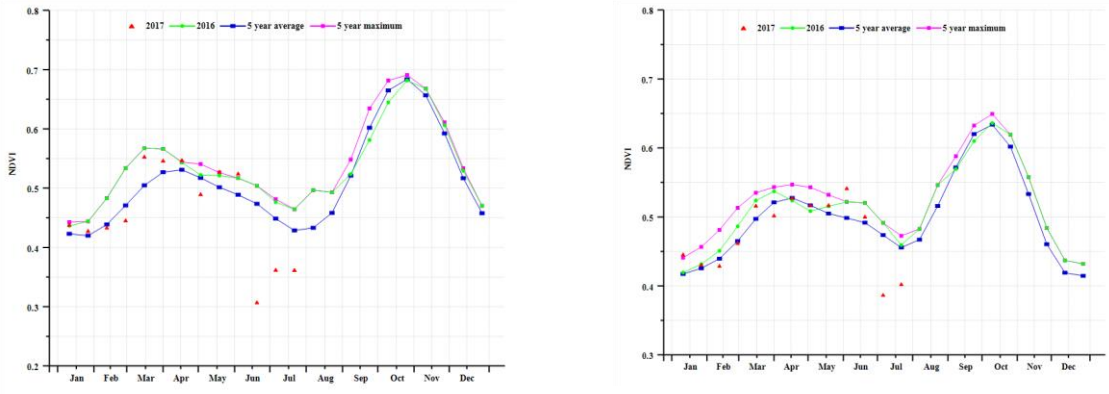
(c) Maximum VCI



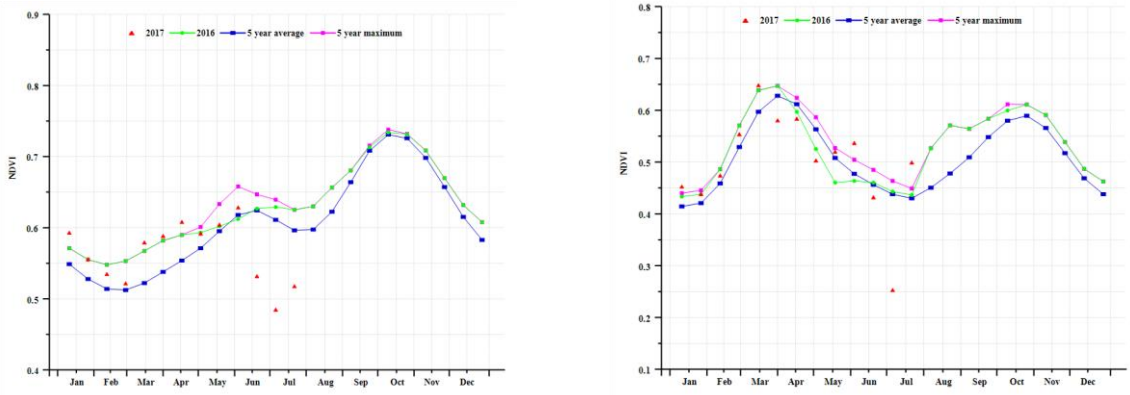
(d) Spatial NDVI patterns compared to 5YA



(e) NDVI profiles



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



(g) Crop condition development graph based on NDVI (Hill Region (left) and Sylhet Basin (right))

Table 3.8. Bangladesh agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Coastal region	1739	39	29.4	-0.7	1019	-6
Gangetic plain	1698	48	29.0	-1.3	982	-7
Hill region	2637	51	27.4	-1.2	968	-6
Sylhet basin	2449	45	28.1	-0.9	864	-9

Table 3.9. Bangladesh agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2017

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Coastal region	2241	15	84	2	0.92
Gangetic plain	2435	21	97	1	0.95
Hill region	2503	10	97	0	0.92
Sylhet basin	2614	12	92	-6	0.92

Table 3.10. CropWatch-estimated maize, rice and wheat production for Bangladesh in 2017 (thousand tons)

Crops	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Maize	2375	2.4%	0.0%	2433	2.4%
Rice	47722	-1.7%	-1.3%	46300	-3.0%
Wheat	1317	1.3%	0.8%	1344	2.1%

[BRA] Brazil

Generally, crop condition in Brazil was above average during the monitoring period. The harvest of maize (main season), rice, and soybean in central and southern Brazil concluded around May, while maize in the northeast is still at an early growing stage. The second maize season in central and southern Brazil will be concluded in August. The planting of winter wheat was finished by the end of June.

RAIN, TEMP, and RADPAR at the national level are close to average and result in a 6% negative departure of potential biomass compared with the five-year average. However, significant spatial differences among both states and sub-national regions are observed (Refer to Table 3.11 and Table A.5 in the annex). RAIN departures range from +42% in Rio Grande do Sul to -36% in Ceara. Other states with more than 10% variation from average are Goias (RAIN, -18%), Minas Gerais (-31%), Parana (+10%), and Sao Paulo (+21%). TEMP and RADPAR are generally close to average for all states except Rio Grande do Sul and Santa Catarina. In both, TEMP is about 1.0°C above average, which may potentially result in negative impacts on crops as indicated by the -9% and -25% departure from the five-year average for BIOMSS in these two states. Crop condition over the two states is nevertheless favorable as confirmed by the VCI map, which can be explained by good management.

According to the national NDVI development profile, crop condition from April to July remained above the situation in the same period last year and close to the five-year average, but was below average during January to April. As presented in NDVI departure clustering maps and profiles, NDVI in northeastern Brazil was continuously below average before April. Scattered areas in Goias and Minas Gerais also show slightly below average NDVI, mainly due to a lack of rainfall. National average VCIx over cropland areas was 0.90, which further confirms the favorable conditions over the reporting period; high VCIx values are observed over almost all the states.

Overall favorable conditions benefited the second maize crop, and CropWatch has revised the maize production estimates for this year to 84,019 ktons, 19.3% above the 2016 production and 4,776 ktons above the estimate from the May 2017 bulletin. Production for rice, wheat, and soybean remain the same as previous forecasts.

Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, eight sub-national regions--central Savanna, east coast, Parana River, Amazon region, Mato Grosso region, subtropical rangeland, mixed forest and farmland, and the Nordeste region--can be distinguished. Specific observations for the reporting period are included for eachregion.

Central Savanna

Brazil's "central savanna" region is not one of its major agricultural regions in terms of crops production. However, rangelands and meat production make the region important in terms of food security. Overall unfavorable climatic conditions dominated the region; rainfall was 36% below average, and the region recorded only 89 mm over 4 months, the lowest value among the 8 regions. The dry conditions have negatively affected crops and livestock.

East coast Brazil

In this region, maize and rice are major crops. NDVI profiles over maize growing areas show below average condition, while peak NDVI values (from May to July) over rice areas are above both the previous year and the five-year average. Significant lower RAIN (-33% below average) resulted in poor crop

condition for maize, while rice condition remains good because of the large proportion of irrigation for rice. Overall crop condition for the region is good according to the high VCIx (0.92).

Parana River Region

Overall, crop condition for the Parana River region is slightly above average. Agro-climatic conditions are close to average with 5% above average RAIN, 0.1°C below average TEMP, and 2% below average RADPAR. All arable land is cropped with at least one crop during the monitoring period, and average VCIx is 0.89. The NDVI profile also confirms the favorable conditions with above average NDVI since April.

Amazon region

The Amazon region is mainly covered by the Amazon rainforest with little cropland. Due to forest logging in the late 1900s to early 2000s, cropland expanded along the roads and produced more and more crops. Overall for this region, agro-climatic indicators are close to average, but crop condition was below average according to the NDVI based crop condition development graph.

Mato Grosso region

The Mato Grosso region covers the states of Mato Grosso and Rondônia, as well as a northern part of Mato Grosso do Sul. Maize and soybean are the major crops in the region, and more and more farmers decide to grow two seasons of maize. Agro-climatic conditions over the reporting period were favorable with 8% above average RAIN and average TEMP and RADPAR. Altogether, potential biomass is 4% up over the five-year average. The NDVI profile over cropland reflects almost average conditions, but still above that of last year. Overall, good outputs are expected from the region.

Subtropical rangeland region

Favorable conditions are observed in the subtropical rangeland region. RAIN departure ranks as first among the eight regions with 38% above average, while other indicators remain close to average. The NDVI peak is above the best condition over the past five years, which strongly suggest a yield increase. Since the harvest of crops was mostly concluded by the end of April, the abundant rainfall over the reporting period will provide favorable soil moisture for the next growing season.

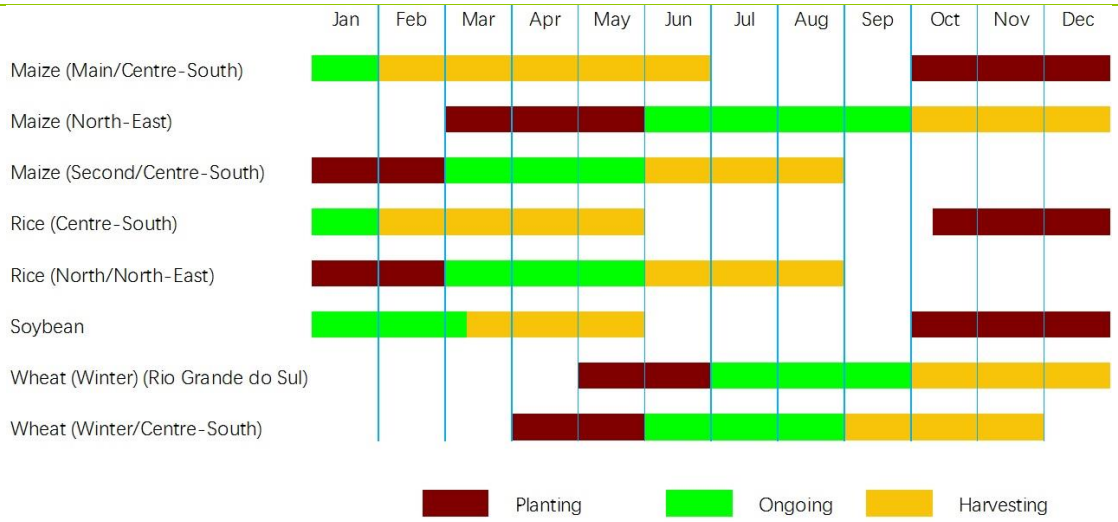
Mixed forest and farmland region

Maize and rice are the two major crops in the mixed forest and farmland region. Maize is at its peak growing period, while the harvest of rice is almost over. RAIN is 14% below average, RADPAR 5% above, while TEMP is normal. Altogether BIOMSS is 12% below average. Nonetheless, a high VCIx value is observed, reflecting overall favorable crop condition. Almost all arable land was cropped during the monitoring period. When averaged separately for maize and rice growing areas, the shapes of the NDVI profiles vary significantly because of different phenology and conditions. Both maize and rice condition are generally above average even with the lower rainfall, which is because the amount of rainfall (499 mm) received during the season is sufficient for crops. Overall crop condition is favorable compared with the previous five years.

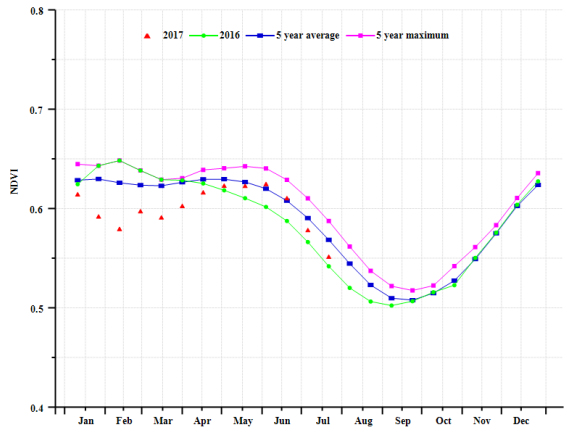
Nordeste region

Overall crop condition is unfavorable due to the adverse weather conditions. The region only received 138 mm of rainfall, down 29% compared to normal for the period. Together with average TEMP and -6% RADPAR, BIOMSS was 23% below the five-year average. Since most arable land is rainfed, crops in the region suffered from drought, and crop condition was continuously below average according to the NDVI based crop development profile.

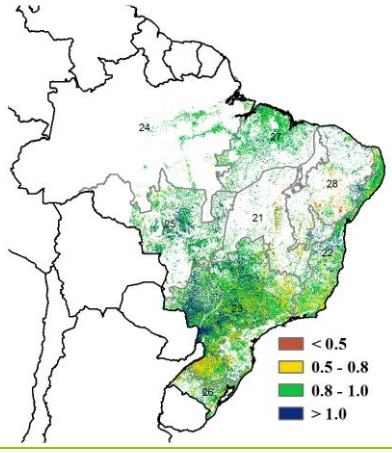
Figure 3.8. Brazil crop condition, April-July 2017



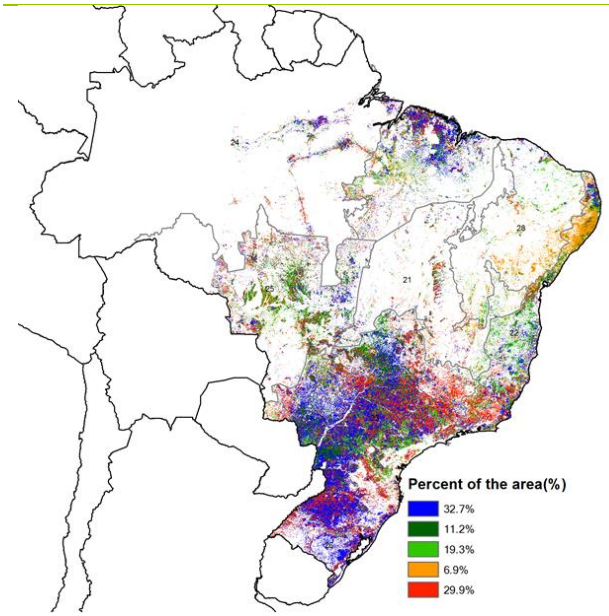
(a). Phenology of major crops



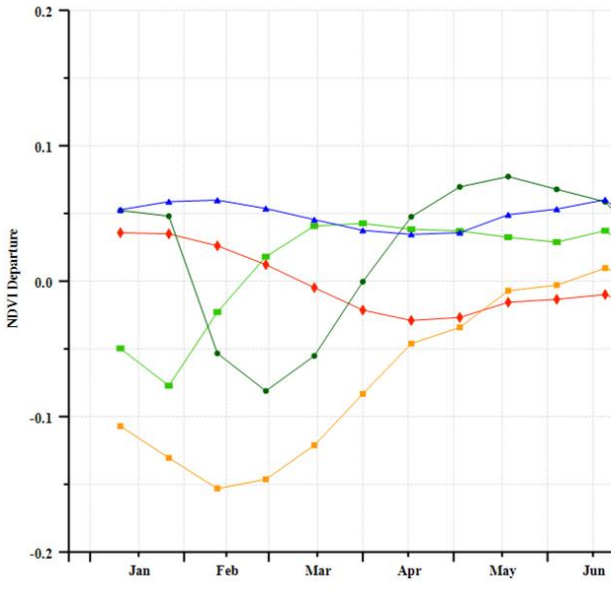
(b) Crop condition development graph based on NDVI



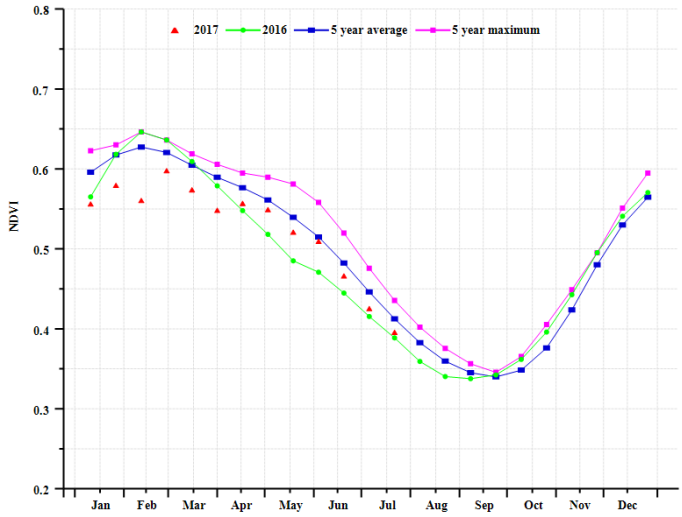
(c) Maximum VCI



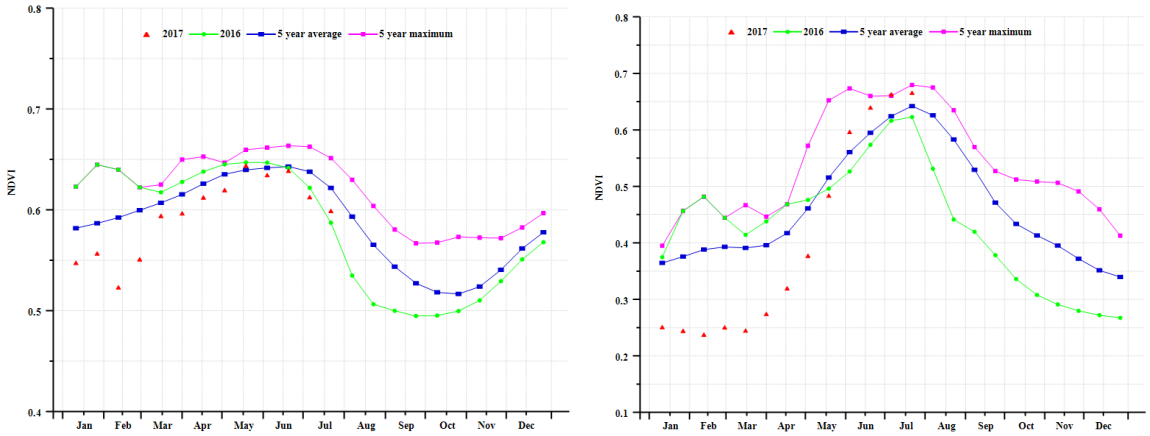
(d) Spatial NDVI patterns compared to 5YA



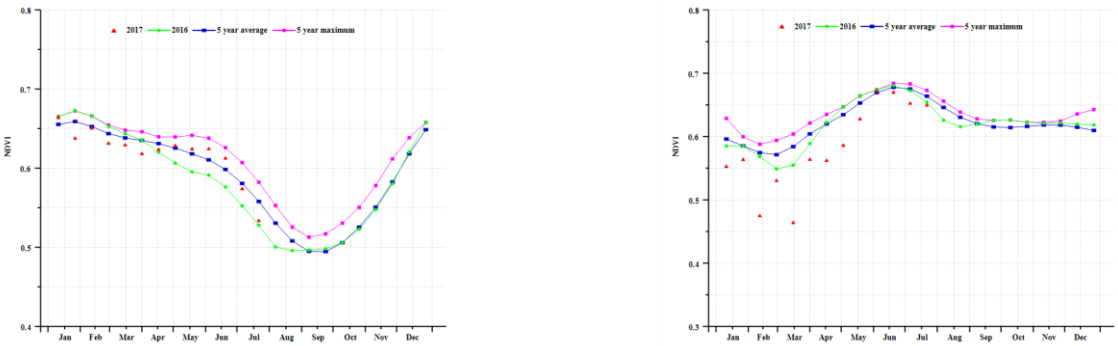
(e) NDVI profiles



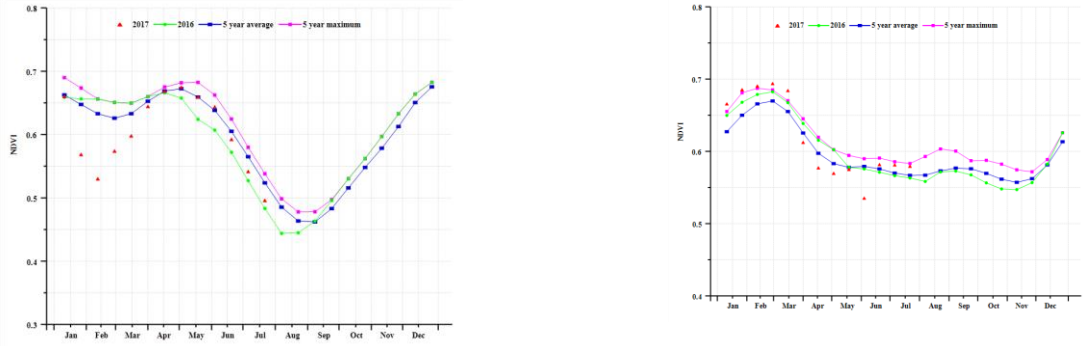
(f) Crop condition development graph based on NDVI (Central Savanna)



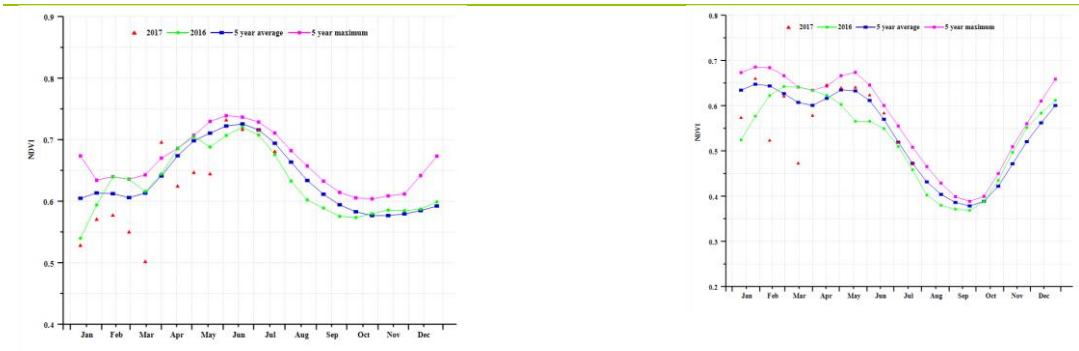
(g) Condition development graph based on NDVI for East coast (Brazil) over maize (left) and rice (right) mask



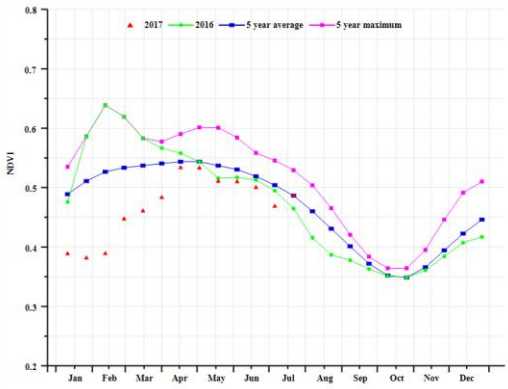
(h) Crop condition development graph based on NDVI (Parana River (left) and Amazon (right))



(i) Crop condition development graph based on NDVI (Mato Grosso region (left) and Subtropical rangeland (right))



(j) Crop condition development graph based on NDVI over maize mask (left) and rice mask (right) for Mixed forest and farmland



(k) Crop condition development graph based on NDVI for Brazil Nordeste

Table 3.11. Brazil agro-climatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Central Savanna	89	-36	24.8	-0.4	1039	1
East coast	144	-33	22.7	-0.9	790	-7
Parana River	368	5	20.7	-0.1	846	-2
Amazon	741	-2	27.5	-0.2	968	4
Mato Grosso region	244	8	26.5	-0.4	1024	2
Subtropical rangeland	721	38	17.6	0.9	628	-4
Mixed forest and farmland	499	-14	28.1	-0.3	1049	5
Nordeste	138	-29	26.6	0.4	975	-6

Table 3.12. Brazil agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2017

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Central Savanna (Brazil)	330	-27	95	0	0.83
East coast (Brazil)	522	-24	100	0	0.92
Parana River (Brazil)	927	-8	100	0	0.89
Amazon (Brazil)	1673	-5	100	0	0.96
Mato Grosso region (Brazil)	768	4	100	0	0.93
Subtropical rangeland (Brazil)	1371	-6	98	0	0.86
Mixed forest and farmland (Brazil)	1206	-12	100	0	0.96
Nordeste (Brazil)	468	-23	90	3	0.83

Table 3.13. CropWatch-estimated maize, rice, wheat, and soybean production for Brazil in 2017 (thousand tons)

Crops	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Maize	70433	19.0	0.2	84019	19.3
Rice	11055	1.1	-0.4	11129	0.7
Wheat	7545	2.9	0.1	7773	3.0
Soybean	91774	2.8	2.5	96726	5.4

[CAN] Canada

The current reporting period covers both the harvest of winter wheat crops and the early development of summer crops. Drought prevailed in most of southwest Canada (RAIN, -8%). At the same time, temperature was almost average (TEMP, +0.1°C). With slightly below average RADPAR (-3%), the potential biomass was also slightly below the recent five-year average (BIOMSS, -1%). Based on the NDVI profiles and crop condition clusters, crop growth conditions are below those of last year for the same period, with conditions even slightly worse than the average of the last five years. Additional evidence for the poor growth condition in the Canadian Prairies are VCIx values mostly between 0.5 and 0.8. In Manitoba (RAIN, -25%) and Saskatchewan (RAIN, -24%), two of the three main production provinces, the drop in rainfall resulted in a decrease in the biomass production potential (BIOMSS, -14% and -15%), respectively. Overall growth conditions were poor, though in the east of the country indicators show normal growing conditions. Generally, CropWatch assesses crop growth condition and yield in Canada as below that of 2016.

Regional analysis

For Canada, five regions can be distinguished. For this bulletin, however, only two--Canadian prairies and Atlantic Ocean region--were analyzed because the other three regions still had freezing temperatures in July.

Canadian Prairies

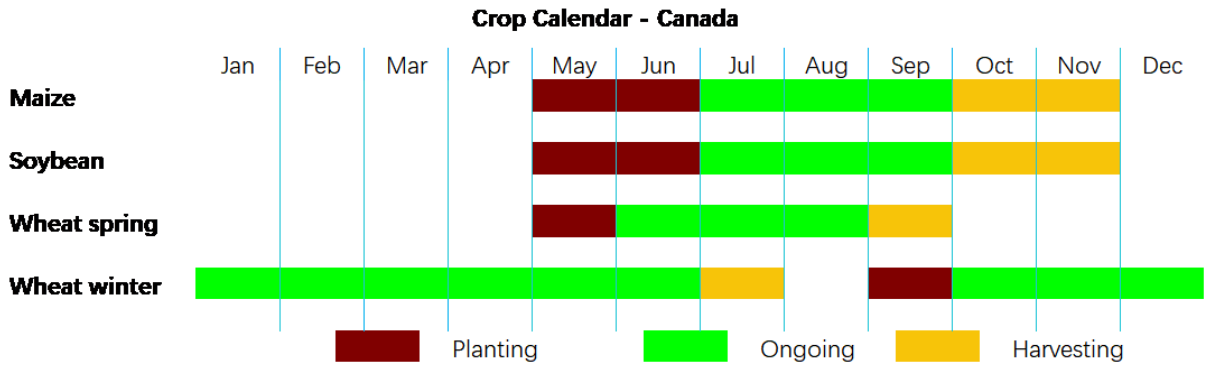
The Canadian Prairies region is the largest food production area in Canada. During the reporting period, rainfall here was significantly below average (-14%). Although the weather was slightly warmer than expected (TEMP, +0.5°C), radiation was average (RADPAR, 0%), and the potential biomass dropped below the five-year average (BIOMSS, -7%). Meanwhile, the Cropped Arable Land Fraction was stable, while VCIx was 0.89. Taking into account also the NDVI profiles, the crop growth condition in the region is considered poor, and CropWatch predicts crop production will be below that of last year.

Atlantic Ocean (CAN)

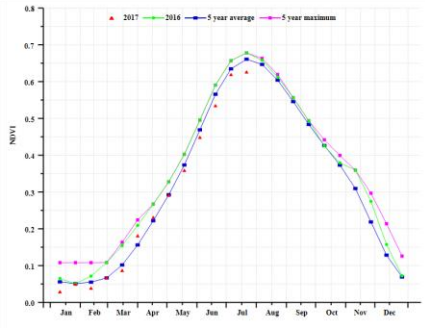
The Atlantic Ocean region includes Ontario and Quebec. Here, agro-climatic indicators were slightly below average (RAIN, -5%; TEMP, -0.2°C; and PAR, -7%), while both the potential biomass and Cropped Arable Land Fraction were unchanged (BIOMSS, 0%; CALF, 0%); VCIx was 0.96. According to the NDVI profiles, crop condition improved in June to July, which led to the unchanged potential biomass. Crop production can exceed the previous year's if conditions remain favorable.

Overall, crop production of Canada could undergo a slight drop due to mild drought conditions, which affected mostly late stages of winter wheat. Maize, soybean, and spring wheat are mostly unaffected. As a result, CropWatch predicts a drop in wheat production (33,290 ktons, -6.8% below 2016), but increases for maize (11,701 ktons, +3.4%) and soybean (5,386 ktons, +3.7%)

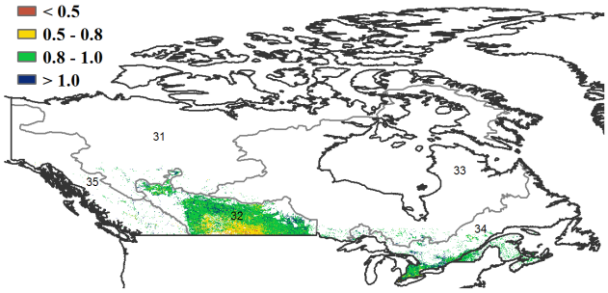
Figure 3.9. Canada crop condition, April – July 2017



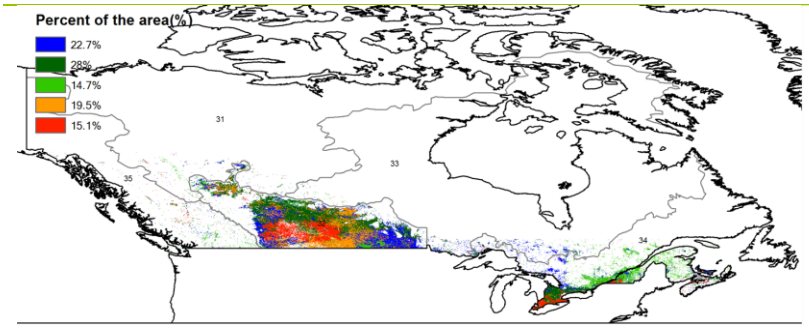
(a). Phenology of major crops



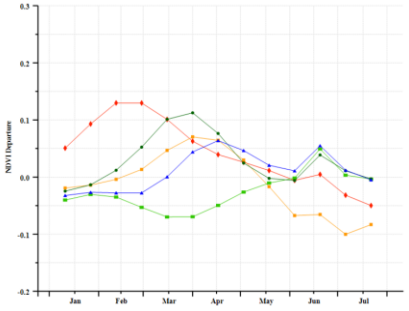
(b) Crop condition development graph based on NDVI



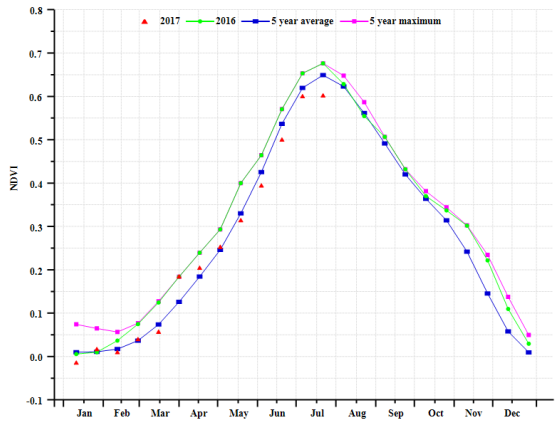
(c) Maximum VCI

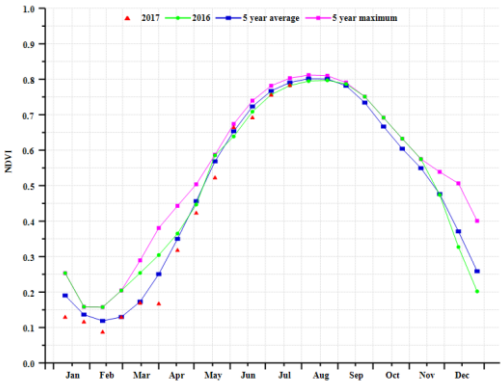


(d) Spatial NDVI patterns compared to 5YA



(e) NDVI profiles





(f) Crop condition development graph based on NDVI (Canadian Prairies region (left) and Atlantic Ocean (right))

Table 3.14. Canada agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Arctic Ocean	232	0	7.3	0.1	1066	-3
Prairies	237	-14	12.1	0.5	1249	0
Hudson Bay	322	-4	10.2	-0.6	1108	-4
Atlantic Ocean	329	-5	11.4	-0.2	1083	-7
Pacific Ocean	256	-11	8.7	0	1253	0

Table 3.15. Canada agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2017

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Arctic Ocean	863	27	84	-1	0.93
Canadian Prairies	1002	-7	98	0	0.89
Hudson Bay	1237	0	97	0	0.97
Atlantic Ocean	1242	0	100	0	0.96
Pacific Ocean	928	-8	98	0	0.94

Table 3.16. CropWatch-estimated maize, rice, wheat, and soybean production in Canada for 2017 (thousand tons)

Crops	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Maize	11701	3.4	0.0	12099	3.4
Wheat	33290	-6.8	-1.1	30679	-7.8
Soybean	5386	3.6	0.0	5584	3.7

[DEU] Germany

Above average crop condition prevailed in Germany over the monitoring period. Winter wheat, spring spring, and maize are the main grain crops of Germany, and currently winter wheat has been harvested while the other two are nearing harvest. The CropWatch agroclimatic indicators show above average rainfall (RAIN, +14%), close to average but cool temperature (TEMP, -0.4°C), and radiation at the national level significantly below average (RADPAR, -5%). Above average rainfall occurred throughout the country, with the largest positive departure occurring from late June to early July. With favorable moisture and temperature, biomass (BIOMSS) is expected to increase by 11% nationwide compared to the five-year average.

As shown by the crop condition development graph, national NDVI values were first above average in mid-April, then below average from early May to early June due to rain deficit and low temperature, next again above average in mid-June due to good soil moisture and suitable temperature condition, and finally below average after early July due to a lack of cool temperature. These observations are confirmed by the NDVI profiles. Winter crops had generally favorable or even very favorable condition, with high VCIx areas and NDVI clusters showing this pattern. Summer crops also are about average in most of the country according to the NDVI profiles, a spatial pattern again reflected by VCIx in the different areas, with a VCIx of 0.94 for Germany overall.

In this monitoring period, the seeded area is close to that of last year's, and, due to favorable condition, the production of wheat and maize is estimated at respectively 0.1% and 1.9% above 2016 values. Generally, the values of agronomic indicators show favorable condition for most winter and summer crops in Germany.

Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, six sub-national regions can be distinguished for Germany, among which three are relevant for crops cultivation. These three regions are the northern wheat zone, northwest mixed wheat and sugarbeets zone, central wheat zone.

Northern wheat zone

This region is the major winter wheat zone of Germany. Above average crop condition is indicated by the region's NDVI development profile. At 362 mm, RAIN was well above average (+48%) with somewhat cool weather (TEMP, -0.6°C) and radiation significantly below average (RADPAR, -9%). With favorable moisture and temperature, biomass (BIOMSS) is expected to increase by 32% compared to the five-year average. The area had a high Cropped Arable Land Fraction (0.99) as well as VCIx (0.97), indicating high cropped area and favorable crop prospects.

Northwest mixed wheat and sugarbeets zone

Wheat and sugarbeets are major crops in this region. NDVI profiles over the wheat growing areas near the peak growing period (June) are above both the previous year and the recent five-year average. Abundant RAIN (21% above average) resulted in favorable crop condition for both crops. Overall crop condition for the region is good according to the high VCIx (0.95).

Central wheat zone

This region is another major winter wheat zone, and it has received about 25% above average rainfall and close to average but cool temperatures conducive to a marginally higher biomass accumulation. Late crop

emergence is evident from the NDVI profile, confirmed also by Cropped Arable Land Fraction of 100%. The VCIx of 0.94 for this region also shows favorable crop prospects.

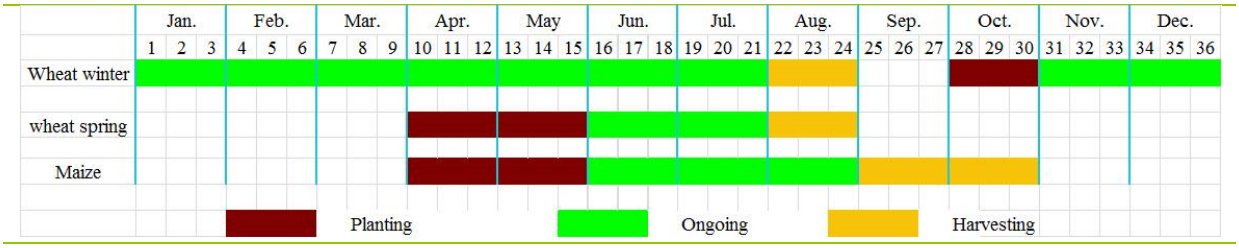
Eastern and western sparse crop areas

These two regions are mainly forested, and cropland is more marginal. Rainy weather was recorded (RAIN (+42% and +7%, respectively for the eastern and western areas), as well as below average temperatures (TEMP, -0.7°C and -0.2°C) and radiation (RADPAR, -7% and -4%). Compared to the average of the last five years, BIOMSS was up by 28% and 1% respectively, while the Cropped Arable Land Fraction was at 100% for both. Favorable crop condition was recorded with high VCIx values of 0.94 for the eastern and 0.93 for the western sparse crop areas, respectively.

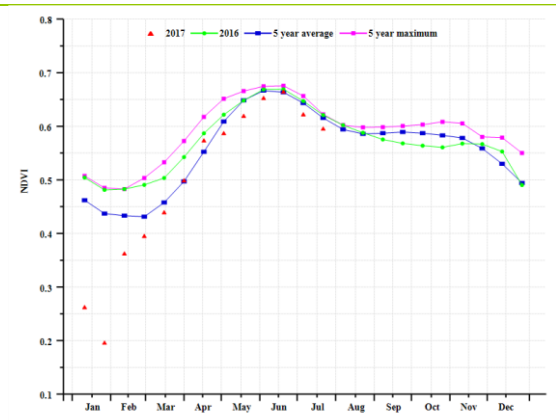
Southern highland

Normal weather was recorded by RAIN (-5%), TEMP (-0.2°C), and RADPAR (-2%). Compared to the five-year average, BIOMSS decreased 2%, while VCIx reached 0.94. The Cropped Arable Land Fraction was at 100%, while the VCIx of 0.94 indicates favorable crop prospects

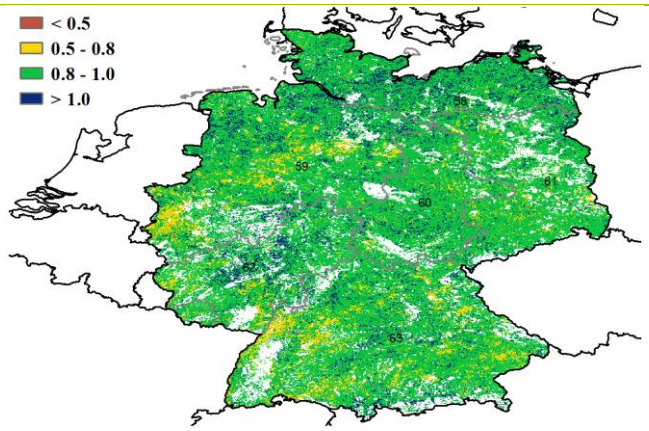
Figure 3.10. Germany crop condition, April-July 2017



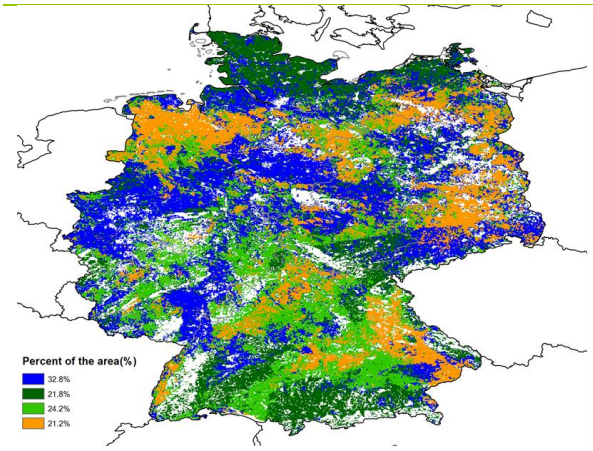
(a). Phenology of major crops

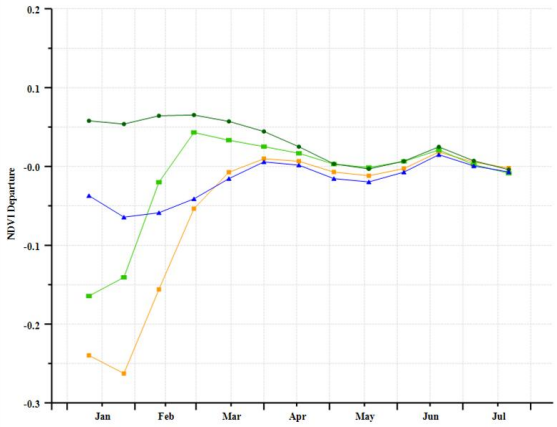


(b) Crop condition development graph based on NDVI



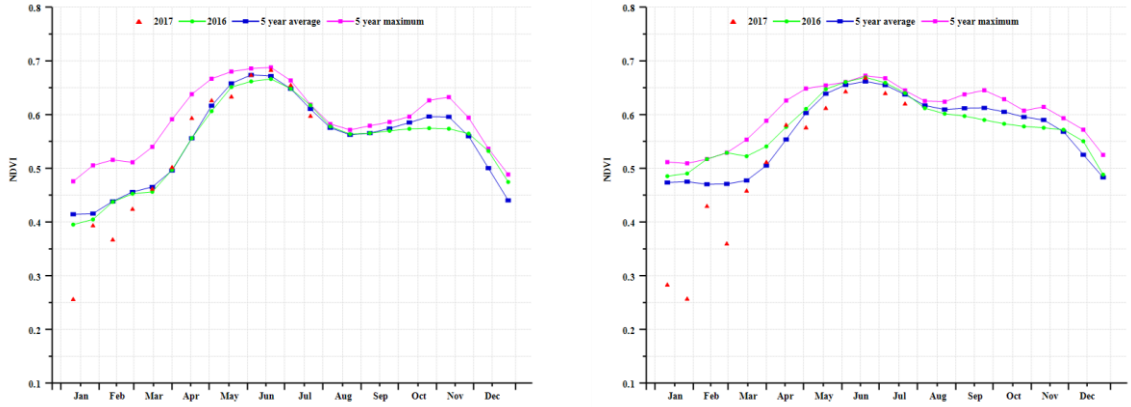
(c) Maximum VCI



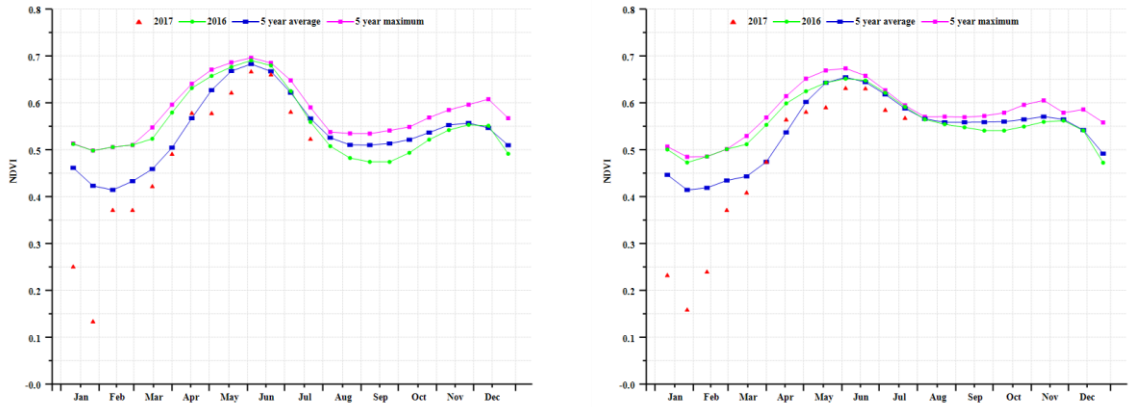


(d) Spatial NDVI patterns compared to 5YA

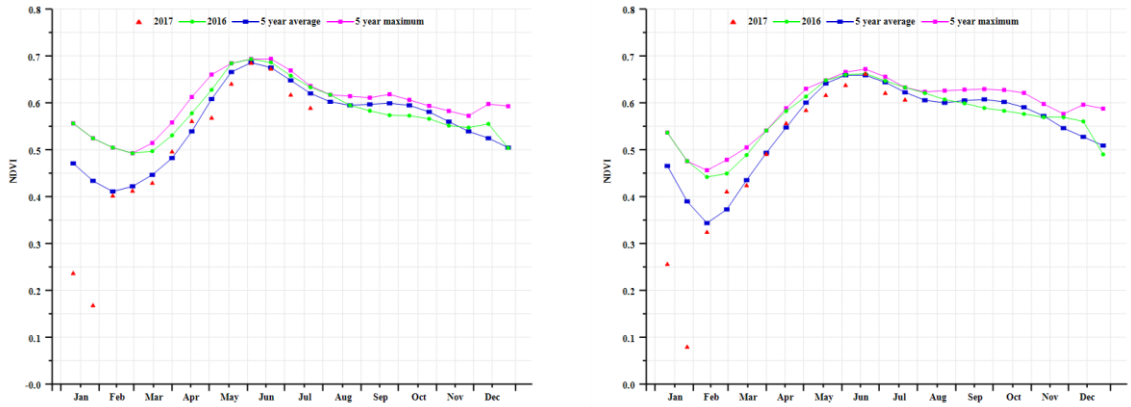
(e) NDVI profiles



(f) Crop condition development graph based on NDVI (Northern wheat zone (left) and Northwest mixed wheat and sugarbeets zone (right))



(g) Crop condition development graph based on NDVI (Central wheat zone (left) and Eastern sparse crop area (right))



(h) Crop condition development graph based on NDVI (Western sparse crop area (left) and Southern highland (right))

Table 3.17. Germany agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Northern wheat zone	362	48	14.0	-0.6	1003	-9
Northwest mixed wheat and sugarbeets zone	321	21	14.6	-0.5	978	-9
Central wheat zone	313	25	15.0	-0.7	1014	-7
Eastern sparse crop area	340	42	14.9	-0.7	1012	-7
Western sparse crop area	283	7	15.0	-0.2	1061	-4
Southern highland	341	-5	14.8	-0.2	1105	-2

Table 3.18. Germany agronomic indicators by sub-national regions, current season's value and departure from 5YA, April-July 2017

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Northern wheat zone	1364	32	100	0	0.97
Northwest mixed wheat and sugarbeets zone	1268	13	100	0	0.95
Central wheat zone	1233	17	100	0	0.94
Eastern sparse crop area	1295	28	100	0	0.94
Western sparse crop area	1135	1	100	0	0.93
Southern highland	1317	-2	100	0	0.94

Table 3.19. CropWatch-estimated maize and wheat production for Germany in 2017 (thousands tons)

Crops	Production 2016	Yield variation	Area variation	Production 2017	Production variation
Maize	4602	1.9%	0.0%	4688	1.9%
Wheat	28106	0.1%	0.0%	28130	0.1%

[EGY] Egypt

In Egypt, the Nile Valley and Delta are the main cultivated land areas, occupying about four percent of the otherwise desertic area. From April to July 2017, temperature (TEMP) and radiation (RADPAR) in the country overall were close to average, while rainfall (RAIN) was significantly higher by 110%. Average NDVI was lower than both the five-year average and the previous season, while the Cropped Arable Land Fraction (CALF) increased 1% to 59%. VCIx was 0.76. A significant increase in (rainfed) BIOMSS is expected, although values remain very low. The production of rice and wheat in 2017 is estimated to rise by 9.5% and 7.4%, respectively, compared with 2016.

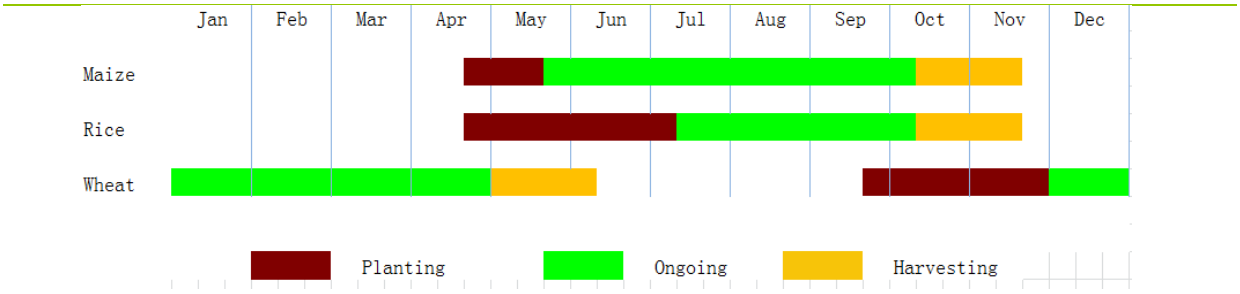
Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, three sub-national regions can be distinguished for Egypt, two of them relevant for crops cultivation. They are Nile Delta and Nile Valley area.

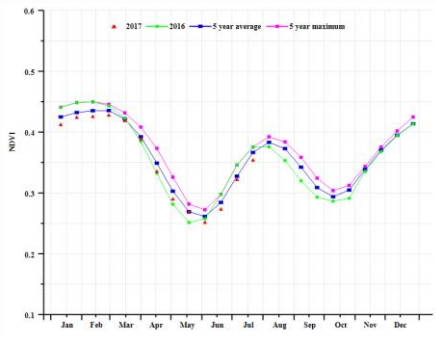
Nile Delta and Valley

Both the Delta and the Valley received considerably large precipitation excesses (RAIN, +143% and +107%, respectively), but since expected rainfall amounts are insignificant and virtually all crop is irrigated, the impact was minimal. The indicators of CALF and VCIx are also favorable in both areas, although the area-wide NDVIs stay below the five-year average. Altogether, production is expected to be satisfactory.

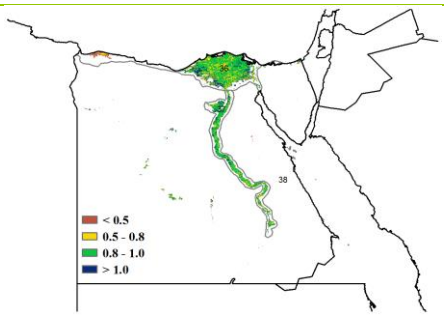
Figure 3.11. Egypt crop condition, April-July 2017



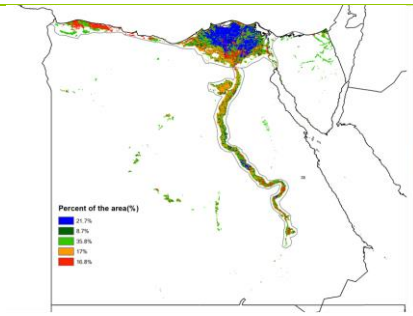
(a). Phenology of major crops



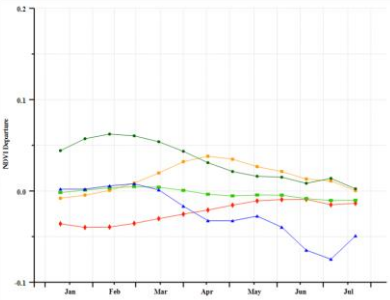
(b) Crop condition development graph based on NDVI



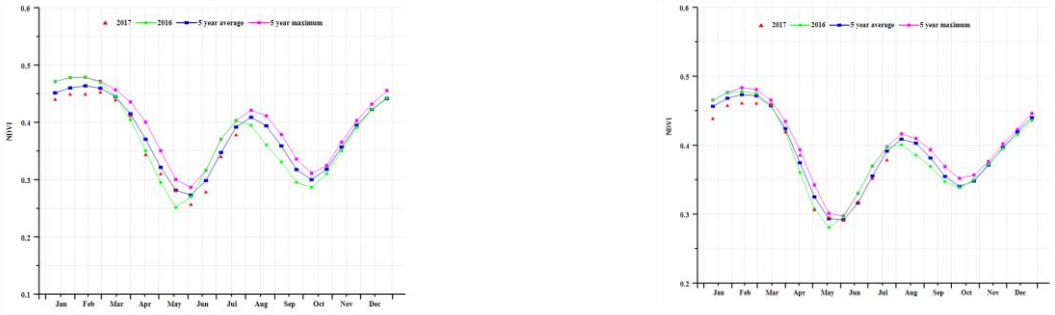
(c) Maximum VCI



(d) Spatial NDVI patterns compared to 5YA



(e) NDVI profiles



(f) Crop condition development graph based on NDVI (Nile Delta (left) and Nile Valley (right))

Table 3.20. Egypt agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

	RAIN		TEMP		RADPAR	
Region	**Current (mm)**	**Departure from 15YA (%)**	**Current (°C)**	**Departure from 15YA (°C)**	**Current (MJ/m2)**	**Departure from 15YA (%)**
Nile Delta	15	143	24	0	1582	0
Nile Valley	28	107	27	0	1637	-1

Table 3.21. Egypt agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2017

	BIOMSS		CALF		Maximum VCI
Region	**Current (gDM/m2)**	**Departure from 5YA (%)**	**Current (%)**	**Departure from 5YA (%)**	**Current**
Nile Delta	81	127	63	1	0.76
Nile Valley	92	99	67	1	0.87

Table 3.22. CropWatch-estimated maize, rice, and wheat production for Egypt in 2017 (thousand tons)

	Production 2016	Yield variation	Area variation	Production 2017	Production variation
Maize	5701	-2.0	2.4	5721	0.3
Rice	6293	7.2	2.2	6888	9.5
Wheat	10207	5.0	2.3	10963	7.4

[ETH] Ethiopia

Following the sporadic rains received so far, the harvest of the Belg season was generally unfavorable. Judging from VCIx values and spatial NDVI profiles, however, the main Meher cropping season has so far been promising. Nationwide, marginal reductions in rainfall (RAIN -4%) and temperature (TEMP, -0.2%) compared to the average were observed. The rainfall of 555 mm with a slight increase in radiation (RADPAR, +1%) have together resulted in a minor biomass production potential reduction of about 4%. Most of the producing areas of North Oromia and Amhara recorded favorably high VCIx, between 0.8 and 1.0.

The timely "Kremt rains" in June aided the favorable establishment of maize and teff in the central and western parts of the country, to be harvested during the Meher season. As a result, conditions were much above average for most crops. Good harvests are anticipated from the central regions of Amhara, while poor to disastrous conditions may prevail in the eastern part.

Regional analysis

The semi-arid pastoral zone, southeastern Mendebo highlands, southeastern mixed-maize zone, western-mixed maize regions, and central-northern maize teff highlands are the major cereal and grain producing areas of Ethiopia reported in this analysis.

Semi-arid pastoral zone

Looking at the indicators by region, severe drought spells affected the semi-arid pastoral zone, thereby affecting thousands of livestock as biomass reduced (BIOMSS, -20%) due to a drop of close to 30% in rainfall. The temperature however, increased marginally (TEMP, + 0.2°C), contributing to increasing evaporation and pressure on water points.

Southeastern Mendebo highlands and mixed-maize zones

The southeastern Mendebo highlands and the southeastern mixed-maize zone, covering part of Oromia and Dire DawaHarari and near the Somali Highlands (a major maize and teff producing area), both received below average rainfall (RAIN, -37% for both) and are currently experiencing unfavorable conditions. There was no reduction in CALF for the southeastern Mendebo highlands; VCIx here is 0.89. As for the southeastern mixed-maize zone, CALF was 4% below the average, with a maximum VCIx of 0.77. A significant biomass reduction (BIOMSS, -25%) was noted for the southeastern mixed-maize zone. The spatial extent of this situation might entail a great investment in food support from government and related organizations.

Western-mixed maize and central-northern maize-teff highlands

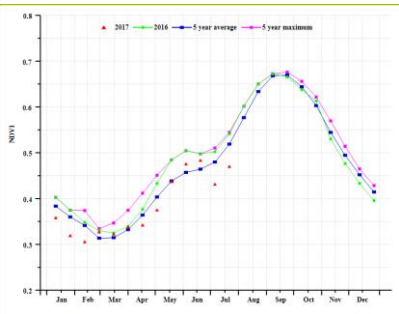
In contrast, the western-mixed maize regions experienced some drought conditions, but rains stabilized and the biomass increment compared to average was about 9%. Similarly, the maximum VCIx was very favorable at 0.94. In this area, there was no shift in the CALF recorded. The central-northern maize teff highlands also experienced good Kremt rains and established a good crop of maize and teff. The maximum VCIx was 0.89, indicating good vegetation conditions. Here, radiation did not vary from the average, while temperature decreased by about 0.2°C during this period. Meanwhile, CALF was reduced by 8% compared to the average.

Altogether, pastoral low rainfall areas suffered drought and the Belg season was poor, but the situation remains fair for Belg crops to be harvested from August until the end of the year.

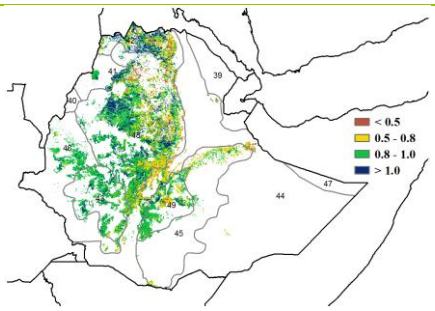
According to CropWatch production estimates, following the poor rains the production of maize is expected to be a little bit below last year's output, by about 9%, while wheat production will be reduced by 12%.

Figure 3.12. Ethiopia crop condition, April-July 2017

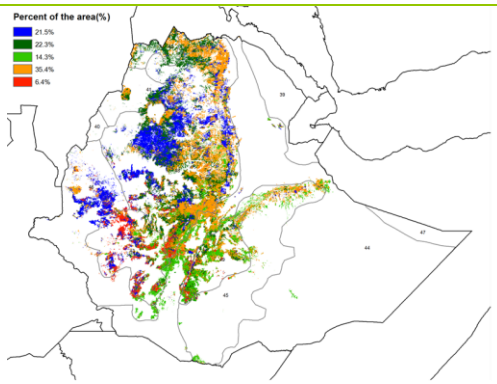
(a). Phenology of major crops



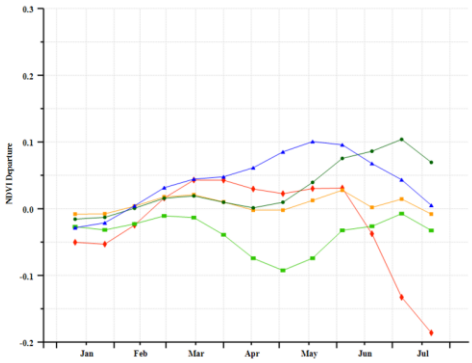
(b) Crop condition development graph based on NDVI



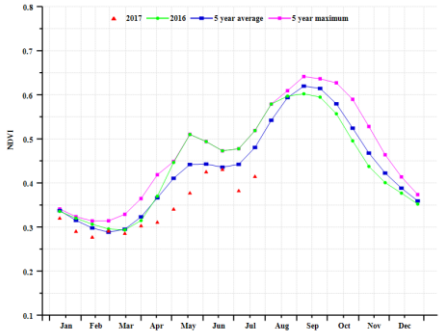
(c) Maximum VCI

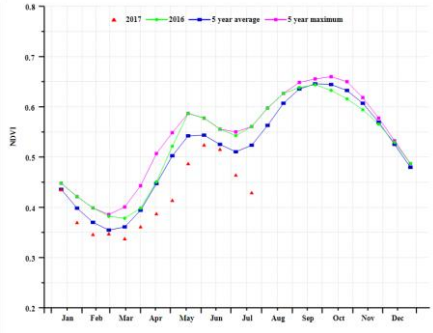


(d) Spatial NDVI patterns compared to 5YA

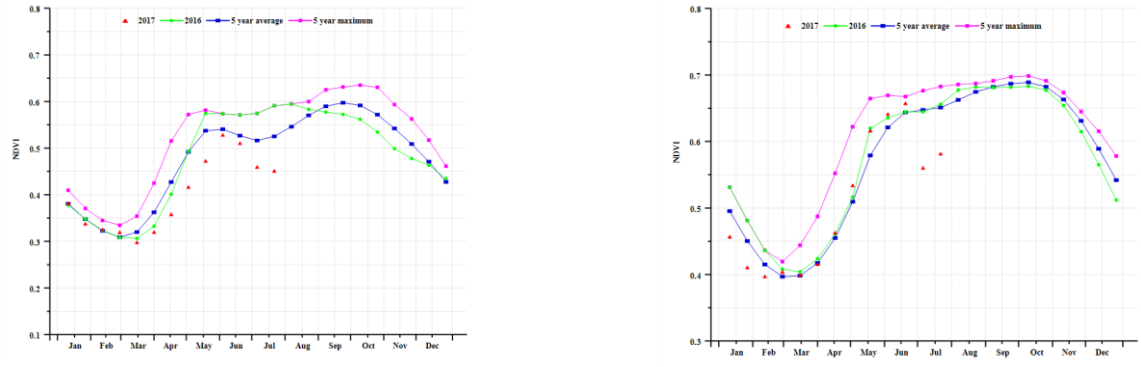


(e) NDVI profiles





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



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

Table 3.22. Ethiopia agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Semi-arid pastoral	300	-29	23.8	0.2	1208	3
South-eastern mixed maize zone	275	-37	23.8	0.2	1166	2
Western mixed maize zone	789	11	24.2	-0.7	1128	1
Central-northern maize-teff highlands	568	1	20.8	-0.2	1211	0
South-eastern Mendebo highlands	294	-37	18.5	0.1	1135	1

Table 3.23. Ethiopia, agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2017

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Semi-arid pastoral	1059	-20	73	-9	0.77
South-eastern mixed maize zone	1067	-23	88	-4	0.77
Western mixed maize zone	2010	9	100	0	0.94
Central-northern maize-teff highlands	1457	-1	75	-8	0.89
South-eastern Mendebo highlands	1107	-25	99	1	0.87

Table 3.24. CropWatch-estimated maize and wheat production in Ethiopia for 2017 (thousand tons)

	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Maize	7157	-0.3	-9	6498	-9
Wheat	4743	-2	-10	4180	-12

[FRA] France

Over the monitoring period, winter wheat in France was at its growing stage, while the planting of the country's maize and spring wheat was completed in May. The harvest of the three crops will start in the month of July for maize and in August and September for spring wheat and winter wheat, respectively.

Compared to average, CropWatch agroclimatic indicators show that the reporting period recorded a 23% drop in RAIN, a 1.2°C increase in TEMP, and 1.4% above average RADPAR at the national level. Also on the national level, crop condition was below average to average, which is confirmed by a significant decrease for the BIOMSS indicator (-16.9%) due to the scarcity in rainfall. As shown by the crop condition development graph, national NDVI values were mostly below average, but close to the five-year maximum from May to July. The national NDVI values began to drop below average from April, which is consistent with the lack of rainfall during this period. The spatial NDVI patterns compared to the five-year average and corresponding NDVI departure cluster profiles also indicate that NDVI is above average in only 14.5% of arable land, with below average NDVI in the other regions. This spatial pattern is reflected by the maximum VCI in the different areas, with a VCIx of 0.9 for France overall. Generally, due to the rainfall deficit, the agronomic indicators mentioned above show unfavorable condition for some crop areas of France. In the next few months, more rain is needed for the country's rainfed arable land areas.

Regional analysis

Considering the cropping system, climatic zones, and topographic conditions, eight sub-national regions for France are included in this bulletin. They are a northern barley region, a western mixed maize, barley and rapeseed area, a northwest mixed maize and barley region, a rapeseed region, a middle arid region, a southwest maize region, an eastern highland region, and a Mediterranean climate region.

Northern barley region

This region is one of the major crop producing regions for barley. Overall unfavorable climatic conditions dominated the region over the reporting period, with 20% below average rainfall compared to the fifteen-year average; compared to the other 7 regions in France, this region received a medium amount of rainfall consisting of only 186 mm over the four months. Meanwhile, temperature (TEMP, +1°C) and radiation (RADPAR, 0%) were average. The dry condition in this region will hamper crop growing progress and production. As a result, the BIOMSS indicator for the region is 17% below average.

Western mixed maize, barley, and rapeseed region

Maize, barley, and rapeseed are the major crops in this region situated in the west of France. (The region is labeled '51' on the VCIx map and NDVI profile map). Over the reporting period, RAIN is 32% below average, while RADPAR is 2% above. As a result of the excess rain, the BIOMSS indicator is 24%below the five-year average. High VCIx values, however, are observed, reflecting overall favorable crop condition.

Northwest mixed maize and barley region

The main crops in this area in the northwest of the country (an area labeled '52'on the VCIx map and NDVI profile map) are maize and barley. Rainfall decreased22% compared to average for this period, while temperature and radiation were slightly above average. Crop condition was below average according to the NDVI development graph, an observation confirmed by the decrease of BIOMSS by 16%compared to average. The VCIx map, however, shows that the crop condition was favorable, with a high VCIx value recorded for the region as a whole (0.92).

Rapeseed region

In this region, situated in the country's southeast, rapeseed is naturally the major crop. Over the reporting period, RAIN here is 21% below average, RADPAR2% above, and TEMP average. BIOMSS is 16% below the five-year average. A high VCIx value for the region, however, is reflecting overall favorable crop condition, even as the amount of rainfall (237 mm) received during the season is insufficient for crops. Overall crop condition is favorable compared with the previous five years according to the crop condition development graph.

Middle arid region

Favorable conditions are observed in this region in the middle of the country. The departure from average for the RAIN indicator (-22%) ranks in the middle when compared to the other regions. Other indicators remain close to average. According to the NDVI profiles, the NDVI peak is close to the best condition of the past five years, which is a strong signal for an increase in yield. BIOMSS is 12% below its five-year average, but a high VCIx value still is reflecting an overall favorable crop condition.

Southwest maize region

For this region in France's southwest (labeled '55' on the VCIx map and NDVI profile map), RAIN below the five-year average for the region was observed, similar to the rainfall departure on the national level. Meanwhile, temperature (TEMP, +1°C) and radiation (RADPAR, 0%) nearly did not vary from the average. according to the NDVI profile map and VCIx map, crop condition was good in the region. Overall, the situation is considered to be close to average.

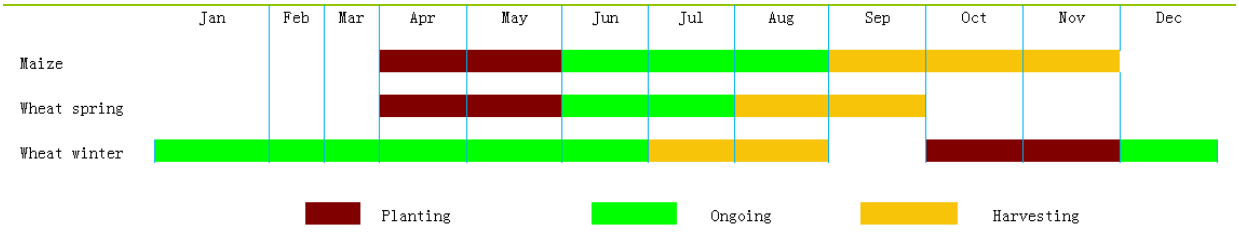
Eastern highland region

Generally, crop condition for this region is slightly above average, while climate conditions are close to average (RAIN, -1%; TEMP, +1°C; and RADPAR, +2%).Some arable land was not cropped during the monitoring period, and the average VCIx is only 0.89. The NDVI profile confirms the favorable conditions with above average NDVI since April.

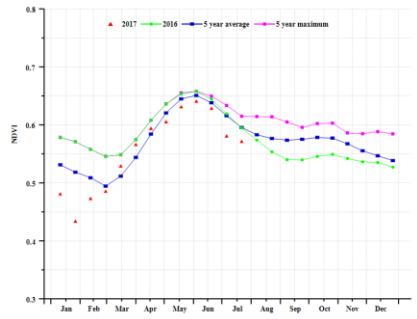
Mediterranean climate region

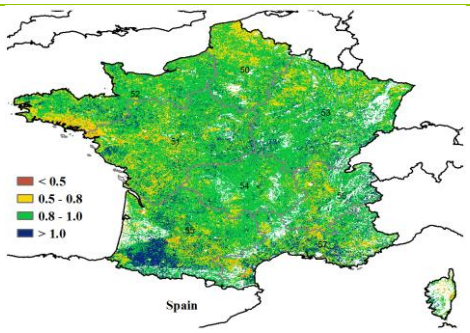
In this region, characterized by a Mediterranean climate, overall crop condition is unfavorable due to the adverse weather conditions. The region only received 130 mm of rainfall, resulting in a decrease in RAIN of 47% compared to the fifteen-year average--the largest such drop in the country. Combined increases in TEMP of 2°C and RADPAR of 2% over average, the drop in BIOMSS was 35% compared to the five-year average for this indicator. Despite the drought and a Cropped Arable Land Fraction of 97%, crop condition stayed average according to NDVI based crop development profile.

Figure 3.13. France crop condition, April-July 2017

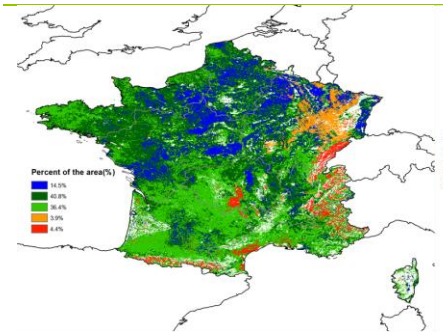


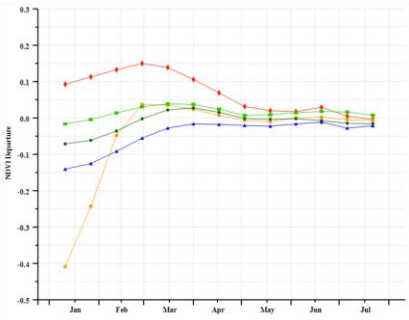
(a). Phenology of major crops



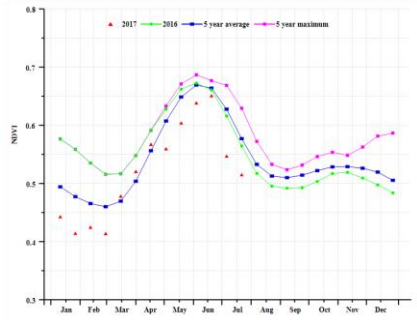


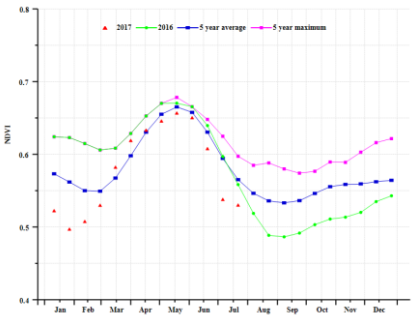
(b) Crop condition development graph based on NDVI (c) Maximum VCI



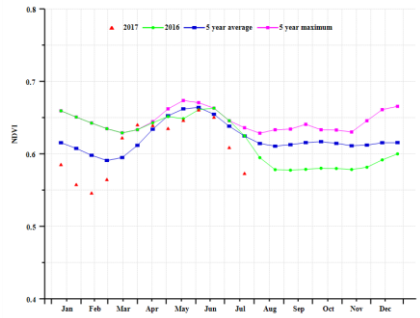


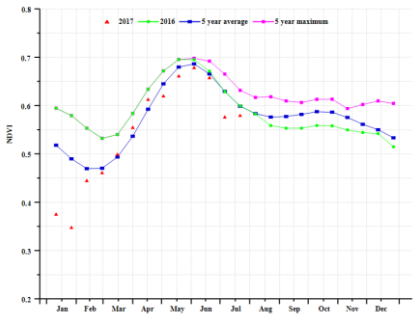
(d) Spatial NDVI patterns compared to 5YA (e) NDVI profiles



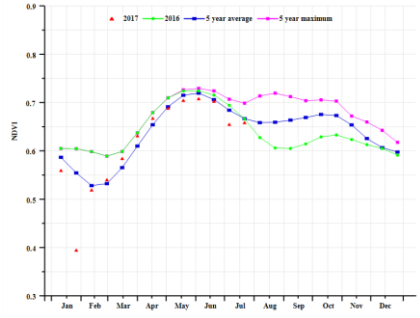


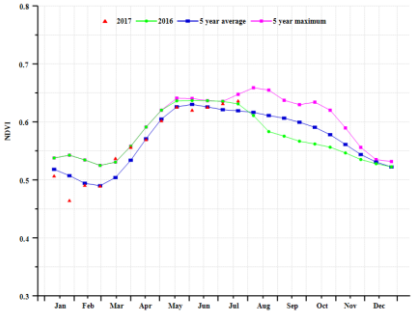
(f) Crop condition development graph based on NDVI (Northern barley region (left) and Western mixed maize, Barley and Rapeseed zone (right))



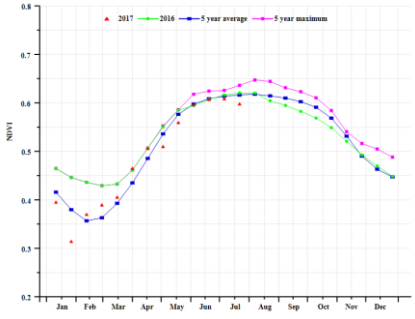


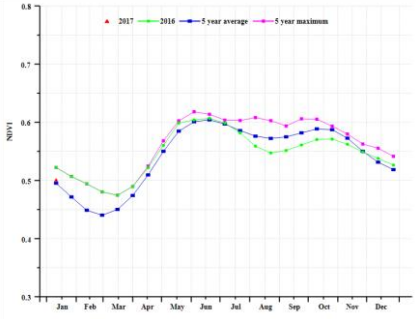
(g) Crop condition development graph based on NDVI (Northwest mixed maize, Barley and rapeseed zone (left) and Rapeseed zone (right))





(h) Crop condition development graph based on NDVI (Middle arid zone (left) and Southwest maize zone (right))





(i) Crop condition development graph based on NDVI (Eastern highland (left) and Mediterranean climate zone (right))

Table 3.26. France agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Northern barley zone	186	-20	15	1	1125	0
Western mixed maize, barley, and rapeseed zone	159	-32	16	2	1204	3
Northwest mixed maize and barley zone	160	-22	15	1	1139	-1
Rapeseed zone	237	-21	16	0	1165	2
Middle arid zone	255	-22	15	1	1220	2
Southwest maize zone	239	-19	17	1	1247	0
Eastern highland	354	-1	14	1	1295	2
Mediterranean climate zone	130	-47	16	2	1395	2

Table 3.27. France agronomic indicators by sub-national regions, current season's value and departure from 5YA, April-July 2017

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Northern Barley zone	835	-17	100	0	0.87
Western mixed maize, barley, and rapeseed zone	720	-24	100	0	0.90
Northwest mixed maize and barley zone	746	-16	100	0	0.92
Rapeseed zone	997	-16	100	0	0.91
Middle arid zone	1061	-12	100	0	0.92
Southwest maize zone	972	-12	100	0	0.93
Eastern highland	1166	-1	97	0	0.89
Mediterranean climate zone	584	-35	96	2	0.90

Table 3.28. CropWatch-estimated maize and rice production for France in 2017 (thousand tons)

Crops	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Maize	14703	-0.2	0.0	14665	-0.3
Wheat	37984	0.0	0.1	38051	0.2

[GBR] United Kingdom

The crops in the United Kingdom showed mostly average condition over the reporting period. Currently, most of the winter wheat, oats, and all the winter barley and winter rapeseed have been harvested, while spring barley is in the vegetative stage. Compared to average, the CropWatch agroclimatic indicators show that biomass and temperature over the reporting period were average, with above average rainfall (RAIN, +6%) and well below average radiation (RADPAR, -7%). The national NDVI values were above and even close to the five-year maximum from May to June according to the crop condition development graph. From May to late June, the spatial NDVI patterns, when compared to the five-year average, and corresponding NDVI departure cluster profiles indicate above average NDVI values the country for more than 82.4% of arable land (including Cornwall, Devon, Somerset, Dorset, and most of Hampshire, Shropshire, Herefordshire and west Worcester-shire, Norfolk and Suffolk, Yorkshire, Durham, south Northumberland, as well as Cupar, Stirling, Dundee, and Aberdeen); only 17.6% of the area had below average condition this period. The national VCIx (0.94) was well above average, and the cropped arable land fraction is unchanged compared to its five-year average.

Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, three sub-national regions--Central sparse crop region, Northern barley region, and Southern mixed wheat and barley region--can be distinguished. Specific observations for the reporting period are included for each region. Overall, production estimates for 2017 are similar to 2016.

Central sparse crop region

The Central sparse crop region is one of its major agricultural regions in terms of crops production. In the central area with sparse crops, NDVI values were well above the five-year maximum according to that region's crop condition development graph, resulting from the adequate rainfall that started in April. Agroclimatic conditions are close to average with 6% above average RAIN, 0.48°C below average TEMP, and 7% below average RADPAR.

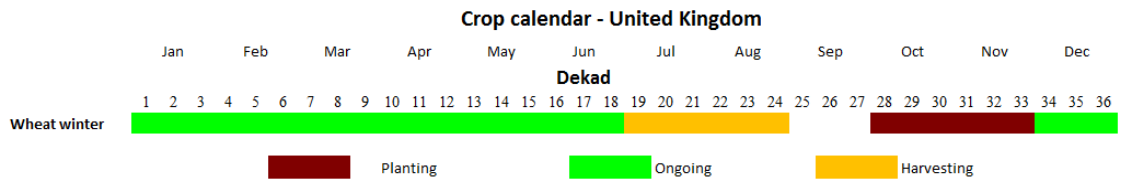
Northern barley region

The Northern barley region is one of the main barley regions in the United Kingdom. In this region, NDVI was below average according to the crop condition graphs. Agroclimatic conditions are close to average with 10% above average RAIN, 0.2°C below average TEMP, and 9% below average RADPAR.

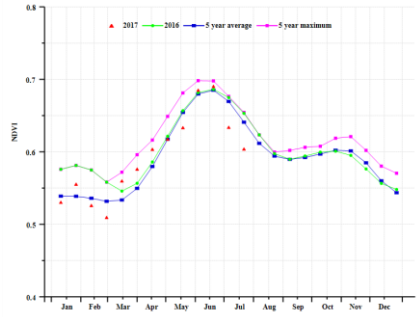
Southern mixed wheat and barley region

In the southern mixed wheat and barley zone, NDVI was below average according to the crop condition graph for that zone specifically. Rainfall (RAIN) was mostly close to average, while temperature (TEMP) and radiation (RADPAR) were below average during the reporting period.

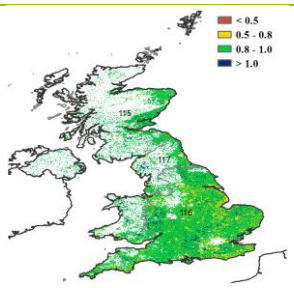
Figure 3.14. United Kingdom crop condition, April-July 2017



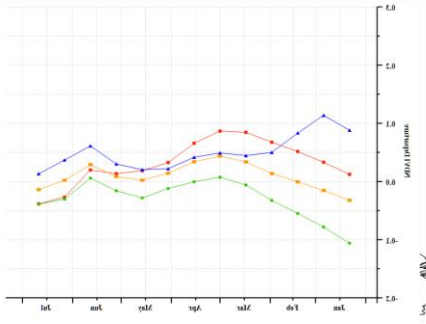
(a). Phenology of major crops



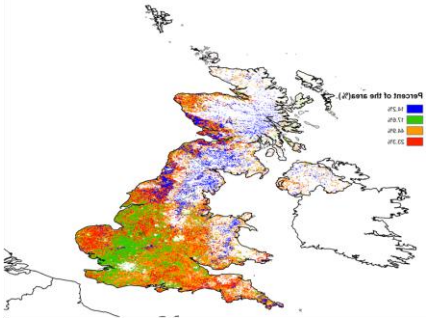
(b) Crop condition development graph based on NDVI



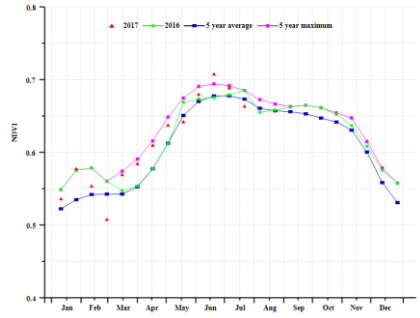
(c) Maximum VCI

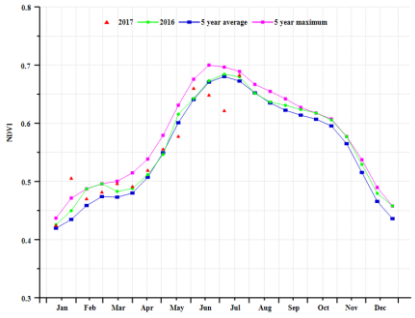


(d) Spatial NDVI patterns compared to 5YA

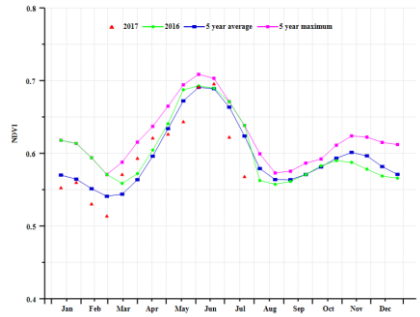


(e) NDVI profiles





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



(g) Crop condition development graph based on NDVI (Southern mixed wheat and Barley region)

Table 3.29. United Kingdom agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Northern Barley area	386	10	10.4	0.2	868	-9
Southern mixed wheat and barley zone	250	1	13.8	1.5	984	-6
Central sparse crop area	336	6	12.00	0.48	951	-7

Table 3.30. United Kingdom, agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2017

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Northern barley area	1301	2	100	0	0.94
Southern mixed wheat and barley zone	1014	-2	100	0	0.93
Central sparse crop area	1220	-2	100	0	0.96

Table 3.31. CropWatch-estimated wheat production for United Kingdom in 2017 (thousand tons)

Crops	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Wheat	14337	1.3	0.0	14521	1.3

[IDN] Indonesia

Crops in Indonesia generally showed good condition between April and July (VCIx=0.95). The monitoring period covers the harvest of the main rice and maize crops, as well as the growing of secondary rice. Compared with the recent average, precipitation (RAIN) was significantly above average by 21%, while temperature was below (TEMP, -0.7°C). Due to the favorable moisture conditions, biomass increased by 7% compared to the recent five-year average. It is stressed, however, that the model used to compute the biomass production potential takes only rainfall and temperature into account. As a result, the significant drop in sunshine (RADPAR, -8%) is likely to have affected yields negatively and the BIOMSS value is too optimistic. The Cropped Arable Land Fraction (CALF) remained stable compared with previous years.

Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, four sub-national regions can be distinguished for Indonesia, among which three are relevant for crops cultivation. These three regions are Sumatra, Java and Kalimantan and Sulawesi.

Sumatra

The crop condition in Sumatra was mostly average. The island experienced wet conditions, with an increase in rainfall reaching +13% compared to average, while temperature dropped 0.8°C. As radiation decreased by 5%, the biomass potential increase of 5% is too optimistic. According to the NDVI clusters, crop condition was above average in Riau, Jambi, and Sumatera Selatan over the entire monitoring period, while the NDVI departure was a significant 0.2 below average in late January in southern Lampung and Bengkulu, rising however to average in recent months.

Java

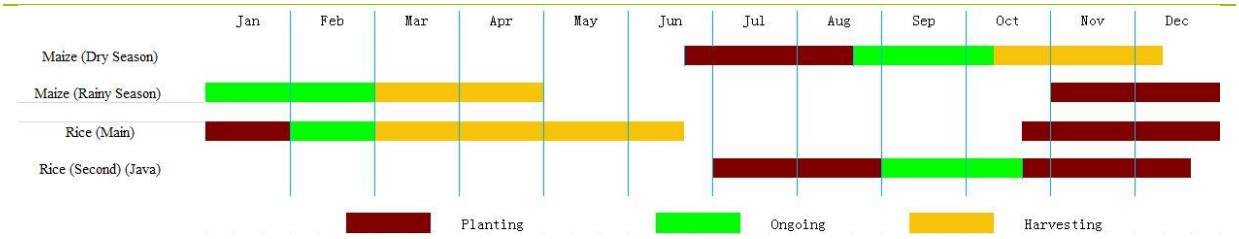
Unlike other regions in the country, rainfall in Java was below average by as much as 21%, while radiation was 4% below average. Affected by the deficit of soil moisture and sunshine, the biomass production potential indicator was 13% below its five-year average. The NDVI profile of Java also shows a crop condition much below the five-year average from May to July. The VCIx for Java is 0.91, which is below that for other regions in the country but nevertheless fair.

Kalimantan and Sulawesi

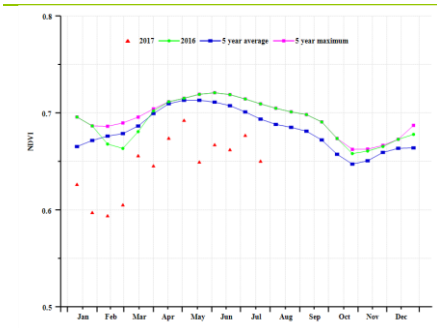
Kalimantan and Sulawesi experienced very wet weather conditions, with rainfall 21% above average and a significant radiation decrease of 9%. Although the BIOMSS indicator increased by 10% compared to the recent five-year average, the low sunshine is likely to have negatively affected rice growth. According to the NDVI clusters, the crop condition in Kalimantan Barat dropped below average in late-February and early-March, then recovered to an average level. The VCIx map shows the value of some pixels in Kalimantan Tengah exceeding 1, indicating favorable crop condition in those places.

Overall for the country, the abundant rainfall during the reporting period provided a favorable soil moisture condition for sowing the secondary rice and dry season maize. CropWatch assesses that the yield of maize in Indonesia will decrease by 4.1% in 2017. The Cropped Arable Land Fraction remains unchanged from 2016

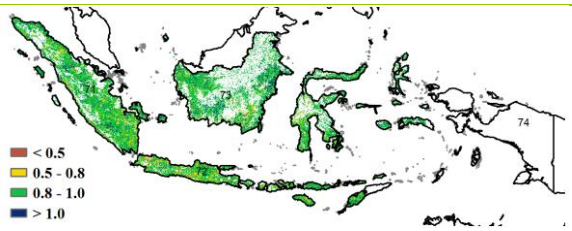
Figure 3.15. Indonesia crop condition, April-July 2017



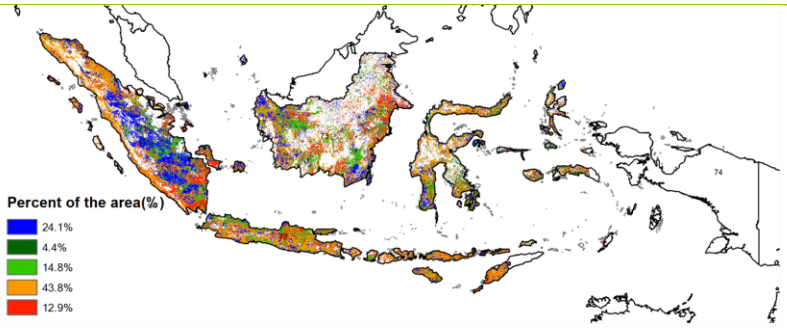
(a). Phenology of major crops



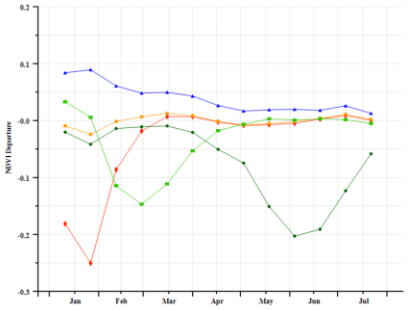
(b) Crop condition development graph based on NDVI



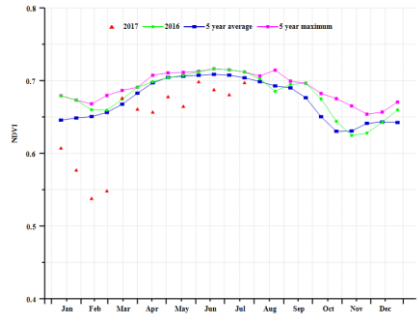
(c) Maximum VCI

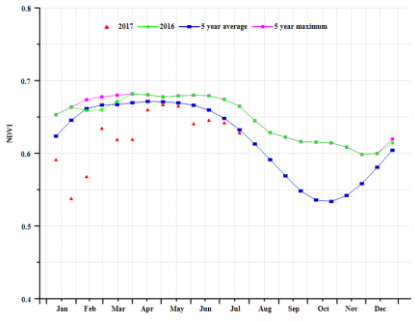


(d) Spatial NDVI patterns compared to 5YA

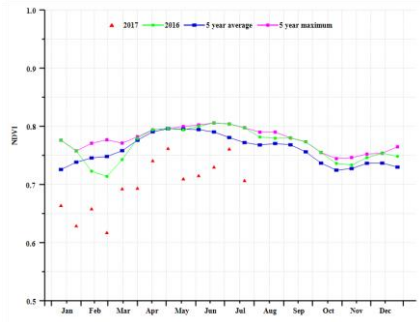


(e) NDVI profiles





(f) Crop condition development graph based on NDVI (Sumatra (left) and Java (right))



(g) Crop condition development graph based on NDVI (Kalimantan and Sulawesi)

Table 3.32. Indonesia agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure (%)	Current (°C)	Departure (%)	Current (MJ/m2)	Departure (%)
Sumatra	897	12.8	25.8	-0.8	977	-5.0
Java	409	-20.7	25.7	-0.4	1018	-3.9
Kalimantan Sulawesi	1166	21.4	26.0	-0.7	891	-8.6
Irian Jaya	1593	34.3	24.7	-0.6	769	-10.5

Table 3.33. Indonesia agronomic indicators by sub-national regions, current season's value and departure from 5YA, April-July 2017

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m2)	Departure (%)	Current (%)	Departure (%)	Current
Sumatra	2059	5	100	0	0.96
Java	1065	-13	100	0	0.91
Kalimantan Sulawesi	2342	10	99	0	0.96
Irian Jaya	2287	8	100	0	0.96

Table 3.34. CropWatch-estimated maize and rice production for Indonesia in 2017 (thousands tons)

Crops	Production 2016	Yield variation	Area variation	Production 2017	Production variation
Maize	18316	-4.1%	0.0%	17565	-4.1%
Rice	69304	-1.4%	0.0%	68339	-1.4%

[IND] India

The reporting period covers the harvesting of Rabi (winter) crops such as Rabi rice and wheat, as well as the field preparation and sowing/transplanting of Kharif (summer) crops, including Kharif rice, maize, and soybean.

On average, the country received "good" monsoon rains (RAIN, +17%). The departure from average was less than 10% (positive or negative) in Chhattisgarh, Delhi, Haryana, Himachal Pradesh, Punjab, Sikkim, Tamil Nadu, and Uttar Pradesh. Rainfall was below average in four states in peninsular India: Goa (-39%), Karnataka (-17%), Kerala (-28%), and Puducherry (-70%). In contrast, seventeen states recorded rainfall that can be qualified as "above average," with above 50% excess rainfall in Gujarat, Rajasthan, and Tripura. Three northern states had below average temperature: Sikkim, -1.5°C; Bihar, -1.4°C; and Himachal Pradesh, -1.4°C, and rather low sunshine (RADPAR, -8%; -3%; and -7% respectively). However, temperature was not a detrimental factor over the reporting period: temperature was high during the early months and later became normal. Similarly with the above-mentioned exceptions, the country received normal radiation, which has resulted in a marginally higher biomass production compared to average. States such as Andhra Pradesh, Delhi, Gujarat, Haryana, Punjab, Rajasthan, and Uttarakhand, all show a potential for a higher than average (above +10%) BIOMSS. In contrast, Puducherry has a high negative departure in for the indicator (BIOMSS, -39%). The NDVI distribution indicates a late beginning of the Rabi season.

Regional analysis

Based on the agroclimatic patterns and topography, India is divided into six regions, which are called: Central India, Eastern coastal Region, Gangetic plains, Northeastern region, Western coastal region and Western dry region. The large variability in agroclimatic condition results in different cropping patterns across the country. Regional crop prospect for the reporting period for six of the seven areas are described below.

Central India

This region has received marginally higher rainfall (678 mm), normal temperature, and average radiation, together indicating a normal biomass production potential for the region. NDVI indicates the late emergence of crops, while the Cropped Arable Land Fraction is as low as previous years (0.43). Low VCIx values (0.76) also show a delayed planting and low crop condition.

Eastern Coastal Region

This region has received 15% above average rainfall and normal temperature and radiation, showing potential for a 7% above average biomass accumulation. NDVI values for the region are mixed, with low to high values distributed across the region. In the south, VCIx is low (0.76), while the northern part of the region has a more mixed pattern with an overall Cropped Arable Land Fraction of 56%.

Gangetic Plains

This region has received about 20% above average rainfall, as well as normal temperature and radiation conducive for marginally higher biomass accumulation. Late crop emergence is evident from the NDVI profile, confirmed also by a Cropped Arable Land Fraction of 68%. The VCIx (0.82 for the region) shows a mixed pattern indicating moderate crop prospects.

Northeastern Region

This high rainfall zone of the country received more than 30% above average rainfall, while temperature and radiation were normal, leading to a good biomass accumulation potential. The Cropped Arable Land Fraction is 96%, and VCIx values of 0.8 and above are indicating very good crop condition in this region.

Western Coastal Region

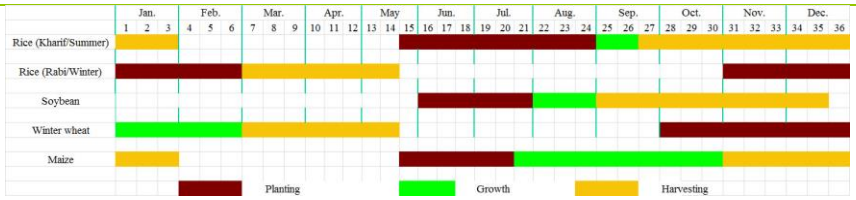
While temperature and radiation were normal, rainfall was below average for the western coastal region over the reporting period. As a result, the accumulated biomass is expected to be marginally below average. The effect of the low rainfall is also reflected in the low Cropped Arable Land Fraction (48%), although crop condition appeared good with a VCIx of 0.85.

Western Dry Region

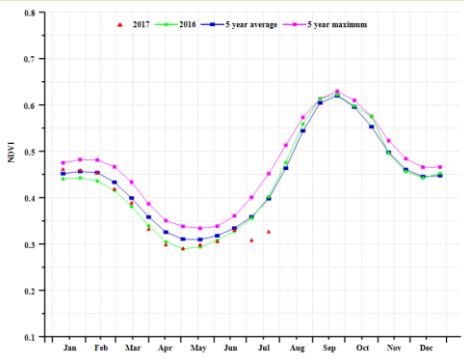
This region with normally low rainfall received an amount more than 70% over average, as indicated by the CropWatch RAIN indicator. Combined with moderate temperature and radiation, the region thus has a much improved prospect for biomass accumulation. The Cropped Arable Land Fraction is low (24%), but NDVI is relatively higher than in other parts. Moreover, large parts of the arable land in this region have high VCIx values (0.92 for the region), indicating good crop condition.

Overall for the country, the CropWatch assessment indicates delayed planting of Kharif crops in parts of India. Crop prospects are good in the northeastern region and the western Himalaya region, while they are low in the western coastal region and average in other large parts of the country..

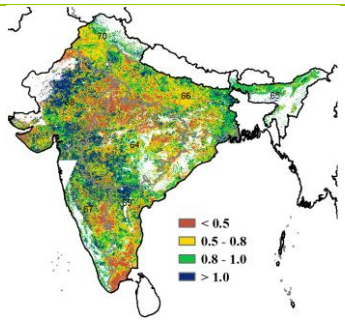
Figure 3.16. India crop condition, April-July 2017



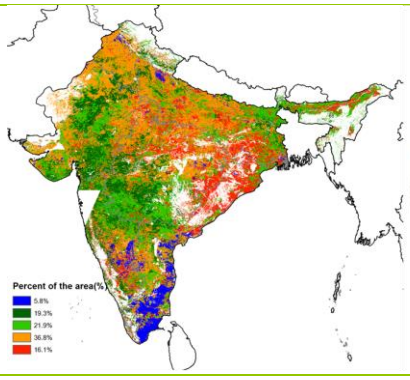
(a). Phenology of major crops



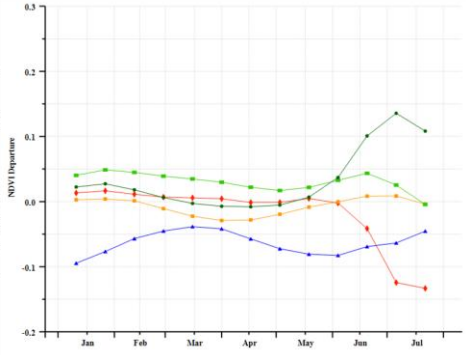
(b) Crop condition development graph based on NDVI



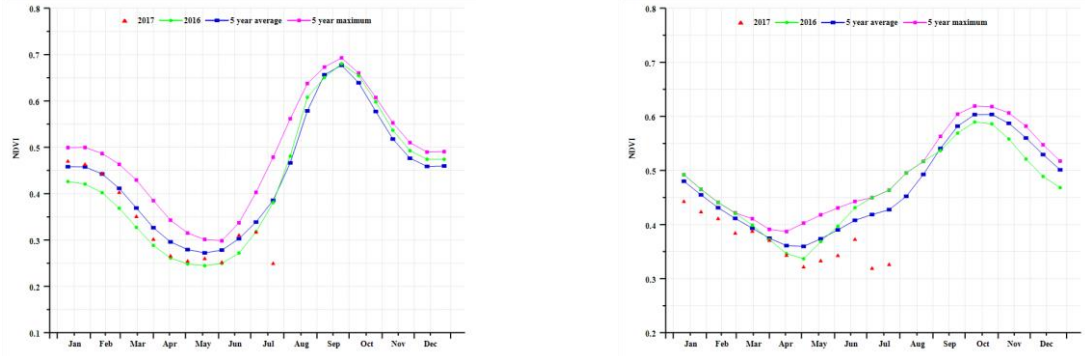
(c) Maximum VCI



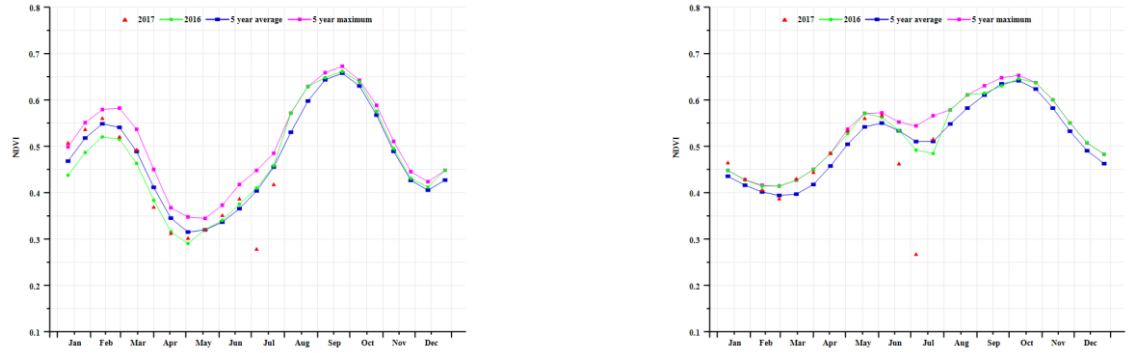
(d) Spatial NDVI patterns compared to 5YA



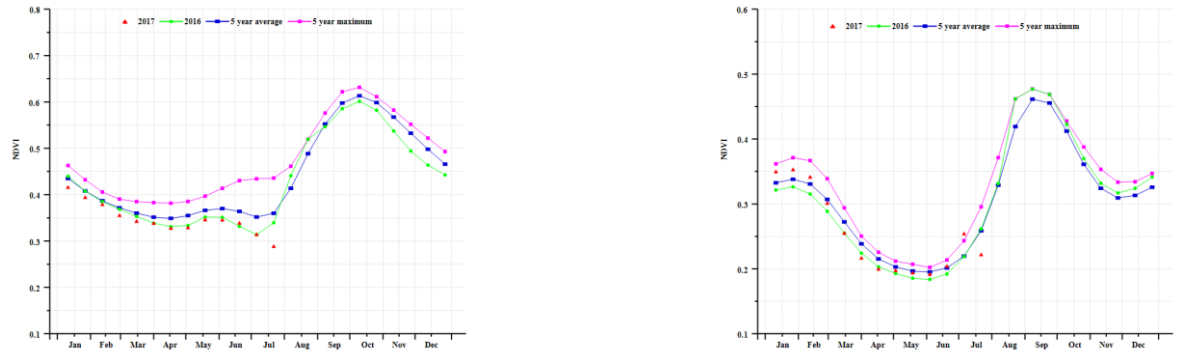
(e) NDVI profiles



(f) Crop condition development graph based on NDVI (Central India (left) and Eastern Coastal Region (right))



(g) Crop condition development graph based on NDVI (Gangatic Plains (left) and North Eastern Region (right))



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

Table 3.35. India agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April - July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Central India	678	13	31.7	-0.2	1227	2
Eastern Coastal Region	584	15	30.5	-0.2	1178	0
Gangatic Plain	750	20	31.2	-0.7	1220	-2
North Eastern Region	2123	32	25.7	-0.5	914	-4
Western Coastal Region	629	-19	27.6	-0.1	1115	2
Western Dry Region	596	71	32.0	-0.8	1287	-4

Table 3.36. India agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2017

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Central India	1211	0	43	-31	0.76
Eastern Coastal Region	1369	7	57	-12	0.76
Gangatic Plain	1395	6	68	-16	0.82
North Eastern Region	2459	6	96	0	0.94
Western Coastal Region	1311	-4	48	-8	0.85
Western Dry Region	1074	44	24	-35	0.92

Table 3.37. CropWatch-estimated maize, rice, wheat, and soybean production for India in 2017 (thousand tons)

Crops	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Maize	18649	12.0%	-16.3%	17492	-6.2%
Rice	156783	0.9%	3.3%	163514	4.3%
Wheat	86099	3.1%	5.3%	93496	8.6%
Soybean	12176	15.9%	-19.7%	11330	-6.9%

[IRN] Iran

Crop condition from April to July 2017 was generally below average in Iran. During the reporting period, winter wheat was harvested in a period from June to July, while the planting of summer crops (potato and rice) had started in April. Accumulated rainfall (RAIN, -34%) was far below average for the period of the year, while the temperature (TEMP, +0.3°C) and radiation (RADPAR, +0.8%) were just above average. The unfavorable agroclimatic conditions resulted in a significant decrease in the BIOMSS index by 28% compared to the five-year average. The national average of the maximum VCI index was 0.7, while the Cropped Arable Land Fraction (CALF) significantly decreased by 15% compared to the five-year average.

From April to July, crop condition was below average in most of Iran's crop areas accounting for 69.1% of total arable land. Areas with above average condition were mainly distributed in Mazadaran and Golestan provinces in the central-north region, as well as in some parts of Luristan province in the central-west and Farsand and Hormozgan provinces in the southwest. The main winter crop areas from Ardabil to Hamadan, and extending south and south-east as far as the Fars province, experienced unfavorable crop conditions during the monitoring period.

Overall, due to the unfavorable weather and crop condition, the yield estimates and cropped area for winter wheat are below 2016 numbers by 10% and 12%, respectively. Winter wheat production is estimated to be even 21% lower than 2016. Crop condition of summer crops was also unfavorable during the monitoring period, and the significant decrease of rice area is an important reason for CropWatch to estimate rice production at a level 13% below last year's harvest.

Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, four sub-national regions can be distinguished for Iran, among which two are relevant for crops cultivation. The two regions are west and north region and south coast region.

West and north region

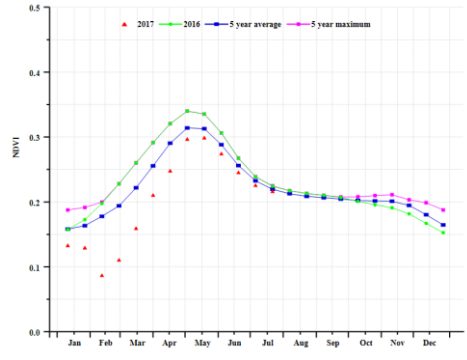
In this region, the accumulated rainfall (RAIN) was 37% below average. Radiation was close to average, while temperature (TEMP, +0.3°C) was above average. The unfavorable agroclimatic conditions resulted in a negative departure of BIOMSS of 33% compared to recent five years average. The Cropped Arable Land Fraction in the area is only 25% (a drop of 17% compared to the five-year average), while the region-wide VCIx was 0.72. According to the NDVI profiles, the crop condition for this region was generally unfavorable. However, the main rice areas in the Mazadaran province and winter crops in Luristan and Golestan provinces experienced favorable crop condition. Overall, the outcome for winter crops in this region is assessed as poor.

South coast region

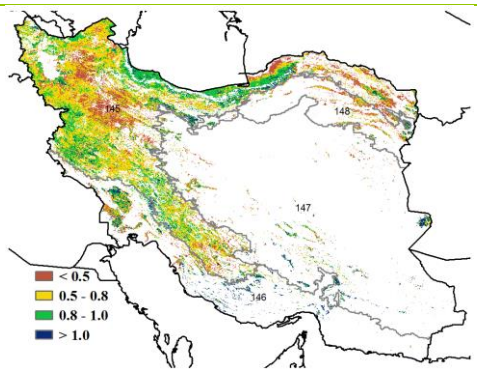
Compared to average, this region received 26% less rainfall, while temperature was up 0.6°C. The agroclimatic indicators also resulted in a decrease of the BIOMSS index for this region by 19%. VCIx was 0.78 for the south coast region's cropped area, with a Cropped Arable Land Fraction of 10%. The cropped area increased by 24% compared to the five-year average for the south coast region. According to the NDVI profiles, the crop condition for this region was close to the five-year average. Overall, the outcome for winter crops is expected to be normal.

Figure 3.17. Iran crop condition, April-July 2017

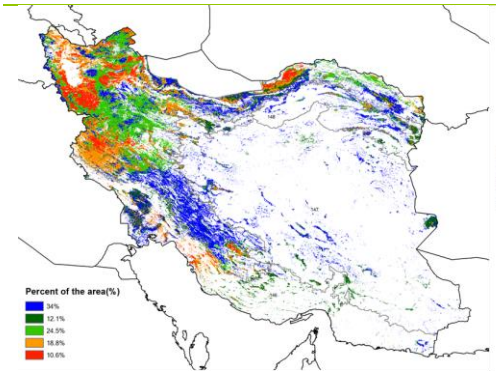
(a) Phenology of major crops



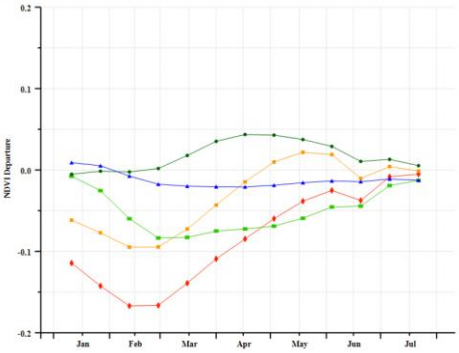
(b) Crop condition development graph based on NDVI



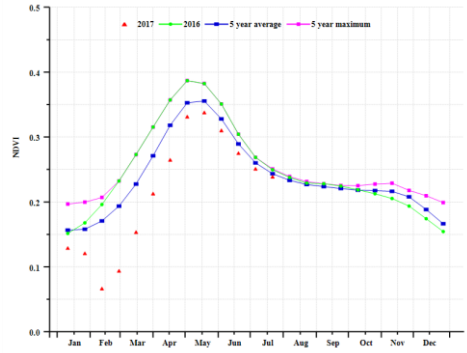
(c) Maximum VCI

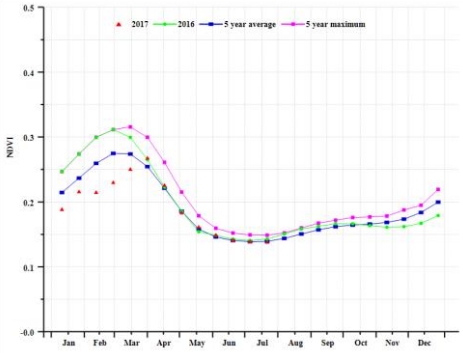


(d) Spatial NDVI patterns compared to 5YA



(e) NDVI profiles





(f) Crop condition development graph based on NDVI (West and north region (left) and South coast region (right))

Table 3.38. Iran agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
West and north region	71	-37	19.7	0.3	1479	1
South coast region	25	-26	30.6	0.6	1546	0

Table 3.39. Iran agronomic indicators by sub-national regions, current season's value and departure from 5YA, April-July 2017

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
West and north region	305	-33	25	-17	0.72
South coast region	113	-19	10	24	0.78

Table 3.40. CropWatch-estimated rice and wheat production for Iran in 2017 (thousands tons)

Crops	Production 2016	Yield change(%)	Area change (%)	Production 2017	Production change (%)
Rice	2763	-1.0	-11.8	2413	-12.7
Wheat	16073	-10.0	-12.0	12735	-20.8

[KAZ] Kazakhstan

In Kazakhstan, spring wheat, barley, and other cereals currently in the field were sowed before June. During the reporting period, crop condition in the country was generally favorable. The national average VCIx was 0.87, and the Cropped Arable Land Fraction increased by 8% compared to the five-year average. Among the CropWatch agroclimatic indicators, RAIN was above average (+12%), while temperature was below average (TEMP, -0.31°C). The combination of these factors resulted in high BIOMSS (+8%) compared to the five-year average. As shown by the NDVI development graph, crop condition was below average from April to late May and above from June to late July. The spatial NDVI pattern and profile show that the crop condition in 75.7% of the cropped areas was below average from April to May. However, NDVI increased significantly from June to late July following favorable rains. The NDVI cluster graphs and profiles was above 70.7% in most parts of the country from June to July. NDVI was below average in most parts of Akmola, the eastern part of north Kazakhstan, and the northern part of Karagandy provinces. It was normal or above in other regions. Currently CropWatch wheat production estimates are 13% below last year's due to a reduced production area of wheat (-6%).

Regional analysis

Northern zone

In this region, crop condition was below the five-year average from April to June. NDVI, however, increased started in June. All the CropWatch agroclimatic indicators were about average (RAIN and RADPAR both +1%; TEMP, -0.4°C; and BIOMSS, -2%). The maximum VCI index (0.86) was above average, and the Cropped Arable Land Fraction significantly increased by 7% compared to the recent five-year average. According to the NDVI profiles, the crop condition was above the five-year average 70.7% in most parts of the country from June to July. Overall, the outcome for the summer crops is favorable in this region.

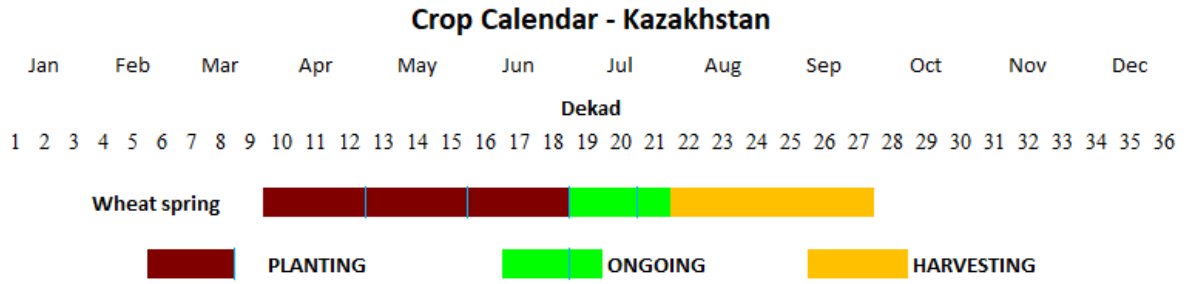
Southeast zone

NDVI for this region was significantly above the five-year average, and crop condition was generally favorable. RAIN was 50% above average, but TEMP and RADPAR were normal (+0.1°C and -1%, respectively). The agroclimatic indicators also resulted in an increase of the BIOMSS index by 29%. The maximum VCI index was 0.96, while the cropped area increased by 14% compared to the five-year average. According to the NDVI profiles, the crop condition was above the five-year average 70.7% in most parts of the country from June to July. Overall crop prospects are favorable.

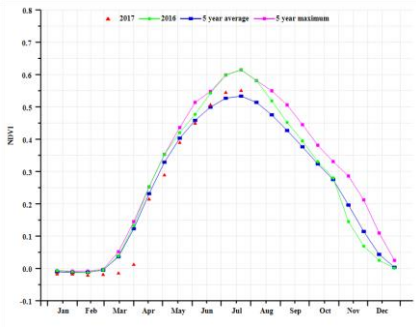
Southwest zone

In this area, NDVI was generally below the five-year average. RAIN was above average (+50%), while TEMP was slightly below (-1°C). The agroclimatic conditions resulted in a BIOMSS increase of 57%. VCIx reached 0.81, and the fraction of cropped arable land (CALF) significantly increased by 8% compared to the five-year average. Overall, the outcome for the winter crops was normal in this region

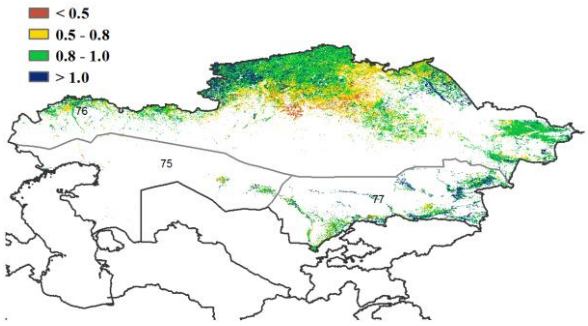
Figure 3.18. Kazakhstan crop condition, April-July 2017



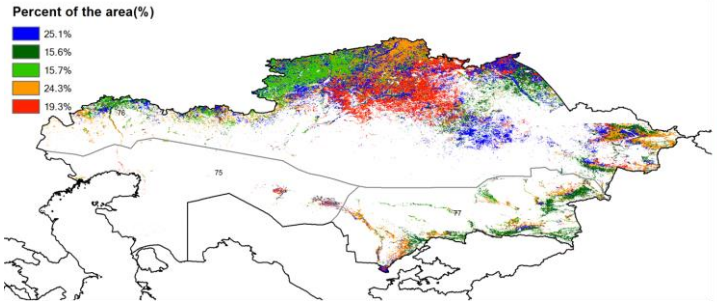
(a). Phenology of major crops



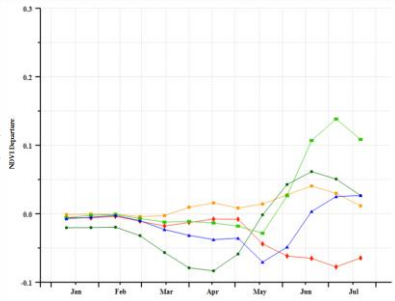
(b) Crop condition development graph based on NDVI



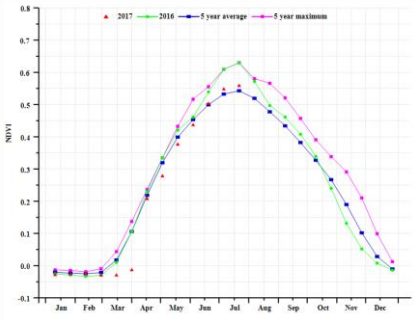
(c) Maximum VCI

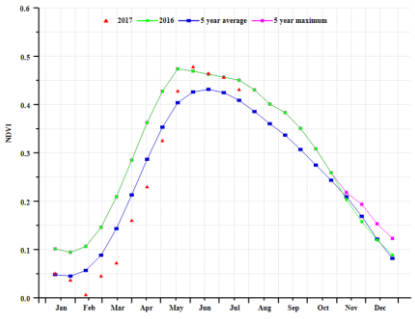


(d) Spatial NDVI patterns compared to 5YA

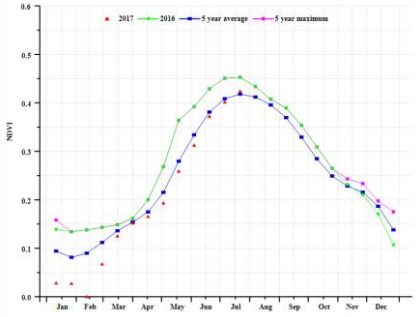


(e) NDVI profiles





(f) Crop condition development graph based on NDVI (Northern region (left) and Southeast region (right))



(g) Crop condition development graph based on NDVI (Southwest region)

Table 3.41. Kazakhstan agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Northern region	175	1	15.0	-0.4	1245	1
Southeast region	290	50	18.9	0.1	1377	-1
Southwest region	123	54	21.1	-1.0	1360	0

Table 3.42. Kazakhstan, agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2017

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Northern region	775	2	91	7	0.86
Southeast region	977	29	89	14	0.96
Southwest region	575	57	54	8	0.81

Table 3.43. CropWatch-estimated wheat production for Kazakhstan in 2017 (thousand tons)

Crops	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Wheat	18199	-8	-6	15837	-13

[KHM] Cambodia

The reporting period covers the harvest of the second (dry season) rice, which was completed before May, and the growing period of maize, which started in May. The planting of the main - wet season - rice started in June. Nationwide, crop condition before July was close to the maximum of the recent five years, but sharply decreased starting in July.

With 908 mm of rainfall, rainfall (RAIN) was up 7% compared to average. Abundant rainfall was accompanied by cool (TEMP, -1.3°C) and cloudy weather (RADPAR, -4%). All the climate indicators combined resulted in an average biomass production potential (BIOMSS, +3%). The Cropped Arable Land Fraction increased 12% in irrigated areas and 6% for rainfed crops. According to the VCIx distribution map, fair crop condition (VCIx>0.5) occurs over most of the country, except for a small area southeast of Tongle Sap, around Peam Chileang and Stung.

Regional analysis

Based on climate differences, two regions can be distinguished in Cambodia. Weather in the Lake area (especially rainfall and temperature) is mainly influenced by Tonle Sap. In the Main crop area, climate conditions are based on the monsoon.

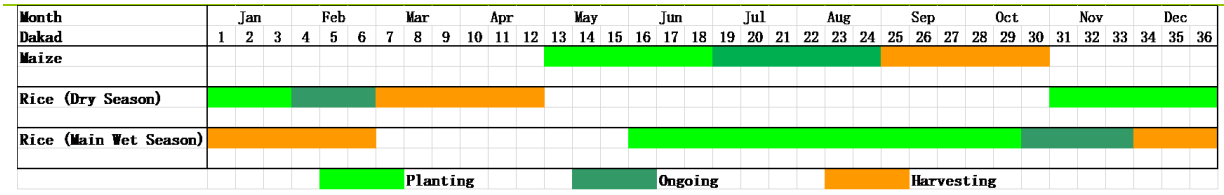
Main crop area and Lake area of Tongle Sap

The drop in average national NDVI in July also affects the two lower-level monitoring areas, namely the Main crop area (RAIN, +14%), bordering Laos and Vietnam, and the Lake area of Tongle Sap (RAIN, -4%), bordering Thailand. The two area share nearly climate conditions except the rainfall, which lead to a different in the biomass(+5.8% in Main Crop Area and -2.6% in Lake Plains).

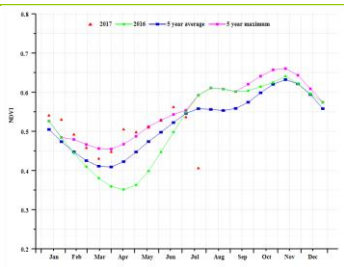
NDVI clusters show a similar pattern, although the drop is less marked. This phenomenon of a very large drop of 0.2 NDVI units is due to unknown causes, possibly flooding (which typically depresses NDVI signals) or cloud contamination of remote sensing signals.

Overall, CropWatch puts the rice production estimate for the country 4.7% above that of last year.

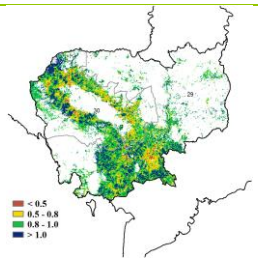
Figure 3.19. Cambodia crop condition, April-July 2017



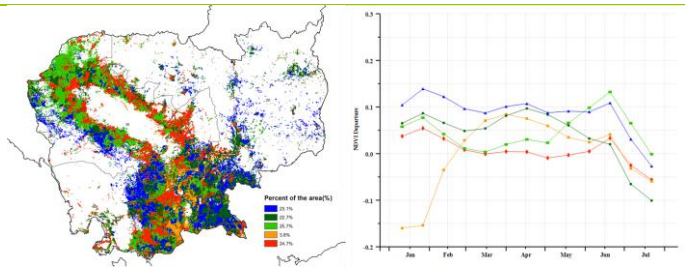
(a). Phenology of major crops



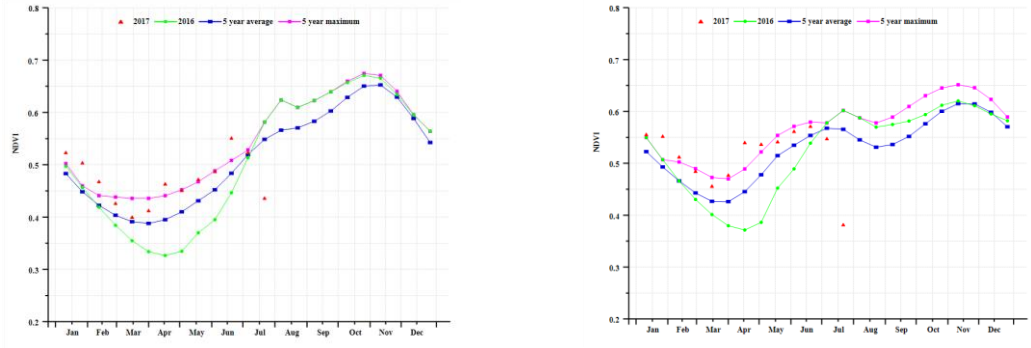
(b) Crop condition development graph based on NDVI



(c) Maximum VCI



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



(f) Crop condition development graph based on NDVI (Lake area of Tongle Sap (left) and Main cropping area (right))

Table 3.44. Cambodia agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Main cropping area	1002.9	14.6	28.5	-1.3	1071.0	-3.7
Lake plains	773.2	-4.2	28.7	-1.5	1093.8	-3.6

Table 3.45. Cambodia, agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2017

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Main cropping area		5.8	0.95	8	0.96
Lake plains		-2.6	0.92	6	0.97

Table 3.46. CropWatch-estimated maize and wheat production for Cambodia in 2017 (thousand tons)

Crops	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Maize	779	0.1%	0.1%	780	0.2%
Rice	8588	3.4%	1.3%	8995	4.7%

[MEX] Mexico

Over the reporting period, winter wheat has been harvested while rice and soybean were still growing. Maize was also in the fields throughout the country except in the northwest. Overall, according to the national NDVI development graph, crop condition in Mexico was below average.

Rainfall (RAIN) exceeded average by 10%, whereas temperature (TEMP) dropped by 0.5°C and radiation (RADPAR) was close to average. At the national scale, the Cropped Arable Land Fraction decreased by 1.0% compared to the five-year average. As shown in the VCIx map, high VCIx values appear in southeastern Mexico, while low values occur in the northern and central parts of the country. About 62.4% of crop lands showed a below-average condition, with those areas mainly located in the west and southeast of the country, as shown by the graph of spatial NDVI patterns and corresponding NDVI profiles. In contrast, the remaining 37.6% of cropped areas had above average condition, with these areas located in the southeast--consistent with the VCIx pattern. Based on the above analysis, the crop production for the current season in Mexico is estimated to be below average.

Regional analysis

According to cropping systems, climatic zones, and topographic conditions, Mexico is divided into five subnational regions, including northwestern mixed wheat and maize area, southern maize zone, central temperate zone, northern mixed cotton and wheat area, and northeastern mixed sorghum and maize area. The following are crop condition analyses for these regions.

Northwestern mixed wheat and maize area

According to the NDVI development graph, crop condition in this region was average from April to the end of May, but below average starting in early June. RAIN and RADPAR were slightly above average (+5% and +2%, respectively), while TEMP was about average (- 0.6°C). BIOMSS was up 5%, while the Cropped Arable Land Fraction decreased by 2.6% compared to the five-year average.

Southern maize zone

Crop condition was consistently below average during the reporting period. Rainfall was above average (RAIN, +18%), with average TEMP (-0.6°C) and relatively low RADPAR (-2%). CALF was average and BIOMSS increased 9%.

Central temperate zone

According to the NDVI development graph, crop condition was below average, together with almost all other indicators: RAIN -9%, TEMP -0.3°C, RADPAR 0%, and BIOMSS -1%. The Cropped Arable Land Fraction was at 94%, 1.4% below its five-year average.

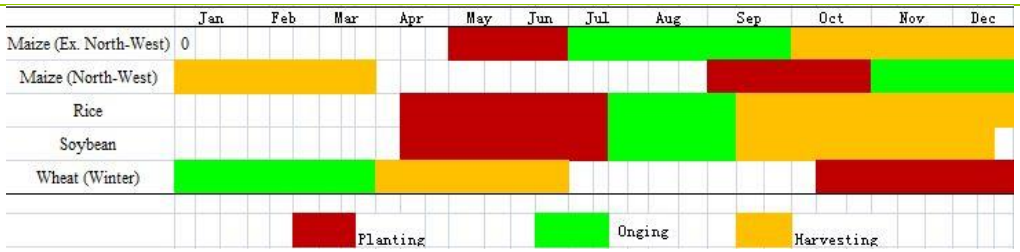
Northern mixed cotton and wheat area

Crop condition in this region was below average, according to the graph of NDVI development. BIOMSS and Cropped Arable Land Fraction fell 6% and 10%, respectively, indicating crop production for this region to be below average.

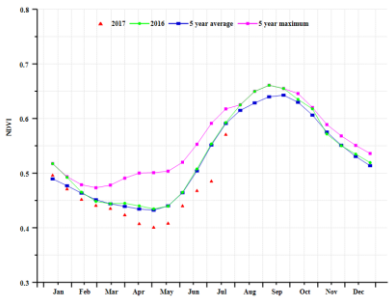
Northeastern mixed sorghum and maize area

Crop condition was below average before June, but average since early July. Rainfall and RADPAR increased by 3% and 1%, respectively. BIOMSS in this region increased 1%

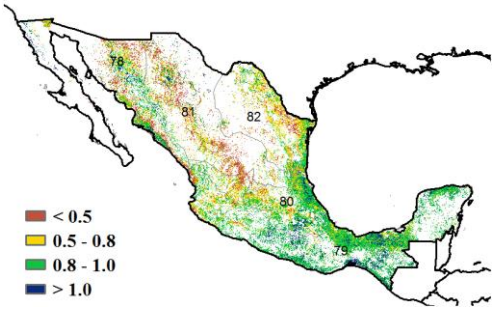
Figure 3.20. Mexico crop condition, April-July 2017



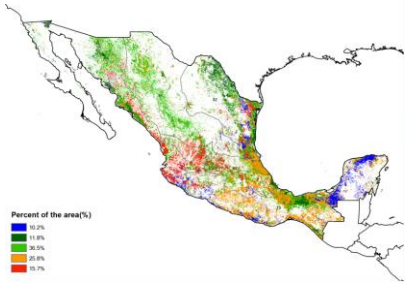
(a). Phenology of major crops



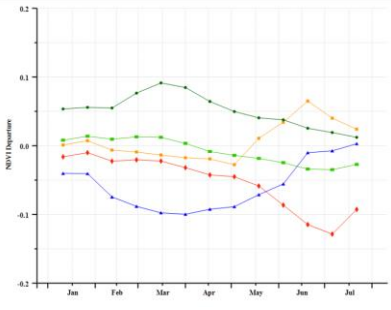
(b) Crop condition development graph based on NDVI



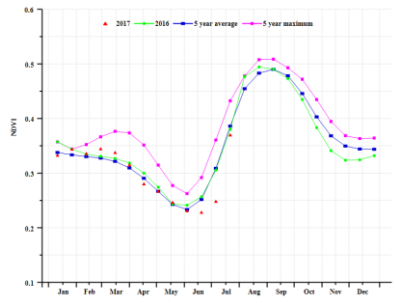
(c) Maximum VCI

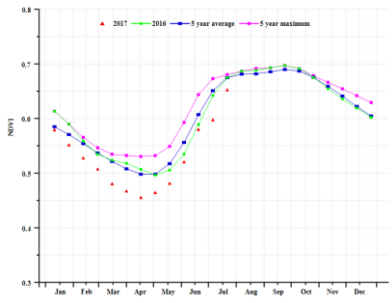


(d) Spatial NDVI patterns compared to 5YA

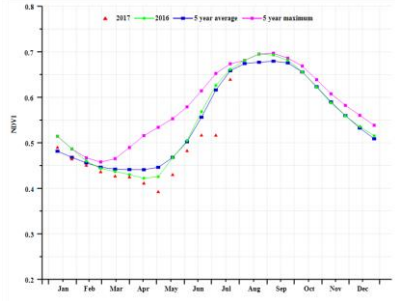


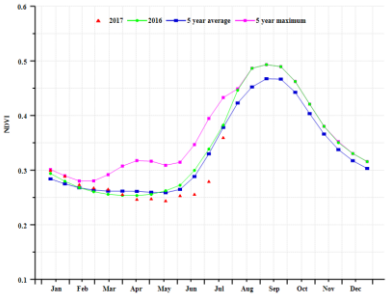
(e) NDVI profiles



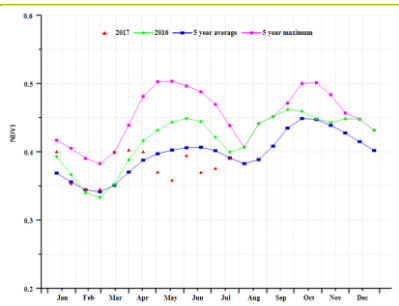


(f) Crop condition development graph based on NDVI (Northwestern mixed wheat and maize area (left) and Southern maize zone (right))





(g) Crop condition development graph based on NDVI (Centre temperate zone (left) and Northern mixed cotton and wheat area (right))



(h) Crop condition development graph based on NDVI (Northeastern mixed sorghum and maize area)

Table 3.47. Mexico agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Northwestern mixed wheat and maize area	209	5	25.4	-0.6	1564	2
Southern maize zone	714	18	25.2	-0.6	1297	-2
Central temperate zone	424	-9	22.4	-0.3	1373	0
Northern mixed cotton and wheat area	230	-5	22.1	-0.3	1546	1
Northeastern mixed sorghum and maize area	303	3	27.3	-0.6	1427	1

Table 3.48. Mexico agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2017

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Northwestern mixed wheat and maize area	496	5	70	-3	0.73
Southern maize zone	1570	9	99	0	0.90
Central temperate zone	1229	-1	94	-1	0.84
Northern mixed cotton and wheat area	715	-6	52	-10	0.68
Northeastern mixed sorghum and maize area	906	1	70	8	0.74

Table 3.49. CropWatch-estimated maize, wheat and soybean production for Mexico in 2017 (thousands tons)

Crops	Production 2016	Yield variation	Area variation	Production 2017	Production variation
Maize	23780	-1.6%	-1.4%	23073	-3.0%
Wheat	3550	-0.7%	-6.9%	3283	-7.5%
Soybean	399	15.9%	9.5%		

[MMR] Myanmar

The reporting period is the main rice season in Myanmar. The harvest of maize in the Hills region and the harvests of wheat and the second rice crop across the country were completed in early April, early May, and mid-June, respectively. The main rice crop started growing in early July. Based on the CropWatch monitoring results, crop condition is considered to have been generally average from April to May, but then decreasing sharply starting in early June. In some regions, crop condition was even worse.

The CropWatch agroclimatic indicators show a slight increase in rainfall (RAIN, +3%), but a decrease in temperature (TEMP, -0.5°C) and radiation (RADPAR, -3%) for Myanmar compared to average. This means close to average conditions, resulting in a near-average BIOMSS index (+1%). The NDVI profiles provide a first assessment of crop condition. For the whole country, the situation until mostly exceeds the five-year average. From early June to mid-July, however, crop condition deteriorated quickly, with a slight improvement in early July.

Regarding spatial variations, the north of Mandalay and east of Magwe remained above average for the whole period. Other regions behaved similarly to the two locations before June but worsened rapidly since early June. The condition reached its minimum in early July; although it recovered a little it is still largely below the average. The spatial distribution of crop condition shows that the central plain experienced better climatic condition than the Hills and Coastal regions, which is consistent with the agroclimatic condition of sub-national regions. The maximum VCI map also displays the high value in central part of central plain and low value in other regions. It is also stressed that Myanmar and several other countries in the region experienced erratic NDVI for unknown reasons; therefore, some uncertainty affects the analyses.

Regional analysis

Based on the cropping system, climatic zones, and topographic conditions, three sub-national regions are included for Myanmar; they are the Hill region, the central plain, and the coastal region.

Hill region

The Hill region is the major maize producing area of the country and also includes some rice. Agroclimatic indicators were close to the national values. According to the NDVI development graphs, crop condition in a period from April to May was good, corresponding with the harvest of maize and the second rice crop.

Central plain area

The Central plain includes most of Mandalay and Magwe, which both show satisfactory values for the CropWatch indicators, as mentioned above. More rainfall (RAIN, +8%) than the other two regions and close to average temperature and radiation resulted in good crop condition; this is confirmed by a high VCIx (0.95) for the area.

Coastal region

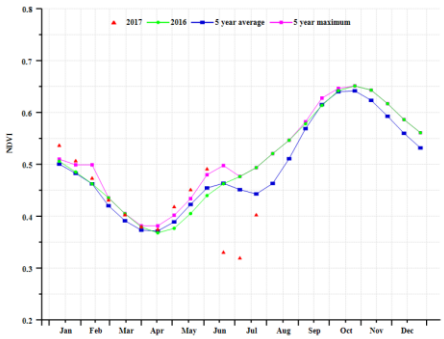
The Coastal region has the worst agroclimatic condition and crop condition among the three sub-national regions. Rainfall and radiation are somewhat below average (RAIN, -4% and RADPAR, -5%), while temperature remained average. The listed values are far from extreme, but nevertheless to a certain extent have affected the second rice crop condition. VCIx for the area is average, at 0.85.

Overall for Myanmar, crop condition is generally average due to the close to average weather conditions

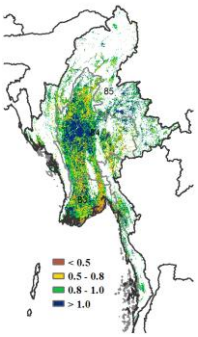
and normal agronomic indicators before June, but the crop condition and production of main rice may have suffered adverse conditions in June. The Cropped Arable Land Fraction (CALF) for the country and the three regions, however, shows a slight increase compared to average, which may contribute to crop production. CropWatch production estimates for 2017 are close to the 2016 values

Figure 3.21. Myanmar crop condition, April-July 2017

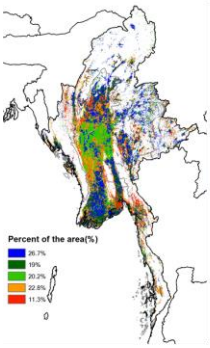
(a). Phenology of major crops



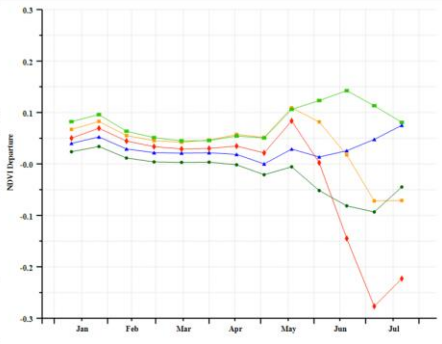
(b) Crop condition development graph based on NDVI



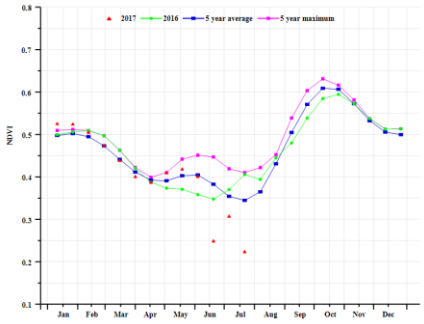
(c) Maximum VCI

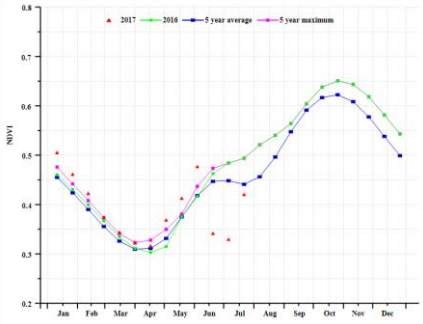


(d) Spatial NDVI patterns compared to 5YA

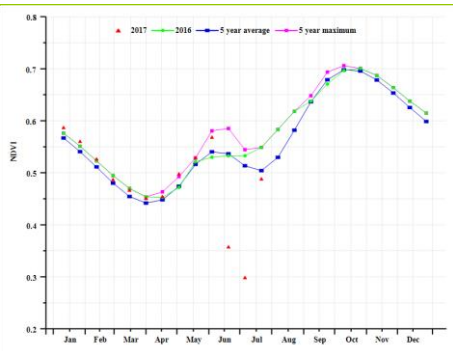


(e) NDVI profiles





(f) Crop condition development graph based on NDVI (Coastal region (left) and Central plain (right))



(g) Crop condition development graph based on NDVI (Hill region)

Table 3.50. Myanmar agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Coastal region	1452	-4	28.8	-0.3	949	-5
Central plain	753	8	28.2	-0.5	1085	-2
Hill region	1120	4	25.3	-0.5	982	-2

Table 3.51. Myanmar agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2017

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Coastal region	2119	0	73	0	0.85
Central plain	1630	-2	84	0	0.95
Hill region	1979	0	95	0	0.93

Table 3.52. CropWatch-estimated maize and rice production for Myanmar in 2017 (thousand tons)

Crops	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Maize	1746	2.3%	-0.8	1772	1.5
Rice	25541	1.8%	-2.6	25328	0.8

[NGA] Nigeria

During the monitoring period, Nigeria overall recorded an increase in rainfall (RAIN, +9%), a correlated drop in temperature (TEMP, -0.9ºC) and radiation (RADPAR, -9%), and an increase in the biomass production potential (BIOMASS, +9%). This period covers the sowing and growing phases of maize in the north of the country (the main rice crop), irrigated rice, rainfed rice, and soybean, as well as the harvest of maize in the southern equatorial areas. Compared with 2016, CropWatch forecasts an increase in maize production (+2.8%) and a decrease for the production of rice (-5.1%).

NDVI levels over the reporting period stayed below the five-year average. Based on the maximum vegetation condition index (VCIx), the northwest showed unfavorable conditions (especially in Borno and Yobe states), while the northeast region (particularly in Zamfara, Sokoto, and Katsina states) and the south showed more favorable conditions.

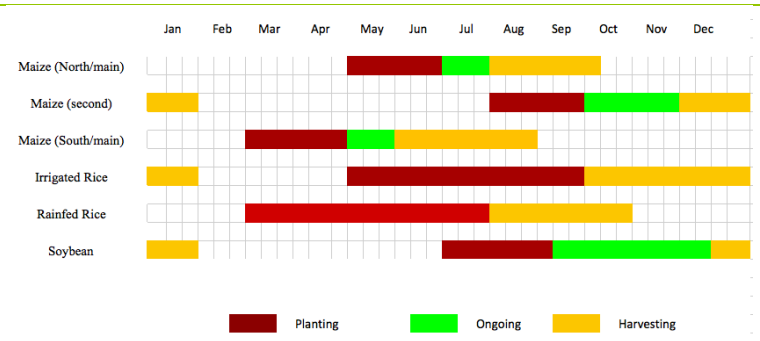
According to the NDVI profiles, 47.9% of the cropped area had better than average conditions, while 14.9% of areas were characterized by an increasing NDVI trend that started in early May and by June led to NDVI levels above average. For 7.0% of the cropped area, crop condition was below average during almost the entire monitoring period.

Regional analysis

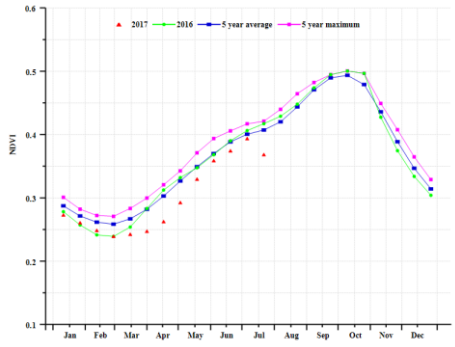
At the sub-national level, the agroclimatic conditions showed that with the exception of the Derived Savana region (which registered a slight decrease in rainfall (RAIN, -1%)), all agro-ecological zones registered an increase, especially the Sudano Sahelian zone (RAIN, +29%). All four zones recorded a decrease in temperature compared to average (-1.0ºC).

The regional crop condition development graphs based on NDVI show that crop condition was unfavorable (below the five-year average) in all agro-ecological zones with the mentioned exception of the Sudano-Sahelian zone. In that zone, crop condition exceeded the five-year average, but the Cropped Arable Land Fraction fell by 9%, which is by far the largest decrease in the country across all areas; Other areas had decreases not exceeding 2.2%.

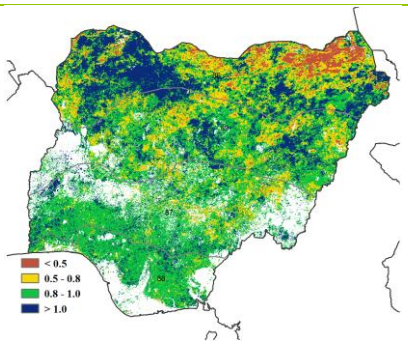
Figure 3.22. Nigeria crop condition, April-July 2017



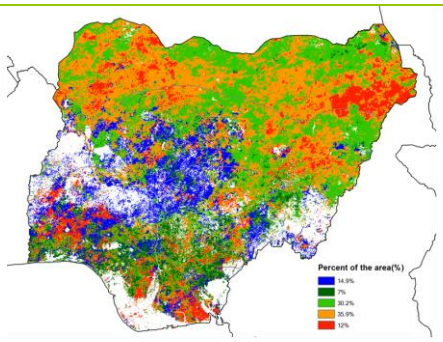
(a) Phenology of major crops



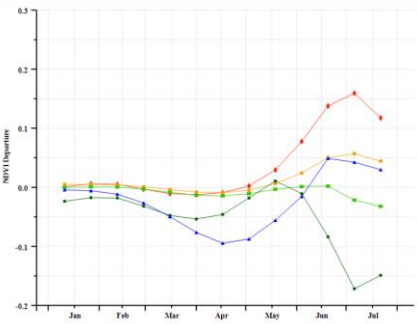
(b) Crop condition development graph based on NDVI



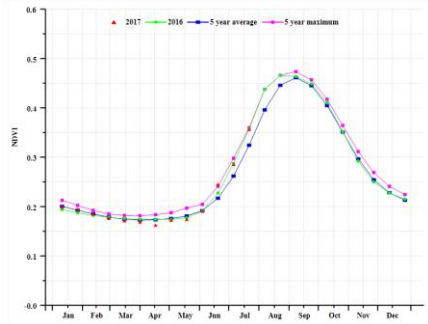
(c) Maximum VCI

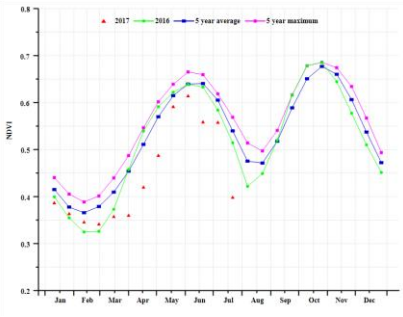


(d) Spatial NDVI patterns compared to 5YA

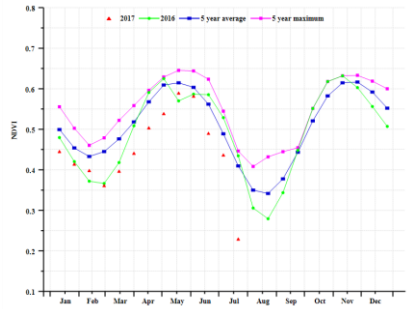


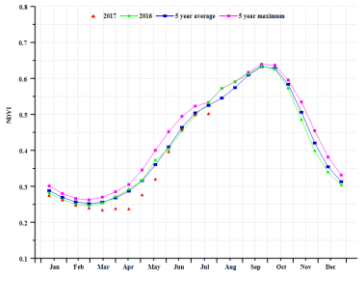
(e) NDVI profiles





(f) Crop condition development graph based on NDVI (Soudano-sahelian region (left) and Derived savanna zone region (right))





(g) Crop condition development graph based on NDVI (Humid forest zone region (left) and Guinean savanna region (right))

Table 3.53. Nigeria agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Sudano Sahelian	453	29	31	-1	1362	-3
Derived Savana	658	-1	28	-1	1076	2
Humid Forest Zone	1176	18	27	-1	885	-4
Guinean Savanna	548	4	28	-1	1235	-1

Table 3.54. Nigeria, agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2017

Region	BIOMASS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Sudano Sahelian	1344	22	0.5	-9	0.9
Derived Savana	1896	3	1.0	-1	0.9
Humid Forest Zone	2393	6	1.0	-0	0.9
Guinean Savanna	1666	5	0.9	-2	0.9

Table 3.55. CropWatch-estimated maize and rice production for Nigeria in 2017 (thousand tons)

Crops	Production 2016	Yield variation (%)	Area variation	Production 2017	Production variation (%)
Maize	10770	3.6%	-0.7%	11069	2.8%
Rice	4588	-4.7%	-0.4%	4353	-5.1%

[PAK] Pakistan

The reporting period corresponds to the planting of summer maize and rice crops in the country, as well as to the harvesting of winter wheat. Rainfall (RAIN) was 44% above average, with the precipitation being very welcome in traditionally low rainfall areas. With near normal temperature and radiation, biomass production (BIOMSS) jumped to a level of 37% above average. NDVI was low initially, but then picked up. Both the Cropped Arable Land Fraction and the VCI are average.

Regional analysis

Based on agroclimatic conditions and topographic variability, Pakistan can be divided into four regions. These are called Balochistan non-agricultural region, Lower Indus river basin, Northern highland, and Northern Punjab. Among these, only the last three have agricultural areas. Crop prospects for these three areas over the reporting period are described below.

Lower Indus river basin

This semi-arid and arid region received very high rainfall (+201% of normal, or 376 mm instead of 125 mm). Meanwhile, temperature was normal and radiation slightly below (-4%). Together, this resulted in a 91% increase in BIOMSS. NDVI values indicate a slow start of the season, but also improvements over time. With a moderate Cropped Arable Land Fraction of 38% and a mix of high and low VCIx clusters, crop condition appears to be normal.

Northern highland

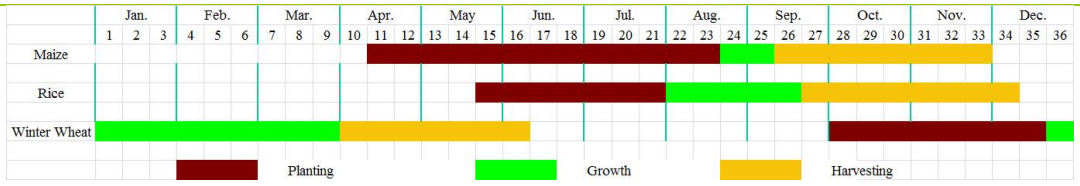
The region received marginally higher rainfall (RAIN, +10%), while temperature and radiation remained normal, thus resulting in a potential for 10% higher biomass accumulation. Low NDVI, a moderate Cropped Arable Land Fraction of 45%, and mostly low VCIx values together indicate moderate crop condition.

Northern Punjab

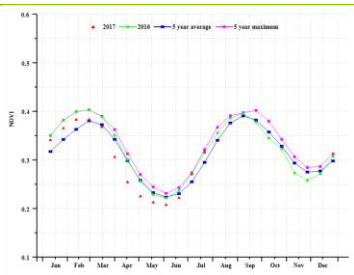
The region recorded higher rainfall than average (RAIN, +21%), with normal temperature and radiation. This is expected to result in a +22% biomass accumulation in the region. NDVI was average, the Cropped Arable Land Fraction 62%, and VCI was touching 0.8, indicating good crop prospects.

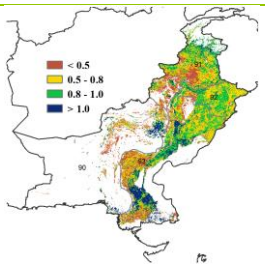
With the above average rainfall and normal temperature and radiation, weather has been conducive for good crops. A marginal initial delay in cropping is improving. Overall, the situation appears to be average for maize and rice crops

Figure 3.23. Pakistan crop condition, April-July 2017



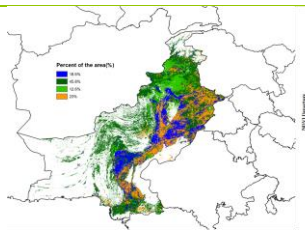
(a). Phenology of major crops

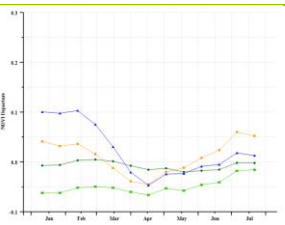




(b) Crop condition development graph based on NDVI

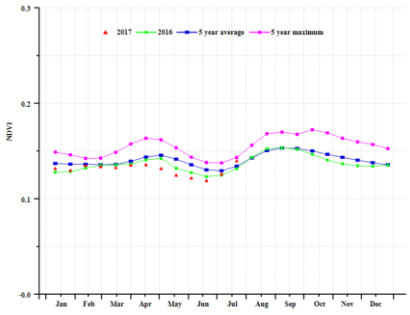
(c) Maximum VCI

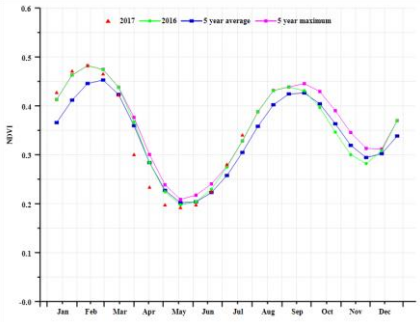




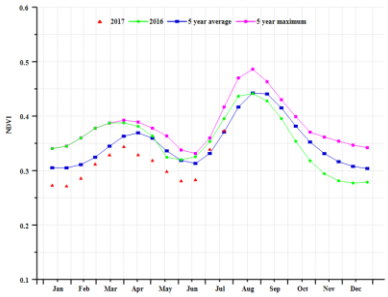
(d) Spatial NDVI patterns compared to 5YA

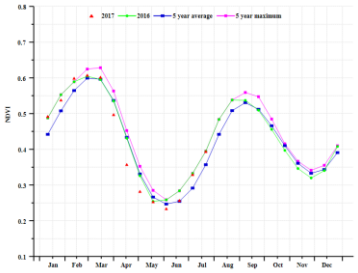
(e) NDVI profiles





(f) Crop condition development graph based on NDVI (Balochistan Non-agricultural Region (left) and Lower Indus River Basin (right))





(g) Crop condition development graph based on NDVI (Northern Highland (left) and Northern Punjab (right))

Table 3.56. Pakistan agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Lower Indus river basin	376	201	33.0	-0.8	1395	-4
Northern highland	343	10	23.7	-0.3	1378	-4
Northern Punjab	348	21	30.6	-1.2	1339	-3

Table 3.57. Pakistan, agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2017

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Lower Indus River Basin	790	91	38	1	0.77
Northern Highland	1070	10	45	-9	0.72
Northern Punjab	1096	22	62	-11	0.79

Table 3.58. CropWatch-estimated maize, rice, and wheat production for Pakistan in 2017 (thousand tons)

Crops	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Maize	4528	-1.8	-7.0	4135	-8.7
Rice	9142	-1.2	-15.0	7676	-16.0
Wheat	24638	-0.5	-1.9	24283	-1.4

[PHL] The Philippines

In the Philippines, the main rice crop is currently growing, while maize has reached maturity and is about to be harvested. Altogether, the outputs for maize and rice in the country are expected to be about average or just above. During the monitoring period, rainfall in the country was above average (RAIN, +15%), while temperature and RADPAR recorded a slight and more significant drop, respectively (TEMP, -0.7ºC and RADPAR, -3%). The increase in rainfall resulted in BIOMSS being 9% above average.

Based on the maximum VCI, favorable crop conditions prevailed, and VCIx mostly exceeded 0.90. VCIx levels by region are as follows: 0.97 in the Hilly agriculture area, 0.96 in the Forest region, and 0.92 in the Lowland agriculture region. The Cropped Arable Land Fraction (CALF) was almost 100%. Considering the spatial patterns of NDVI profiles, 86.3% of the cropped area experienced above average conditions from April to June, after which (in July) conditions suddenly dropped below average. It is not excluded, however, that this drop stems from an unknown artifact.

Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, 3 sub-national regions can be distinguished for Philippines, all are relevant for crops cultivation. These 3 regions are lowland agriculture area, hilly agriculture area and forest area.

Lowland agriculture region

The Lowland agriculture area experienced normal RAIN (+4%), RADPAR (-1%), TEMP (-0.7°C) and BIOMSS (+5%). The Cropped Arable Land Fraction is 100%, and the VCIx was good at 0.92. Altogether, the outputs for maize and rice are expected to be about average or above.

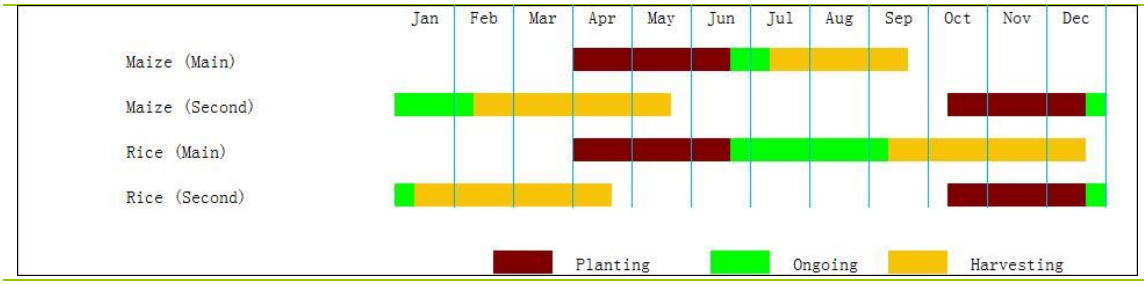
Hilly agriculture region

The Hilly agriculture area recorded above average rainfall (RAIN, +8%), low radiation (RADPAR, -4%), and average temperature (TEMP, -0.4°C), expecting biomass (BIOMSS) to be about 10% up. With a Cropped Arable Land Fraction of 100% and good VCIx (0.97), the outputs of the maize and rice seasons are expected to be at least average.

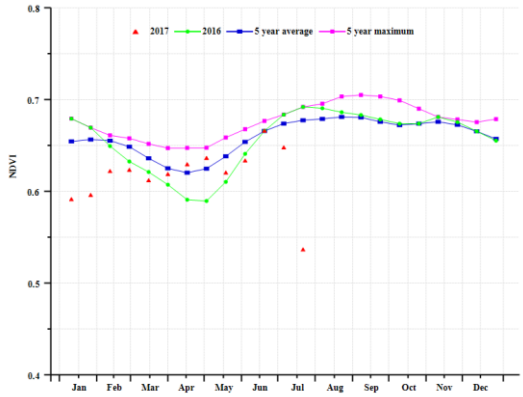
Forest region

The Forest area recorded the highest rainfall departure (RAIN, +29%) with normal temperature and radiation. BIOMSS is 12% above the five-year average. A high Cropped Arable Land Fraction of 100% and good VCIx (0.96) should result in above average maize and main rice seasons.

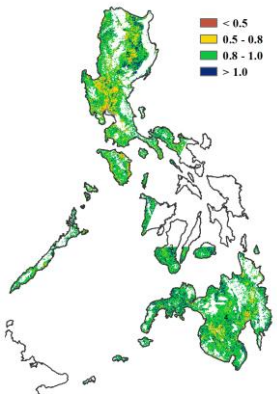
Figure 3.24. Philippines crop condition, April-July 2017



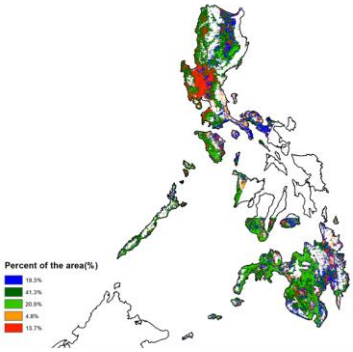
(a). Phenology of major crops



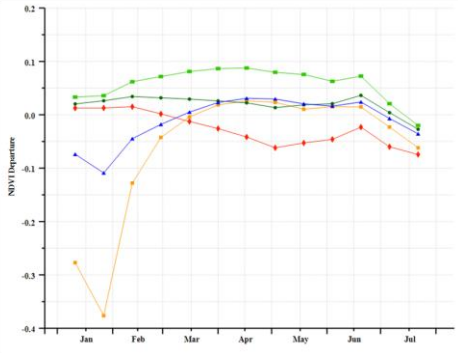
(b) Crop condition development graph based on NDVI



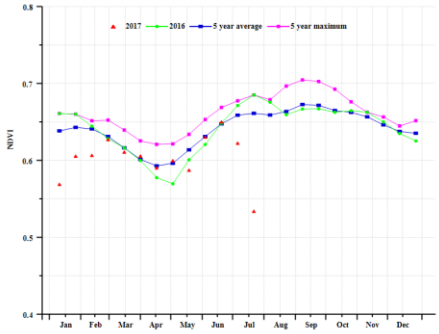
(c) Maximum VCI

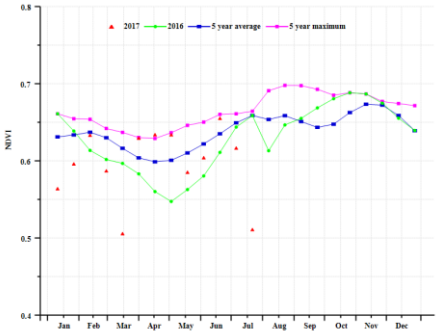


(d) Spatial NDVI patterns compared to 5YA

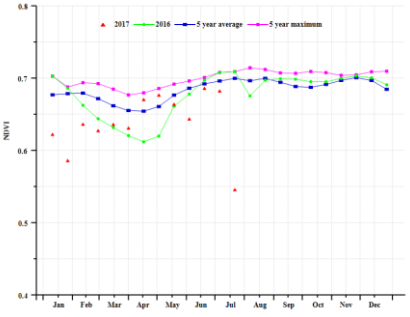


(e) NDVI profiles





(f) Crop condition development graph based on NDVI (Lowland agriculture region (left) and Hilly agriculture region (right))



(f) Crop condition development graph based on NDVI (Forest region (right))

Table 3.59. Philippines agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Lowland agriculture region	1040	4	26.7	-0.7	1156	-1
Hilly agriculture region	846	8	27.1	-0.4	1102	-4
Forest region	1066	29	26.4	-0.7	1069	-4

Table 3.60. Philippines agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2017

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Lowland agriculture region	2002	5	1	0	0.92
Hilly agriculture region	2024	10	1	0	0.97
Forest region	2224	12	1	0.	0.96

Table 3.61. CropWatch-estimated maize and rice production for Philippines in 2017 (thousand tons)

Crops	Production 2016	Yield variation	Area variation	Production 2017	Production variation
Maize	7565	3.9%	0.0%	7854	3.8%
Rice	20106	8.6%	-0.1%	21824	8.5%

[POL] Poland

In Poland, maize planting begins in May, while winter wheat harvesting starts in mid-July. Over the reporting period, the Cropped Arable Land Fraction (CALF) remained the same as the average of the last five years, very close to 100%. During April to July, rainfall (RAIN) was up 21% compared to average. Both temperature and radiation were below average (TEMP, -1.3°C and RADPAR a significant -6%), while the potential biomass (BIOMSS) increased 19% due to the sufficient rainfall.

As shown in the NDVI crop condition development graphs, the NDVI in Poland is below average when compared to the previous 2015-16 season and the last five years, especially from April to June. By July, NDVI was close to or even slightly above average. This behavior is reflected by the VCIx in the different areas, with a VCIx of 0.96 for Poland overall. Overall, the crop condition was above average in Poland as a result of sufficient rainfall in the period.

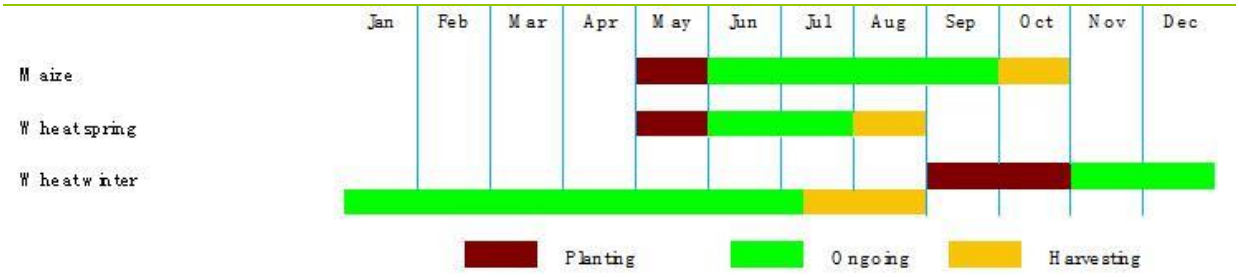
Regional analysis

Based on the Global Agro-Ecological Zones (GAEZ) map, Poland can be divided into three regions, namely a Cold and mesic forest zone, which occupies the northeast of the country, a Cool temperate and dry zone, which is the largest zone for the country, and a Cool temperate and moist zone, which is located in the south and southwest of the country. As shown in the tables, the departure of biomass is consistent with the departure of rainfall from the three zones.

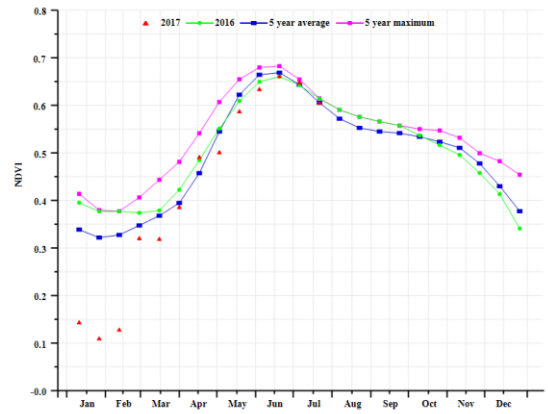
In the largest zone, the Cool temperate and dry zone, agroclimatic indicators show an increase of rainfall over average (RAIN, +24%) and a decline of radiation (RADPAR, -7%). Temperature was below average (TEMP, -1°C), while the biomass production potential is above (BIOMSS, +21%). The Cropped Arable Land Fraction in the zone was also close to 100%.

In conclusion, both crop condition and BIOMSS were above average across the three zones due to sufficient rainfall in the monitoring period, pointing to an estimated yield and production in 2017 that both increase slightly over 2016.

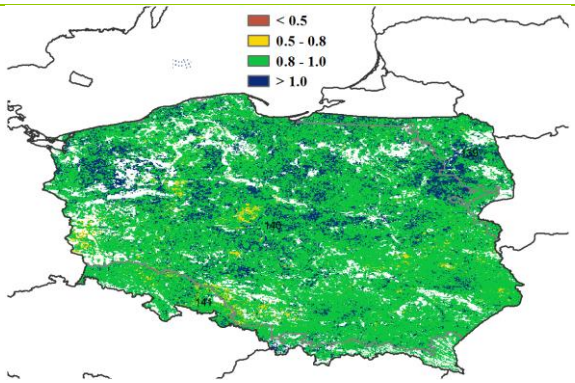
Figure 3.25. Poland crop condition, April-July 2017



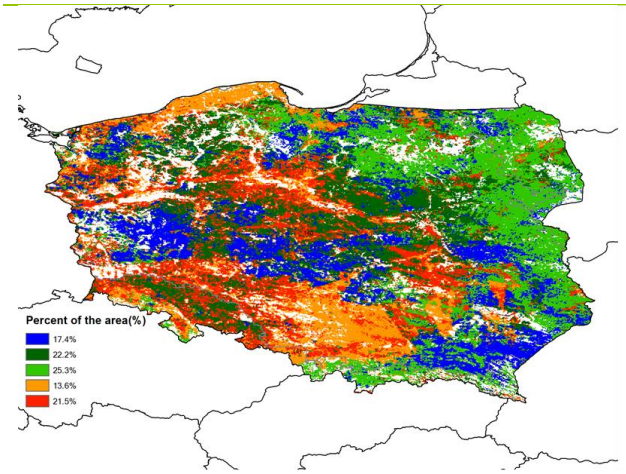
(a). Phenology of major crops



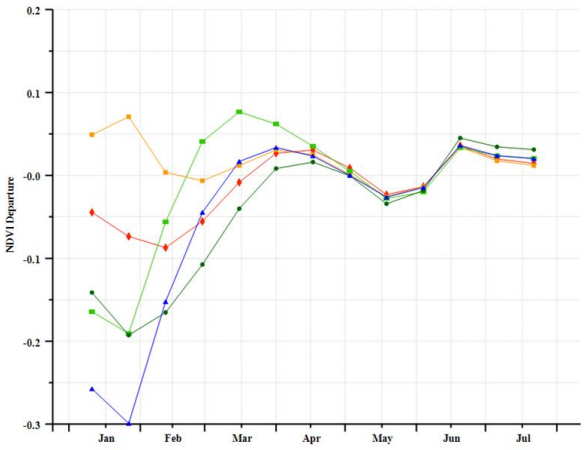
(b) Crop condition development graph based on NDVI



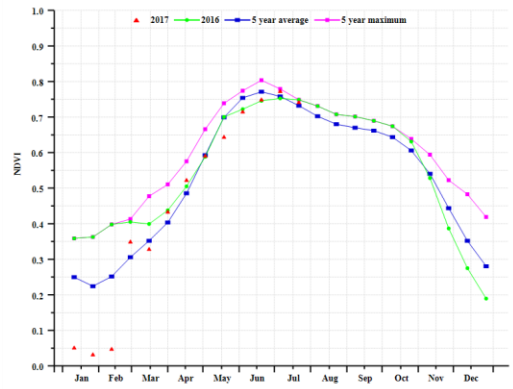
(c) Maximum VCI

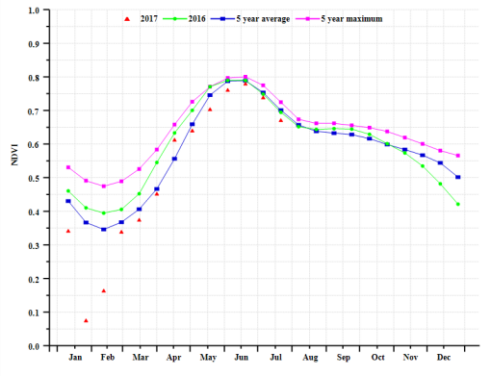


(d) Spatial NDVI patterns compared to 5YA

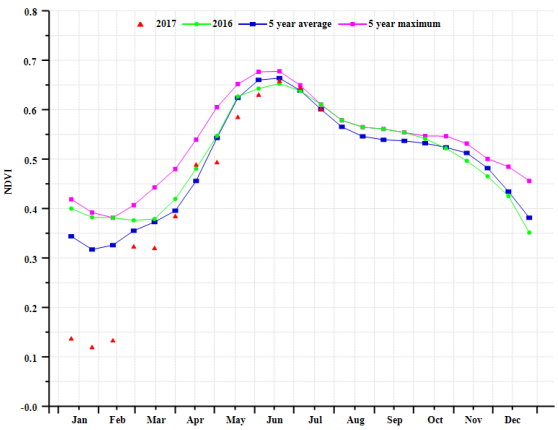


(e) NDVI profiles





(f) Crop condition development graph based on NDVI (Cold and mesic forest zone (left) and Cool temperate and moist zone (right))



(g) Crop condition development graph based on NDVI (Cool temperate and dry zone)

Table 3.62. Poland agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Cold and mesic forest zone	296	11	13	-1	1020	-6
Cool temperate and dry zone	322	24	14	-1	1023	-7
Cool temperate and moist zone	341	6	14	-1	1048	-4

Table 3.63. Poland agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2017

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Cold and mesic forest zone	1247	11	1	0	0.97
Cool temperate and dry zone	1310	21	1	0	0.96
Cool temperate and moist zone	1397	10	1	0	0.95

Table 3.64. CropWatch-estimated wheat production for Poland in 2017 (thousand tons)

Crops	Production 2016	Yield variation	Area variation	Production 2017	Production variation
Wheat	10704	2.10%	0.00%	10931	2.10%

[ROU] Romania

Maize and spring wheat planting in Romania started in April, while winter wheat was harvested in July. During the reporting period, Romania presented favorable crop conditions (VCIx, 0.95). Overall, rainfall was slightly below average (RAIN, -2%). Temperature was also a bit lower than the average (TEMP, -0.8°C), while radiation was just above (RADPAR, +1%).

The national NDVI development graph shows that crop condition rather closely followed the average of the previous five years from April to July, but the whole time remained below 2016 values.

Regional analysis

For Romania, three regions are distinguished, namely a West region, a Middle region, and a Southern and eastern plain region.

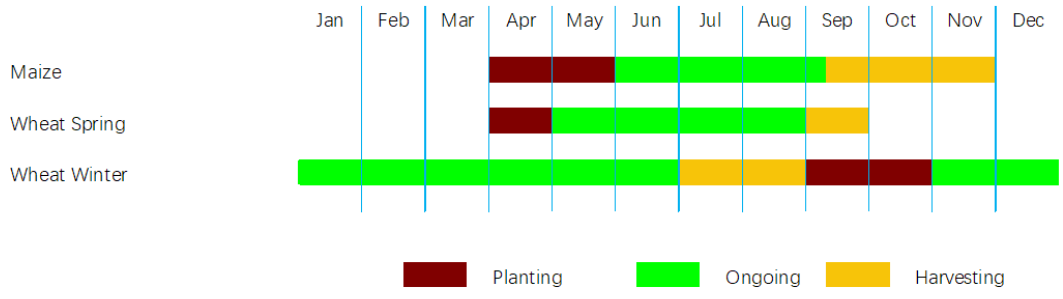
In the West, crop condition was somewhat below average during the monitoring period, while it was average in the Middle region. In the Southern and eastern plain region, crop condition was above average. Crop condition development was generally fair over the whole country.

Agro-climatic indicators also show some variations across the three regions. In the West region, rain was relatively low (RAIN, -9%), which accounts for the decrease of biomass (BIOMSS, -3%). The Middle region has average BIOMSS (+0%) resulting from a a slight drop in RAIN (-4%) combined with a slightly positive radiation departure (RADPAR, +1%). The Southern and eastern plain region has the largest--but still modest--BIOMSS increase (+5%), due to an increase in rainfall (RAIN, +5%) and average radiation (RADPAR, 0%). All regions have experienced a moderate drop in temperature close to -1.0°C.

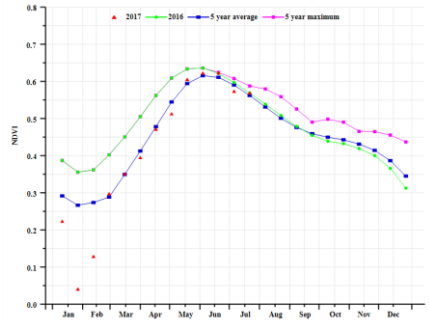
All regions enjoyed a high maximum VCI (VCIx) in excess of 0.8. For the West region, crop condition was not so good near the western border (VCIx ranging from 0.5 to 0.8), while condition in the Middle region is nearly as good as in the Southern and eastern plain region (VCIx close to 1.0). Although this Middle region is not cropped a lot due to the hilly terrain, crop condition was fairly good there too.

Overall, with most parts of Romania having experienced favorable weather and above average crop conditions, prospects for summer crops are favorable.

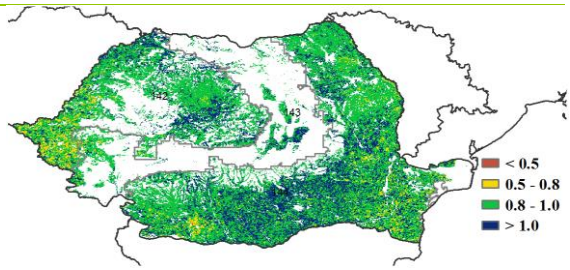
Figure 3.26. Romania crop condition, April-July 2017



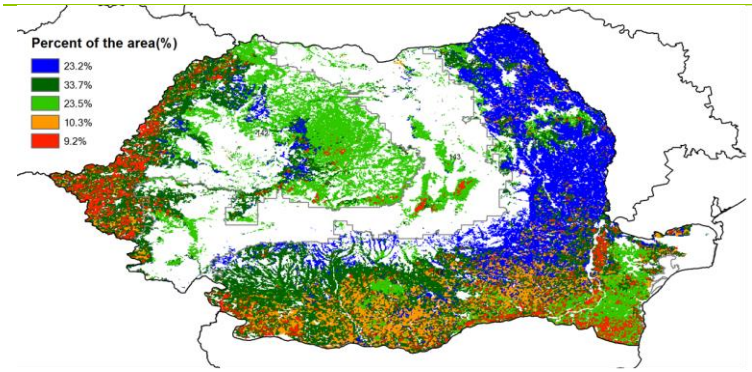
(a). Phenology of major crops



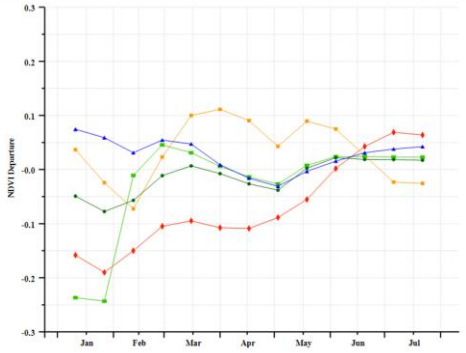
(b) Crop condition development graph based on NDVI



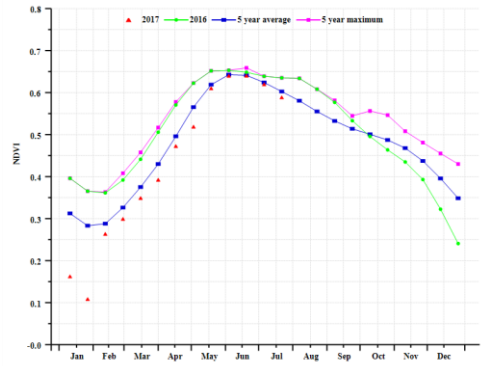
(c) Maximum VCI

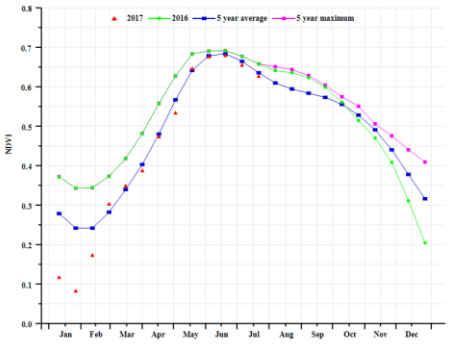


(d) Spatial NDVI patterns compared to 5YA

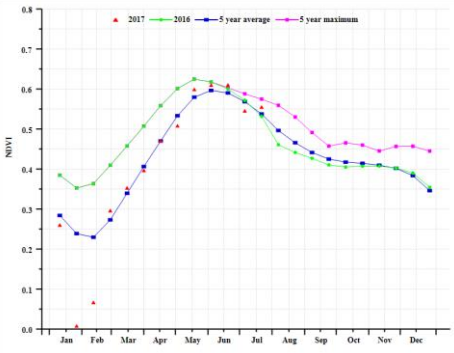


(e) NDVI profiles





(f) Crop condition development graph based on NDVI (West Region (left) and Middle Region (right))



(f) Crop condition development graph based on NDVI (South&East Plain (right))

Table 3.65. Romania agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
West region	312	-9.26	16	-0.66	1222	1.85
Middle region	362	-4.20	13	-0.65	1201	1.12
South & east plain	299	4.62	17	-1.02	1234	-0.19

Table 3.66. Romania agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2017

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
West region	1235	-2.87	1	0	0.94
Middle region	1335	0.40	1	0	0.96
South & east plain	1139	5.02	1	0	0.96

Table 3.67. CropWatch-estimated maize and wheat production for Romania in 2017 (thousand tons)

Crops	Production 2016	Yield variation	Area variation	Production 2017	Production variation
Maize	11491	0.7%	0.0%	11571	0.7%
Wheat	7675	-0.1%	0.0%	7670	-0.1%

[RUS] Russia

Russia experienced very favorable climate conditions from April to July (VCIx=0.96). The winter wheat harvest in the country began in July, while the planting of maize and spring wheat started in April and May. The Cropped Arable Land Fraction was closed to last five-year average (above 100%). In general, Russia experienced cool and wet conditions over the recent four months. Precipitation exceeds the recent average (RAIN, +19%), and the temperature was significantly lower than average (-1.4°C). Mainly due to weather condition, the BIOMSS indicator rose 13% over its five-year average.

As shown in the NDVI crop condition development graph for the country as a whole, NDVI was close to the five-year maximum, and crop condition is generally favorable in most parts of Russia's cropland. Maize and soybean production are expected to increased 4.7% and 4.3%, respectively, over 2016 production, while wheat is estimated to have a production increase of 2.4% compared to last year.

Regional analysis

For Russia, closer monitoring is provided for seven regions, namely the Kalingrad region, Caucasus, Volga region, Central region, Southern Urals, South Siberia, and Northwest region.

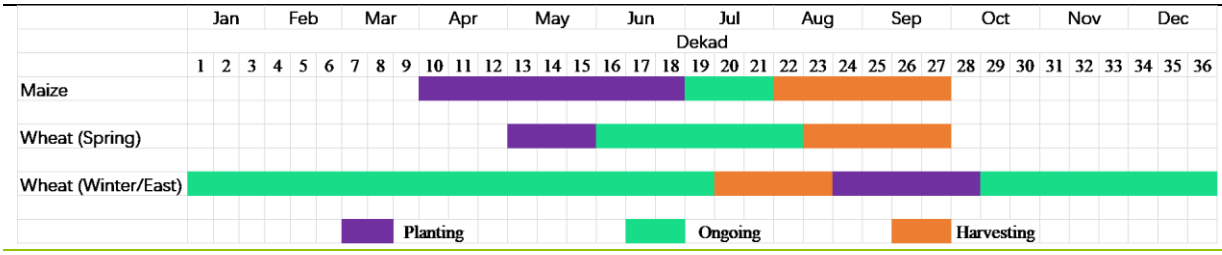
Kalingrad, Volga, and Central and Northwest region

Kaliningrad (labeled 94 the map), Volga (97), Central area (98), and Northwest area (101) all experienced extremely wet and cold weather conditions, with rainfall departures in these areas all exceeding +20%, while the temperature departure was below -1°C. According to the crop condition development graph based on NDVI, crop condition was close to the five-year average in most areas except Volga. The average NDVI in the Volga region was similar to the five-year average from June. The crop condition in these areas is favorable.

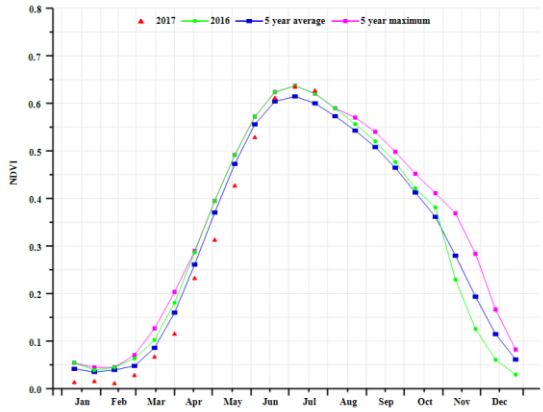
Caucasus, Southern Ural, and South Siberia

Unlike most parts of Russia, the rainfall in the Caucasus (95), Southern Urals (99), and South Siberia (100) was close to average (RAIN departure below +6%). The only area in Russia where temperature was more favorable than average was the South Siberian area, and this was just +0.5°C. Due to the agro-climatic conditions, the VCIx in Caucasus and South Siberia is just above 0.92. Crop condition in these two areas is assessed as average

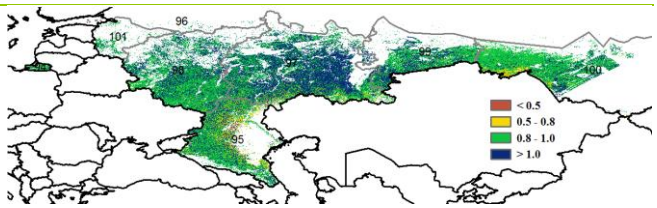
Figure 3.27. Russia crop condition, April-July 2017



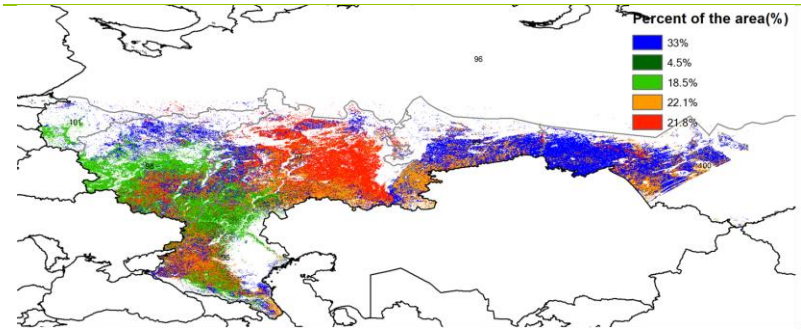
(a). Phenology of major crops



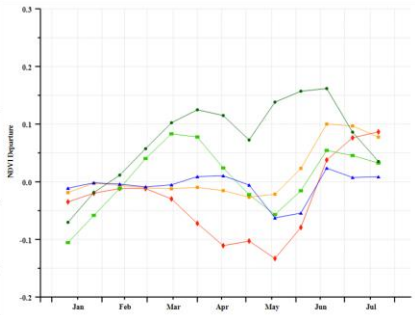
(b) Crop condition development graph based on NDVI



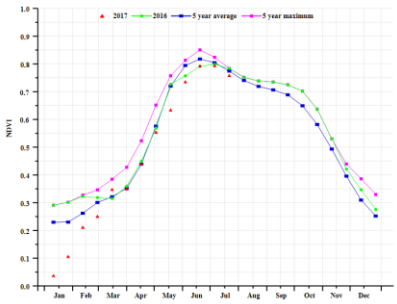
(c) Maximum VCI

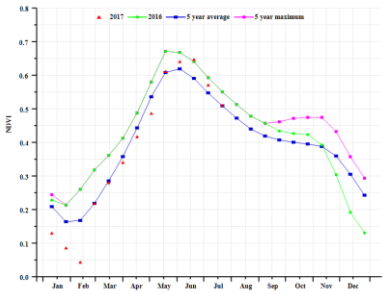


(d) Spatial NDVI patterns compared to 5YA

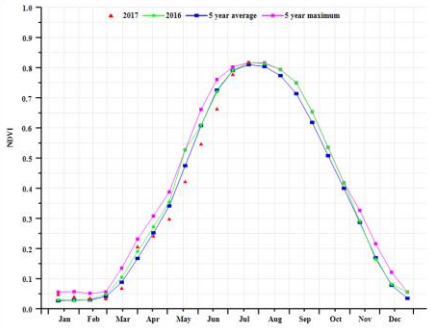


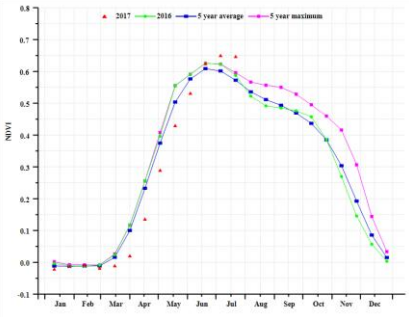
(e) NDVI profiles



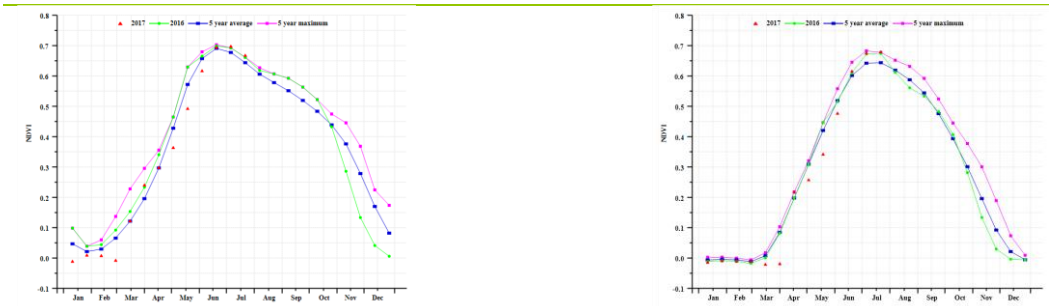


(f) Crop condition development graph based on NDVI (Kalingrad (left) and Caucasian (right))

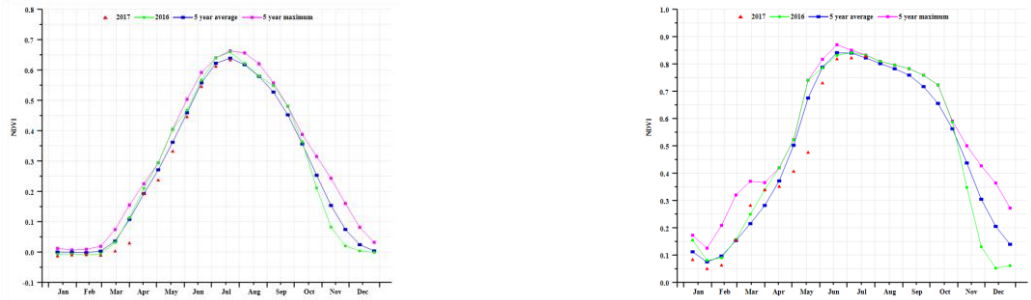




(g) Crop condition development graph based on NDVI (North Subarctic area (left) and Volga (right))



(h) Crop condition development graph based on NDVI (Central area (left) and South Urals area (right))



(i) Crop condition development graph based on NDVI (South Siberian area (left) and Northwest area (right))

Table 3.68. Russia agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Kalingrad	334	31	12.7	-1.6	1054	-5
Caucasus	257	6	17.2	-1.3	1200	-2
Northern Subarctic	345	16	11.8	-1.1	1069	-4
Volga	321	54	12.5	-2.5	1072	-7
Central area	304	24	12.4	-2.6	1022	-8
Southern Urals area	239	2	12.7	-1.0	1099	-3
South Siberian area	229	-4	12.7	0.5	1192	-1
Northwest area	346	30	10.4	-3.1	963	-9

Table 3.69. Russia agronomic indicators by sub-national regions, current season's values and departure from 5YA, April - July 2017

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Kalingrad	1355	25	1	0	0.94
Caucasus	1018	10	1	3	0.92
Northern Subarctic	1276	10	1	0	0.98
Volga	1227	35	1	2	1.01
Central area	1259	20	1	0	0.98
Southern Urals area	1026	3	1	1	0.98
South Siberian area	975	-2	1	1	0.91
Northwest area	1349	21	1	0	0.99

Table 3.70. CropWatch-estimated maize, rice, wheat and soybean production for Russia in 2017 (thousand tons)

Crops	Production 2016	Yield variation	Area variation	Production 2017	Production variation
Maize	12337	4.7%	0.0%	12918	4.7%
Rice	1017	4.7%	0.0%		
Wheat	57506	2.7%	-0.2%	58912	2.4%
Soybean	2099	4.3%	0.0%	2190	4.3%

[THA] Thailand

During this monitoring period, the main rice crop in Thailand is at its sowing stage, while the harvest of the country's second rice crop was completed in June.

According to the agroclimatic indices, radiation (RADPAR, -3%) and temperature (TEMP, -1.1°C) were below average for the country, while accumulated rainfall (RAIN, +16%) was above. At the national level, crop condition was close to average, which is confirmed by a minor increase of BIOMSS by 6%. The NDVI development graph also shows that crop condition was slightly above average for the whole country. At the beginning of the monitoring period, crop condition in most of Thailand was close to average, but the condition in 62.6% of croplands deteriorated at the end of June and start of July, especially in the northeast of the single-cropped rice area. The VCIx map shows that crop condition was not very good in the central part of the Single-cropped rice area, in the Double and triple-cropped rice area, and in the north of the Mountain area.

Regional analysis

For Thailand, regional analysis is provided for four areas: the Double and triple-cropped rice area, Mountain area, Horticulture area, and the Single-cropped rice area.

Double and triple-cropped rice area

The main crops in this area in the center of Thailand (labeled 109 on the VCIx and NDVI profile maps) are double and triple-cropped rice. In this area, rainfall was 30% over average, the largest departure in the country, while temperature (TEMP, -1.0°C) and radiation (RADPAR, -3%) were below average. Crop condition was close to average according to the NDVI development graph, which is confirmed by the increase in BIOMSS by 11%. The VCIx map shows some patches of not so favorable crops in the center of this region, including Phichit and Phitsanulok. Overall, the situation was close to average.

Mountain area

The mountain region (labeled 108 on the maps) covers the west, south, and north of the country. Rainfall (RAIN, +7%) was above average, but temperature (TEMP, -0.9°C) and radiation (RADPAR, -3%) were below, which is similar to the behavior observed nationwide. The NDVI development graph shows fair condition, which is consistent with the BIOMSS indicator (+6%). According to the NDVI profile map and VCIx map, crop condition was good in the south of Thailand. Overall the situation was close to the average.

Horticulture area

Unlike the country as a whole, the accumulated rainfall in this area in the east of Thailand (labeled 107) was average, while temperature (TEMP, -1.2°C) and radiation (RADPAR, -4%) were below average. The VCIx map, NDVI development graph, and BIOMSS indicators (-1%) all lead to the conclusion that crop condition was close to average.

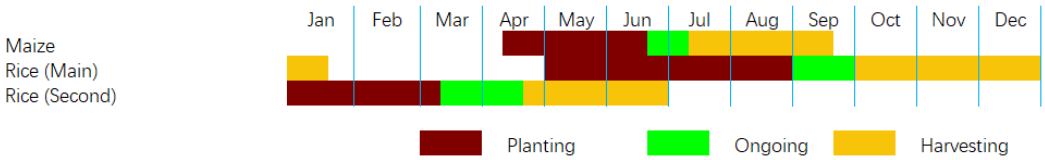
Single-cropped rice area

Single-cropped rice occurs in the northeast of Thailand (area 106 on the NDVI profile and VCIx maps). Comparable to the country as a whole, rainfall was above average (RAIN, +24%), with lower temperature (TEMP, -1.3°C) and radiation (RADPAR, -3%). BIOMSS (+4%) shows close to average values. Based on the VCIx map, crop condition was somewhat unfavorable in the center of this region, including the south of Roi Et, Maha Sarakham, Khon kaen, and the north of Buriram, Surin, and Makhon Ratchasima. Altogether,

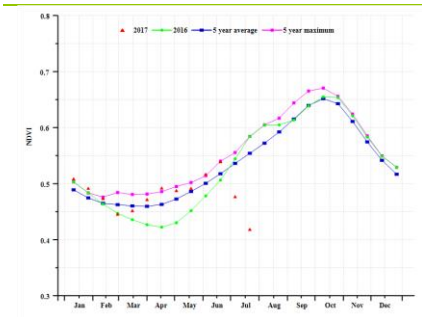
the crop condition in the area is assessed as close to or possibly below average, but overall average.

At the national level, most arable land in the country was cropped during the season and it had favorable VCIx values at 0.9 or above. Production of maize and rice is projected to undergo slight increases.

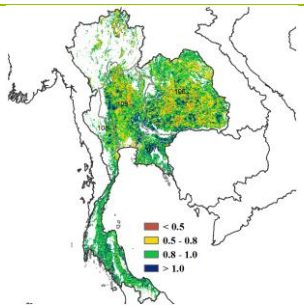
Figure 3.28. Thailand crop condition, April-July 2017



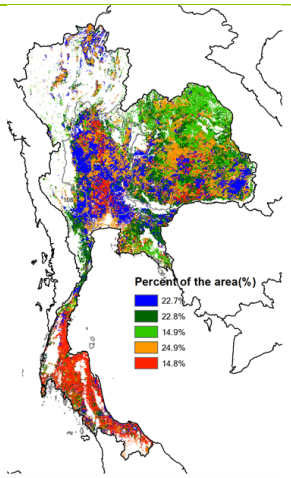
(a). Phenology of major crops



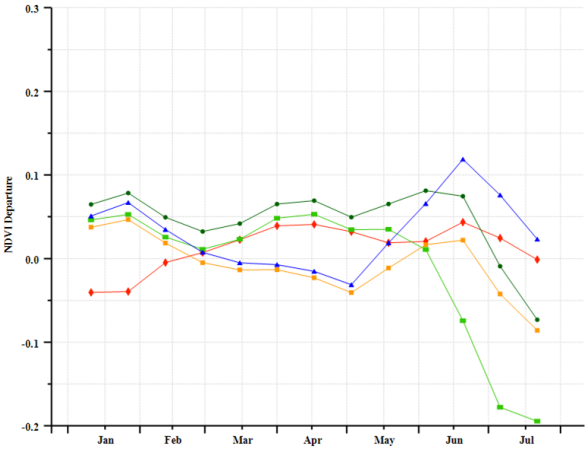
(b) Crop condition development graph based on NDVI



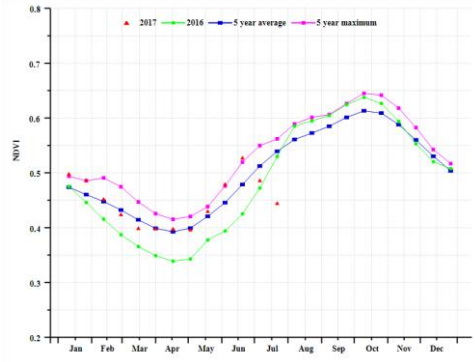
(c) Maximum VCI

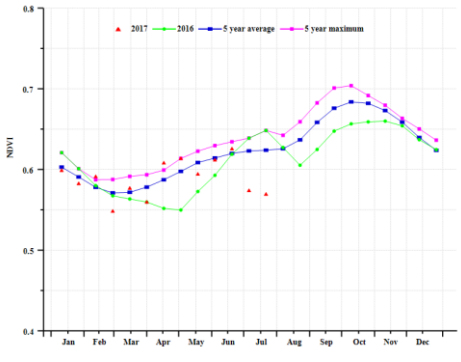


(d) Spatial NDVI patterns compared to 5YA

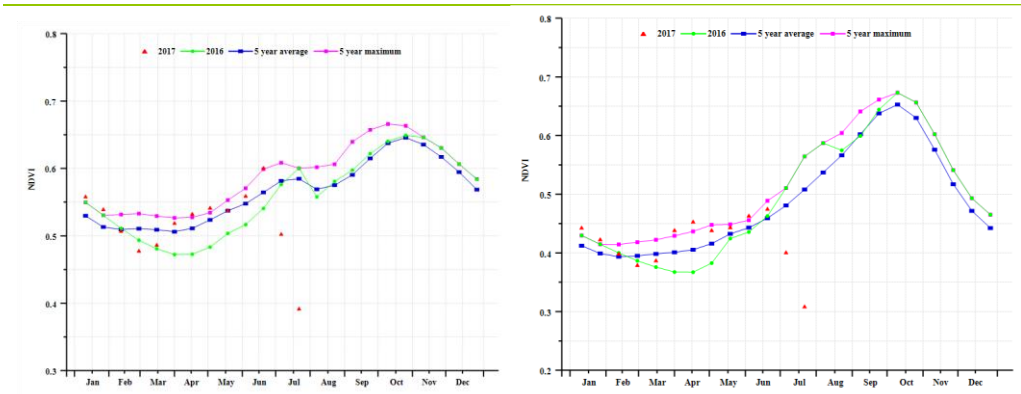


(e) NDVI profiles





(f) Crop condition development graph based on NDVI (Double_triple-cropped rice area (left) and Mountains area (right))



(g) Crop condition development graph based on NDVI (Horticulture area (left) and Single-cropped rice area (right))

Table 3.71. April- July 2017 agroclimatic indicators by sub-national regions, current season values and departure from15YA

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Single-cropped rice area	994	24	28.3	-1.3	1094	-3
Horticulture area	844	0	27.9	-1.2	1038	-4
Mountains area	799	7	27.1	-0.9	1040	-3
Double and triple-cropped rice area	762	30	28.5	-1.0	1081	-3

Table 3.72. April- July 2017 agronomic indicators by sub-national regions, current season values and departure from 5YA

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Double and triple-cropped rice area	1935	11	0.99	1	0.91
Mountains area	2007	6	0.99	1	0.97
Horticulture area	2048	-1	0.99	1	0.97
Single-cropped rice area	2044	4	0.98	1	0.91

Table 3.73. CropWatch estimated maize and rice production for 2017 (thousands tons)

Crops	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Maize	5080	2.7%	0.0%	5219	2.7%
Rice	39661	1.9%	-0.1%	40379	1.8%

[TUR] Turkey

Over the reporting period, the winter wheat harvest in Turkey was completed, while summer crops--planted since April--are still growing. The condition of crops was generally below average from April to May, but close to average from June to July. Accumulated rainfall (RAIN, +2%) was above average, and both TEMP and RADPAR were about average. The agroclimatic conditions resulted in a decrease of BIOMSS by 3.8%. The maximum VCIx (0.8) was fair, while the Cropped Arable Land Fraction was low (72%) and almost identical to the five-year average.

The map of maximum VCIx is mostly consistent with the NDVI cluster map. In Ankara Province, despite a rise in the NDVI curve during the monitoring period, values stayed below the five-year average. In Konya Province, crop condition was favorable from May to July. In nearly the entire East Anatolia region, crop growth was better than average only in June, with crop growth about average in the other three months of the monitoring period.

Overall, the production of winter and summer crops in Turkey is estimated to be average in 2017.

Regional analysis

For Turkey, five regions are used for a more detailed CropWatch analysis.

Black Sea region

Crop condition in this region was close to average from June to July. Compared with average, rainfall and temperature decreased by 4% and 0.3°C, respectively. The Cropped Arable Land Fraction was above average (+1.3%), while VCIx was 0.96.

Northeast Region

Turkey's northeast was highly deficient in rain and also had an increase in temperature over average of about 0.7°C. Radiation (RADPAR, +3%) was also above average. Weather-based projected biomass was 20% below the five-year average, while the Cropped Arable Land Fraction reached 83% and VCIx for the area was high (0.91), together indicating average crop condition.

Southeast region

Crop condition in this region was less favorable in this monitoring period than during the same period in 2016. Rainfall (RAIN, -23%) was below average, while temperature (+1.1°C) and radiation (RADPAR, +1%) were both above. The Cropped Arable Land Fraction dropped 3.2%, while VCIx was just fair (0.81) and BIOMSS was -20%. Below average crops are expected for the region.

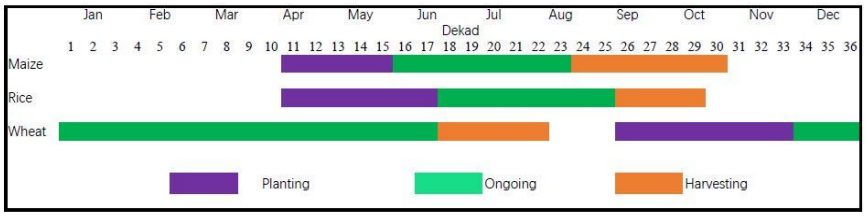
Central Anatolia

Sufficient rainfall, average temperature (TEMP, +0.3°C), and a slight decrease in radiation (RADPAR, -1%) characterized this region over the reporting period. As a result, BIOMSS is up by 3% over the five-year average. The Cropped Arable Land Fraction in the region is low, at 61%. Together with a moderate VCIx (0.81) and above average NDVI from June to July, these indicators suggest a fair yield but low production.

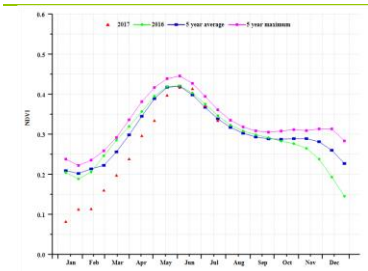
Marmara, Agean and Mediterranean

Rainfall in this region was 18% above average, while temperature (TEMP, -0.2°C) and RADPAR (-1.2%) were comparable to the reference value. Other conditions were similar to those prevailing in Central Anatolia with a drop in the Cropped Arable Land Fraction (-1.3%), fair VCIx (0.8), and NDVI from June to July 2017 generally close to average. Production in this region is estimated to be just fair.

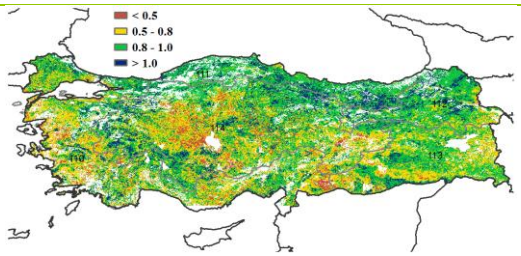
Figure 3.29. Turkey crop condition, April-July 2017



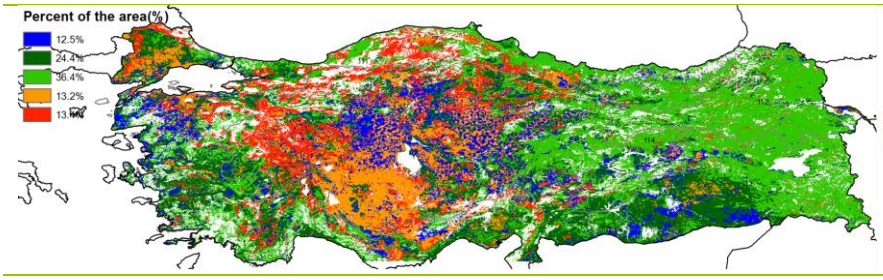
(a). Phenology of major crops



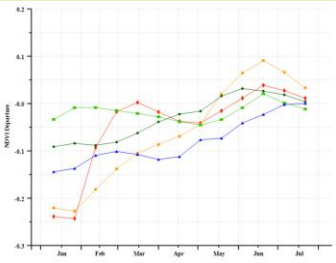
(b) Crop condition development graph based on NDVI



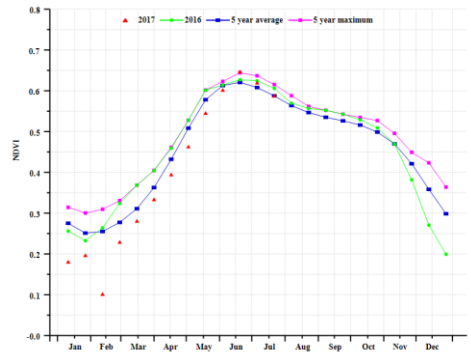
(c) Maximum VCI

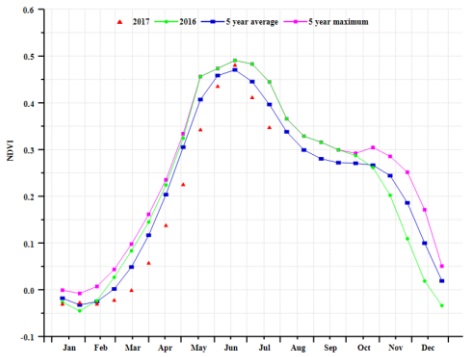


(d) Spatial NDVI patterns compared to 5YA

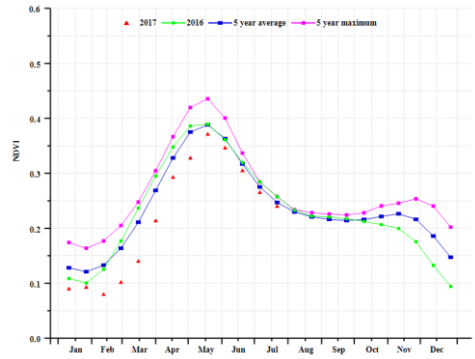


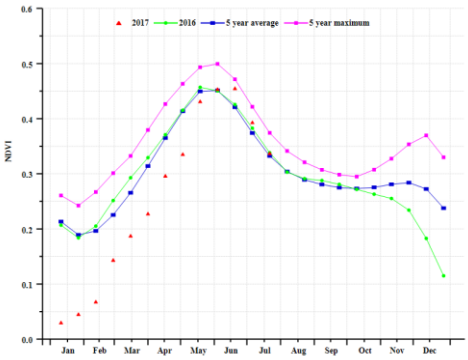
(e) NDVI profiles



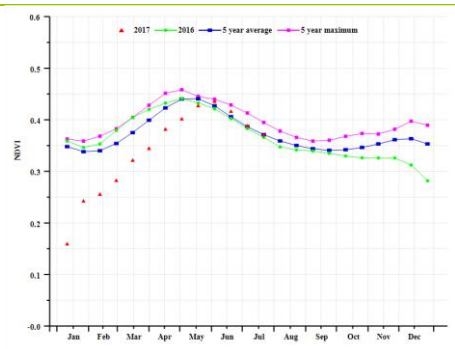


(f) Crop condition development graph based on NDVI (Black Sea region (left) and North East region (right))





(g) Crop condition development graph based on NDVI (South East region (left) and Central Anatolia region (right))



(h) Crop condition development graph based on NDVI (Marmara_Agean_Mediterranean region (right))

Table 3.74.Turkey agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	Rain		TEMP		RADPAR	
	Rain Current (mm)	Rain 15 YA Departure (%)	TEMP Current (℃)	Temp 15YA Departure (°C)	RADPAR Current (MJ/㎡)	RADPAR 15YA departure (%)
Black Sea region	237	-4	14.8	-0.3	1266	-1
Northeast region	228	-22	12.3	0.7	1407	3
Southeast region	141	-23	20.0	1.1	1517	1
Central Anatolia region	208	13	16.3	-0.3	1412	-1
Marmara, Agean and Mediterranean region	177	18	18.9	-0.2	1433	-1.2

Table 3.75. Turkey agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2017

Region	BIOMSS		CALF		Maximum VCI
	BIOMSS Current (gDM/㎡)	BIOMSS 5 YA Departure (%)	CALF(%)	Departure from 5YA (%)	VCI Current
Black Sea region	921	-6	98	1	0.96
Northeast region	888	-20	83	1	0.91
Southeast region	585	-20	70	-3	0.81
Central Anatolia region	782	3	61	3	0.81
Marmara, Agean and Mediterranean region	676	7	78	-1	0.80

Table 3.76. CropWatch-estimated maize and wheat production for Turkey in 2017 (thousand tons)

Crops	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Maize	5920	2.9	0.001	6102	3.1
Wheat	18981	1.2	-0.002	19174	1.0

[UKR] Ukraine

Maize, wheat, and barley are the main crops in the field in Ukraine during this monitoring period. Temperature (-1.2°C) and radiation (RADPAR, +1%) were close to average, but a deficit in rainfall (RAIN, -17%) was observed across the whole country; this deficit was especially severe in the central and northern wheat area. According to the national NDVI profile, crop condition was persistently below the five-year average, while the maximum VCI (VCIx) value was 0.91. As a result of the rainfall deficit, most parts of the country suffered a difficult situation: at the national level, a biomass reduction (BIOMSS, -11%) is expected, and CropWatch is forecasting a decrease in the wheat and maize productions for 2017, with wheat production estimated to be 6% and maize production 1% below 2016 values.

In the central Oblasts (including Kirovohrad, Cherkasy, and Poltava), prolonged dry conditions affected crop development during May and June, according to the spatial distribution of NDVI profiles. Although NDVI recovered to average in late June, crop production in the central wheat area is expected to decrease by 12%.

Altogether, the biomass and the output of summer crops is expected to below the five-year average.

Regional analysis

For Ukraine, separate analysis is provided for the Central wheat area, the Northern wheat area, the Mountain region, and the Southern wheat and maize area.

Central wheat area

The Central wheat area was highly deficient in rainfall (RAIN, -21%) and had low temperature (TEMP, -1.2°C), but radiation (RADPAR) was normal. Weather data projects the BIOMSS to be 14% below the reference five-year average, which is supported by the NDVI development graph. However, with a Cropped Arable Land Fraction at 100% and high VCIx (0.88), the overall situation remains fair.

Northern wheat area

Rainfall was deficient as well in the Northern wheat area; here, all the departures of the agroclimatic indices were negative: RAIN, -19%; TEMP, -1.1°C; and RADPAR, -1%, leading to a BIOMSS drop of 12%. Initial area-wide NDVI was low, but it gradually recovered to the five-yer average starting in mid-July. Combined with a good Cropped Arable Land Fraction (100%) and VCI (0.94), the indicators show average crop condition and production expectations.

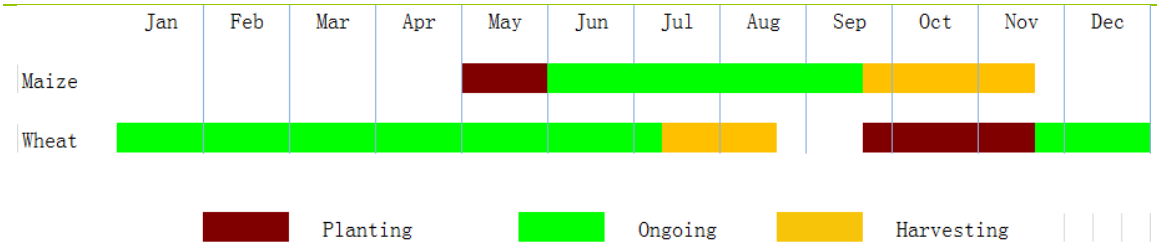
Mountain region

The Mountain region in Ukraine received 12% less precipitation than normal; temperature (TEMP) was 1.0°C below average, while radiation was slightly above (RADPAR, +1%). With a BIOMSS variation just 5% below the five-year average, close to average NDVI throughout the season, fully cropped land (Cropped Arable Land Fraction at 100%) and high VCIx (0.97), the output is expected to be lower than during 2016 but nevertheless close to average.

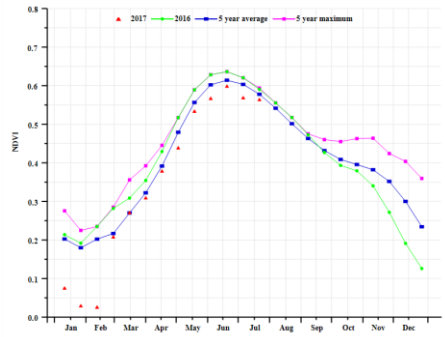
Southern wheat and maize area

Finally, the Southern wheat and maize area had a mild drought (RAIN, -13%), cool weather (TEMP, -1.3°C), and average sunshine. The resulting BIOMSS reduction (-13%), average NDVI until July (when the values dropped about 0.1 NDVI units), a Cropped Arable Land Fraction of 99%, and VCIx at 0.89 together indicate fair output expectations, even if conditions were less favorable than in the mountain region.

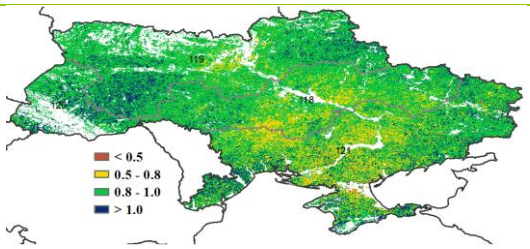
Figure 3.30. Ukraine crop condition, April-July 2017



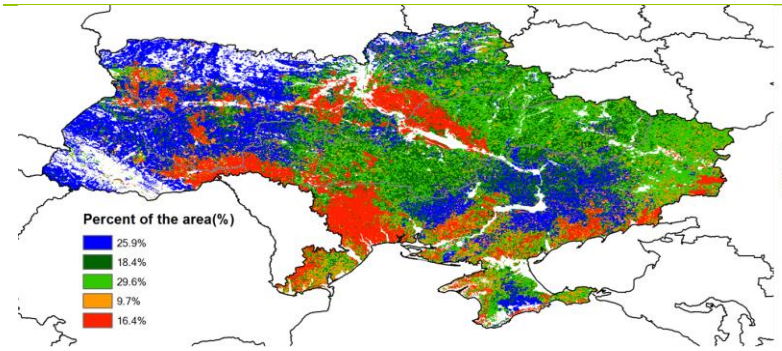
(a). Phenology of major crops



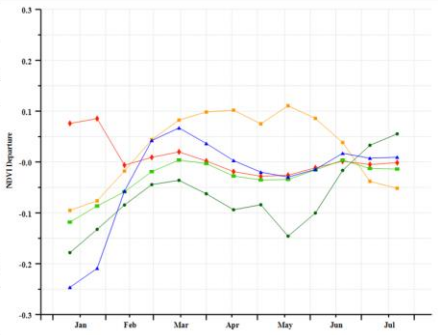
(b) Crop condition development graph based on NDVI



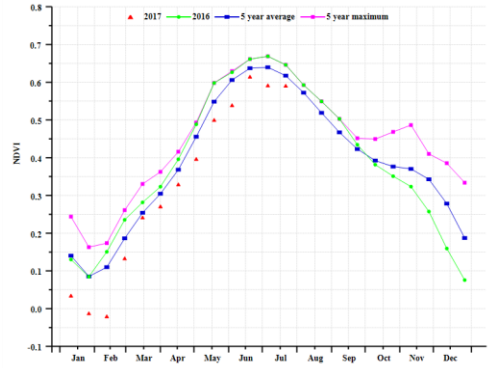
(c) Maximum VCI

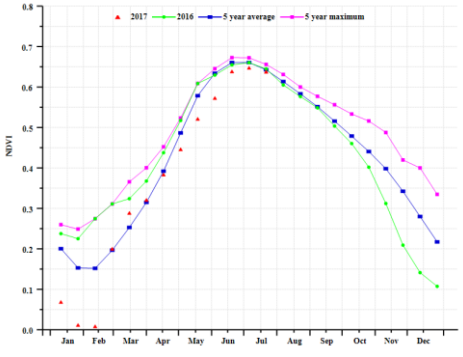


(d) Spatial NDVI patterns compared to 5YA

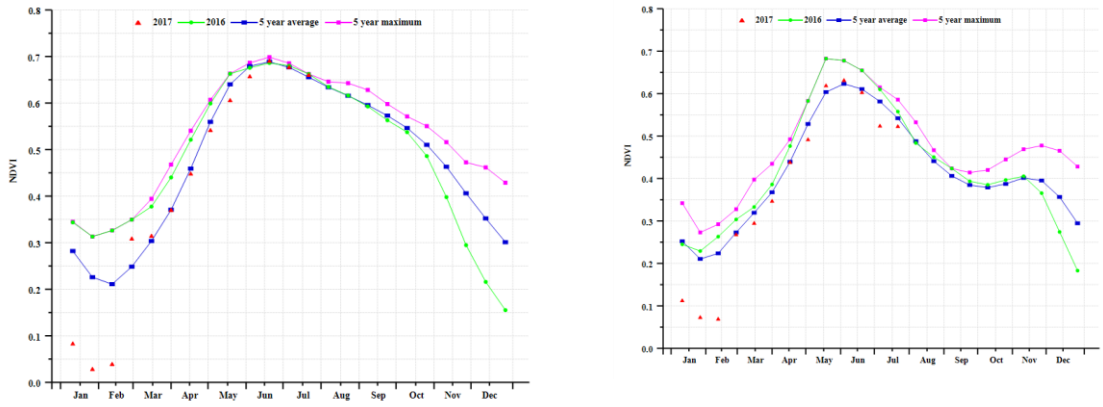


(e) NDVI profiles





(f) Crop condition development graph based on NDVI (Cebntral wheat area (left) and Northern wheat area (right))



(f) Crop condition development graph based on NDVI (Mountains regions (left) and Southern wheat and maize area (right))

Table 3.77. Ukraine agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

	RAIN		TEMP		RADPAR	
Region	**Current (mm)**	**Departure from 15YA (%)**	**Current (°C)**	**Departure from 15YA (°C)**	**Current (MJ/m2)**	**Departure from 15YA (%)**
Central wheat area	179	-21	16	-1	1182	0
Northern wheat area	211	-19	15	-1	1118	-2
Mountains regions	332	-12	14	-1	1124	1
Southern wheat and maize area	180	-13	17	-1	1224	0

Table 3.78. Ukraine agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2017

	BIOMSS		CALF		Maximum VCI
Region	**Current (gDM/m2)**	**Departure from 5YA (%)**	**Current (%)**	**Departure from 5YA (%)**	**Current**
Central wheat area	831	-14	100	0	0.88
Northern wheat area	965	-12	100	0	0.94
Mountains regions	1332	-5	100	0	0.97
Southern wheat and maize area	765	-11	99	1	0.89

Table 3.79. CropWatch-estimated maize, wheat and soybean production for Ukraine in 2017 (thousand tons)

Crop	Production 2016	Yield variation	Area variation	Production 2017	Production variation
Maize	30774	-0.7	0.0	30561	-0.7
Wheat	24059	-5.7	-0.1	22662	-5.8
Soybean	3799			3799	

[USA] United States

This reporting period covered the harvesting season of winter crops and the core of the growing season of summer crops, including maize, rice, soybean, and spring wheat. In general, the nationwide NDVI development graph indicates crop condition in the country is below the average of the previous five years.

Rainy weather was recorded over the United States as a whole, with 21% above average precipitation (RAIN) accompanied by a 3% drop in sunshine (RADPAR). Meanwhile, temperature was about average (TEMP, -0.3°C). In the Northern plains, however, some major wheat production zones experienced a shortage of rainfall, including in Montana (RAIN, -10%), North Dakota (-21%), and Oregon (-25%), which slowed the development of spring wheat and other crops. The largest rainfall excesses were recorded in the main winter wheat zones, where they delayed harvest in Kansas (RAIN, +48%), Oklahoma (+51%), and California (+38%). The major maize and soybean production zones recorded average temperature and abundant rainfall (Illinois, +29%; Iowa, +23%; Missouri, +65%; and Wisconsin, +55%), which provided ample soil moisture for crop growth. In the most important rice production zones, a 47% increase in precipitation was recorded for Arkansas, which benefited the growth of paddy.

Different NDVI development patterns occurred across the country, with in the United States this indicator typically peaking in July. In the Northern plain, the main spring wheat zone, after the peak NDVI values fell below the five-year average as a result of drought, especially in North Dakota. In the Southern plain and northwest region, the main winter wheat zone (including Washington state, Oklahoma and North Texas), NDVI stayed below average throughout the reporting period; in particular in April, NDVI was far below average due to flooding caused by heavy rain, especially in Oklahoma and northern Texas. In the corn belt, the main maize and soybean production zones, from April on forward NDVI gradually dropped from high values to average. Finally, in the lower Mississippi, the main rice production zones, above average crop condition was recorded for this monitoring period, in particular for Arkansas.

The Cropped Arable Land Fraction in the United States overall was 1.2% over the five-year average. Nonetheless, CropWatch projects the productions of wheat, maize, and soybeans to drop below 2016 values by 4.6%, 3.6%, and 0.6%, respectively. For rice, a production increase of 3.4% is expected.

Regional analysis

In the United States, 12 regions can be distinguished. They are: Alaska and Hawaii, Blue Grass region, Corn Belt, Middle Atlantic, Northeast, Northern plains, Northwest, Southern Plains, Southeast, Southwest, Lower Mississippi, and California. For the seven major grain and oil production zones among them, a more detailed CropWatch analysis is provided below.

Northwest region

In the Northwest, one of the major winter wheat zones of the country, above average crop condition was indicated by the region's NDVI development profile. Mostly normal weather was recorded, with rainfall and radiation down by 1% and 2%, respectively, and temperature just average. Compared to average, BIOMSS increased 6%, with VCIx reaching 0.96. The Cropped Arable Land Fraction reached a spectacular 15.7% above average. Based mostly on this CALF, above average winter wheat production is expected by CropWatch in 2017.

Northern plains

North Dakota, South Dakota, Montana, and parts of Nebraska are the main spring wheat production zone

of the United States. The NDVI development profile for this region was far below both last year's development profile and the five-year average. Weather was mostly normal with RAIN, +5%; TEMP, +0.7°C; and RADPAR, +2%. Montana and North Dakota, however, underwent precipitation deficits of 10% and 21%, respectively. The estimated biomass production potential (BIOMSS) for the region is +2%, while the Cropped Arable Land Fraction is 2% below average. Combined with moderate VCIx, the indicators are likely to result in a below average crop.

Southern plains

The Southern plains include Texas, Oklahoma, Kansas, and parts of Missouri and Nebraska--all major winter wheat and maize production states. Average, but nevertheless well below 2016 crop condition is indicated by the NDVI development profile. The very humid climate included RAIN at 40% above average, cool temperature (TEMP, -0.7°C), and relatively low radiation (RADPAR, -2%). The heavy rain caused flooding across Oklahoma in April. The expected biomass production potential is 16% above its five-year average, while the Cropped Arable Land Fraction increased by 0.9% over average. Considering the current situation and the favorable crop condition from 2016, CropWatch predicts a decrease in crop production in the Southern plains for this year.

California

As indicated by the region's NDVI development profile, above average crop condition (from the early growth stages to the harvest stages) is indicated for California, one of the major winter wheat production zones of the United States. Favorable agroclimatic conditions benefited the growth of winter wheat: abundant rainfall (RAIN, +34%) and average temperature and radiation (TEMP, +0.3°C; RADPAR, -2%). BIOMSS was up 21%, with a record VCIx (1.07) and a significant increase in the Cropped Arable Land Fraction (+17.9%), which together will result in above-average production.

Corn Belt

The Corn Belt (Iowa, Illinois, Indiana, Ohio, Michigan, Minnesota, and Wisconsin) is the main summer crop producing area of the United States. Average crop condition is indicated by the region's NDVI development profile, even though levels are below last year's. Due to the rainy weather (RAIN, +27%), with average temperature (TEMP, -0.2°C) and radiation (RADPAR, -2%), BIOMSS increased by 8% over the five-year average, while the Cropped Arable Land Fraction was stable. Favorable crop condition prevailed in Wisconsin, Michigan, and Illinois, while the crop condition in Ohio should be watched.

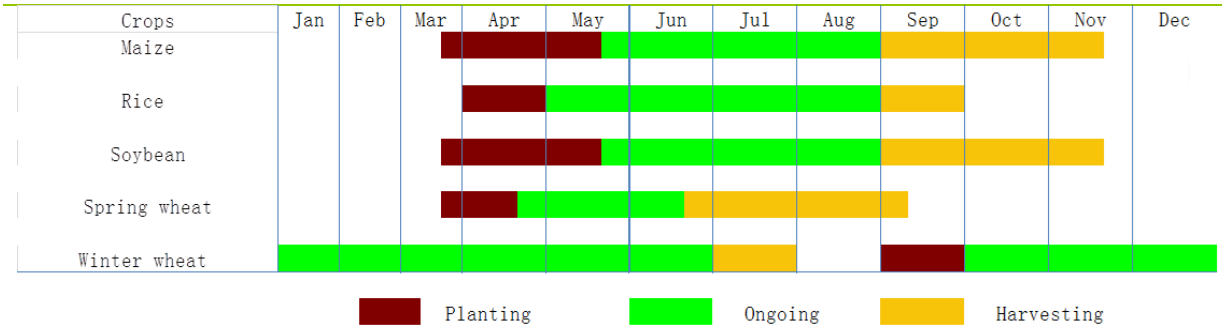
Southeast

The Southeastern states of Alabama, Georgia, and Florida form the major cotton production zone of the United States. Slightly below average crop condition is indicated by this region's NDVI development profile. Weather was predominantly rainy with low sunshine and somewhat cooler than average: RAIN, +20%; TEMP, -0.6°C; and RADPAR, -4%. With BIOMSS 10% above the five-year average, a Cropped Arable Land Fraction similar to its 2016 value, and VCIx at 0.92, expectations are for average crops.

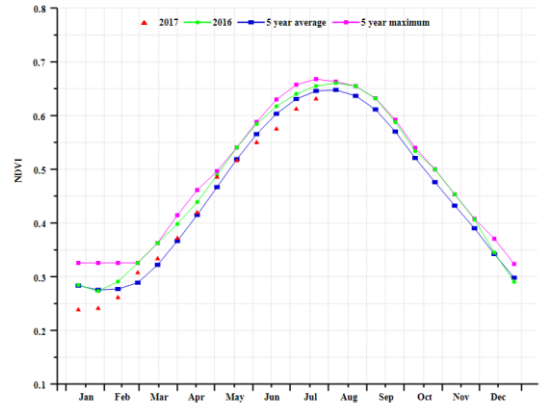
Lower Mississippi

In this last region, a major rice production zone, the NDVI development profile was almost identical to its 2016 behavior and above the five-year average. Humid agroclimatic condition (RAIN, +33%) was accompanied by low sunshine (RADPAR, -5%), and cool weather (TEMP, -0.9°C). The favorable crop condition is indicated by above average BIOMSS and a high VCIx (0.96).

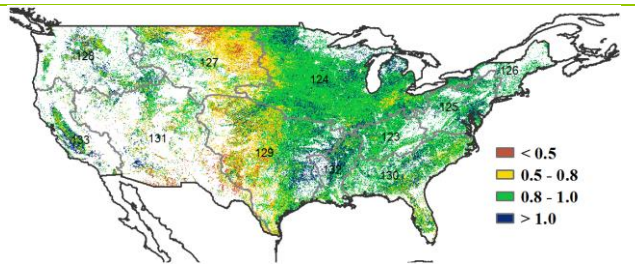
Figure 3.31. United States crop condition, April-July 2017



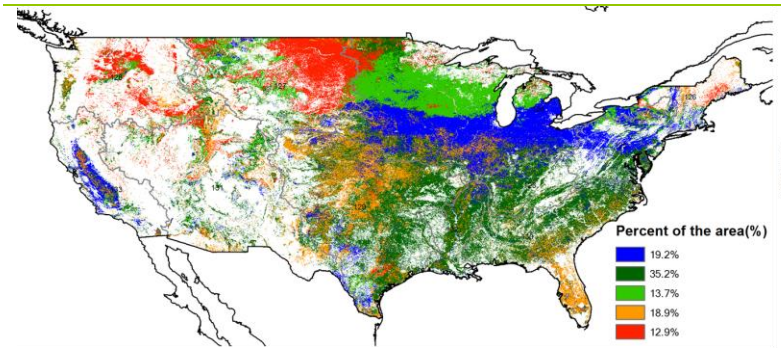
(a). Phenology of major crops



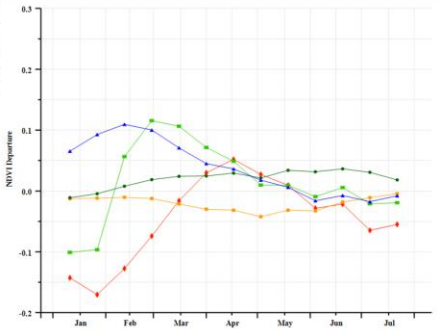
(b) Crop condition development graph based on NDVI



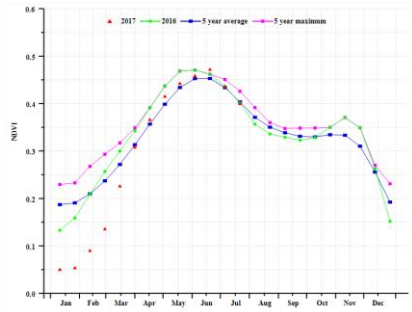
(c) Maximum VCI

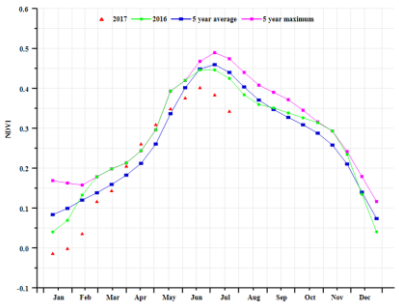


(d) Spatial NDVI patterns compared to 5YA

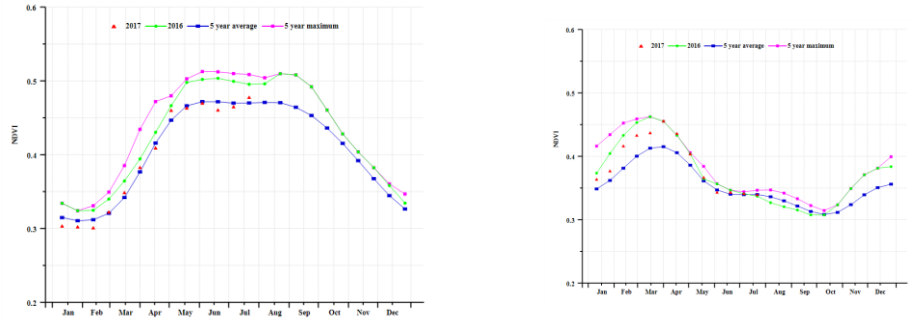


(e) NDVI profiles

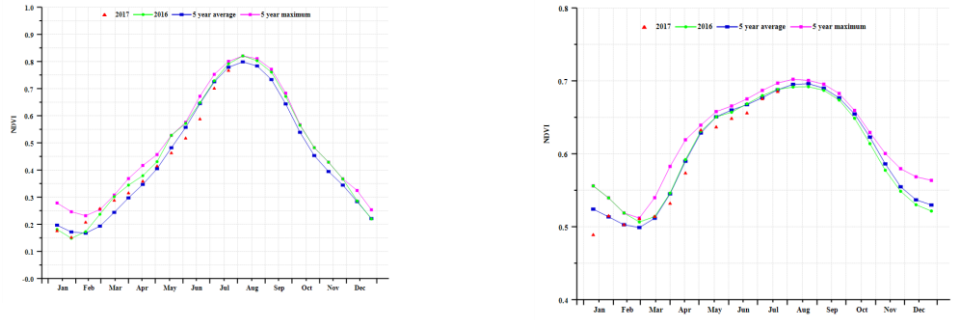




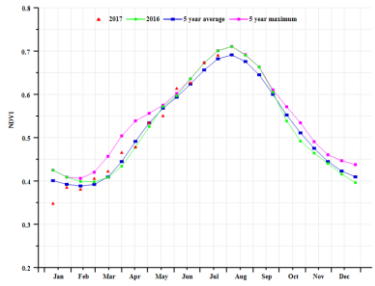
(f) Crop condition development graph based on NDVI (northwest region (left) and North plains (right))



(g) Crop condition development graph based on NDVI (South plains (left) and California (right))



(h) Crop condition development graph based on NDVI (Corn Belt (left) and Southeast (right))



(i) Crop condition development graph based on NDVI (Lower Mississippi)

Table 3.80. United States agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

	RAIN		TEMP(°C)		RADPAR	
Region	**Current (mm)**	**Departure from 15YA (%)**	**Current (°C)**	**Departure from 15YA (°C)**	**Current (MJ/m2)**	**Departure from 15YA (%)**
Alaska and Hawaii	304	6	7.2	0.4	1001	-3
Blue Grass	519	-1	20.5	-0.3	1258	-1
Corn Belt	557	27	17.3	-0.2	1264	-2
Middle Atlantic	405	-9	18.1	0	1154	-7
Northeast	378	-7	14.4	-0.3	1076	-9
North Plains	273	5	15.2	0.7	1415	2
Northwest	150	-1	12.9	0	1401	-2
South Plains	555	40	22.2	-0.7	1346	-2
Southeast	609	20	23.2	-0.6	1245	-4
Southwest	150	28	17.9	0.1	1572	-2
Lower Mississippi	656	33	23.3	-0.9	1252	-5
California	111	34	16.8	0.3	1571	-2

Table 3.81. United States agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2017

	BIOMASS		CALF		Maximum VCI
Region	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Alaska and Hawaii	972	0	-	-	0.95
Blue Grass	1644	3	100	0	0.95
Corn Belt	1485	8	100	0	0.92
Middle Atlantic	1438	-4	100	0	0.97
Northeast	1421	3	100	0	0.98
North Plains	1037	4	81	-2	0.76
Northwest	668	6	91	16	0.96
South Plains	1364	16	84	1	0.84
Southeast	1703	10	100	0	0.92
Southwest	571	17	40	10	0.87
Lower Mississippi	1765	19	100	0	0.96
California	364	21	78	18	1.07

Table 3.82. CropWatch-estimated maize, wheat, rice and soybean production for the United States in 2017 (thousand tons)

	Production 2016	Yield variation	Area variation	Production 2017	Production variation
Maize	367862	-2.6%	-1%	354763	-3.6%
Rice	10528	3.4%	0.0%	10888	3.4%
Wheat	56877	-3.0%	-1.6%	54270	-4.6%
Soybean	110024	-0.6%	0.0%	109323	-0.6%

[UZB] Uzbekistan

The reporting period covers the growing and harvesting stages of winter cereals, along with the sowing and growth of maize and other coarse grains from April to July. Crop condition was generally favorable. The national average VCIx was 0.87, and the Cropped Arable Land Fraction was 4.6% above the five-year average. Among the CropWatch agroclimatic indicators, RAIN and RADPAR were above average (13% and +1%, respectively), and TEMP was slightly below (-0.1°C). The combination of factors resulted in high BIOMSS (+16%) compared to average. As shown by the NDVI development graph, crop condition was below average from April to May and from late May to early June. NDVI cluster graphs and profiles show that 52.2% of the agriculture areas had below average condition from April to late May (mainly in part of Qunghirot, Chimbay, Altynkul, Khiva, Beruni, and Turtkul provinces and part of Kitab, Guzar, Samarqand, and Guliston provinces). NDVI was above average in part of Andijon, Farghoma, and Namangan, the three eastern provinces where most wheat is produced. Condition was normal or above in other regions. Overall, CropWatch expects a drop in wheat production compared with last year's record.

Regional analysis

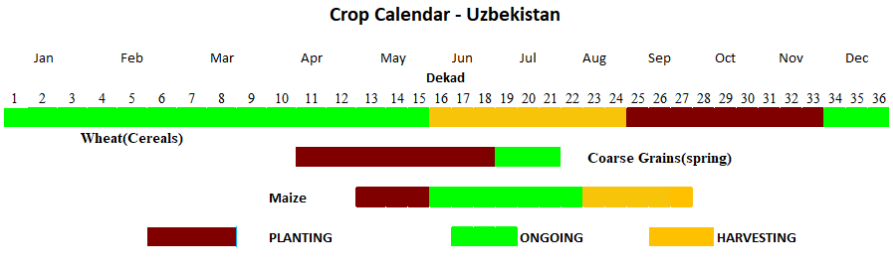
Maize and cereals zone

In this area in the east of the country, the harvesting of 2017 winter cereals (mainly wheat) is underway and will be completed by the end of August. Harvesting of the spring crops will start soon and is expected to continue until the end of September. The crop condition was below the five-year average from late May to early June. For the other months, it was above average. Among the CropWatch agroclimatic indicators, rainfall and radiation were slightly above the fifteen-year average (RAIN, 6% and RADPAR, 2%), while temperature (TEMP) was average. BIOMSS shows a 3% increase compared to average. The Cropped Arable Land Fraction for the region was 6% over average, and crop condition was generally favorable in this region.

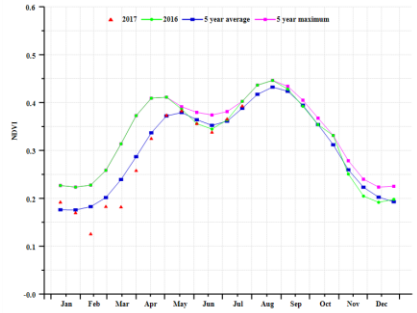
Cotton zone

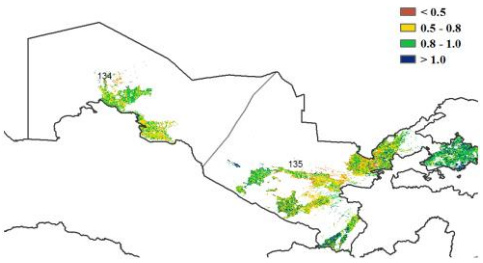
In the western and northern areas of the country that grow mostly cotton, NDVI profiles indicate generally favorable crop, which has now reached harvesting stage. Accumulated rainfall was far above average during the monitoring period (RAIN, +105%), while temperature (TEMP, -0.6°C) and radiation were about average. The agroclimatic indices for the current season indicate favorable weather conditions for crop growth, which is confirmed by the increase of the BIOMSS index by 84% compared to average. The regional average of the VCIx was 0.82. Overall crop prospects for the country are normal.

Figure 3.32. Uzbekistan crop condition, April-July 2017



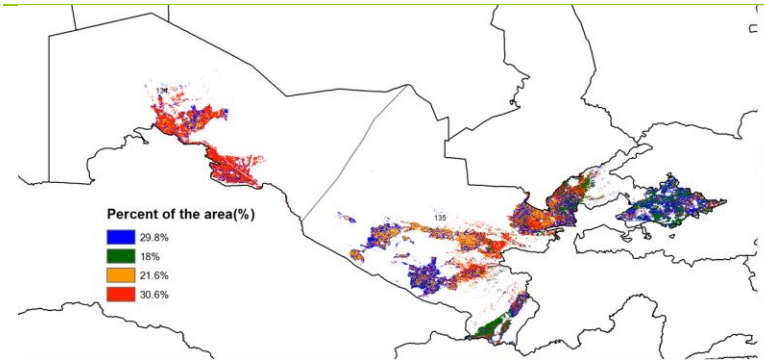
(a). Phenology of major crops

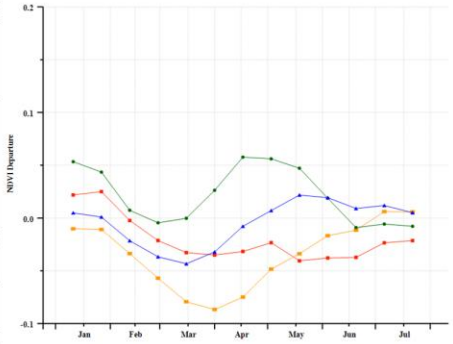




(b) Crop condition development graph based on NDVI

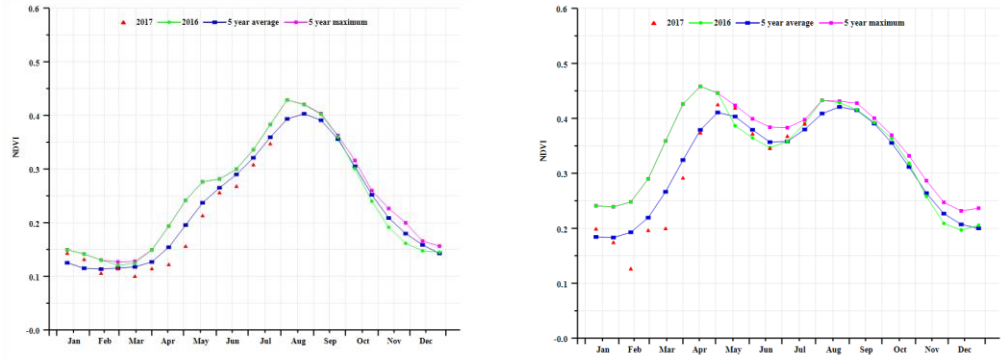
(c) Maximum VCI





(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



(f) Crop condition development graph based on NDVI (Cotton region (left) and Maize and Cereals region (right))

Table 3.83. Uzbekistan agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Cotton zone	146	105	23.4	-0.6	1405	0
Maize and cereals zone	125	6	22.0	0	1467	2

Table 3.84. Uzbekistan agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2017

Region	BIOMSS		CALF		Max. VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Cotton zone	597	84	58	-1	0.82
Maize and cereals zone	464	3	69	6	0.88

Table 3.85. CropWatch-estimated wheat production for Uzbekistan in 2017 (thousand tons)

Type	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Wheat	6391	-1	-15	5401	-15

[VNM] Vietnam

The reporting period from April to July in 2017 mainly covers the harvest of winter/spring rice and the sowing of the 10th month rice in the north. Generally, crop condition was similar to the average of the previous five years in April and May, but clearly below in June and July. It cannot be excluded that the erratic behavior of NDVI in Vietnam and other countries in the region is an artifact due to abnormal cloudiness patterns or other factors. Unfavorable crops occur in more than 34% of the arable land (mainly in the north of the country). The condition is above the reference 5YA in 26.3% of croplands (mainly in the south of the country) where a VCIx near 1.0 confirms the favorable situation. The national NDVI condition development graph also indicates mostly above average crop condition. CropWatch agroclimatic indicators show that precipitation and biomass were slightly above their respective reference averages (15YA and 5YA) while temperature and RADPAR were slightly below. The Cropped Arable Land Fraction (CALF) is basically the same as the average. Overall crop condition in the country is satisfactory.

Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, three sub-national regions can be distinguished for Vietnam, among which three are relevant for crops cultivation. These three regions are Southern Vietnam, Northern Vietnam, and Middle Vietnam.

Southern Vietnam

With the exception of low RADPAR (-6%) and high RAIN (+11%) overall condition of weather and crops was close to average: TEMP -1.0°C and BIOMSS +5%. VCIx was high (1.0) with CALF up 1% over 2016. CropWatch expects average or slightly better production.

Northern Vietnam

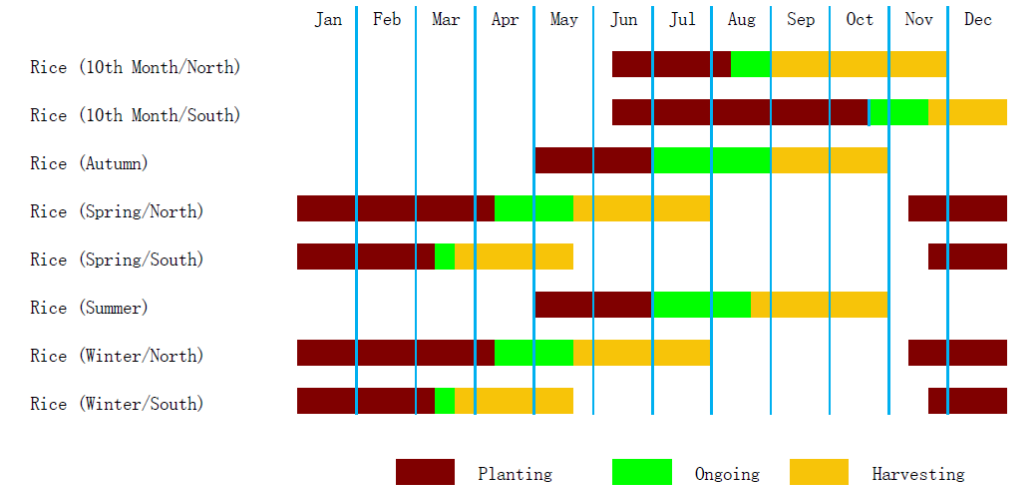
The northern part of the country recorded average rainfall (RAIN equal to 15YA) and about average TEMP (-1°C). The drop in RAPAR is 5% and BIOMSS is down 8%. CALF is unchanged compared to 2016. The crop condition development graph of NDVI shows the above mentioned erratic behavior and its interpretation is inconclusive. Based on agroclimatic indicators, especially RADPAR, below average output is expected.

Middle Vietnam

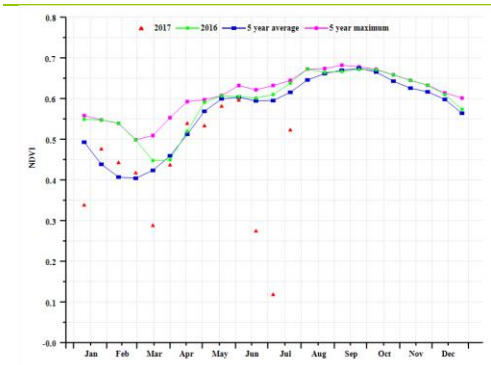
The situation and expected impact on crop production is almost identical with Southern Vietnam with the exception of a larger rainfall excess and resulting biomass production potential: RAIN, + 42%; TEMP, -1.0°C; RADPAR, -7%; BIOMSS, +13%; VCIx 1; and CALF, +1%.

With the mentioned caveats, crop prospects are generally fair due to favorable rainfall. Production of rice is likely to increase, especially in the Mekong Delta which produces about half the national output.

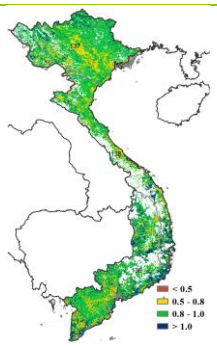
Figure 3.33. Vietnam crop condition, April-July 2017



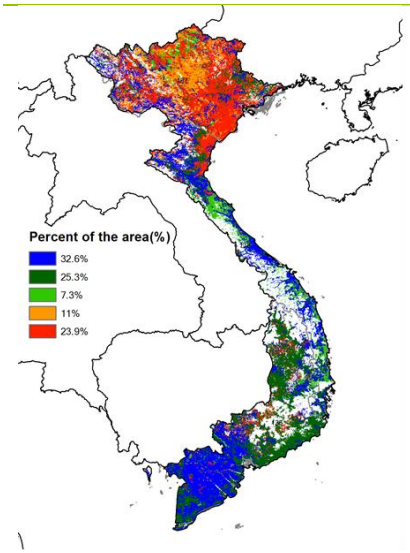
(a). Phenology of major crops



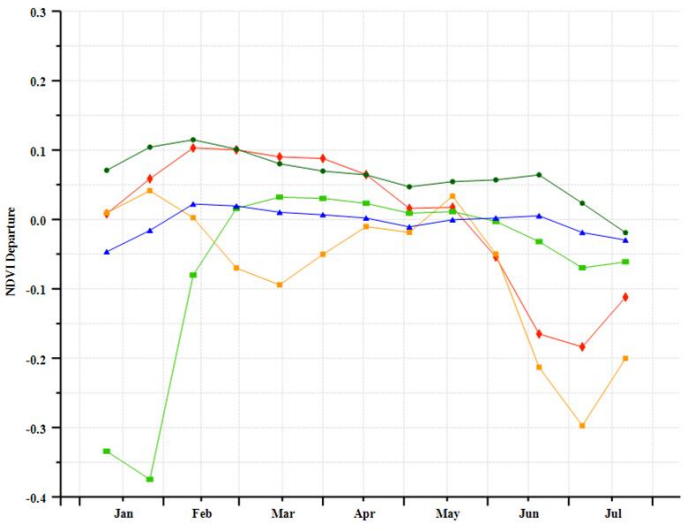
(b) Crop condition development graph based on NDVI



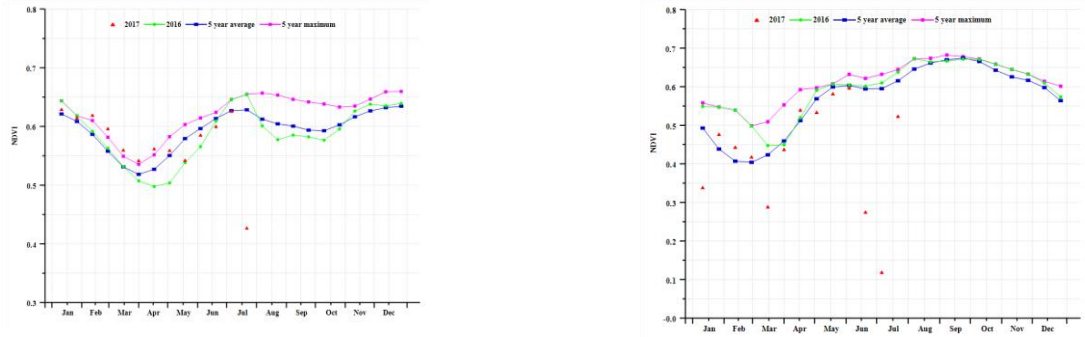
(c) Maximum VCI



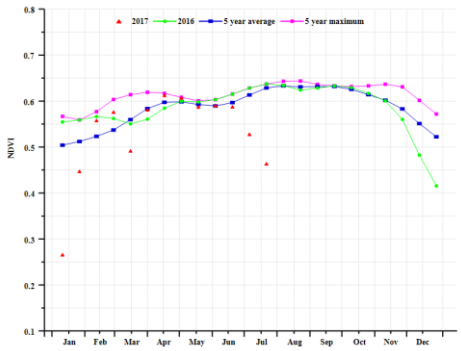
(d) Spatial NDVI patterns compared to 5YA



(e) NDVI profiles



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



(g) Crop condition development graph based on NDVI (Middle Vietnam)

Table 3.86 Vietnam agroclimatic indicators by sub-national regions, current season values and departure from 15YA, April - July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
South Vietnam	890	11	26.8	-0.7	1048	-6
North Vietnam	974	0	25.2	-0.9	966	-5
Middle Vietnam	890	42	27.8	-0.9	1098	-7

Table 3.87 Vietnam agronomic indicators by sub-national regions, current season values and departure from 5YA, April - July 2017

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
South Vietnam	2065	5	1	2	0.94
North Vietnam	1944	-8	1	0	0.92
Middle Vietnam	1849	13	1	1	0.95

Table 3.88 CropWatch-estimated rice production for Vietnam in 2017 (thousands tons)

Crops	Production 2016	Yield variation (%)	Area variation (%)	Production 2017	Production variation (%)
Rice	42550	8.4	0.9	46511	9.3

[ZAF] South Africa

Favorable rainfall and radiation prevailed during the cropping season of the main cereals in South Africa, and the NDVI profiles reflect better crop conditions than those of last year (above 0.5). After an unprecedented El Niño-driven agricultural drought during the 2015-2016 growing season devastated maize producers across the country, with this growing season's conditions South Africa is likely to re-position itself as the major maize-exporter in the region. The NDVI profiles (between January and April) of North West, Mpumalanga, and Free-State, the major maize-producing provinces of the country, confirm this. Following these good conditions, sorghum, soybean, and millet harvests are also expected to be favorable..

Currently the maximum VCI (VCIx) is about 0.7, and in both Free State and North West province, irrigated wheat is growing. At the same time, in Kwazulu Natal, the citrus-growing areas are experiencing favorable conditions as seen from NDVI profiles. Most of the maize has been harvested, and an observed reduction of about 5% in cropped area may not have a huge negative impact on production. Overall, the crop conditions across the country were good, especially when compared with 2015-16.

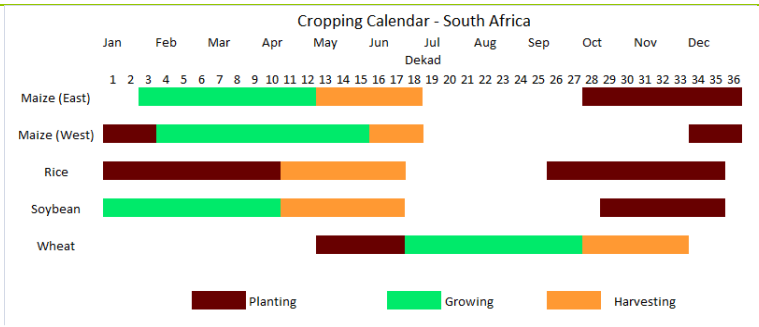
Regional analysis

Semi-arid steppe and Mediterranean

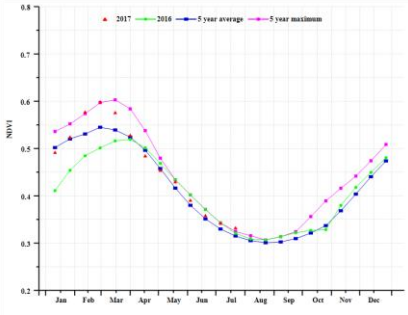
Regional differences were observed for the agronomic indicators due to meteorological factors. The highest VCIx (0.84) was observed in the semi-arid steppe zone, in which irrigated wheat is currently growing. This region encompasses most of Free State, Northern Cape, and Eastern Cape provinces. A large departure from average was observed in the rainfall (RAIN, -52%) in the Mediterranean zone, which is a citrus-growing region; the BIOMSS reduction here was -47%.

Overall, CropWatch-estimated maize production for the country is 57% above 2016 output, with the country's maize. The major maize producing areas are the Free State (approx. 40%) and North West and Mpumalanga (each about 20%). Wheat yield, however, has not increased much. Following the 2015-2016 drought, water levels in reservoirs are reportedly still low and might have contributed to a reduced cropped area (CALF, -5%) in the Mediterranean zone. Generally, a slight decrease in wheat production has been observed across the nation, confirming a long-time trend.

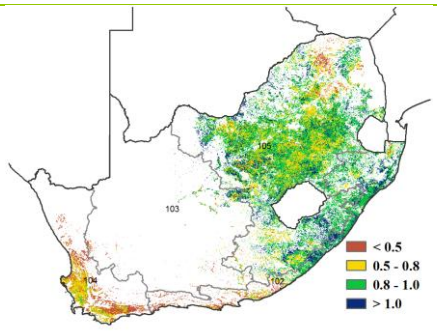
Figure 3.34. South Africa crop condition, April-July 2017



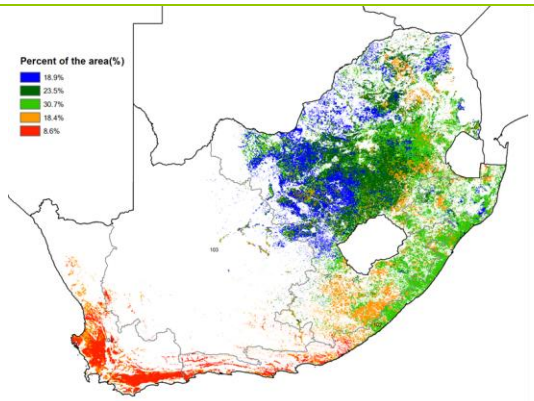
(a). Phenology of major crops



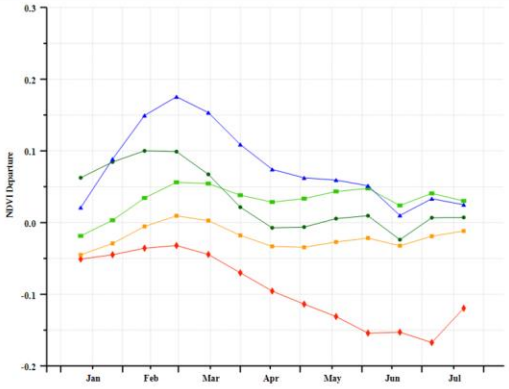
(b) Crop condition development graph based on NDVI



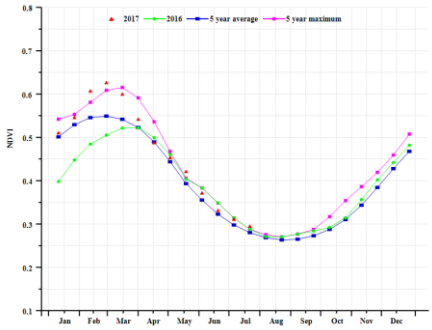
(c) Maximum VCI

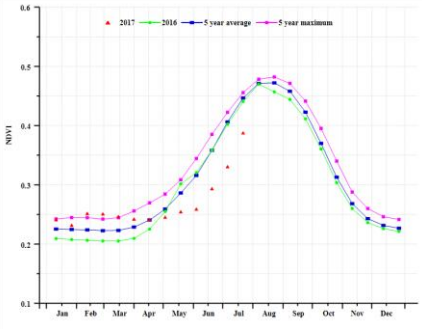


(d) Spatial NDVI patterns compared to 5YA

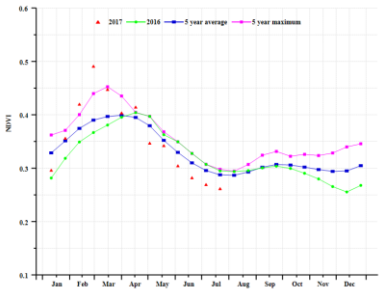


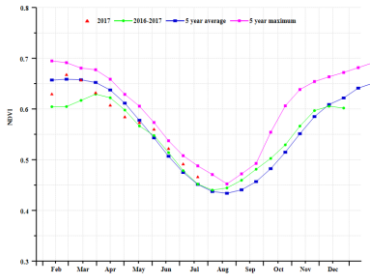
(e) NDVI profiles





(f) Crop condition development graph based on NDVI (Semi-arid steppe region (left) and Mediterranean region (right))





(g) Crop condition development graph based on NDVI (Arid_desert region (left) and Humid sub-Tropical region (right))

Table 3.89. South Africa agroclimatic indicators by sub-national regions, current season values and departure from 15YA, April - July 2017

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Humid sub-tropical zone	78	-32	16.5	0.4	758	-1
Arid desert zone	64	-24	13.4	0.8	822	1
Mediterranean zone	82	-52	13.3	0.3	721	4
Semi-arid steppe zone	66	-11	13.8	0.4	878	-1

Table 3.90. South Africa agronomic indicators by sub-national regions, current season values and departure from 5YA, April - July 2017

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Humid sub-tropical zone	318	-31	0.9	-1	0.76
Arid desert zone	275	-23	0.4	25	0.80
Mediterranean zone	305	-47	0.8	-5	0.28
Semi-arid steppe zone	275	-13	0.8	19	0.84

Table 3.91. CropWatch estimated maize and wheat production for South Africa in 2017 (thousands tons)

	Production 2016	Yield variation %	Area variation %	Production 2017	Production variation %
Maize	9018	35.1	16.3	14161	57
Wheat	1704	4.3	6.4	1892	11