

Chapter 3. Main producing and exporting countries

Chapter 1 has focused on large climate anomalies that sometimes reach the size of continents and beyond. This 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

Table 3.1 presents the agroclimatic and agronomic indicators for the period from October 2017-January 2018, showing their departure from the five and fifteen-year averages as applicable. Figures 3.2 through 3.5 show the underlying CWAI indicators. While chapter 1 focuses on global climate patterns that characterize the current reporting period (“ONDJ”) using large spatial units, the present introduction to chapter 3 focuses on countries, i.e. it aims at identifying countries that suffered abnormal climatic conditions and resulting abnormal agronomic conditions. 165 countries and territories are included, omitting only those which are too small to yield meaningful results at the spatial resolution (approximately 25 km x 25 km at the equator) adopted for the CropWatch agroclimatic indices (CWAI). They include mostly the smallest island nations.

Only for the 30 major producers and China (30+1 countries), Table 3.1 also lists departures for important agronomic variables including the biomass production potential (BIOMSS), Cropped Arable Land Fraction (CALF) and the maximum Vegetation Condition Index (VCIx). BIOMSS provides the rainfall and temperature limited contribution of the reporting period to annual biomass accumulation. CALF indicates the fraction of arable land which was actually cropped. Positive departures mean that cultivated area increased over the average of the previous five years (5YA). VCIx is a measure of yield compared with historical yield for the same locations. High values identify areas where crops performed as well as during the best recent years. Below 0 and above 1 values stand for “worst ever” and “best ever”, respectively.

The major climatic characteristics and anomalies of the reporting period are listed in Chapter 1 and are not repeated in this section which, as mentioned, focuses on countries. Figures 3.1 to 3.4 (RAIN, TEMP, RADPAR and BIOMSS departures, respectively) bear a marked resemblance to the corresponding figures in Chapter 1, although the spatial detail is greater, as in this chapter, figures include not only countries but also first-level administrative units for the 8 largest countries of the world, of which Kazakhstan is the smallest.

Readers are also invited to consult section 5.2 (Chapter 5) on disasters where additional information is provided for major disasters that occurred during the reporting period, and table 3.1 - mentioned above - which summarises the indicators for the 30 major agricultural countries.

Agronomic indicators

The available agronomic indicators do not carry the same statistical weight as the agroclimatic indicators because only selected countries are covered. It is, nevertheless, interesting to compare the countries and to highlight “good” and “bad” performers.

Average VCIx is 0.86 (unweighted), but the statistical distribution is negatively skewed (skew: -0,997), i.e. 35% of values are below 0.86 and 65% are above. The large number of positive values results from the technological trend of yields. The lowest values are the following: Iran (0.51), Pakistan (0.67), Australia (0.67), Kazakhstan (0.67), South Africa (0.68) and China (0.70). High values occur in Indonesia (0.97), Philippines (0.97), Brazil (0.97), Myanmar (0.98), Poland (1.00) and Ukraine (1.04). It is relatively easy to understand the numbers in terms of environmental conditions, as will be illustrated in the country narratives in Chapter 3.2.

The (unweighted) average CALF variation reaches +3% and here too, the distribution is skewed, but this time the skew is positive (1.202) with 68% of values below the average and 32% above. The worst performers for the current reporting period include Canada (-11%) and Australia (-7%), thus including two of the main global wheat exporters. At the high end we find Ukraine (+13%), Iran (+14%), and Pakistan (+16%).

Interestingly, very few countries "compensate" CALF by VCIx, i.e. low CALF by high VCIx or the reverse. On the contrary, CALF and VCIx appear to be (weakly) positively correlated, which results from the same environmental factors affecting both areas cultivated and yield. Among the countries that do "compensate" it is in order to mention Iran (CALF +14%, VCIx 0.51), Pakistan (+16%, 0.67) and Argentina (+8%, 0.71). It is not known at this stage, however, to what extent the "compensation" will ensure satisfactory production.

The extremes include Australia (-7%, 0.67), Canada (-11%, 0.74), South Africa (-4%, 0.68) and China (-3%, 0.7). At the high end we find Romania (9%, 0.94), Brazil (2%, 0.97), and Ukraine (13%, 1.04).

Abnormal rainfall

Drought

The main country-wide rainfall deficit occur in the Mediterranean basin, where winter is the main period of agricultural production and the dominant field crops include wheat in Europe, wheat and barley in Africa as well as in Asia. If rainfall does not improve during spring, serious agricultural impacts are to be expected, all the more so because the same area has suffered drought in the recent past, which resulted in low soil moisture and groundwater storage. Significantly above average precipitation amounts are required to replenish water reserves which are needed as well for irrigating crops cultivated in winter and summer, not to mention other uses of water. Irrigation using river water dominates in Italy, Spain and Egypt. Countries where groundwater plays a major role in irrigation are particularly at risk, including Portugal, Spain, Greece and Morocco, as well as the remaining countries bordering the Mediterranean.

Portugal (-65%) and Algeria (-63%) were the driest countries of the area followed by Cyprus (-52%) and several countries in the -50% to -40% range (Italy, Lebanon, Spain, Tunisia and Libya). Among the dry countries we have several Middle-Eastern countries but their expected rainfall is much lower. For instance Saudi Arabia recorded 13 mm against an average of 34mm Although the deficit was -62%, it is irrelevant for current crop production, but it matters for recharging groundwater reserves.

Nepal (-60%) and Pakistan (-48%) are among the top drought affected countries in Asia. They are part of a much larger post-monsoon ensemble where irrigation plays a dominant part for winter (rabi) crops. Winter rainfall is not irrelevant in those areas as it provides extra and free water, but it is usually not vital for crops. The following areas can be listed in this context, listed by decreasing deficit (-92% to -50%): Delhi, Uttar Pradesh, Uttarkhand*, Haryana, Bihar, Madhya Pradesh and Rajasthan. Only the two States marked by an asterisk normally expect more than 100 mm during the ONDJ period.

Severe deficits also occurred in Chile (-51%) where crops are now mostly in the vegetative stage or nearing harvest (wheat). The impact of the drought is potentially severe, particularly for wheat, but the large agro-ecological diversity of the country is a favorable factor. Most of the “southern cone” south of and including the Gran Chaco had moisture supply below expectations, including Uruguay (-26%) and most provinces of Argentina where the deficits are of the order of -40% to -30% exceptionally drier parts of Patagonia, where crops have a limited importance compared with livestock. Rangeland productivity is likely to have been reduced by drought. Drops in BIOMSS indices are, however, about 10% smaller than the corresponding rainfall deficits.

At the national level, two more areas deserve mentioning: New-Zealand (rainfall is down to 145 mm from 279 mm, a 48% drop) and southern Africa with deficit given in decreasing order were - Zimbabwe (-36%), Malawi (-36%), Lesotho (-25%) and Botswana (-21%). South Africa (-14%), the major agricultural country in the region is described in detail in the later sections of this chapter. Readers will find that yields of the current maize crop, the main staple in the country, are currently faring poorly (VCIx at 0.68) with a reduction in area (CALF) of 4%. It is emphasised that all countries in the region suffered from drought at the time when they receive their summer rains, which correspond to the growth period for dominant cereal staple, i.e. maize. Maize flowering and most water demanding growth stage typically occur in February. February rainfall will thus largely determine the output of crops in the region.

Excess precipitation

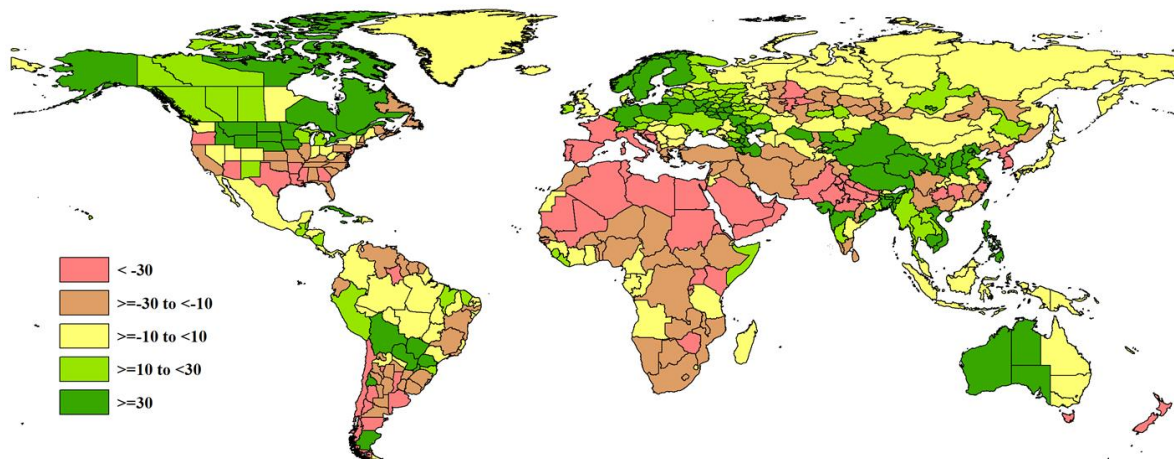
At the national level five groups of countries clearly emerge. They are presented here according to their growing season type and timing.

The first includes eight countries grouped around the Baltic sea and which constitute the “wet counterpart” to the “dry Mediterranean” in Europe. Countries listed in increasing order of water excesses, the group includes Estonia (+30%), Finland, Germany, Lithuania, Sweden (+37%), Belarus, Poland and Norway (+46%). All the countries grow winter crops, although their relative importance compared with summer crops decreases in the northernmost countries. The core of this “Baltic” group is surrounded, especially to the east by a fringe of areas with decreasing excess water. Still among winter crop areas, we mention two Black Sea countries: Georgia (+30%) and Armenia (+76%) and, in central Asia, Kyrgyzstan (+51%) and Azerbaijan (+60%). It is unlikely that the listed countries have suffered from excess water, even if planting may have been initially delayed because of water logged soils. On the contrary, the stored soil moisture will be beneficial to both winter crops and the summer crops to be planted in 2018.

A second group of two countries that belongs to similar climate conditions occurs in Latin America (Paraguay +35%, Bolivia +34%) ; however they are currently in the summer-crop season which are mostly at a vegetative stage or very the very beginning of harvest. In Bolivia, due to altitude, crops are currently at the planting stage. In both countries excess precipitation is potentially harmful if soils remain water-logged too long.

The subsequent groups of countries are all tropical or equatorial. The reporting period covers the harvest of their main crop and early stages or planting of secondary crops. Two Caribbean countries (Jamaica +36%, Cuba +56%) and their central American neighbors were affected by two cyclones (Hurricanes Maria and Irma, November 2017) and therefore recorded damage to their crops due excess water, ocean spray and strong winds. Several typhoons that hit maritime south-east Asia also brought abundant moisture to Vietnam (+38%), Cambodia (+39%) and the Philippines (+46%). The three countries are listed in the section on disasters and they are the subject of a detailed narrative later in the chapter. All of them behaved well in terms of their agronomic indicators with CALF departures close to 0 and VCIx above 0.93 (the lowest of the three values which occurs in Vietnam).

Figure 3.1. Global map of October 2017 to January 2018 rainfall (RAIN) by country and sub-national areas, departure from 15YA (percentage)



Abnormal temperature

How extreme a temperature is, can be defined in statistical terms based on a time series analyses. In this case, temperatures in the upper or lower deciles could be termed extreme. This is the approach adopted by the Standardized Precipitation Index (SPI) for rainfall. It is, however, more useful, and more difficult, to define the extreme temperatures in terms of their impacts.

How extreme any climatic parameter is, interestingly also depends on the spatial scale. The CropWatch agroclimatic indicators are spatial averages over agricultural areas (polygons, such as countries or the large CropWatch MRUs used in Chapter 1). At that scale, random spatial variations of temperature will result in low, probably zero departures compared with average values. In order for departures to reach larger absolute values of departures (for instance two or three degree) it is necessary that the abnormal temperatures be present over large areas inside the polygon. This is why a departure of two or three degrees at the scale of a country is a meaningful departure. It means that, inside the polygon, there are pixels where the departure was probably much larger, with accordingly larger impacts. Finally, it is noted that positive and negative departures are not symmetric in their effects, as negative departures may reach freezing.

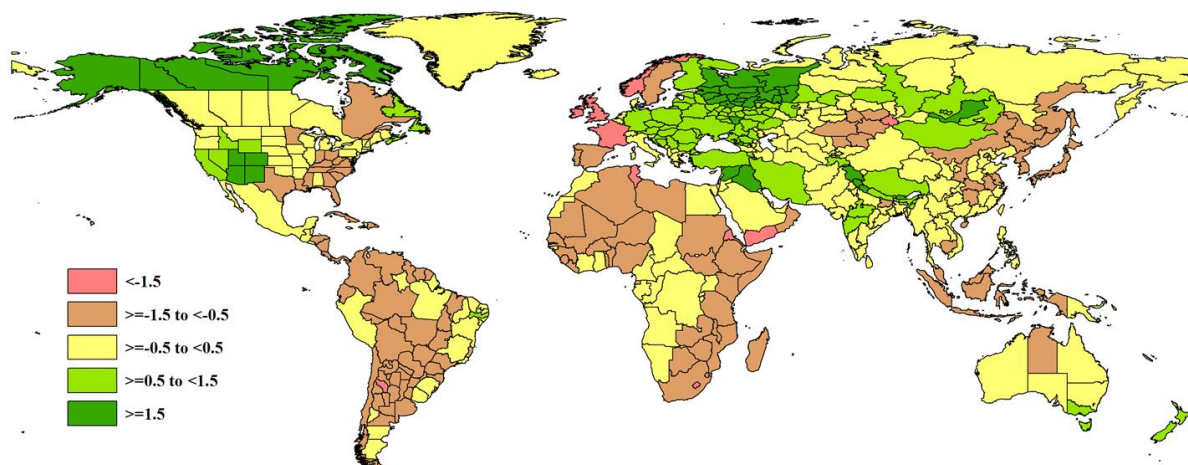
For the current discussion, we adopt a 1.5 °C threshold as “significant” for both negative and positive departures. This is sufficient to define “cooler (warmer) than average” weather, but it does not qualify as cold (heat) wave, for which larger departures in the range of 4 or 5 degrees are required.

The largest negative departures occurred in Yemen (-2.2 °C) and neighboring Eritrea (-1.8 °C) as well as Ethiopia and North Sudan. They are followed by an area in southern Africa which includes Swaziland (-2.1 °C) and Lesotho (-1.5 °C) as well as Mozambique, Malawi and Madagascar with departures close to 1.0 °C. In Europe, the area affected by low temperature includes the United Kingdom and Ireland (both at -1.9 °C), France and Norway (both at -1.6 °C). North Africa, Tunisia recorded 1.6 °C below average. Ethiopia was doing fine in terms of agronomic indices for the reporting period, which covers the late harvest of the main “meher” season. The same applies to the United Kingdom and France, where winter crops are currently overwintering (CALF +1% and -1%; VCIx 0.89 and 0.84).

Positive departures, but nowhere of heat-wave intensity occurred in Bhutan and Belarus (+1.5 °C for both), Jammu & Kashmir (+1.6 °C), as well as Iraq and Syria (resp. +1.8 °C and +1.9 °C). The largest increases occur, as noted repeatedly in the Recent CropWatch bulletins, at Boreal latitudes in areas of minor agricultural relevance, such as the Arkhangelsk Oblast and the Komi Republic in the European part of Russia and the Yukon & Northwest Territory, which constitute the northernmost parts of Canada. In

Canada, the corresponding average temperatures are close to $-20.0\text{ }^{\circ}\text{C}$, so that temperature remains well within the freezing range and significant ecological changes are unlikely. In Russia, however, the averages are just $-5.0\text{ }^{\circ}\text{C}$ or $-6.0\text{ }^{\circ}\text{C}$, and local thawing or ice and snow is likely, with possible agricultural and ecological consequences such as overwintering of pests, alterations to the water balance and increased winter methane emissions from peat-lands.

Figure 3.2. Global map of October 2017 to January 2018 temperature (TEMP) by country and sub-national areas, departure from 15YA (degrees)



Abnormal radiation

Sunshine deficits in excess of 15% occurred in Europe in an area centered on the Baltic Sea and including Finland (-24%), Belarus (-19%), Estonia (-18%), Luxembourg (-17%), Ireland (-16%), Germany and neighboring Poland, both at -15%. For sunshine, a factor much less variable spatially than temperature and rainfall, the listed values would be the equivalent of a “dark wave”. During summer, it would reduce photosynthesis by an approximately equivalent percentage and yields would be affected. For the current season, when crops are dormant and days are short, it is unlikely that a lasting effect on crops will result. Indeed, agronomic indices for Germany and Poland are very favourable, with VCIx showing yields close to historical records.

Values below average by more than 10% include, in Europe, Lithuania (-14%), Belgium (-13%), Latvia (-13%), Ukraine (-13%), Norway (-12%), Czechia (-12%), Netherlands (-11%) and Sweden (-10%). In Asia, with the main exception of China (-12%), which also cultivates winter crops, several tropical countries are currently in their irrigated dry season or at the early stages of their second crop after harvesting the main crops at the end of the year, which includes Vietnam (-14%), Japan (-12%), Bangladesh (-11%), Lao PDR (-10%) and Timor Leste (-10%). Impact of the low sunshine is likely on some crops, especially on rice for which sunshine is the major limiting factor, although both Bangladesh and Vietnam show rather good VCIx of 0.95 and 0.93, respectively. Among the listed countries, China is the only one where crop is likely to be impacted, based on agronomic indicators, including a reduction in planted area (CALF, -3%) and just about fair yield (VCIx at 0.70).

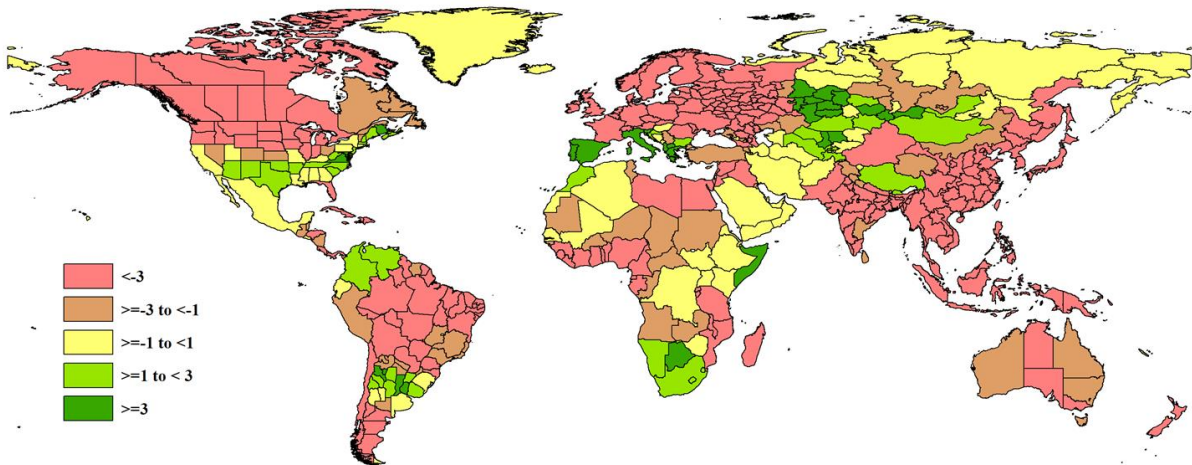
Finally, one African country has to be listed: Sao Tome and Principe (-12%).

Countries in the range of -6% to -9% number 26. They cannot be listed although the sunshine departures are still significant. Most of them belong to the general areas mentioned above, e.g. Nigeria (-6%) and Liberia (-8%). Some do occur in other parts of the world, such as Honduras (-9%), Cuba (-9%) and Jamaica (-8%) and, in the south of the continent, Chile at -6%. Russia, because of its size, deserves mentioning as well (-6%). Actually, RADPAR is the most “extreme” CWAI for Russia. Some very low values between -21%

and -26% departures are recorded in the west, between the Baltic and Ukraine and including the Oblasts of Arkhangelsk (-21%), Orlovsky, Kursk, Vologodsky, Lipetsk and Murmansk (-26%). According to VCIx Russian yields are not spectacular, but they are largely compensated by a cropped arable land fraction increase of 7% over the 5YA.

Positive RADPAR departures are much less frequent than poor sunshine conditions. They are all associated with reduced rainfall or drought and include Italy (+5%), Botswana (+6%), Greece (+6%) and Portugal (+9%).

Figure 3.3. Global map of October 2017 to January 2018 PAR (RADPAR) by country and sub-national areas, departure from 15YA (percentage)



Combinations of abnormal weather conditions

The above-mentioned Portugal combines two extremes: the largest positive sunshine anomaly (+9% RADPAR) with the largest rainfall departure (RAIN -65%). Other countries combine three extremes.

To establish the list below, the deciles are considered as the thresholds for extremes, i.e. for each variable (RAIN, TEMP, RADPAR) the departures (among 164 countries) that fall in the upper or lower 10% are considered as extremes. Five European countries are ranked as extreme for all their climatic variables: Belarus (+40%, 1.5 °C, -19%), Poland (+41%, 1.4 °C, -15%), Norway (+46%, -1.6 °C, -12%), Lithuania (+33%, 1.4 °C, -14%) and Germany (33%, 1.2 °C, -15%), where the brackets contain \hat{r} RAIN, \hat{r} TEMP and \hat{r} RADPAR. Four of them fall into the category of very wet and warm winter conditions with very low sunshine; all of them are “Baltic” countries. Interestingly, number 5, a geographically very close country (Norway) is in the category of very wet and cold winter conditions with very low sunshine.

If a less stringent threshold is adopted, e.g. 0.75, which considers the upper and lower quartiles as extreme, the category of countries extreme for all three RAIN, TEMP and RADPAR would number 22.

Six countries stand out for unusual values of TEMP and RADPAR, including Ireland (-1.9 °C, -16%), Estonia (1.3 °C, -18%), Latvia (1.3 °C, -13%), Czechia (1.3 °C, -12%), Ukraine (1.4 °C, -13%) and Somalia (-1.3 °C, 3%). All of them also had above average rainfall in the range of +20% to +30%. CropWatch agronomic indicators are available for Ukraine where the combination of a record yield (VCIx value of 1.04) and a significant increase in cultivated areas (+13%, one of the largest of all countries monitored by CropWatch).

Countries which, for the current reporting period, were abnormal in terms of RAIN and RADPAR number three: Portugal (-65%, 9%), Spain (-46%, 4%) and Vietnam (38%, -14%). Four stand out because of unusual RAIN and TEMP: dry and cool Horn of Africa and south Arabian Peninsula with Yemen (-58%, -2.2 °C), Eritrea (-51%, -1.8 °C) and North Sudan (-46%, -1.2 °C), wet and cool Paraguay (35%, -1.4 °C) and dry and warm New Zealand (-48%, 1.2 °C).

Figure 3.4. Global map of October 2017 to January 2018 biomass (BIOMSS) by country and sub-national areas, departure from 15YA (percentage)

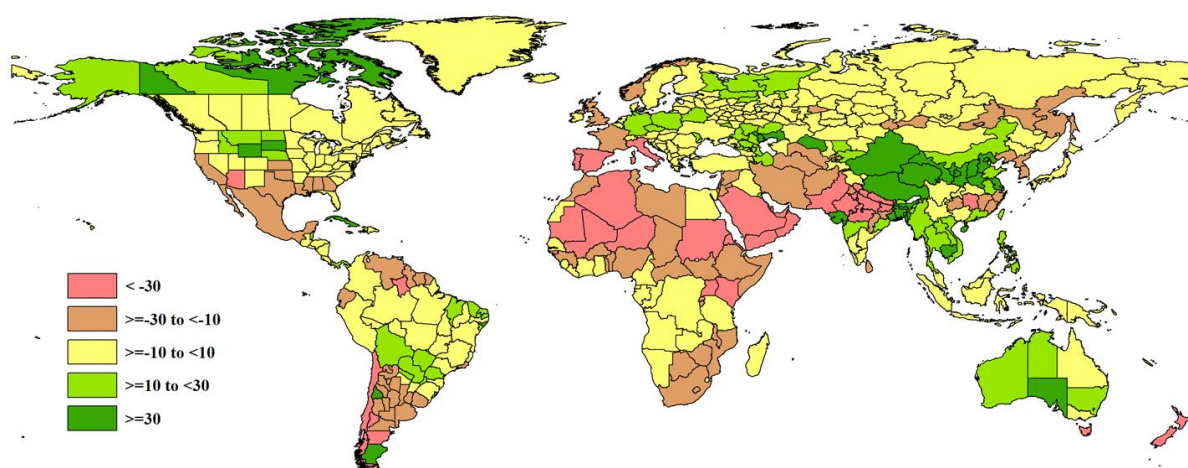


Table 3.1. CropWatch agroclimatic and agronomic indicators for October 2017 to January 2018, departure from 5YA and 15YA

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	-22	-1.0	1	-13	8	0.71
Australia	8	0.2	-3	13	-7	0.67
Bangladesh	63	-0.4	-11	69	0	0.95
Brazil	-1	-0.5	-4	1	2	0.97
Cambodia	39	-0.7	-8	34	1	0.90
Canada	18	0.0	-4	5	-	0.74
China	-5	-0.3	-12	7	-3	0.70
Egypt	-35	-0.3	-5	-8	5	0.83
Ethiopia	-29	-1.2	0	-26	0	0.96
France	-30	-1.6	-7	-20	-1	0.84
Germany	33	1.2	-15	14	0	0.96
India	4	0.2	-5	-5	2	0.93
Indonesia	1	-0.6	-5	3	1	0.97
Iran	-16	1.0	0	-19	14	0.51
Kazakhstan	2	-0.4	3	5	-	0.67
Mexico	-2	-0.3	0	-11	1	0.89
Myanmar	13	0.2	-5	19	1	0.98
Nigeria	-26	-1.2	-6	-27	-4	0.86
Pakistan	-48	0.1	-3	-38	16	0.67
Philippines	46	-0.4	-5	20	0	0.97
Poland	41	1.4	-15	17	1	1.00
Romania	9	1.2	-3	9	9	0.94
Russia	9	0.9	-6	4	7	0.86
S. Africa	-14	-1.0	2	-17	-4	0.68
Thailand	29	-0.4	-8	16	0	0.88
Turkey	-13	1.0	-2	-1	7	0.88
Ukraine	18	1.4	-13	8	13	1.04
United Kingdom	8	-1.9	-8	-11	1	0.89
United States	-9	-0.1	-1	-3	5	0.91
Uzbekistan	-7	0.3	2	-11	-	0.95
Vietnam	38	-0.4	-14	27	0	0.93

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 October 2017-January 2018 period to the previous season and the five-year average (5YA) and maximum; (c) Maximum VCI (over arable land mask) for October 2017-January 2018 by pixel; (d) Spatial NDVI patterns up to January 2018 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 October 2017-January 2018 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 agroecological zones during October 2017-January 2018.

[ARG] Argentina

All summer crops (maize, rice, and soybean) have now been planted and are currently growing; winter wheat was close to harvest or actually being harvested

Rainfall was significantly lower than the average (22% below average). The average temperature dropped 1 °C compared average, while solar radiation was about average (only 1% above average). The conditions led to a significant reduction in the biomass production potential (1194 gDM/m², 13% below 5YA).

The country-wide crop condition development graph based on NDVI and the spatial distribution of NDVI profiles show crop condition below the last 5 years average during the monitoring period except in October when the NDVI values were above the average. The worst condition was in the middle of December, when winter wheat was being harvested and summer crops were still at early stages.

Maximum VCI confirms that, in large areas of the country and also nationwide crop conditions was not as favorable as during previous seasons, mostly due to poor rainfall. The CropWatch estimate for wheat production in 2017-2018 is -4.7% less than the previous year's production.

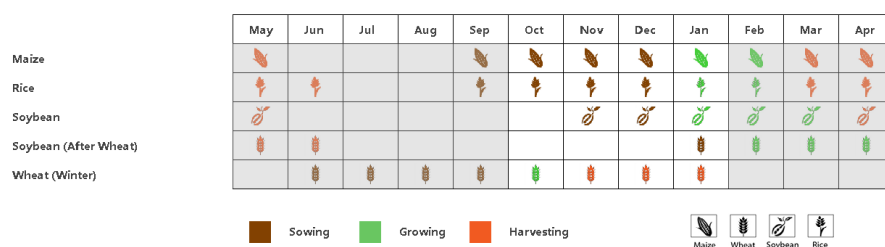
Regional analysis

CropWatch subdivides Argentina into eight agro-ecological zones (AEZ) based on cropping systems, climatic zones, and topography; they are identified by numbers in the VCIx map. Only four of them are found to be relevant for crops cultivation: the Chaco, Mesopotamia, the Pampas, and the Subtropical highlands for which the crop conditions will be discussed with some detail in this section.

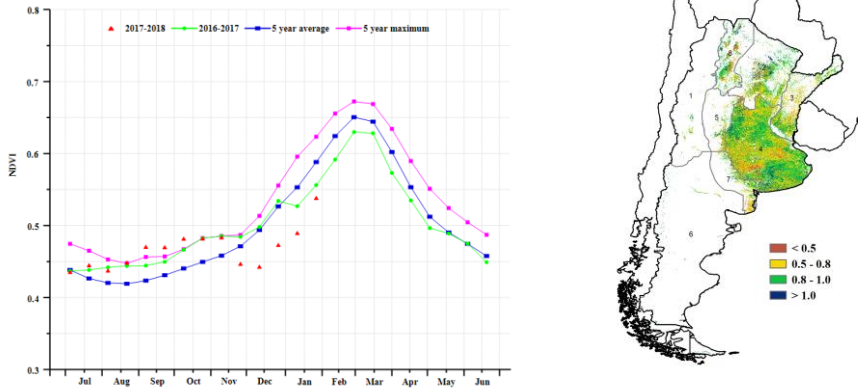
In the four AEZs the association between the drop in rainfall, and the reduction in biomass is obvious. For instance, the largest drop in RAIN was in the Pampas zone (29% below 15YA) which also suffered the largest reduction in biomass production potential (1184 gDM/m², 17 % below 5YA). On the contrary, the lowest drop in rainfall was in Mesopotamia (-15% below the average) was associated with reduction in BIOMSS (1609 gDM/m², 7% below 5YA). The temperature departure was almost the same for both zones (1 °C below average). RADPAR also displayed the highest increase for Mesopotamia (1411 MJ/m², 3% above average) compared with the other AEZs. According to the cropped arable land fraction indicator (CALF) the whole area was almost fully cultivated, resulting from a marked increase for the Chaco and the Subtropical highlands zones (CALF, 11% and 10 % above 5YA respectively) compared to five previous seasons.

In general, the VCIx average value, which reflects crop condition based on NDVI, was 0.82 for the four AEZ. The minimum value occurred in the Pampas (0.78) and the maximum was 0.86 in the Chaco.

Figure 3.5. Argentina crop condition, October 2017-January 2018

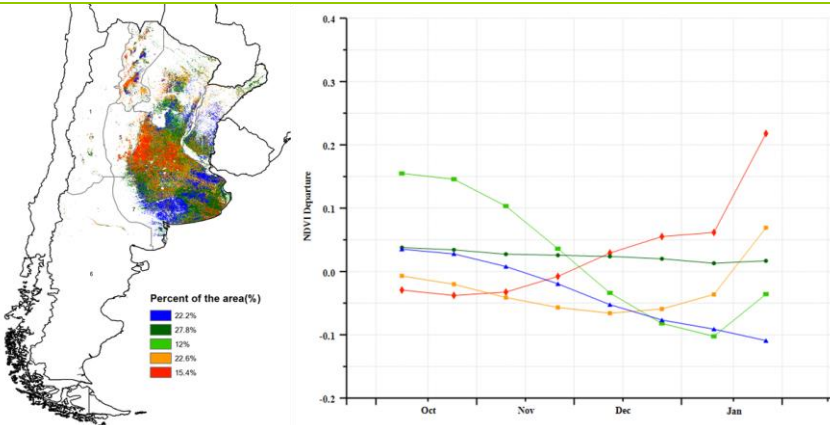


(a). Phenology of major crops



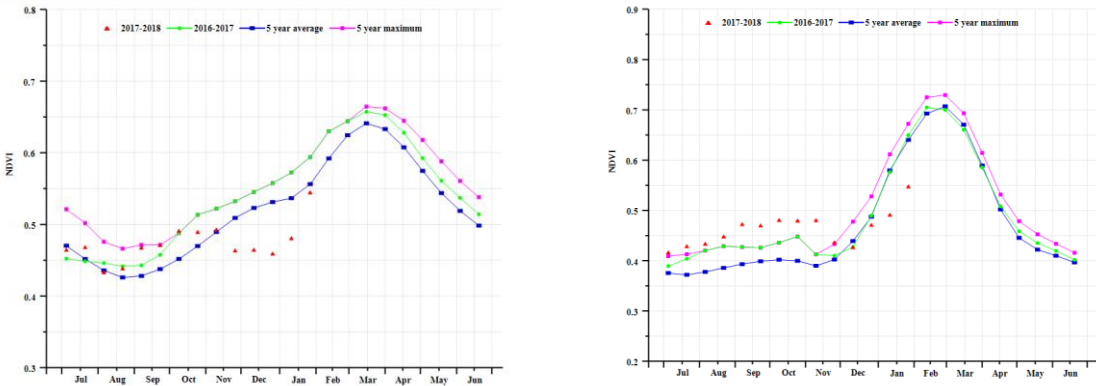
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

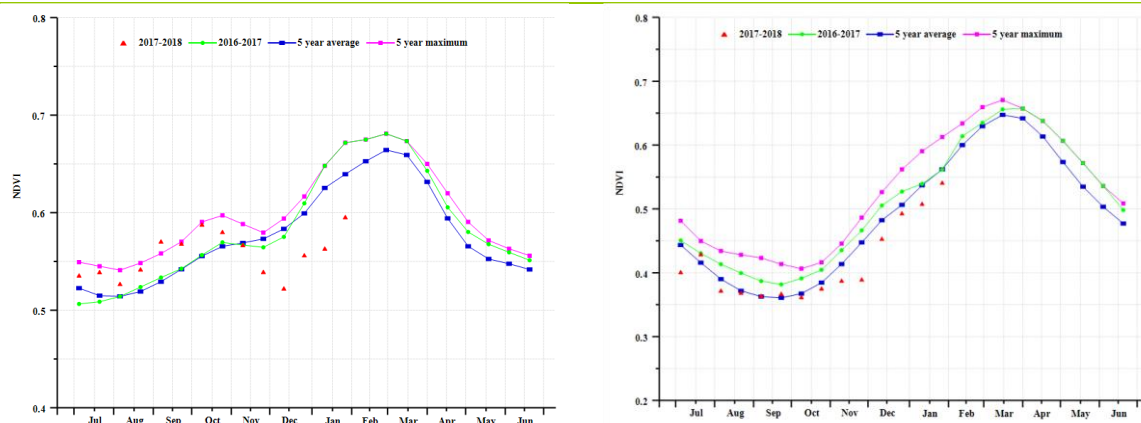


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

Table 3.2. Argentina agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Chaco	442	-20	25.1	-1	1344	0
Mesopotamia	623	-15	23.3	-1	1411	3
Pampas	332	-29	20.5	-1	1476	1
Tropical highland	356	-17	24.4	-1	1222	0

Table 3.3. Argentina agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Chaco	1371	-10	1	11	0.86
Mesopotamia	1609	-7	1	0	0.81
Pampas	1184	-17	1	7	0.77
Tropicalhighland	1056	-16	1	10	0.83

Table 3.4. CropWatch-estimated wheat production for Argentina in 2017-2018 (thousand tons)

Crops	Production 2016-2017	Yield variation(%)	Area variation(%)	Production 2017-2018	Production variation(%)
Wheat	11630	- 1.6	- 3.2	11080	-4.7

ARG AUS BGD BRA CAN DEU EGY ETH FRA GBR IDN IND IRN KAZ KHM MEX MMR NGA PAK PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF

[AUS] Australia

The main crops of Australia are wheat and barley, which are planted mainly from May to July and harvested from October to January. The monitored time period thus covers the harvest of wheat and barley in Australia. Based on spatial NDVI patterns and profiles, the harvest started in October. At that time, the crop condition in Australia was below average. To be more specific, the south-eastern part of New South Wales and north-eastern part of Victoria show poor crop conditions, accounting for about 25% of the cropped land of Australia. The South-western part of West Australia and south-eastern South Australia also show partly below average condition in October, accounting for about 39.5% of the cropped land of Australia. The VCIx below 0.5 confirms the condition in the regions mentioned above. The NDVI returned to average later but that average is "post-harvest" as crops are no longer in the field. The CALF decreased by 7%, compared to the last 5 year average.

Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, four agroecological zones (agro-ecological zones, AEZ) can be distinguished for Australia, which are relevant for crops cultivation. They include the Southeastern wheat zone, Southwestern wheat zone, Wet temperate and subtropical zone, and Subhumid subtropical zone.

The crop condition in the Southeastern wheat zone, especially in the north part showed below average crop condition at the start of the harvest in October. It is possibly due to 22% excess rainfall and 5% lower radiation with a higher temperature of about 0.6°C. Most of the VCIx lies in the range below 0.5. Furthermore, the CALF has decreased by 13%. Below average production is likely.

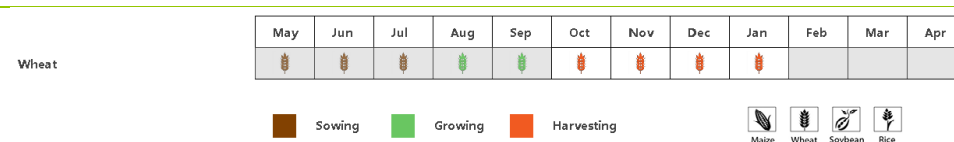
The crop condition in the Southwestern wheat zone shows basically average situation in this period of harvesting. The region received 6% above average rainfall and 2% below average RADPAR, with average TEMP. The VCIx is in the range of 0.5-0.8 and 0.8-1.0 for most of the region. The CALF there increased by 8% and good output is expected.

The crop condition in Wet Temperate and Subtropical Zone shows partly below average crop condition at the time of harvest from October. It is possibly due to the deficit in rainfall of 8% and low RADPAR (-4%). The VCIx is in the range of 0.5-0.8 and 0.8-1.0 for most of the region. The CALF there underwent a small increase of 2%. Average to good output is expected here as well.

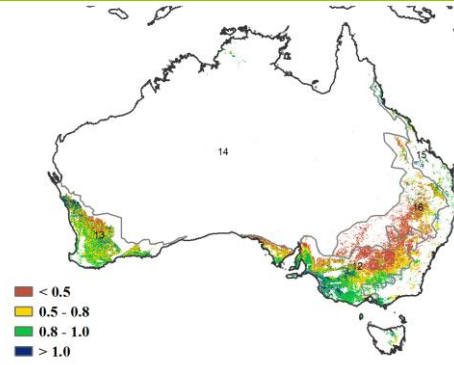
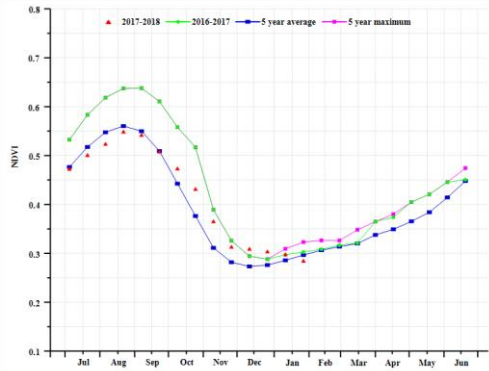
The crop condition in the Subhumid subtropical zone, especially in the southern part was below average in October. Furthermore, CALF dropped significantly (27%) and VCIx of only 0.42, indicating poor yield and production for this AEZ. An average crop is unlikely.

On the whole, with the cropped arable land decreased by 7.2% and yield decreased by 16.1% in Australia, CropWatch forecasts a production drop of 22.1% for wheat and barley in 2017.

Figure 3.6. Australia crop condition, October 2017-January 2018

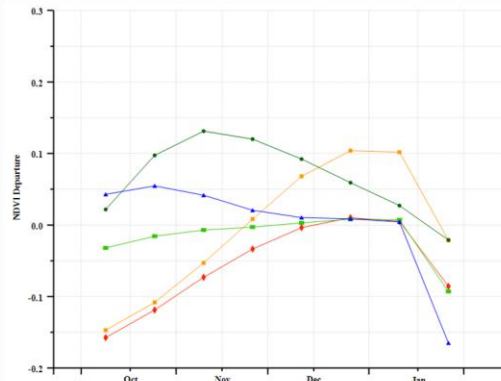
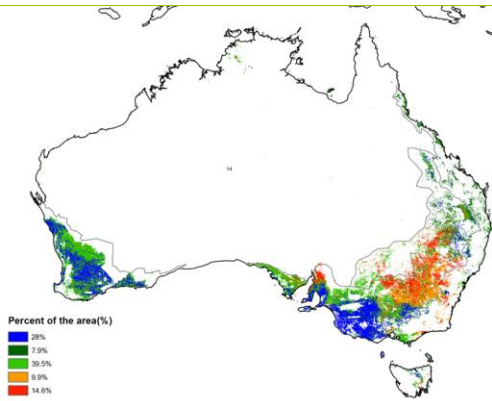


(a). Phenology of major crops



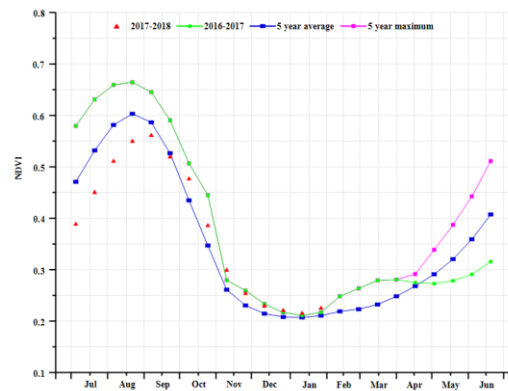
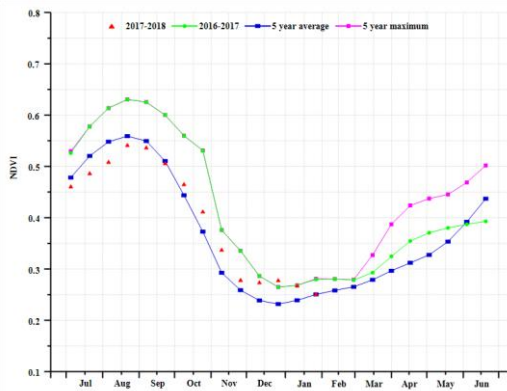
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

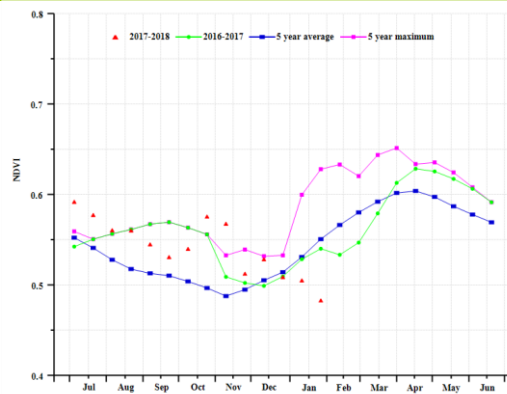
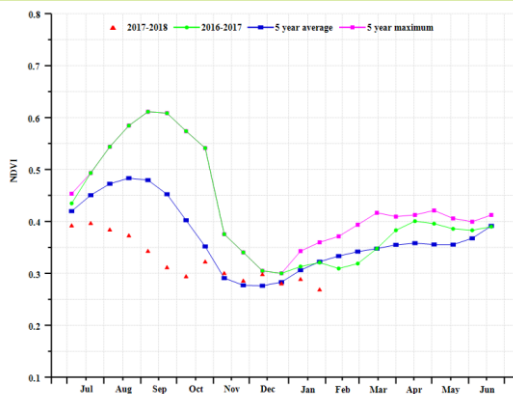


(d) Spatial NDVI patterns compared to 5YA

(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 (Subhumid subtropical zone (left) and Wet temperate and subtropical zone (right))

Table 3.5. Australia agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Southeastern wheat zone	196	22	20.7	0.6	1451	-5
Southwestern wheat zone	106	6	19.6	-0.3	1539	-2
Arid and semiarid zone	1033	64	27.8	-0.6	1309	-5
Wet temperate and subtropical zone	333	-8	20.7	0.2	1348	-4
Subhumid subtropical zone	265	-2	24.2	0.2	1492	-1

Table 3.6. Australia agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		CALF		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current	Departure from 5YA (%)	
Southeastern wheat zone	837	29	1	-13	0.66
Southwestern wheat zone	455	8	1	8	0.63
Arid and semiarid zone	1357	18	1	11	0.77
Wet temperate and subtropical zone	1088	0	1	2	0.38
Subhumid subtropical zone	986	8	0	-27	0.42

Table 3.7. CropWatch-estimated wheat production for Australia in 2017-2018 (thousand tons)

Crops	Production 2016-2017	Yield variation (%)	Area variation (%)	Production 2017-2018	Production variation (%)
Wheat	31600	-16.1	-7.2	24606	-22.1

[BGD] Bangladesh

The current reporting period covers the growing season for Aman rice and field preparation and early growth of Boro rice and wheat crops. Although October to January is off-monsoon season, the country received 364 mm of rainfall, which exceed average by 63%. At 22.4°C TEMP was 0.4 °C cooler than average and conducive to crop growth. RADPAR was 11% below average but it has probably not seriously affected the irrigated dry season at a time when cloudiness is low. A 69% higher than 5YA BIOMSS accumulation was indicated, which is corroborated by NDVI remaining above 5 year average. CALF shows a marginal increase of 0.3% but VCIx of 0.95 indicates good crop condition. All the above factors indicate good prospect for crops except for Aman rice at its maturity/harvesting stages.

Regional analysis

Bangladesh comprises four agro-ecological regions, which are the Coastal region, the Gangetic plains, the Hilly region and the Sylhet basin.

The Coastal region recorded heavy rainfall of 446 mm (76% higher than average) and the temperature of 22.7°C was marginally lower than average. RADPAR down by 12% is probably of marginal significance as sunshine is high during the "dry" season which lasts approximately from December to February. Following high rainfall BIOMSS at 1118 gDM/m² is 74% higher than expected, which is corroborated by higher than average NDVI throughout the period except the last observation. CALF has shown no change but VCIx of 0.95 indicates good crop condition for Boro rice and wheat. There may have been some problem for Aman rice at maturity and harvesting due to higher rainfall.

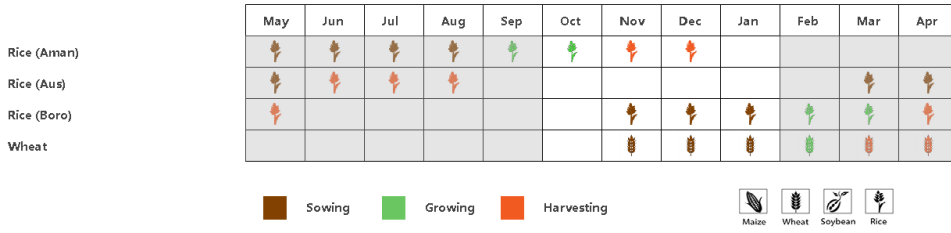
The Gangetic region received abundant rainfall of 493mm (+54%) with 21.8 °C temperature and 7% below average RADPAR, leading to 65% above 5YA BIOMSS. Initially NDVI was lower than average but picked up in November and remained higher later on indicating good crop growth. CALF and VCIx both have been favorable. Overall condition is very good for Boro rice as well as wheat.

The Hill region too received high rainfall of 493mm (+46%) and relatively cool temperature of 22.5 °C (-0.7 °C) but RADPAR was low by 7.5%. BIOMSS is still estimated at 1174 gDM/m² (+63%). It is supported by consistent high NDVI throughout the period, except the last observation (it could be cloud contamination, as no adverse condition is observed). Nearly 99% of crop planted area and equally good VCIx of 0.95 confirm the possibility of good harvest of both crops.

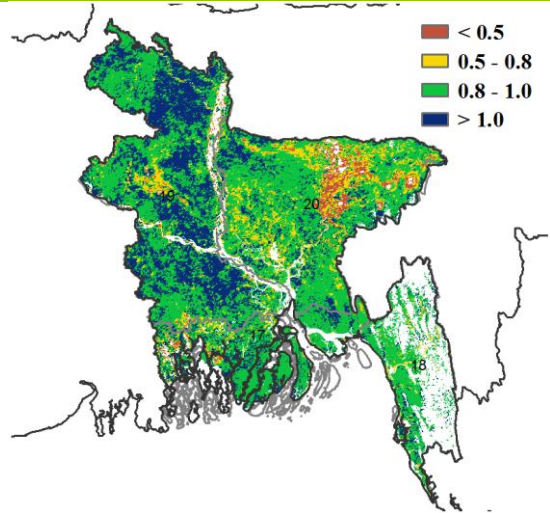
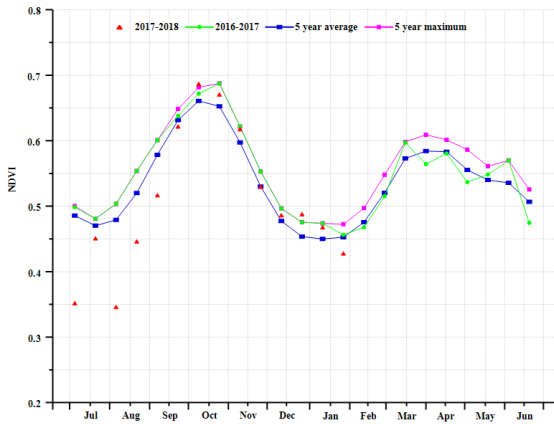
The Sylhet basin too received high (+78%) rainfall, 22.2 °C temperature but -12% RADPAR. Still BIOMSS of 852 gDM/m² corresponds to a 75% increase over average; NDVI remained average during the period. Crop planted area has not changed and VCIx of 0.89 does not indicate so good crop prospect for Boro rice and wheat as in other regions. Aman may have been affected by excess moisture at the time of maturity.

Overall Bangladesh is expected to have good harvest of Boro rice and wheat, discounting some adversity to Aman rice during maturity and harvesting stage due to high rainfall. It will be important to watch weather for remaining period of Boro rice and wheat crops.

Figure 3.7. Bangladesh crop condition, October 2017-January 2018

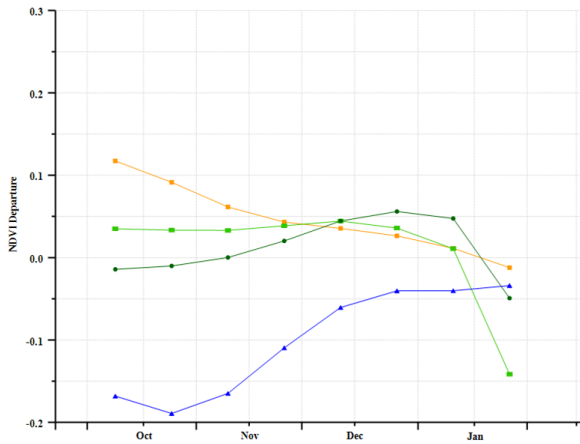
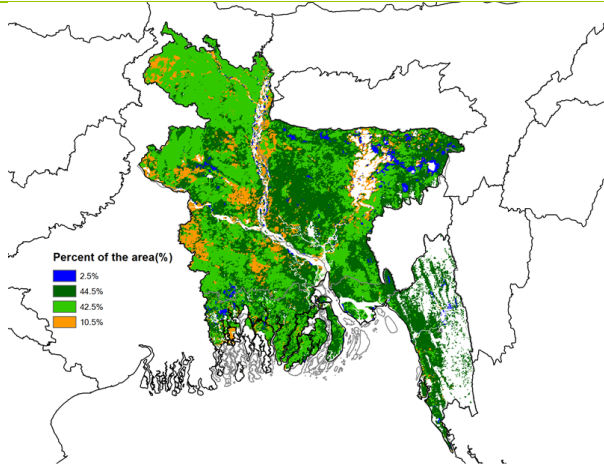


(a). Phenology of major crops



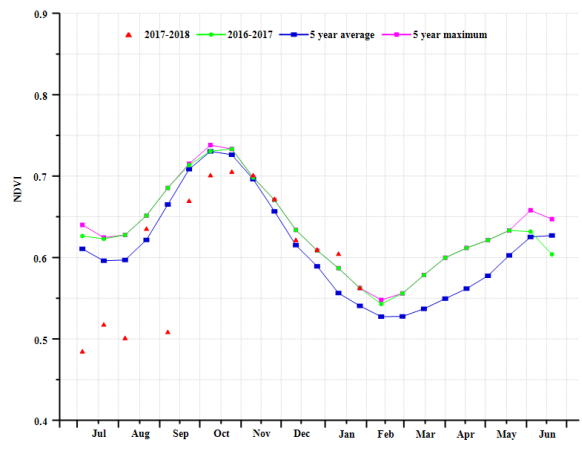
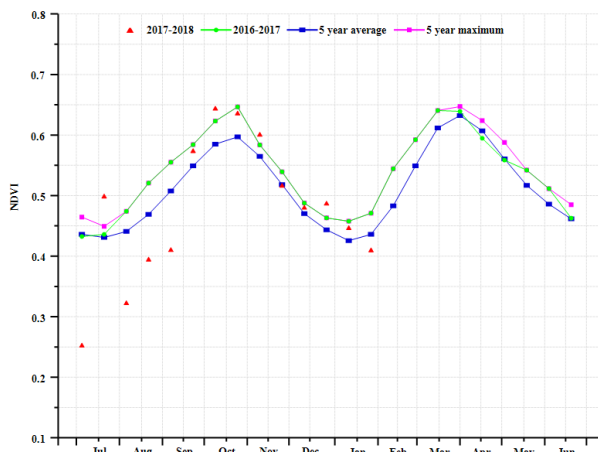
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

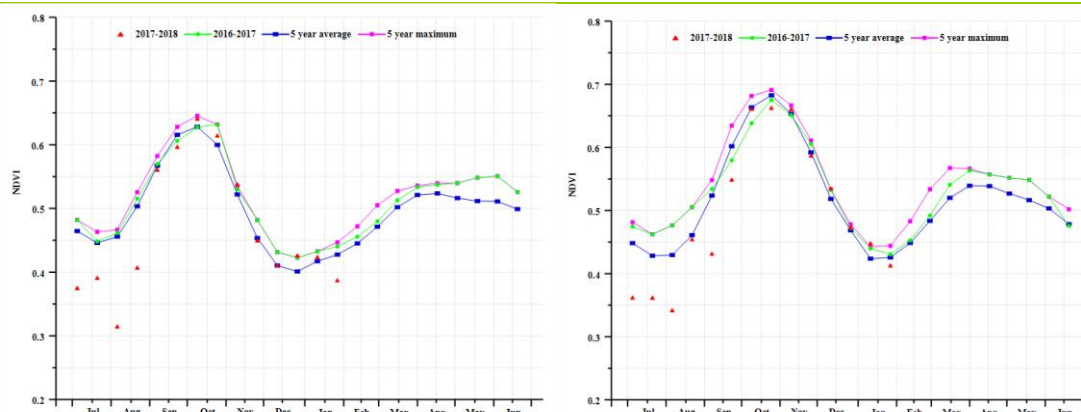


(d) Spatial NDVI patterns compared to 5YA

(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 agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Coastal region	449	76.1	22.7	-0.6	833	-12.4
Gangetic plain	280	54.3	21.8	-0.4	806	-12.3
Hills	493	46.3	22.5	-0.7	881	-7.5
Sylhet basin	369	78.6	22.2	-0.1	803	-11.8

Table 3.9. Bangladesh agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Coastal region	1018	74.2	91	0	0.95
Gangetic plain	730	65.4	96	1	1.00
Hills	1174	62.3	99	0	0.95
Sylhet basin	852	75.5	87	0	0.89

[BRA] Brazil

This bulletin covers the harvest of maize in northeastern Brazil and wheat in late December, as well as the sowing season of maize, soybean and rice.

Generally, crop condition in Brazil was favorable compared to the same period in the previous five years. According to the CropWatch agroclimatic indicators, weather conditions were close to average. As a whole country recorded average rainfall (722 mm) and temperature (26.3 degree). Together with -4% below average radiation, BIOMSS was 1% above the previous five years average. However, agro-climatic conditions differ significantly from state to state especially for rainfall. RAIN departures by state ranged from -13% to +44%. Minas Gerais, Rio Grande Do Sul, Goias, and Mato Grosso experienced below average rainfall, with -13%, -10%, -10% and -8% negative departures, respectively. It needs to be highlighted that in the major producing state of Parana RAIN reached 1118 mm, the highest departure in the country (44% above average). Other states including Sao Paulo, Ceara, Santa Catarina, and Mato Grosso Do Sul also received favorable rainfall with 5%, 12%, 15% and 31% above average, respectively. Temperature departure from average was generally negative except in Ceara where TEMP was average (+0.4 degree). Sufficient rainfall in Ceara, Santa Catarina, Mato Grosso Do Sul, and Parana benefited crops and resulted in positive BIOMSS departure.

According to the nation-wide NDVI profile for Brazil, crop condition was below average from October to December and caught up with the 5YA and the previous year in January. Spatial and temporal patterns of crop condition during the monitoring period are shown in the NDVI departure clustering map. The eastern coastal regions are the only area that presents above average conditions throughout the monitoring period. Most areas of southern Brazil experienced overall average condition. Crop condition in Mato Grosso, Mato Grosso Do Sul and Goias was below average but exceeded average from early January due to favourable precipitation. The Nordeste was the only area where crop condition was below average in January 2018. The national average maximum vegetation condition index (VCIx) value for Brazil was 0.97 during the monitoring period. The VCIx map also presents values above 0.8, indicating good conditions nation-wide. Values below 0.5 appear only in the southern part of Rio Grande Do Sul and Nordeste regions because of water shortage. Most arable land in Brazil are cultivated. Cropped arable land fraction (CALF) reached 97%, 2% above 5YA.

Wheat production for Brazil is revised at 7876 ktons, 4.4% up compared to that in 2016-2017 season, but 244 ktons down from the previous production estimate issued by CropWatch last November.

Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, eight agro-ecological zones are identified for Brazil. These include the Amazonas, Central Savanna, Eastern coastal zone, Northeastern mixed forest and farmland, Mato Grosso, Nordeste, Parana basin, and Southern subtropical rangelands. Over the recent reporting period, only two zones (Northeastern mixed forest and farmland and Parana basin) received above average rainfall. RAIN in all other six zones was below average, ranging from -6% in Mato Grosso and -25% in Southern subtropical rangelands. The deficit region is part of a larger problem area in the south of the continent (refer to Chapter 1) Considering the crops calendar, this bulletin will focus on all zones except Amazonas.

Conditions were well below average in the Southern subtropical rangelands during the monitoring period, with 25% below average RAIN and average TEMP and RADPAR. Shortage of rainfall resulted in 10% below average BIOMSS. CALF at 100% nevertheless indicates that all cropland is cultivated. NDVI

profiles confirm the drought stress: crops in this zone are well below five-year average condition. The VCIx map shows lower values compared with other zones.

The Parana Basin zone is the major wheat producing area of the country. Agroclimatic conditions were overall above average, with RAIN at +11% and BIOMSS at +5%. CALF at 100% indicates that almost all cropland is cultivated. Favorable agro-climatic conditions in the zone benefitted crops and resulted in VCIx close to 1.0 (0.97). NDVI development profile indicates that crops are reaching their peaks and NDVI is above 5YA.

Adverse weather conditions in the Nordeste resulted in unfavorable crop condition. The region received the least rainfall compared to other zones, 11% lower than average for the monitoring period. Lack of rainfall hampered the crop development. As indicated by the NDVI development profile, NDVI has been below 5YA average since Oct. 2017 but still slightly above the previous year. VCIx for the zone was just 0.74 and CALF was just 62%, well below that of other zones.

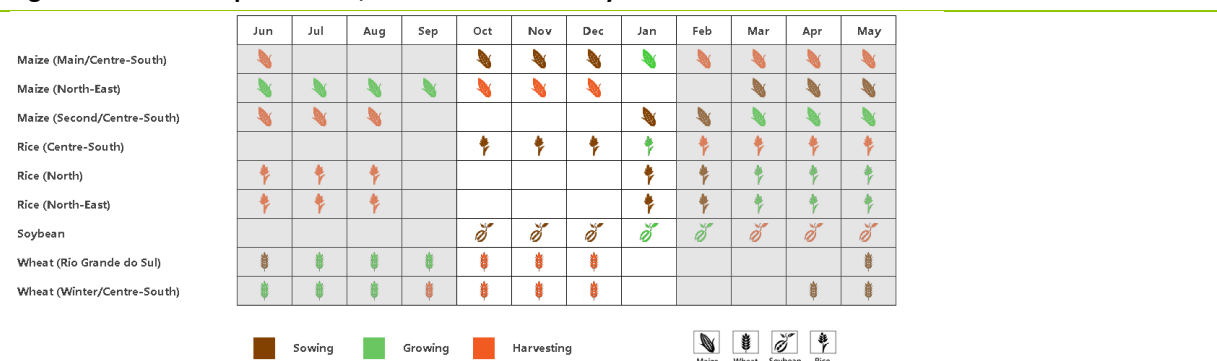
The Mato Grosso zone covers the states of Mato Grosso and Rondonia, as well as a northern part of Mato Grosso do Sul. Maize and soybean are at early development stages in the region. Agro-climatic conditions over the reporting period were close to average with 6% below average RAIN and average TEMP and RADPAR. The zone recorded 919mm rainfall which is beneficial for summer crops development. The NDVI profile over cropland reflects below average conditions before January and almost caught up with the 5YA in January 2018. Almost all cropland is cultivated and VCIx is 1.0, which confirms the favorable crop condition.

Rice in the Northeastern mixed forest and farmland zone is currently at sowing. Agro-climatic conditions were generally above average with RAIN at 9% above average and BIOMSS at 5% above 5YA. Abundant rainfall during the monitoring period provided sufficient water moisture for the crops after sowing.

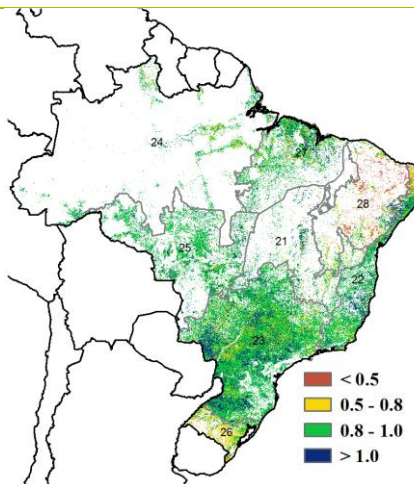
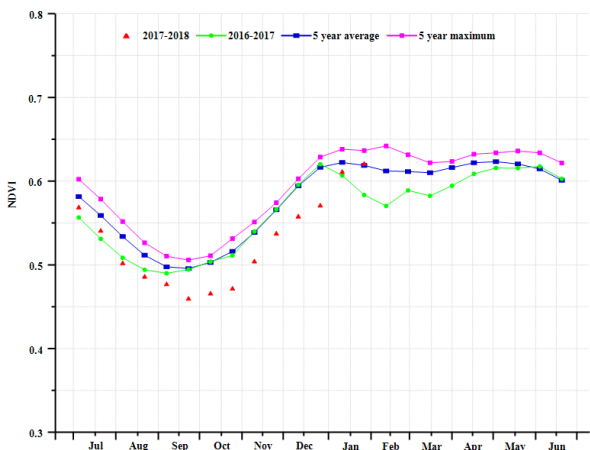
In the Eastern coastal zone, the sowing of rice is still on-going. Generally below average crop condition due to shortage of rainfall (492mm rainfall, 13% below average) is confirmed by the 5YA NDVI crop development profile.

The major output from Central Savanna zone is not crops but rangelands and meat, which makes the region important in terms of food security. Overall unfavorable climatic conditions dominated the area (RAIN, -13% and BIOMSS 5% below 5YA). Nevertheless, vegetation condition is still at 5YA average according to the NDVI development profile.

Figure 3.8. Brazil crop condition, October 2017-January 2018

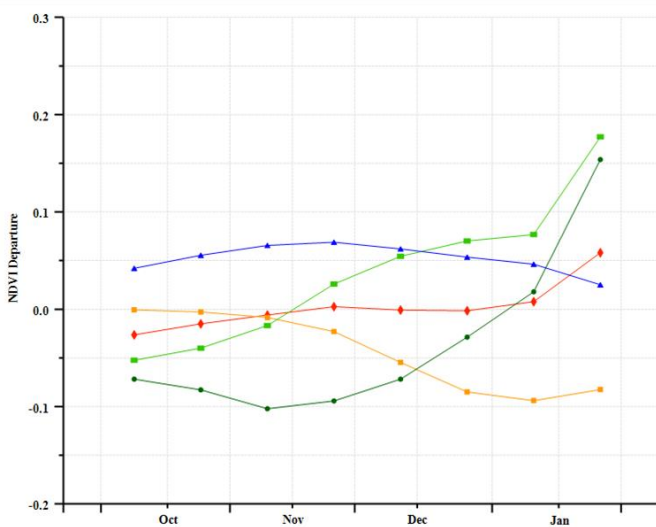
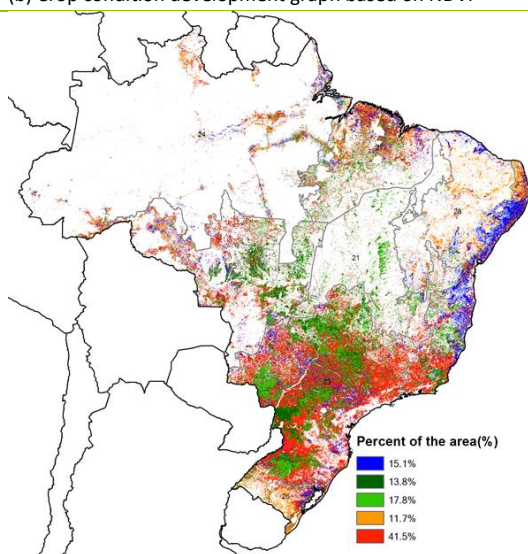


(a). Phenology of major crops



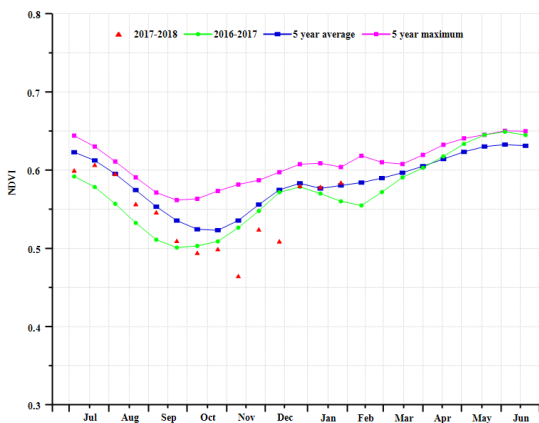
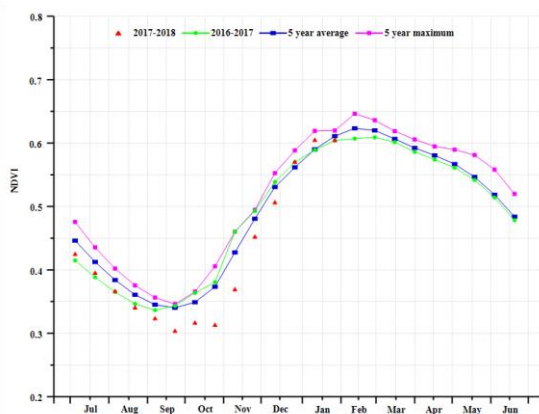
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

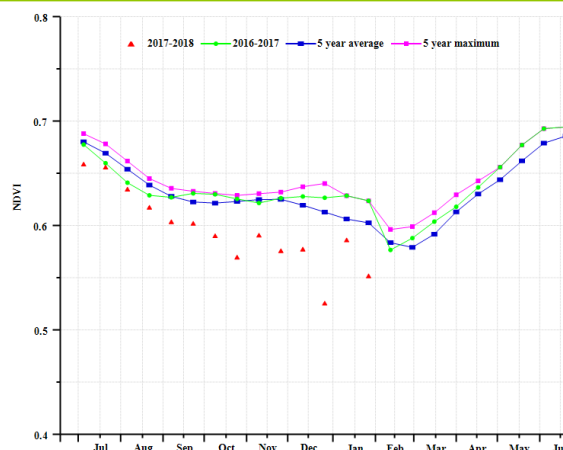
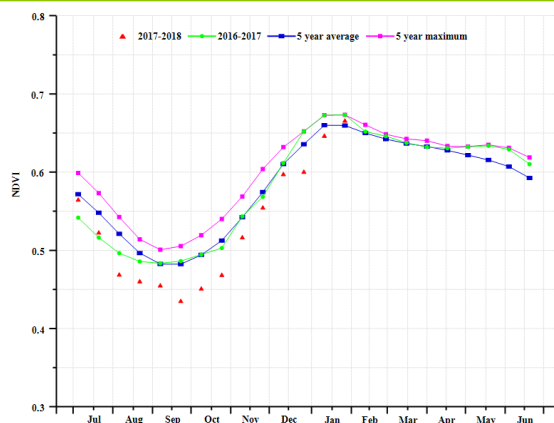


(d) Spatial NDVI patterns compared to 5YA

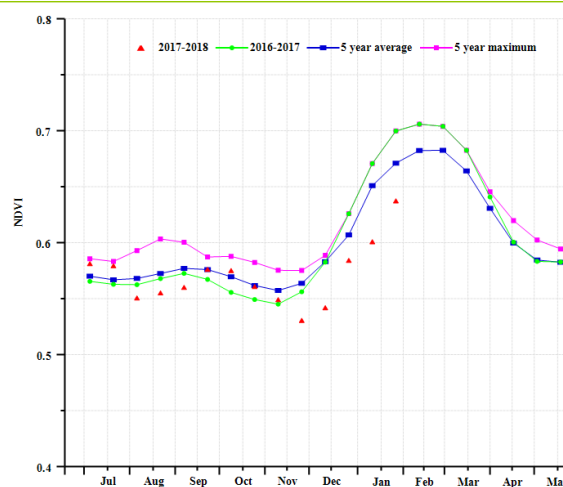
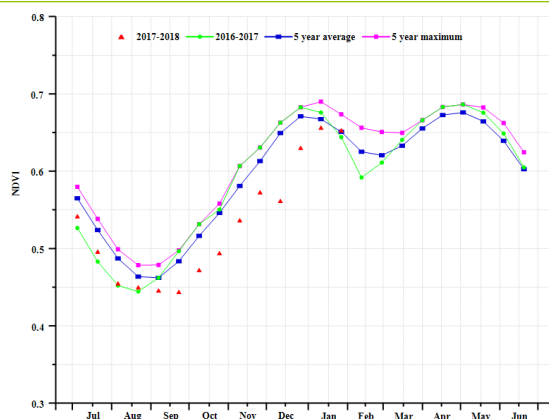
(e) NDVI profiles



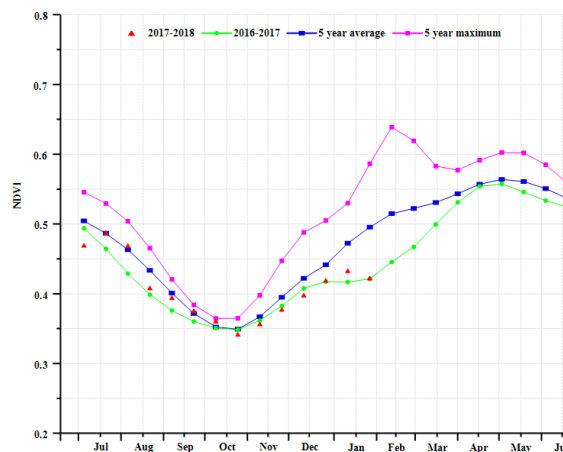
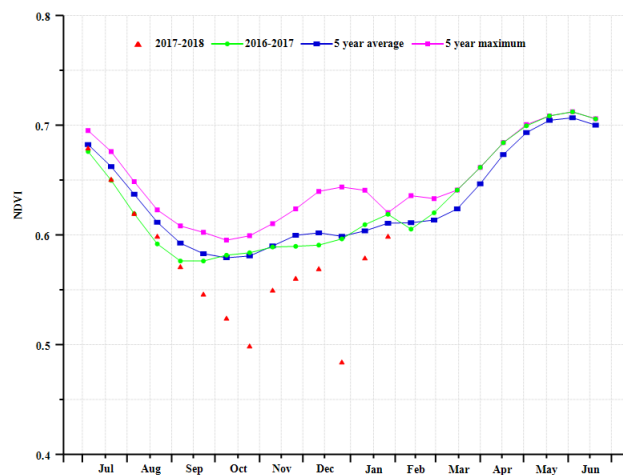
(f) Crop condition development graph based on NDVI (Central Savanna(left) and East coast(right))



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



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



(j) Crop condition development graph based on NDVI (Northeastern Mixed forest and farmland (left) and Nordeste (right))

Table 3.10. Brazil agro-climatic indicators by agroecological zones, current season values and departure from 15YA, October 2017 to January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)

Amazonas	627	-9	28.1	-0.3	1043	-5
Central Savanna	632	-14	26.5	-0.3	1221	-1
East coast	492	-13	25.2	-0.6	1175	-4
Northeastern mixed forest and farmland	662	9	28.3	-0.5	1078	-7
Mato Grosso	919	-6	27.1	-0.7	1088	-5
Nordeste	246	-11	28.6	0.5	1306	-5
Parana basin	889	11	24.1	-0.6	1197	-4
Southern subtropical rangelands	535	-25	23.2	-0.5	1353	1

Table 3.11. Brazil agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Amazonas	1618	-5	99	1	1.01
Central Savanna	1698	-5	97	8	0.98
East coast	1251	-4	97	4	1.02
Northeastern mixed forest and farmland	1637	5	99	1	1.04
Mato Grosso	2254	-1	100	0	1.00
Nordeste	791	3	62	18	0.74
Parana basin	2085	5	100	0	0.97
Southern subtropical rangelands	1504	-10	100	0	0.80

Table 3.12. CropWatch-estimated wheat production for Brazil in 2017-2018 (thousand tons)

Crops	Production 2016-2017	Yield variation (%)	Area variation (%)	Production 2017-2018	Production variation (%)
Wheat	7545	3.7	0.7	7876	4.4

[CAN] Canada

The current reporting period covers the harvest of summer crops, and the sowing of winter wheat in Canada. Most agricultural areas were covered in snow from November, limiting the relevance of NDVI-based indicators.

Rainfall was 18% above average, which increased soil moisture storage for winter wheat. The temperature was average and radiation was slightly below average (-4%), with the maximum VCI value was 0.74. The potential biomass accumulation index was slightly above the recent five-year average (BIOMSS, +5%).

In Manitoba (RAIN, -7%) and Saskatchewan (RAIN, +16%), two of the three main production provinces, the drought which lasted for the last 3 reporting periods is basically over, and the potential biomass was almost equal to the average of last 5 years (BIOMSS, Manitoba -4%; Saskatchewan 2%).

As a result, the overall condition of crops in Canada would be good due to the rainfall. The production is expected to be better than during 2017 if the favourable conditions continue.

Regional analysis

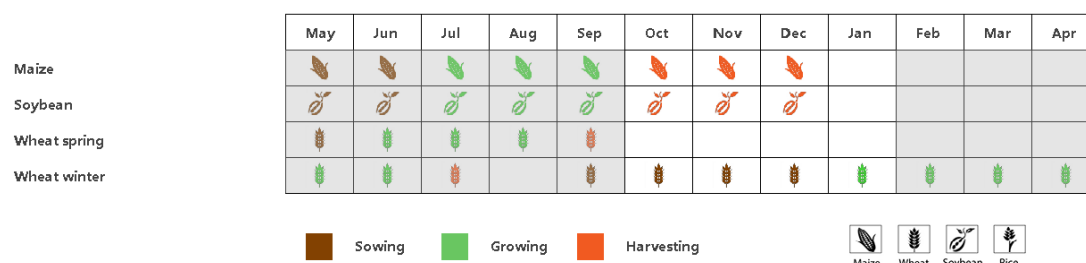
The Prairies (area identified as 32 in the VCIx map) and Saint Lawrence basin (34, covering Ontario and Quebec) are the major agricultural regions.

In the Prairies, the main food production area in Canada, rainfall was above average (122mm or +9%), the temperature was average while the radiation was slightly below (RADPAR, -4%). The potential biomass was slightly above the five-year average (BIOMSS, 3%). Probably because of snow, the Cropped Arable Land Fraction dropped significantly (CALF, -22%), the VCIx was 0.66, and the NDVI was largely below the average from November to December, while it was slightly better than the last five years in January. The crop production of 2018 could be favourable if good weather continues.

In the Saint Lawrence basin region, rainfall was above average (428 mm equivalent to +16%), the temperature was average and radiation was slightly below (RADPAR, -2%). Both the potential biomass and Cropped Arable Land Fraction were slightly above the average (BIOMSS, 4%; CALF, 1%), while the VCIx was 0.97. Based on the similar NDVI profiles to the Prairies, the agro-climatic indicators, especially the rainfall, indicate favourable crop prospects when compared to the last several years.

Overall, after the end of the drought, the outlook for wheat production is favourable.

Figure 3.9. Canada crop condition, October 2017– January 2018



(a). Phenology of major crops

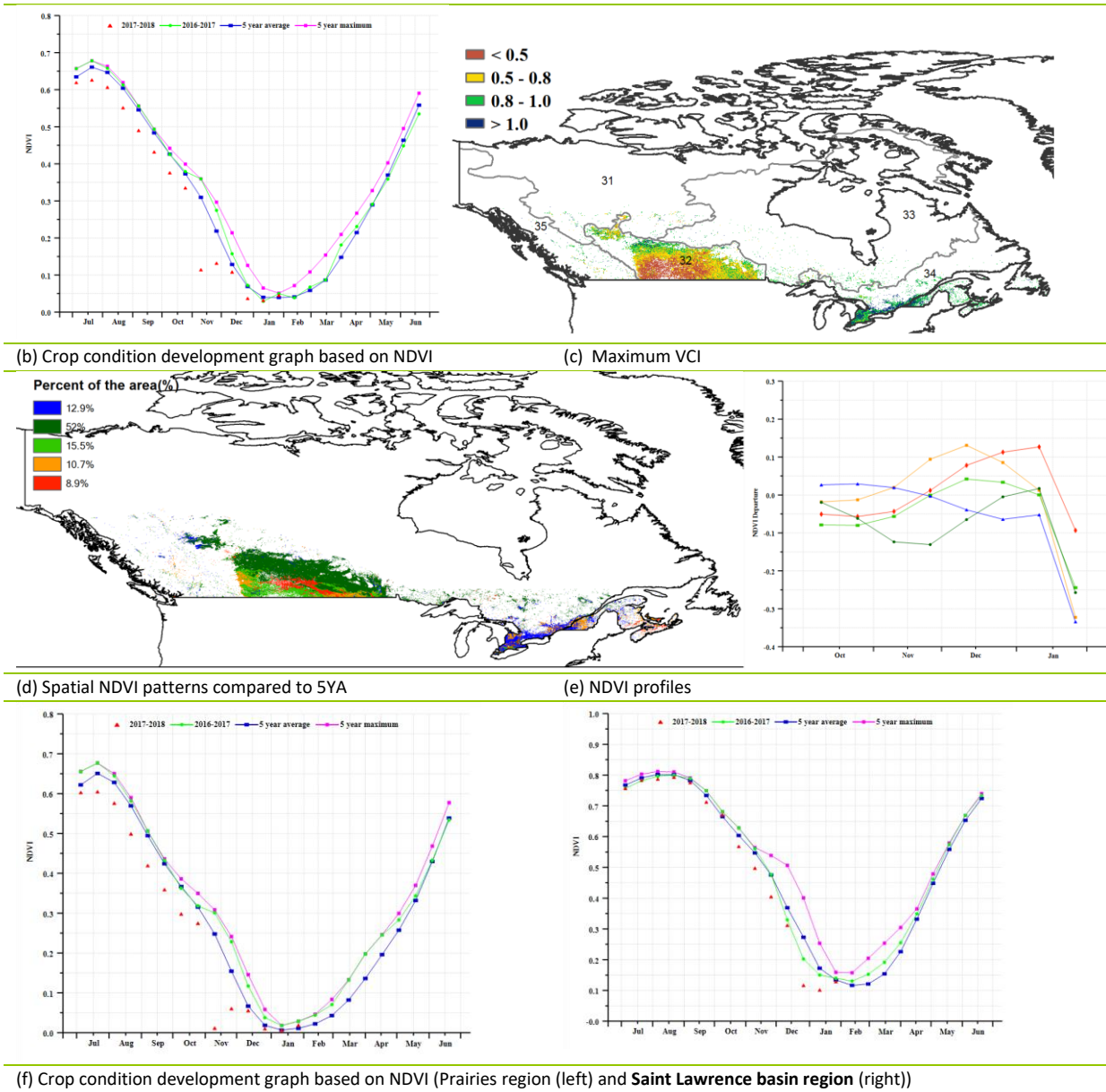


Table 3.13. Canada agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Prairies	122	9	-6.6	0.0	293	-4
Saint Lawrence basin	428	16	-2.3	0.0	346	-2

Table 3.14. Canada agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Prairies	430	3	31	-22	0.66
Saint Lawrence basin	637	4	99	1	0.97

[DEU] Germany

Crops in Germany generally showed above average condition over the reporting period, which covered the late stages of sugar beets (October harvest) and early vegetative stages of winter wheat and winter barley. The CropWatch agroclimatic indicators show that for the country as a whole, total precipitation (as measured by the RAIN indicator) was 33% above average, temperature was above average (TEMP, 1.2 °C), and radiation significantly below average (RADPAR, -15%). Negative rainfall departures occurred mostly from October to early November and above average rainfall occurred throughout the country after early November. With favorable moisture and suitable temperature, the biomass production potential (BIOMSS) is expected to increase by 14% nationwide compared to the five-year average, even if below average sunshine may reduce expectations. As shown in the national crop condition development graph and the NDVI profiles, the abundant rain delayed field operations. The VCIx in Germany during this monitoring period was 0.96. The snow has probably protected crops from cold weather and will continue to provide soil moisture. The outlook of winter crops is above average.

Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, six sub-national agro-ecological regions are adopted for Germany. They include, listed with their identification numbers: Wheat zone of Schleswig-Holstein and the Baltic coast, Mixed wheat and sugarbeets zone of the north-west, Central wheat zone of Saxony and Thuringia, Sparse crop area of the east-German lake and Heathland, Western sparse crop area of the Rhenish massif, and Bavarian Plateau. The numbers identify the areas on the maps.

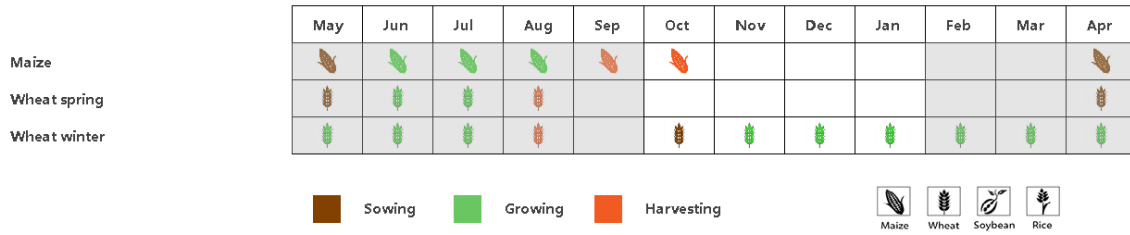
Schleswig-Holstein and the Baltic coast is the major winter wheat zone of Germany. The CropWatch agroclimatic indicator RAIN was well above average (+46%) with warm weather (TEMP, +1.2°C) and radiation significantly below average (RADPAR, -13%). With sufficient precipitation and suitable temperature, biomass (BIOMSS) in this zone is expected to increase by 16% compared to the five-year average. Due to two snow storms NDVI started dropping from December. The area has a high CALF (100%) as well as a favorable VCIx (0.95), indicating high cropped area and favorable crop prospects.

Wheat and sugarbeet are major crops in the Mixed wheat and sugarbeet zone of the north-west. The CropWatch agroclimatic indicators show that abundant RAIN (37% above average) and warm weather (TEMP, +1.1°C) resulted in favorable crop condition for both crops. Biomass (BIOMSS) in this zone is expected to increase by 11% compared to the five-year average. It is conjectured that snow has protected crops from cold weather and will continue to provide sufficient soil moisture. Therefore, crop condition for the region is good according to the high VCIx (0.96).

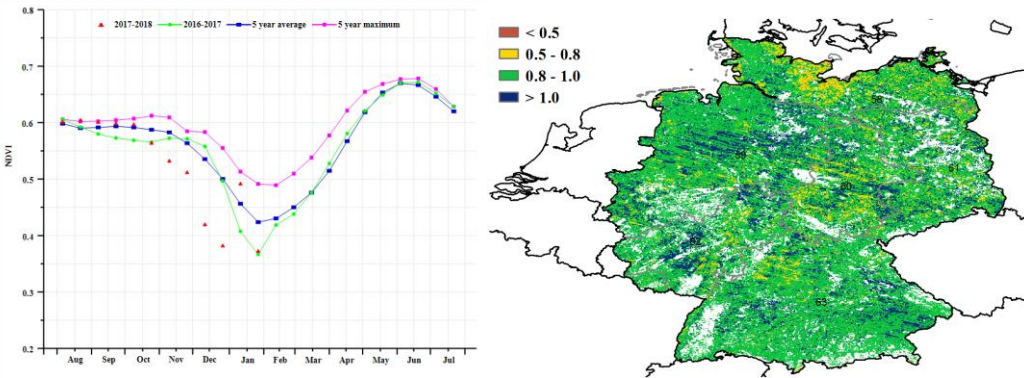
Central wheat zone of Saxony and Thuringia are another major winter wheat zone; it received about 26% above average rainfall and experienced warm weather condition (TEMP, +1.5°C). Due to favourable weather, the biomass potential (BIOMSS indicator) increased by 19% above average. The VCIx of 0.94 for this region also shows favorable crop prospects.

The sparse crop area of the east-German lake and Heathland district, and western sparse crop area of the Rhenish massif experienced very wet weather conditions, with RAIN above average (+32% and +37%, respectively), warm weather condition (TEMP, +1.7°C and +1.1°C), and very poor radiation (RADPAR, -17% and -18%). BIOMSS was up by 22% and 11% respectively with favorable moisture and temperature, while CALF was at 100% for both. Favorable crop condition was recorded with high VCIx values of 0.96 for the eastern and 0.97 for the western areas, respectively.

Figure 3.10. Germany crop condition, October 2017-January 2018

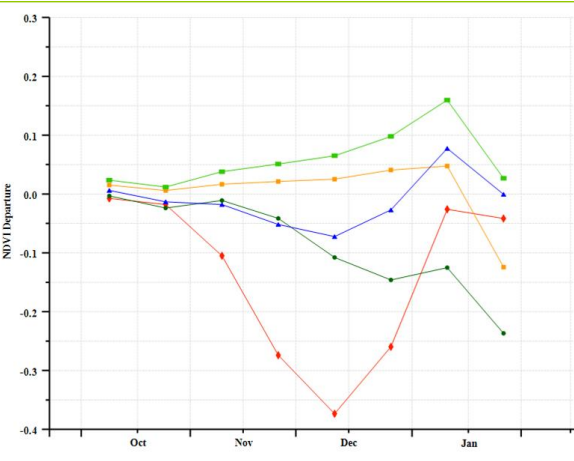
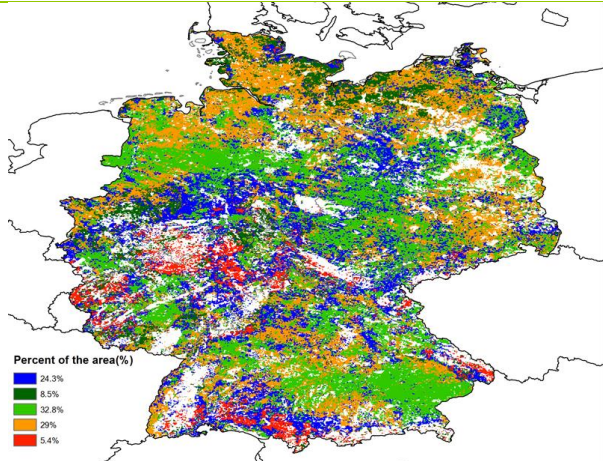


(a). Phenology of major crops



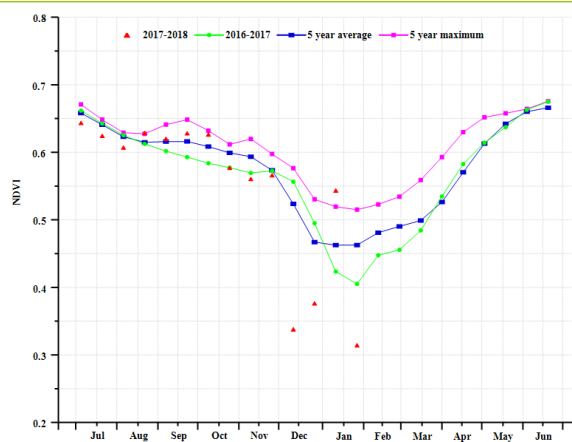
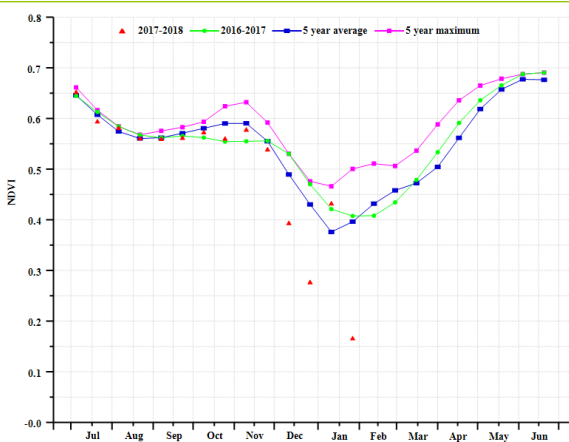
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

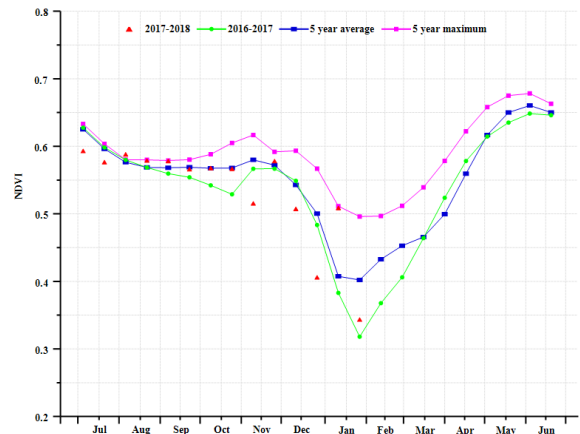
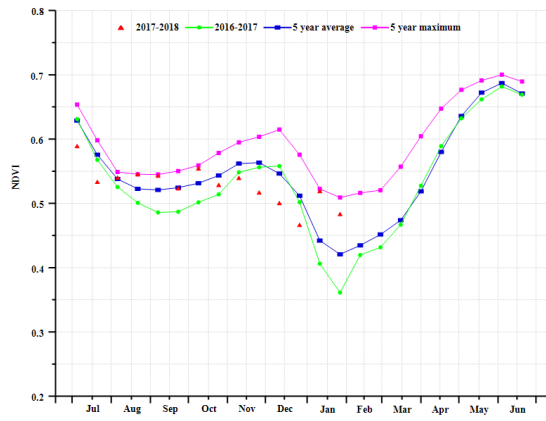


(d) Spatial NDVI patterns compared to 5YA

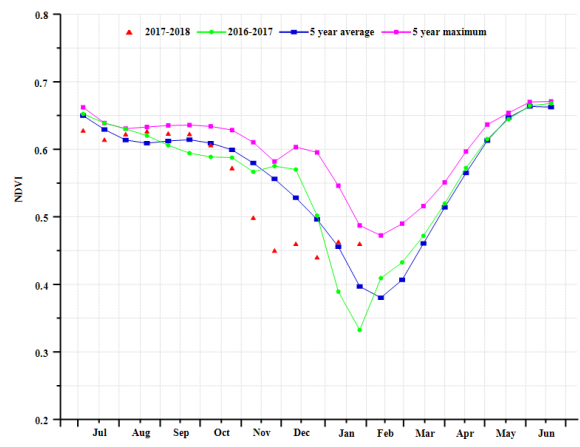
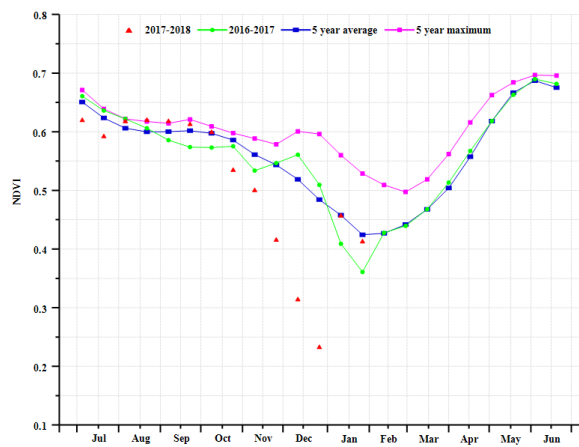
(e) NDVI profiles



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



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



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

Table 3.15. Germany agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Wheat zone of Schleswig-Holstein and the Baltic coast	345	46	6.3	1.2	169	-13
Mixed wheat and sugarbeets zone of the north-west	364	37	6.6	1.1	182	-17
Central wheat zone of Saxony and Thuringia	281	26	6.0	1.5	197	-17
Sparse crop area of the east-German lake and Heathland	280	32	5.8	1.7	193	-17
Western sparse crop area of the Rhenish massif	352	37	5.8	1.1	208	-18
Bavarian Plateau	340	26	4.7	1.2	258	-12

Table 3.16. Germany agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Wheat zone of Schleswig-Holstein and the Baltic coast	1102	16	100	0	0.95
Mixed wheat and sugarbeets zone of the north-west	1128	11	100	0	0.96
Central wheat zone of Saxony and Thuringia	1064	19	100	0	0.94
Sparse crop area of the east-German lake and Heathland	1067	22	100	0	0.96
Western sparse crop area of the Rhenish massif	1066	11	100	0	0.97
Bavarian Plateau	979	11	100	0	0.97

[EGY] Egypt

The reporting period includes the late stages and the harvest of summer crops, mostly maize and rice, potatoes, sugar cane, sugar beet and fiber crops, and the planting and early vegetative stages of winter wheat.

The recorded rainfall was 36 mm, down 35% below 55mm, the average of the period; TEMP (17.8°C) was about average but radiation was 760 MJ/m², -5% below average, which is significant for a variable and a location that normally shows little variation. Since all crops are irrigated RAIN usually plays a negligible part in the determination of yields (refer to the average rainfall above, which is sufficient to cover about 20 days of crop water consumption during the present cool season), but sunshine is the main limiting variable. In fact, rainfall in the Highlands of East Africa is more relevant to Egyptian agriculture than local precipitation.

The nation-wide crop development graph based on NDVI shows that the condition was slightly below the 5 years average. NDVI profile maps provide additional detail: only about 6% of summer crops were below average at the time of harvest. In January, which covers wheat and many winter vegetables, NDVI increased above average everywhere. VCIx is difficult to interpret as the period covers two cropping seasons, but values are nevertheless fair with the VCIx for the whole country at 0.8. The condition of the current winter crop is assessed as fairly good.

Regional analysis

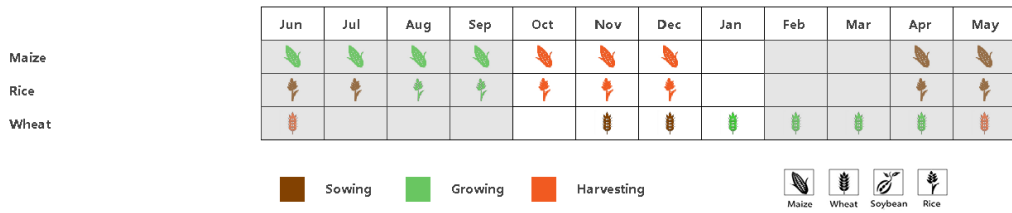
Egypt can be subdivided into three agro-ecological zones (AEZ) based mostly on cropping systems, climatic zones, and topographic conditions. Only two of them are relevant for crops: the Nile Delta and Mediterranean coastal strip, and the Nile Valley. They are identified by their numbers in the maximum VCI map.

The Nile Delta and Mediterranean coastal strip zone experienced agroclimatic conditions close to those of the country as a whole. In contrast, the rainfall in Nile Valley zone reached 94 mm, an increase of 73% compared with average. While the amounts involved are small, they nevertheless correspond to about 20 days of crop water requirements, and they are free. Therefore, rainfall has an economically and agronomically beneficial impact on rainfed crops. This appears in the rise of the BiOMSS index (39% over 6YA) but may be negatively affected by the RADPAR drop (3%) compared to the last 15YA. As a result, the BIOMSS has increased (39% above 5YA).

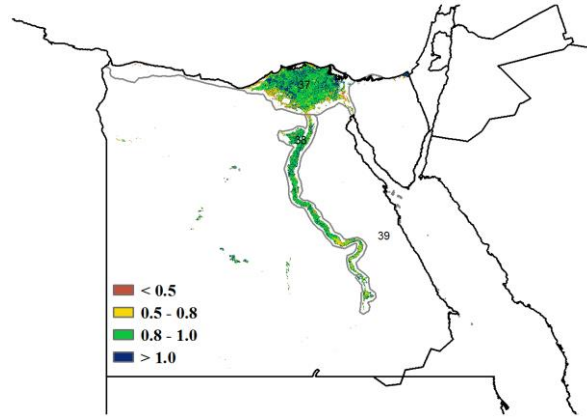
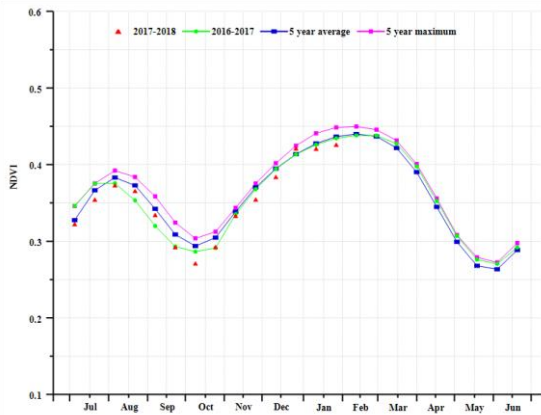
The Crop condition development graph based on NDVI for both zones indicates below average condition, especially in the Nile Delta and Mediterranean coastal strip zone in October.

Based mostly on the VCIx value and CALF variations (Nile Valley: 0.98 and +8%; Nile Delta and Mediterranean coastal strip zone: 0.81, +3%, respectively), CropWatch assesses crop condition in the Nile Valley AEZ as more favorable than in the north of the country.

Figure 3.11. Egypt crop condition, October 2017-January 2018

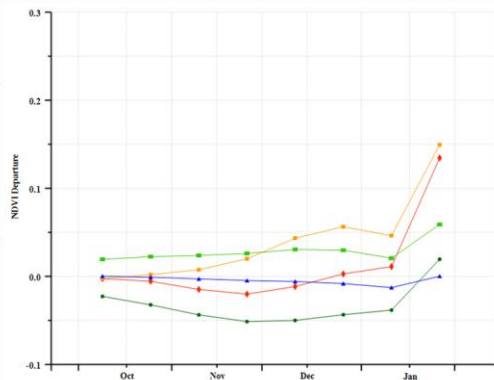
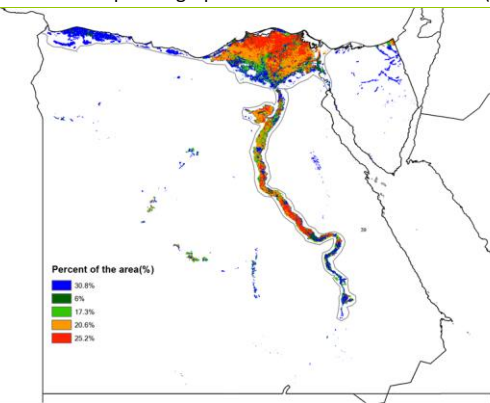


(a). Phenology of major crops



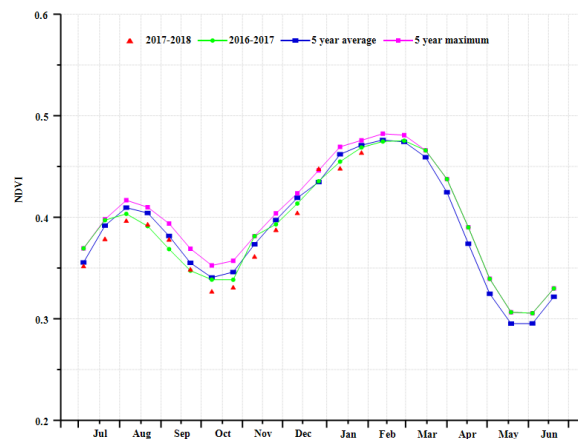
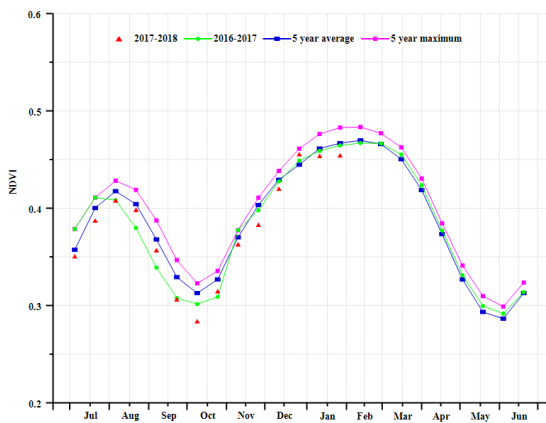
(b) Crop condition development graph based on NDVI

(c) Maximum VCI



(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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

Table 3.17. Egypt agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Nile Delta and Mediterranean coastal strip	23	-55	18.2	0	740	-5
Nile Valley	94	73	17.8	0	877	-3

Table 3.18. Egypt agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		CALF		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	
Nile Delta and Mediterranean coastal strip	125	-39	1	3	0.81
Nile Valley	176	39	1	8	0.98

ARG AUS BGD BRA CAN DEU EGY **ETH** FRA GBR IDN IND IRN KAZ KHM MEX MMR NGA PAK PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF

[ETH] Ethiopia

The monitoring period includes mainly the harvesting period for *Meher* maize, wheat and the preferred cereal, teff. Severe drought occurred in most of the eastern part of the country with deficits as high as 58% below the average. Similarly, temperature was between 1°C and 2°C below average. Coupled with average RADPAR, most of the country experienced reduced biomass expectations. According to the spatial NDVI profiles, 31% of the cropped area experienced worse conditions compared to the average. Despite persistent drought the CALF remained almost constant at 100%. Some parts of northern, eastern and south eastern regions recorded poor wheat crop condition with VCIx ranging from less than 0.5 to around 0.8.

Regional Analysis

The main rain-fed cereal producing areas include the South eastern mixed-maize zone of Oromia and Dire Dawa, Harari, Western mixed maize zone, and Central-northern maize-teff highlands zone including Addis Ababa, Amhara, and Tigray.

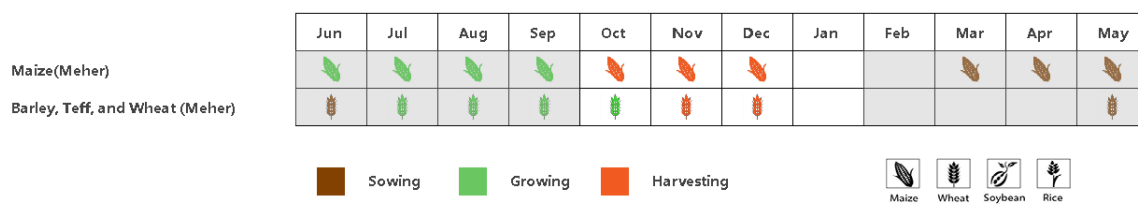
The south eastern mixed-maize zone (46) suffered severe drought (RAIN 69 mm) which is about 58% less than average. TEMP reduced by about 0.9°C, while RADPAR increased by 6%. The highest reduction in biomass (BIOMSS -52%) was recorded in this zone; it results from the combination of water shortage and increased water demand. Crop output is expected to be poor.

The western mixed maize zone recorded better rain than the previous one (RAIN 139mm) although it was still 22% short compared with average. BIOMSS was equally higher despite being 19% less than the average. The CALF of the south-eastern mixed-maize and the western mixed maize zones increased by 1%.

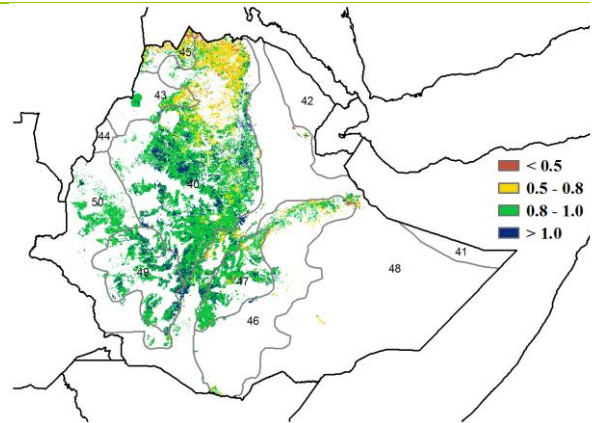
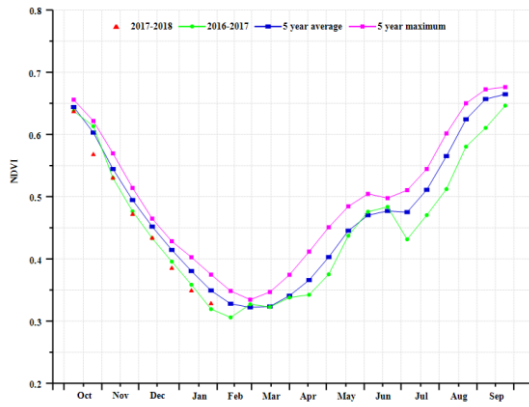
The CALF in Central-northern maize-teff highlands zone fell 1%. Central Amhara, the main teff and wheat producing area, high NDVI values of above 0.8, although RAIN was reduced by 37%, with average RADPAR. BIOMSS dropped 35% below average.

Overall, the drought effect on biomass production was evident across the regions and below average or just average crops can be expected.

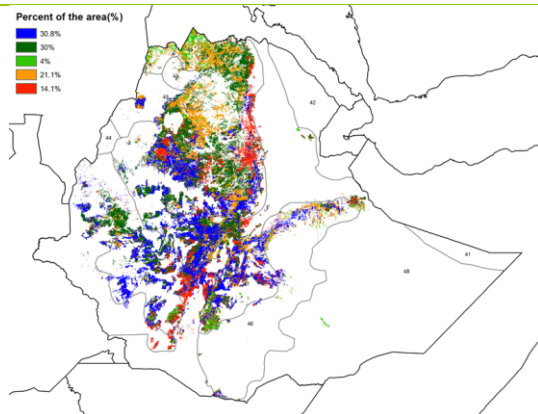
Figure 3.12. Ethiopia crop condition, October 2017-January 2018



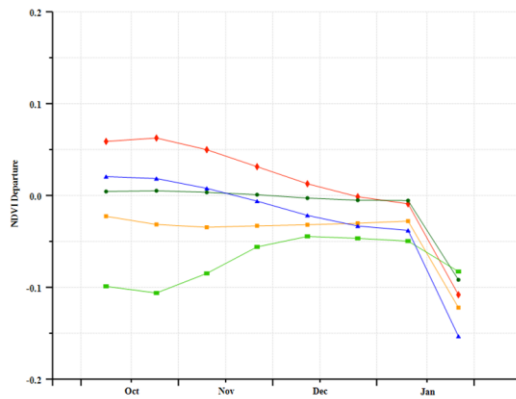
(a). Phenology of major crops



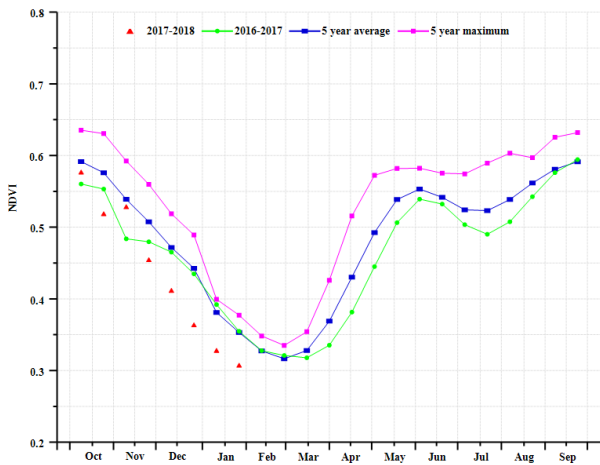
(b) Crop condition development graph based on NDVI



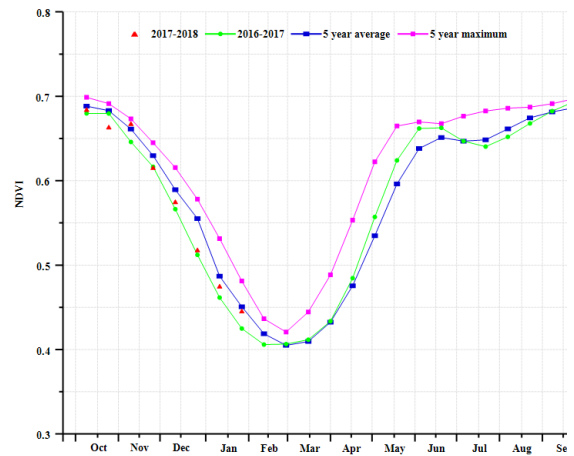
(c) Maximum VCI



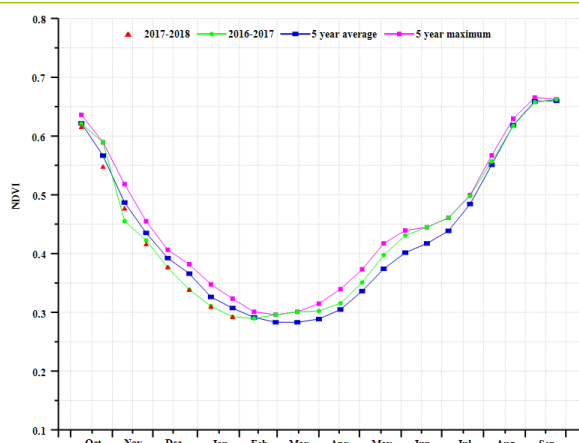
(d) Spatial NDVI patterns compared to 5YA



(e) NDVI profiles



(f) Crop condition development graph based on NDVI (south-eastern mixed-maize (left) and western mixed maize zone (right))



(g) Crop condition development graph based on NDVI (Central-northern maize-teff highlands zone)

Table 3.19. Ethiopia agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
South-eastern mixed maize zone	69	-58	20.2	-0.9	1300	6
Western mixed maize zone	139	-22	22.3	-1.3	1166	2
Central-northern maize-teff highlands	63	-37	17.4	-1.3	1300	-1

Table 3.20. Ethiopia agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		CALF		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	
South-eastern mixed maize zone	250	-35	90	1	0.95
Western mixed maize zone	547	-19	100	1	0.96
Central-northern maize-teff highlands	274	-52	90	-1	0.95

[FRA] France

During the monitoring period, the harvest of maize was completed by December. Winter wheat was also harvested from October to December. Compared to average, CropWatch agroclimatic indicators show that the conditions were unfavorable. This includes the following: a 30% drop in RAIN, about average temperature, and a marked drop (7%) in RADPAR at the national level. Also at the national level, crop condition was below average, which is confirmed by a significant decrease for the BIOMSS indicator (-20%).

As shown by the crop condition development graph, national NDVI values were mostly below those for the five-year average, but close to 2016 from July to November. The national NDVI values began to drop rapidly below their 2016 equivalent in December, 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 further indicate that NDVI is above average in 34.2% of arable land, with below average NDVI in the other regions.

This spatial pattern is reflected by the maximum VCI (VCIx) in the different areas, with a VCIx of 0.84 and a negative CALF departure (-0.8%) 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 winter wheat areas.

Regional analysis

Considering the cropping system, climatic zones, and topographic conditions, additional sub-national detail is provided for eight agro-ecological zones. They are identified in the maps by the following numbers in the VCIx map: Northern barley zone, covering the regions of Île-de-France, Picardie, and Nord-Pas-de-Calais; Mixed maize/barley and rapeseed zone (Centre, Pays-de-Loire, and Poitou-Charentes); Maize barley and livestock zone (Basse Normandie, Bretagne, and Haute Normandie); Rapeseed region (Alsace, Bourgogne, Champagne-Ardenne, Franche-Comté, and Lorraine); Dry Massif Central zone (Auvergne, Limousin, and NWRhône-Alpes); South-western maize zone (Aquitaine and Midi-Pyrénées); Eastern Alps region coinciding with the Rhône-Alpes region, and the Mediterranean region (Languedoc-Roussillon and Provence-Alpes-Côte-d'Azur).

In the Northern barley zone, RADPAR is 9% and TEMP is 1.0°C below average, respectively, while RAIN is 3% above. As a result of the increase of rain, the BIOMSS indicator is only 1% below the five-year average. High VCIx values (0.98), however, are observed, reflecting overall favorable crop condition.

The most severe adverse weather conditions were observed in the Mixed maize/barley and rapeseed zone (RAIN -52%) even if other indicators remain close to average. According to the NDVI profiles, crop condition has been continuously deteriorating since October. BIOMSS is 41% below its five-year average, and the VCIx value of 0.79 for the region is low in the country.

Generally, crop condition for the Maize, barley and livestock zone is close average, in spite of climate conditions being poor (RAIN -22%, TEMP -1.4°C, and RADPAR, -10%). Almost all arable land in this region was cropped during the monitoring period, and the average VCIx is 0.91. The NDVI profile confirms the favorable conditions with above average NDVI since October.

The Rapeseed region also had below average rainfall (RAIN, -16%). Temperature was average, but sunshine was very low (RADPAR, -12%). 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.

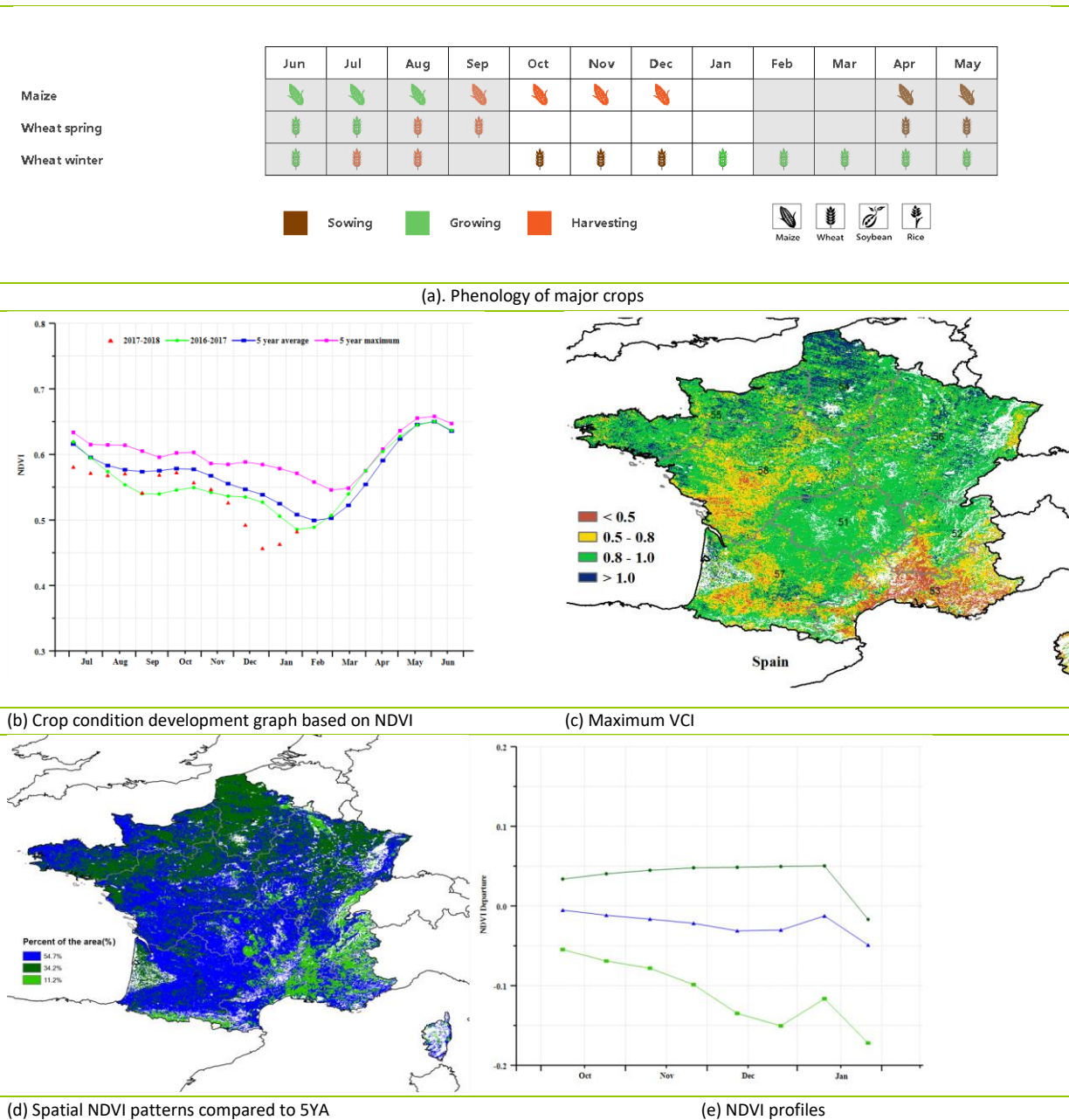
Mostly unfavorable climatic conditions dominated the Dry Massif Central zone over the reporting period.

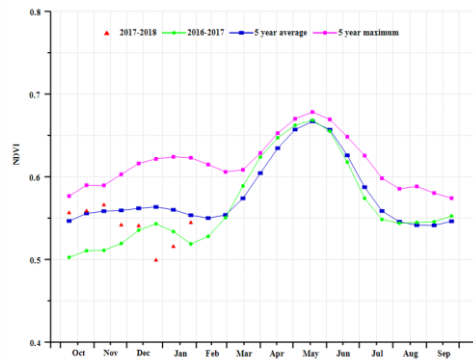
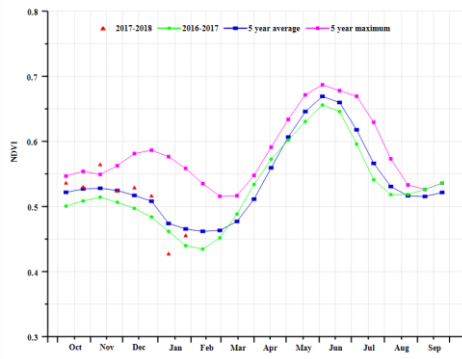
Rainfall was 36% below average (207 mm over four months). Temperature was normal, but radiation (RADPAR) was well below (-11%).

With the Mediterranean area, the Eastern Alps region was one of the wettest in France (302 mm over four months), representing however below average values for both RADPAR and TEMP; BIOMSS for the region is 18% below the five-year average, and a low VCIx value reflects the generally unfavorable crop condition. That overall crop condition is unfavorable compared with the previous five years is further confirmed by the crop condition development graph.

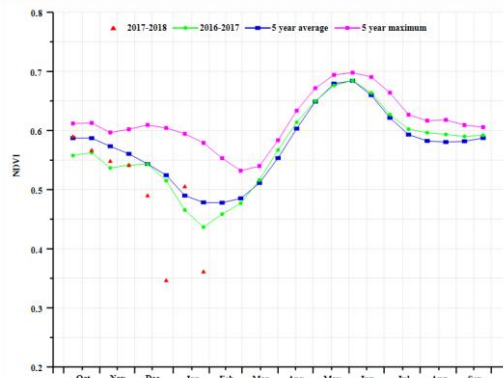
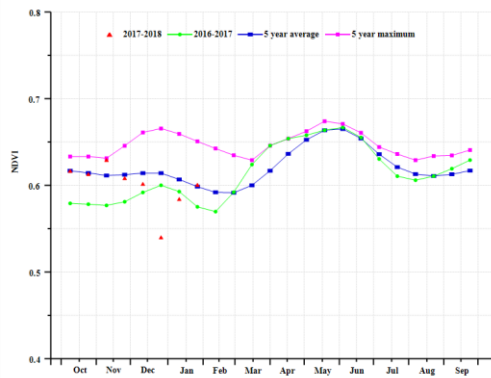
Finally, severe adverse weather conditions were observed in the Mediterranean region (RAIN -46%) even if other indicators remain close to average. According to the NDVI profiles, crop condition has been continuously deteriorating since October. BIOMSS is 26% below its five-year average, and the VCIx value of 0.51 for the region is the lowest in the country.

Figure 3.13. France crop condition, October 2017-January 2018

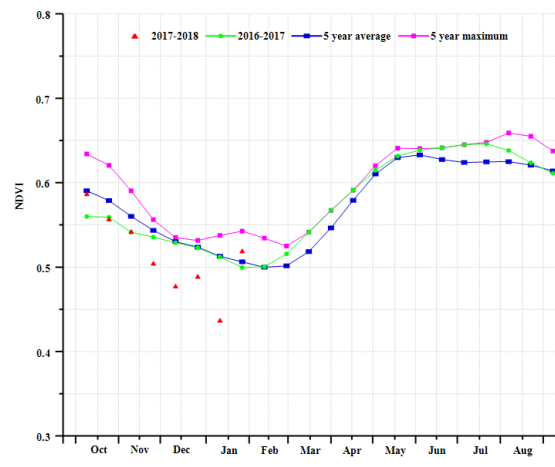
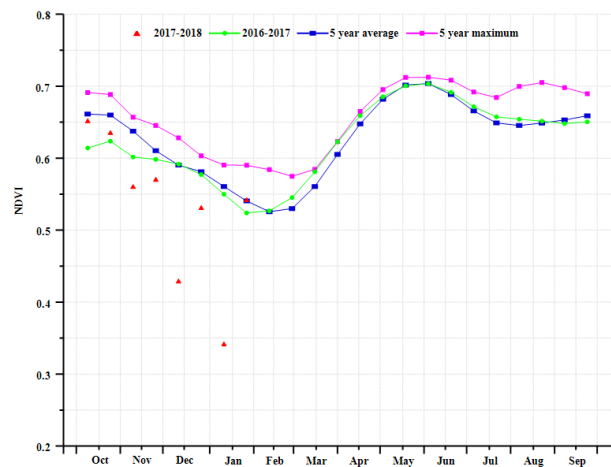




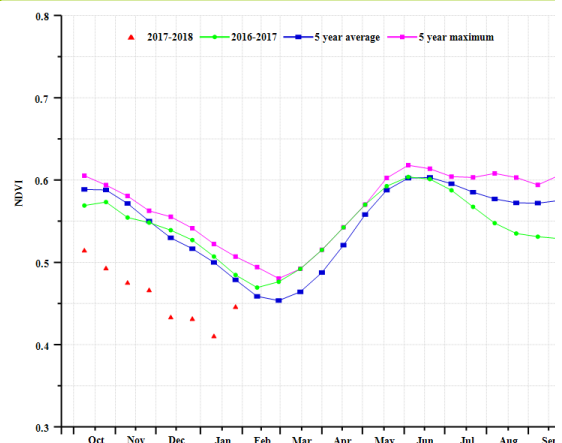
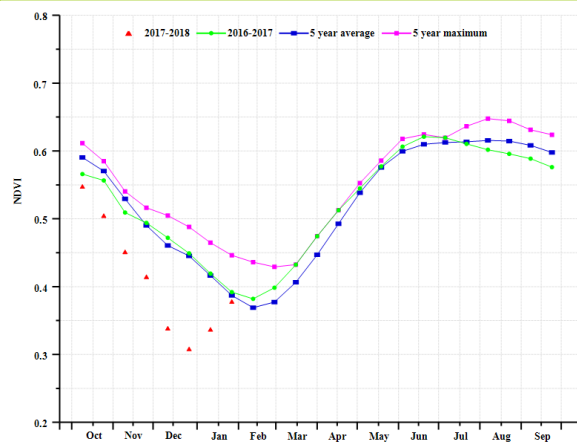
(f) Crop condition development graph based on NDVI (Northern barley region (left) and Mixed maize/barley and rapeseed zone (right))



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



(h) Crop condition development graph based on NDVI (Dry Massif Central zone (left) and South-western maize zone (right))



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

Table 3.21. France agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Northern barley zone (France)	267	3	7.9	-1.0	242	-9
Mixed maize/barley and rapeseed zone (France)	120	-52	8.7	-2.0	296	-8
Maize barley and livestock zone (France)	240	-22	9.1	-1.4	261	-10
Rapeseed zone (France)	258	-16	6.6	-0.8	261	-12
Dry Massif Central zone (France)	207	-36	6.3	-1.8	318	-11
Southwest maize zone (France)	213	-33	8.6	-2.4	382	-6
Eastern Alps region (France)	302	-30	3.9	-1.6	375	-5
Mediterranean zone (France)	200	-46	7.1	-1.0	464	2.13

Table 3.22. France agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	
Northern barley zone (France)	1076	-1	100	2	0.98
Mixed maize/barley and rapeseed zone (France)	554	-41	98	3	0.79
Maize barley and livestock zone (France)	981	-13	100	0	0.91
Rapeseed zone (France)	961	-9	100	0	0.90
Dry Massif Central zone (France)	788	-25	99	0	0.89
Southwest maize zone (France)	827	-21	97	2	0.91
Eastern Alps region (France)	783	-18	90	-5	0.74

[GBR] United Kingdom

Summer crops have been harvested and winter crops (winter wheat, winter barley, and rapeseed) have been planted during the current reporting period. The agroclimatic indicators show that rainfall for the country was slightly above average (RAIN +8.1%), with well below average radiation (RADPAR, -8.4%) and temperature (-1.9°C). Due to below average radiation and low temperature, the BIOMSS on the national scale decreased only -11% compared to the five-year average. As shown by the national crop condition development graph, NDVI values were below average almost throughout the winter season. The NDVI profile clustering provides additional spatial detail. In 51.9% (24.4%+27.5%) of the croplands NDVI was average or above throughout the season, with a drop just below average in about half of the area at the very end of January. This situation occurred in and around the following general areas: Somersetshire to Kent, Salop, west Yorkshire to Nottinghamshire and, in Scotland, Fyfe and east Tayside. Below average conditions from October or at least from late November affected 48.2 % of croplands (15.5%+32.7%) between south-east Wales (Mid- Glamorgan and Gwent) and Cambridgeshire and Essex in England, as well as East Grampian in Scotland. Conditions are very mixed from Lincolnshire to the eastern part of North Yorkshire, which is mostly confirmed by VCIx distribution, the average national value of which (0.89) is fair. Prospects for winter crops are currently mixed but not unfavourable.

Regional analysis

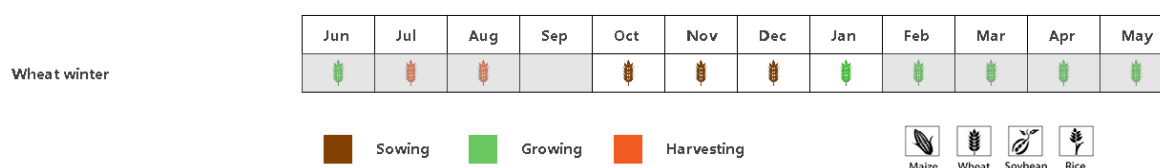
CropWatch has adopted three agro-ecological zones (AEZ) to provide a more detailed spatial analysis for the country; they include the Central sparse crop region (covering northern England, Wales, and Northern Ireland), the Northern barley region (Scotland and northern England), and the Southern mixed wheat and barley region (southern England). The Northern barley region and the Southern mixed wheat and barley region are characterized by unchanged fractions of cultivated arable land (CALF) compared to average. In the Central sparse crop area CALF decreased by -9.7%.

In the Central sparse crop region NDVI values were below the five-year maximum according to the region's crop condition development graph in October to January. Agroclimatic conditions were: RAIN +14%, well below average temperature and sunshine (TEMP -1.9°C, RADPAR -11%). The VCIx was low at 0.10.

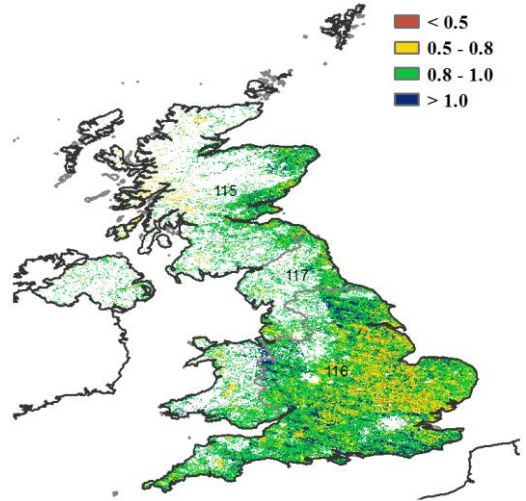
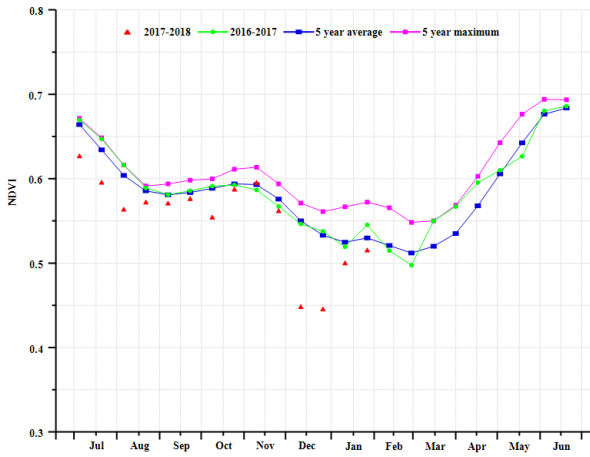
In the northern barley region, NDVI was below average according to the crop condition graphs. Agroclimatic conditions were: RAIN +20%, below average TEMP (-2.3°C), and rather poor sunshine (RADPAR -12%). The regional VCIx (0.92) was well above average.

Crop condition was below average in southern mixed wheat and barley zone. Dry conditions prevailed, with a 10% decrease of rainfall below average, average temperature, and a significant drop the sunshine (RADPAR, -5%); the biomass production potential decreased by 10% compared to the recent five-year average. The regional VCIx (0.88) indicates about average crops.

Figure 3.14. United Kingdom crop condition, October 2017-January 2018

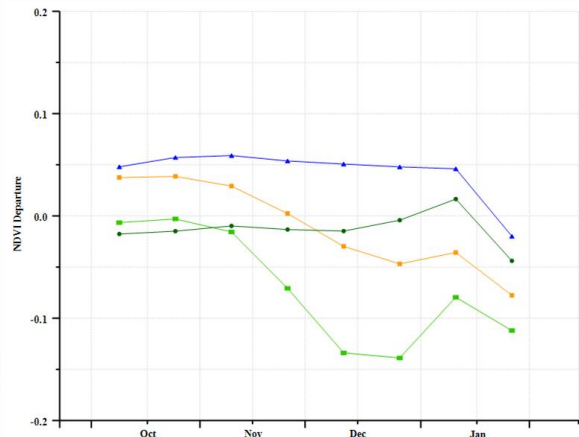
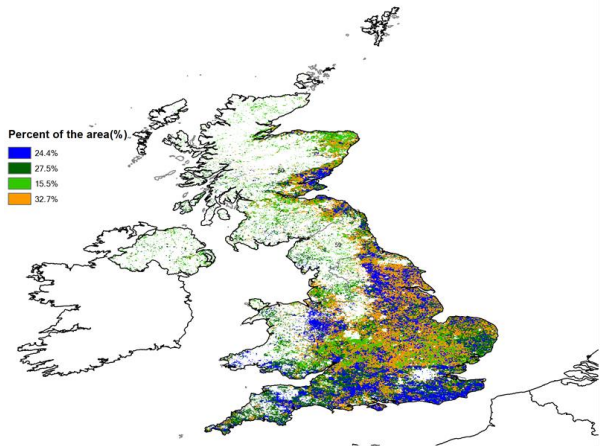


(a). Phenology of major crops



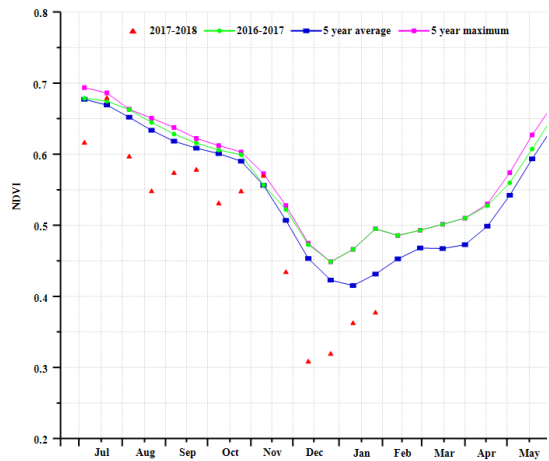
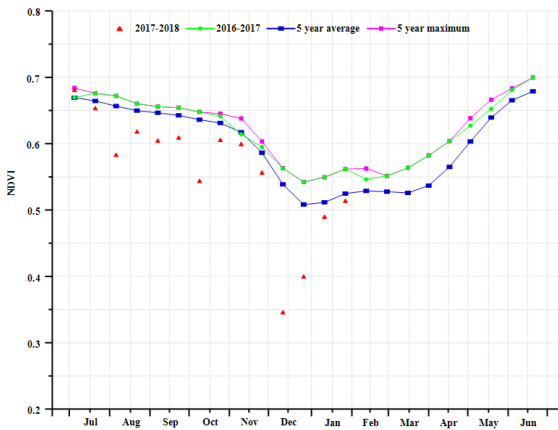
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

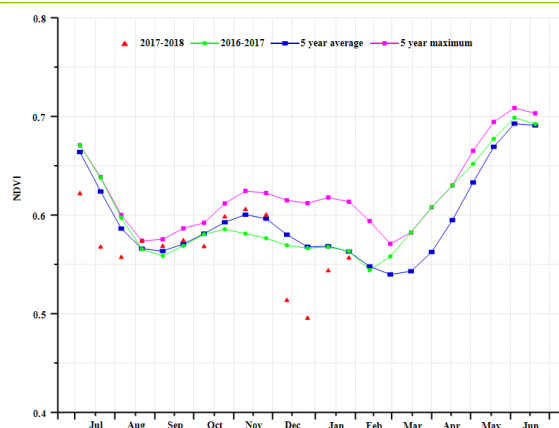


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



(f) Crop condition development graph based on NDVI (Sparse crop area of N England, Wales and N. Ireland (left) and Barley area in Scotland (right))



(g) Crop condition development graph based on NDVI (South mixed wheat and Barley zone)

Table 3.23. United Kingdom agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Northern Barley area (UK)	555	20	5.0	-2.3	140	-12
Southern mixed wheat and Barley zone (UK)	260	-10	7.6	-1.7	219	-5.0

Table 3.24. United Kingdom agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Northern Barley area (UK)	994	-14	99	1	0.92
Southern mixed wheat and Barley zone (UK)	1025	-10	100	1	0.88

[IDN] Indonesia

The crops in Indonesia generally showed average condition from October to January, with the maximum VCI (VCIx) value on the national level reaching 0.97. The period covers the harvesting stage of the dry season maize and rice, while wet season crops are currently in the field. Compared with the recent average, precipitation was average (RAIN, +1%), while temperature was slightly below average (TEMP, -0.6°C) with cloudiness causing a drop in sunshine (RADPAR, -5%). BIOMSS increased by 3% compared to the recent five-year average. The area of cropped arable land (CALF) was comparable to the five-year average. Due to persistent cloudiness and very wet weather, however, the NDVI values of most pixels are invalid. This leads to unrealistically low values in the national NDVI profiles compared to the recent five-year average and last year’s level during the whole monitoring period.

Regional analysis

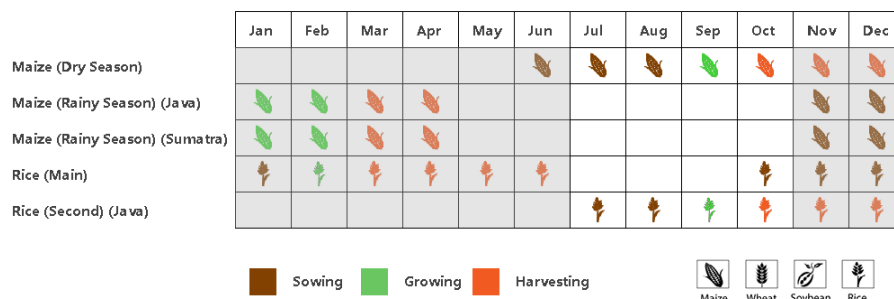
For more spatial detail, CropWatch also prepares regional analyses for three agro-ecological zones (AEZ) within the country, covering the main islands groups: Sumatra; Java (the main agricultural region in the country); and Kalimantan-Sulawesi.

Crop condition was similar in Sumatra and Kalimantan-Sulawesi. Both islands experienced very mildly dry conditions, with a 2% decrease of rainfall below average, temperature was average (-0.7°C and +0.4°C compared with the average in Sumatra, and Kalimantan-Sulawesi, respectively), and a drop in sunshine (RADPAR, -4%); the biomass production potential showed a slight increase compared to the recent five-year average. According to the NDVI clusters, crop condition was slightly above average in most area of the two islands, while the NDVI profile dropped below average from mid-December in Kalimantan Barat and Bangka Belitung.

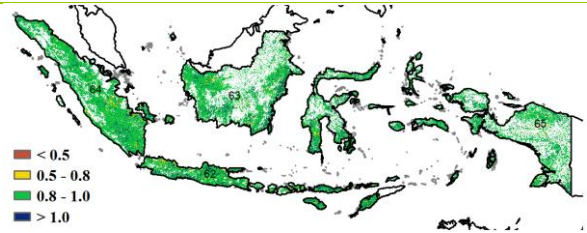
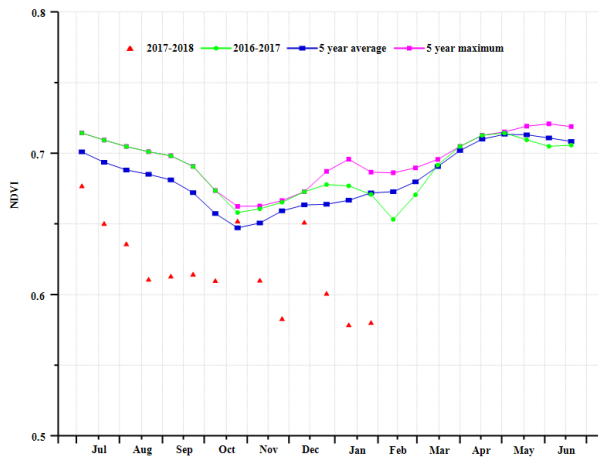
As the main agricultural region in the country, the agroclimate condition in Java is of special relevance compared to other regions in the country. The crop condition in Java is more favorable than in other islands of the country. Rainfall in Java was above average by 5%, temperature decreased by 0.6°C below average, and radiation was much below average (11%). Due to the abundant rainfall in the monitoring period, the biomass production potential increased by 9% compared to the recent five years. The NDVI profile of Java from October to December is nearly the same as its five-year average, except some abnormal values caused by cloudiness. The VCIx for Java is 0.97.

Altogether, although the NDVI profiles showed poor crop growth condition, there is no other clear evidence that unfavourable conditions have affected crops in Indonesia.

Figure 3.15. Indonesia crop condition, October 2017-January 2018

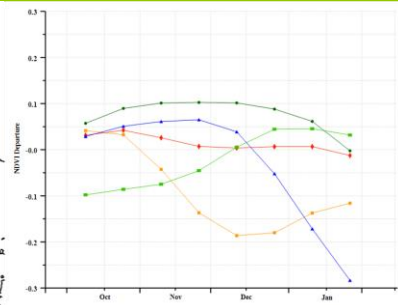
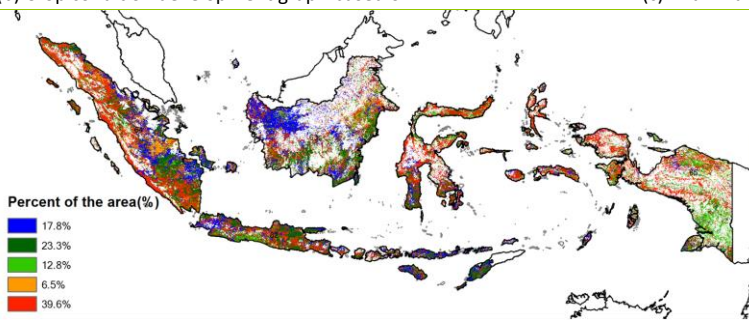


(a). Phenology of major crops



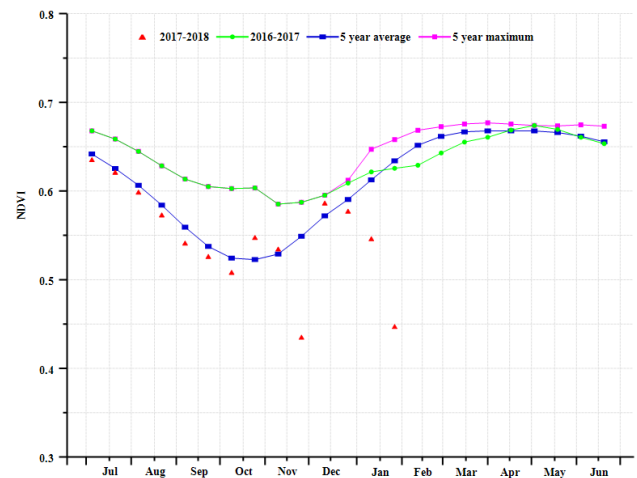
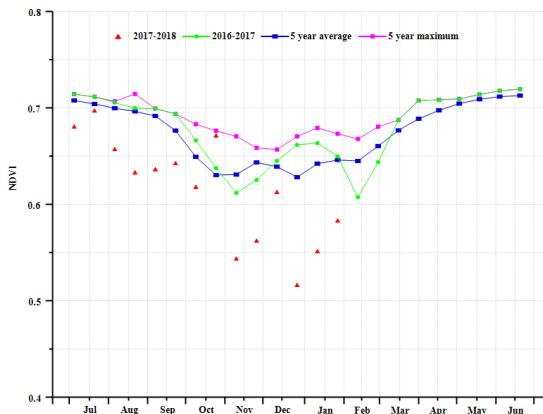
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

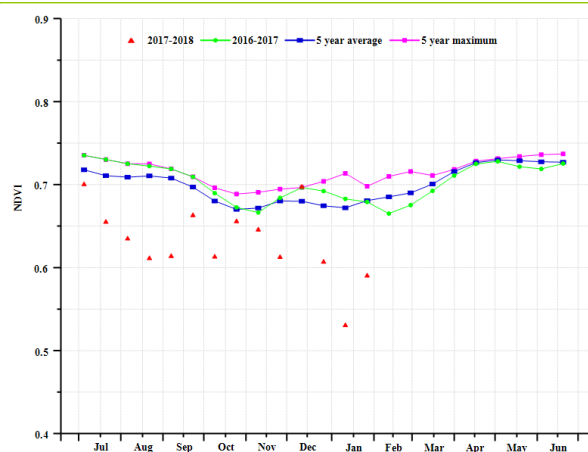


(d) Spatial NDVI patterns compared to 5YA

(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 3.25. Indonesia agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure (%)	Current (°C)	Departure (%)	Current (MJ/m ²)	Departure (%)
Sumatra	1151	-2	25.3	-0.7	919	-4
Java	1103	6	25.7	-0.6	1020	-11
Kalimantan-Sulawesi	1064	-2	26.0	-0.4	944	-4
Irian Jaya	1256	10	25.3	-0.6	941	-6

Table 3.26. Indonesia agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI Current
	Current (gDM/m ²)	Departure (%)	Current (%)	Departure (%)	
Sumatra	2329	1	99	0	0.96
Java	2111	9	98	3	0.97
Kalimantan-Sulawesi	2264	3	100	0	0.97
Irian Jaya	2323	4	100	0	0.96

[IND] India

The current bulletin covers the growing and maturity period for maize, Kharif rice and soybean, whereas it was sowing and early growth for winter wheat. It coincides with the end of the summer monsoon in the country. Country received 147 mm rainfall (+4%), temperature remaining about 22.1°C (average) and RADPAR of 937 MJ/m² (-5%).

The period not being main rainy season, 13 states mostly in the peninsular and eastern parts received above average rainfall. At the same time 13 states falling in central and northern parts were deficient in rainfall. TEMP was above average in Assam and Meghalaya (1°C), Sikkim and Nagaland (both 1.3°C), and Uttarakhand (2.7°C). On the other side Bihar (-0.9°C), Daman & Diu (-1.1°C) were cooler, while rest of the country recorded near average temperature. RADPAR deficient states include Assam, Daman & Diu, Gujarat, Goa, Orissa, Mizoram and Puducherry (all -6%), Kerala, Punjab and Rajasthan (each -7%), Haryana (-8%), Bihar, Uttar Pradesh and Meghalaya (each -9%), Jharkhand and Tripura (-10%) and West Bengal (-12%). Values were close to average elsewhere.

The slightly below average nation-wide BIOMSS estimate (-5%) results from above average in most of the southern states (Assam, Daman and Diu, Gujarat, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Puducherry, Tripura and West Bengal), and relatively low values in northern states where Bihar, Delhi, Haryana, Madhya Pradesh Rajasthan, Uttar Pradesh and Uttarakhand are experienced a BIOMSS drop below the average of 40% and more.

NDVI for the country followed the average line or stayed a little lower but dropped during January. NDVI clusters show initially low values but pick up during January in the northern part of the country. CALF of 90% indicates low cropped area coverage while VCix of 0.93 indicate average yield prospects.

Regional analysis

CropWatch adopts the following Agro-ecological zones for India: the Deccan plateau, the Eastern coastal region, the Gangetic plains, the North eastern region, the Western coastal region, the North western dry region and the Western Himalayan region. Crop assessments for six of the seven regions are presented here.

The Deccan plateau region received 67mm of rainfall (-13% compared to average), 23.1 °C (-0.7 °C) and 988 MJ/m² of RADPAR resulting in BIOMSS of 210 gDM/m², a sharp decline (21%) below average. NDVI profile followed the 5YA line till December but fell in January. Coupled with a CALF value of 98% and VCix of 0.97, the indicators imply average prospects for Kharif rice, maize, soybean and wheat outputs.

An average rainfall of 300mm was received in the Eastern coastal where TEMP was average and RADPAR was -4% below average, resulting in a biomass production potential of 674 gDM/m². The NDVI profile started above 5 year maximum in October and closely followed the 5YA thereafter. With 98% of potential area being cropped and VCix at 1.05 in most parts of the region indicate, good to excellent prospect for Kharif and Rabi rice crops.

The Gangetic plains region too received low rainfall of only 59mm (-34% below average); temperature was close to average but RADPAR was markedly below (-10%). The estimated biomass accumulation potential was very low at 161 gDM/m². NDVI has remained low throughout the reporting period. Initially it was just below average but it dropped in January, though one of the NDVI observations appears to be cloud contaminated. Thus, overall condition for Kharif rice as well as wheat can be called below average.

The Assam and north eastern region was among the high rainfall areas with 313mm (58% higher than average), close to average temperature (0.8 °C up) and deficient RADPAR -6%, resulting in a high BIOMSS

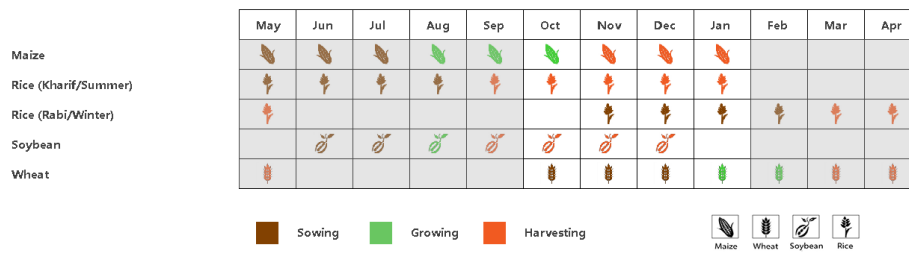
accumulation of 759 gDM/m². NDVI was higher than the 5 year maximum in the beginning of the reporting period. It slightly dipped in November to recover in January again crossing the 5year maximum. It has continuously oscillated, but except for January 2nd Dekad, always remained higher than average. CALF (95%) and VCIx (0.97) indicate average to good prospects for Kharif, Boro rice and wheat.

Among the listed AEZs, the third highest rainfall (250mm, 16% above average) was recorded for the Western coastal region, which had average TEMP and a 5% drop in RADPAR. This resulted in a low biomass accumulation potential (570 gDM/m²), but still 4% higher than 5YA. NDVI has remained higher than 5YA throughout the period. With CALF at 99% and VCIx at 1.01 the crop condition can be considered good for maize, Kharif as well as Rabi rice.

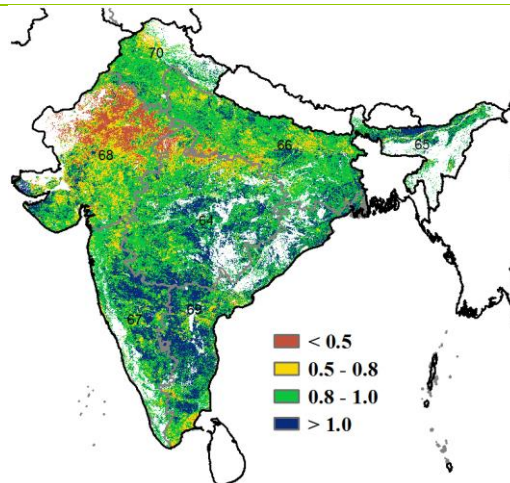
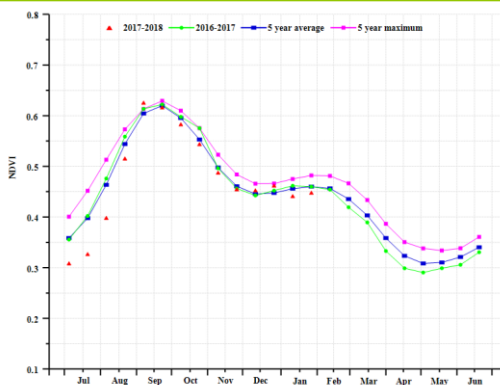
Rainfall exceeded average by 31% in the North-western dry region, with temperature remaining near average and RADPAR being 6% below; higher than average (+28% of 5YA) BIOMSS is expected. NDVI remained as low at 0.3 till November, improved in December, but again showed a decline towards end of January. Similarly, only 61% of the potential agricultural area was cultivated regional VCIx was 0.77. Large patches even display VCIx values at or below 0.5, indicating poor prospects for Soybean as well as wheat crops.

Agroclimatic and agronomic indicators reveal favourable crop condition in the Southern half of India and the North-eastern regions. The Northern part appears to have undergone much less favourable conditions and crop production prospects are at best average.

Figure 3.16. India crop condition, October 2017-January 2018

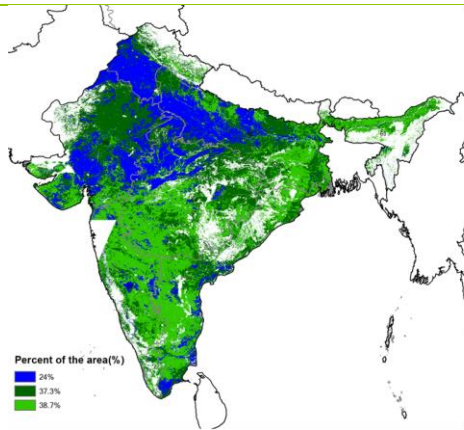


(a). Phenology of major crops

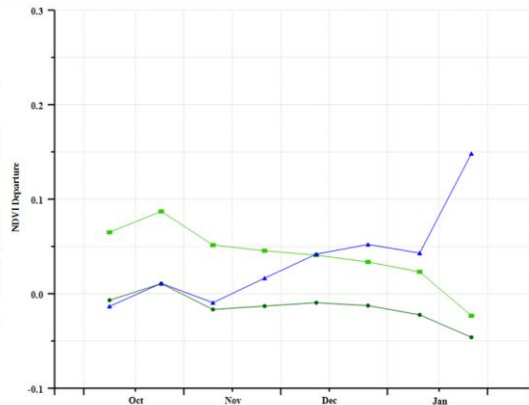


(b) Crop condition development graph based on NDVI

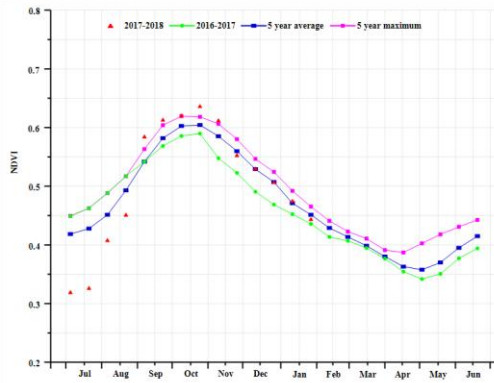
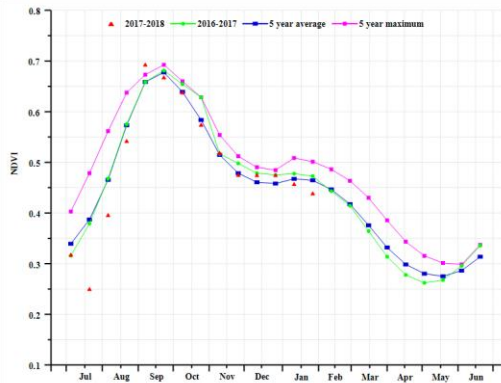
(c) Maximum VCI



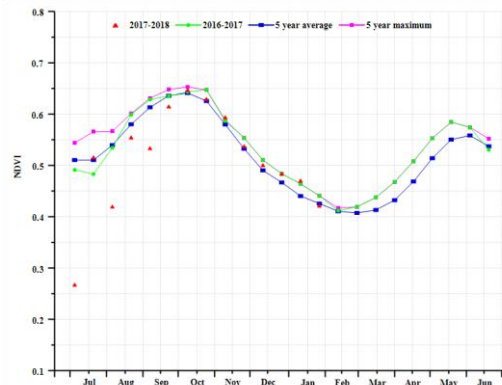
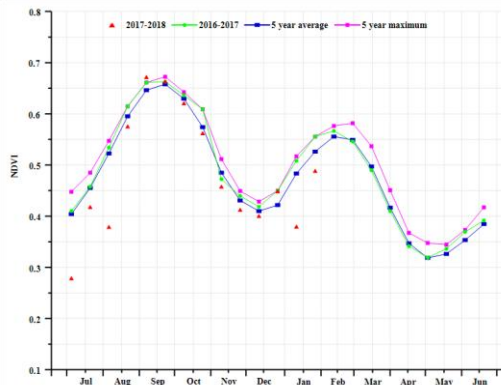
(d) Spatial NDVI patterns compared to 5YA



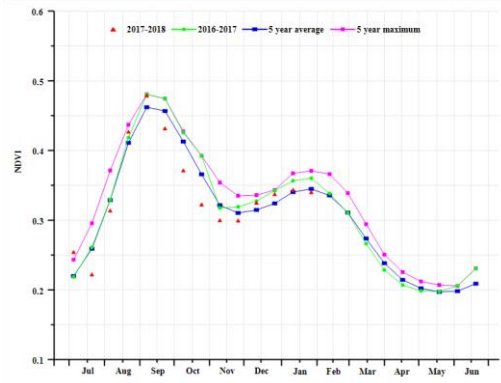
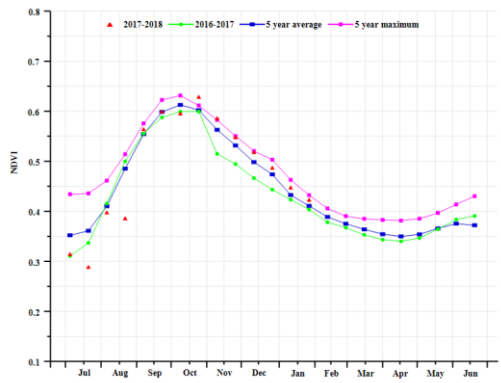
(e) NDVI profiles



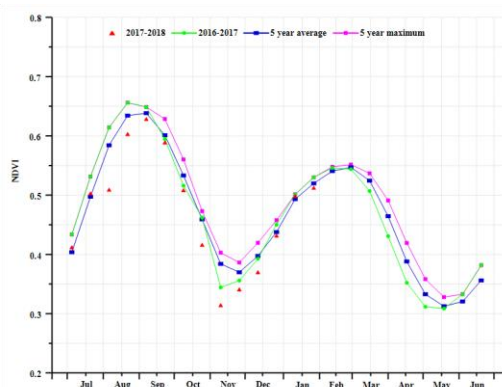
(f) Crop condition development graph based on NDVI (Central India (left) and Eastern Coastal Region (right))



(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 North Western Dry Region (right))



(i) Crop condition development graph based on NDVI (Western Himalayan Region)

Table 3.27. India agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Deccan Plateau (India)	67	-13	23.1	0.7	988	-4
Eastern coastal region (India)	300	1	24.6	-0.2	977	-4
Gangatic plain (India)	59	-34	20.6	-0.3	852	-10
Assam and north-eastern regions (India)	313	58	20.1	0.8	807	-6
Western coastal region (India)	250	16	24.1	-0.2	1039	-5
North-western dry region or Rajasthan and Gujarat (India)	36	31	22.5	0.0	945	-6

Table 3.28. India agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		CALF		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	
Deccan Plateau (India)	210	-21	98	1	0.97
Eastern coastal region (India)	674	-1	98	4	1.05
Gangatic plain (India)	161	-42	97	2	0.92
Assam and north-eastern regions (India)	759	44	95	0	0.97
Western coastal region (India)	570	4	99	7	1.01
North-western dry region or Rajasthan and Gujarat (India)	122	28	61	-3	0.77

[IRN] Iran

In Iran, crop condition was generally below average from October to early December 2017. It recovered to above average until early January 2018, and dropped again, sharply so in late January due to a snowstorm in Iran's western and northern parts. The planting of winter wheat has been completed, while it was still underway for barley in late January. Accumulated rainfall (RAIN, -16%) was below average over the last four months, and temperature was above (TEMP, +1.0°C); radiation was close to average. The unfavorable agroclimatic conditions resulted in a significant decrease in the BIOMSS index by 19% compared to the five-year average. The national average of maximum VCI index for this monitoring period was rather low at 0.51, while Cropped Arable Land Fraction (CALF) increased by 14%.

According to the national crop condition development graphs, crop condition was close or below average in most of Iran's crop areas accounting for 65.9% of total arable land during the monitoring period. About 24% of croplands, mainly in Ardabil, East Azerbaijan and West Azerbaijan provinces of the northwest region, experienced favorable crop condition from the end of November. The crop condition in Gilan, Mazandaran, and Golestan provinces stayed close to average in October, above from November to December, and then dropped to below average at the end of January 2018.

Overall, the crop condition is mixed in the current season. The final outcome of the season will be determined by soil moisture in March when vegetative grows will resume.

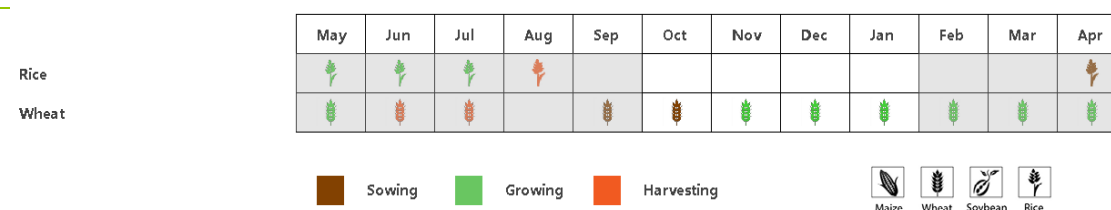
Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, three sub-national agro-ecological regions can be distinguished for Iran, among which two are relevant for crop cultivation. The two regions are referred to as the Semi-arid to sub-tropical hills of the west and north and the Arid Red Sea coastal low hills and plains.

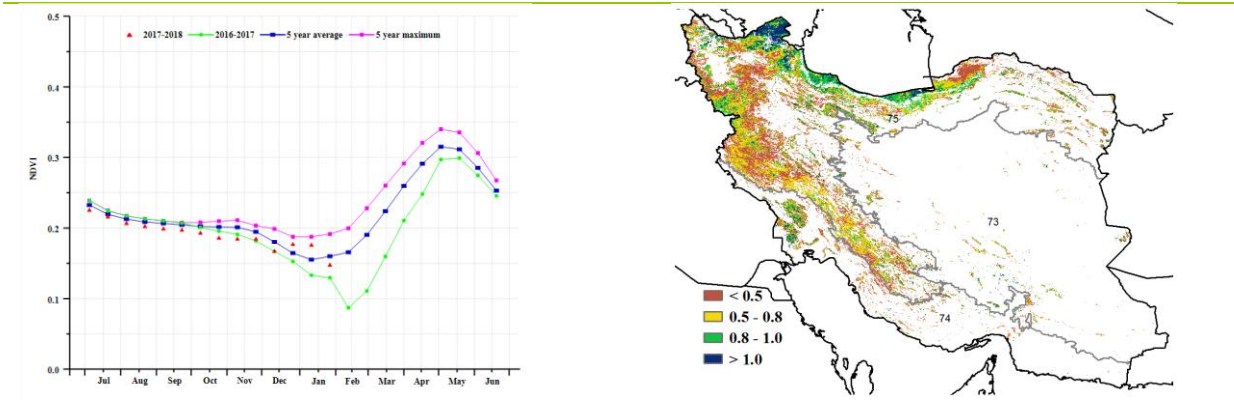
In the Semi-arid to sub-tropical hills of the west and north region, the accumulated rainfall (RAIN) was 10% below average, temperature (TEMP, +1.1°C) was above average, while radiation was close to average during this monitoring period. The water shortage due to low rainfall resulted in a decrease of BIOMSS by 14% compared to the recent five years average. The average CALF (9%) and VCIx (0.54) were both low in this monitoring period. According to the NDVI profiles, the crop condition change was comparable to national values. The crop condition is very mixed so far.

Crop condition in the Arid Red Sea coastal low hills and plains region was below average. The region received only 60 mm rainfall, 67% below average for this report period. The unfavorable rainfall resulted in a significant drop of BIOMSS by 56%. The continued rainfall deficit was also the main factor behind the low CALF (9%) and poor VCIx (0.50). Therefore, the outcome for winter crops of this region is estimated to be poor.

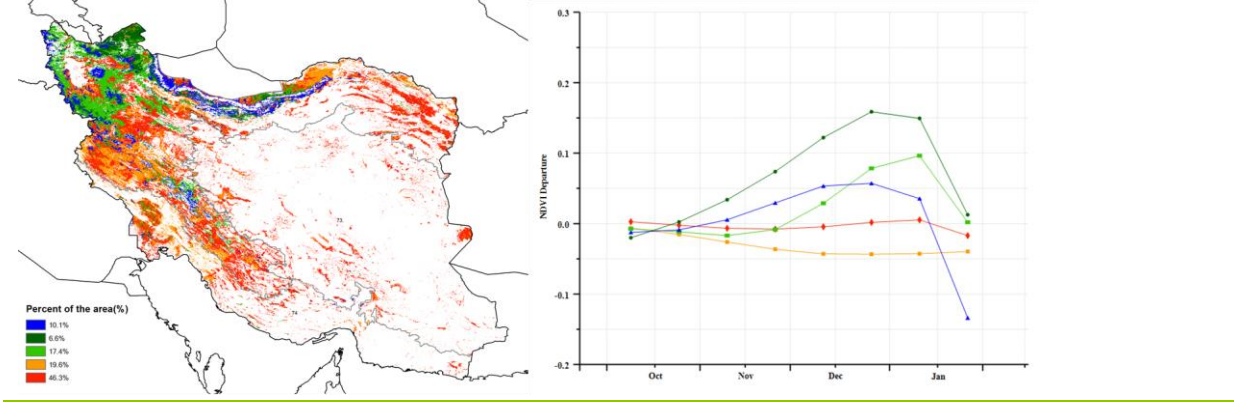
Figure 3.17. Iran crop condition, October 2017-January 2018



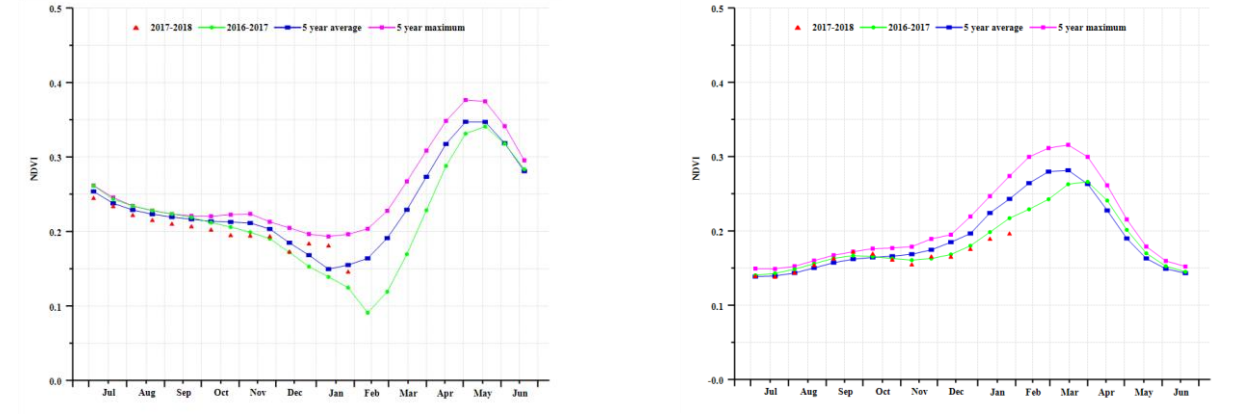
(a)Phenology of major crops



(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 to sub-tropical hills of the west region (left) and Arid Red Sea coastal low hills and plains region (right))

Table 3.29. Iran agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Semi-arid to sub-tropical hills of the west and north	188	-10	6.7	1.1	705	0
Arid Red Sea coastal low hills and plains	60	-67	17.0	0.6	864	2

Table 3.30. Iran agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	
Semi-arid to sub-tropical hills of the west and north	565	-14	9	11	0.54
Arid Red Sea coastal low hills and plains	241	-56	9	56	0.50

ARG AUS BGD BRA CAN DEU EGY ETH FRA GBR IDN IND IRN **KAZ** KHM MEX MMR NGA PAK PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF

[KAZ] Kazakhstan

This monitoring period covers the harvesting of last year's summer crops (cereals, spring barley and wheat) from October 2017 to January this year. The national average VCIx was just 0.67, and the cropped arable land fraction (CALF) decreased by 45% compared to the five-year average. The CropWatch agroclimatic indicators were average (RAIN +2%, RADPAR +3%, TEMP -0.4°C). BIOMSS is expected to increase by +5% compared to the five-year average at the national scale. Overall crop prospects are unfavorable.

As shown by the NDVI development graph, crop condition was slightly below average from late November to December in most parts of the country. The spatial NDVI patterns and profiles show that the crop condition was above average from late October to late December in 87% of croplands, including Kostanay, North Kazakhstan, Pavlodar, Akmola, East Kazakhstan, north eastern part of Karagandy and south eastern part of Zambyl. However, NDVI fell below the 5YA average from late December to late January. No crop was planted since November and from December the NDVI index has been close to zero. Crop condition was generally unfavorable in Kazakhstan during the reporting period.

Regional analysis

The following paragraphs provide additional detail for four major agro-ecological zones (AEZ) of Kazakhstan, referred to as the Northern zone, the Eastern plateau and southeastern zone, the Southern zone and the Central zone.

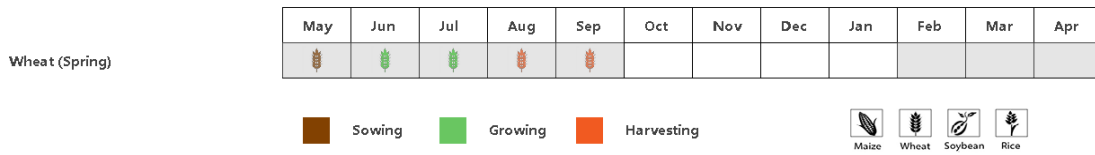
In the Northern zone, crop condition was below the five-year average from late December to late January. The average VCIx was 0.60. RAIN and TEMP were below average (by -2% and -0.3°C, respectively) and RADPAR was above average (4.4%), resulting in a minor increase of the BIOMSS index (4%). CALF significantly decreased by 55% compared to the recent five-year average. The NDVI profiles for the region were consistently below average. Overall, the outcome for the crops in the region is unfavorable.

The Eastern plateau and southeastern zone displayed NDVI above the five-year average in the beginning of November and from late October to late January. The average VCIx was 0.70. RAIN and TEMP were slightly below average (-1% and -0.7°C), but RADPAR was above the average (+2%). The agroclimatic indicators also resulted in decrease of the BIOMSS index by 2%. The cropped area decreased by 29% compared to the five-year average. Overall crop prospects are unfavorable.

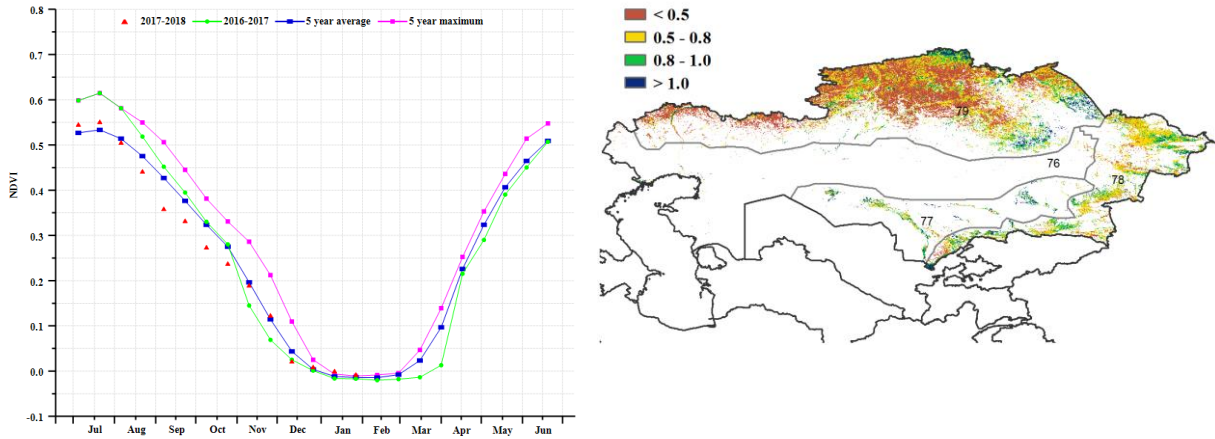
In the southern zone, NDVI was generally above the five-year average from late October to late November and in January. NDVI was significantly below the average from late November to late December. The average VCIx was 0.90 in this region. RAIN was well above average (+50%), while TEMP were slightly below (-0.4°C) and RADPAR was below average (3%). The agroclimatic conditions resulted in a BIOMSS decrease of 2%. CALF also significantly increased by 79% compared to the five-year average. Overall, the outcome for the crops is considered favorable in this region.

In the central zone, crop condition was below the five-year average in November and late December. The average VCIx was 0.70. RAIN was above average (by 42%) and TEMP and RADPAR was slightly below average, resulting in a minor increase of the BIOMSS index (25%). CALF significantly decreased by 18% compared to the recent five-year average. The NDVI profiles for the region were consistently below average. Overall, the outcome for the crops in the region is unfavorable.

Figure 3.18. Kazakhstan crop condition, October 2017-January 2018

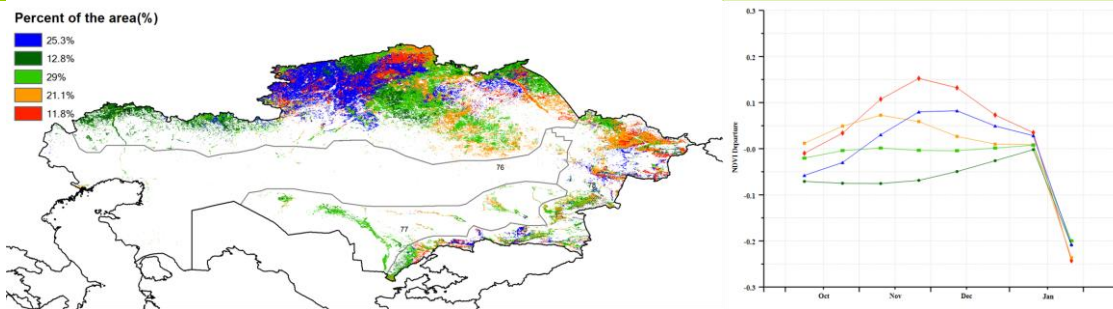


(a). Phenology of major crops



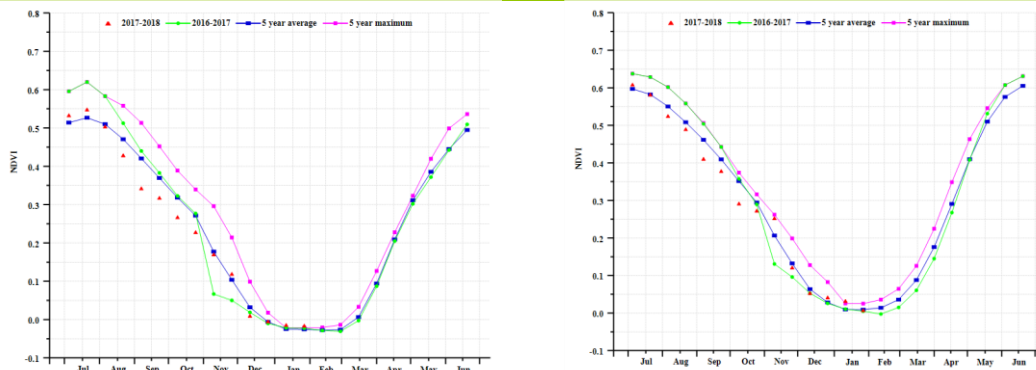
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

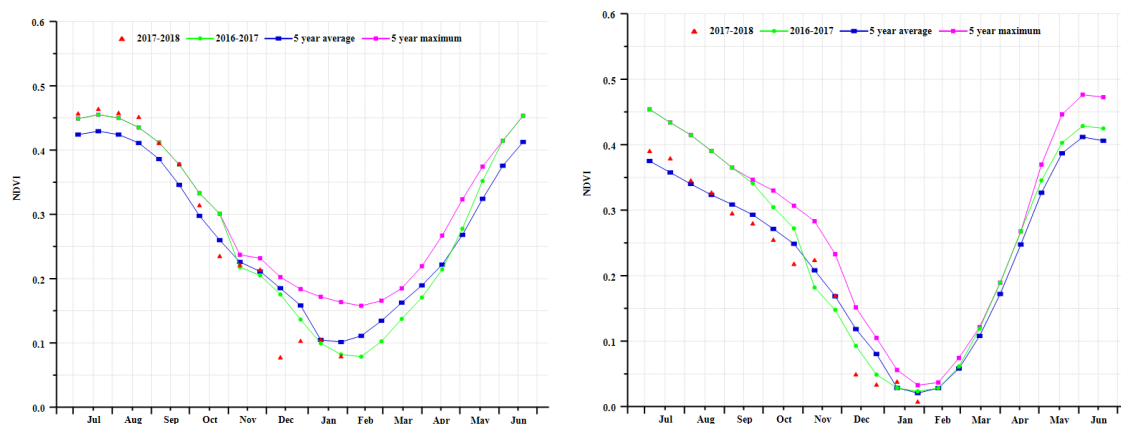


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



(g) Crop condition development graph based on NDVI (Eastern plateau and southeastern region)

Table 3.31. Kazakhstan agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Northern region	104	-2	-7.4	-0.3	279	4.4
Eastern plateau Southeastern region	165	-1	-6.1	-0.7	443	2.0
Central south region	160	50	0.4	-0.4	467	2.6

Table 3.32. Kazakhstan, agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		CALF		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	
Northern region	427	4	0	-55	0.65
Eastern plateau Southeastern region	437	-2	0	-29	0.72
Central south region	581	34	0	79	0.91

[KHM] Cambodia

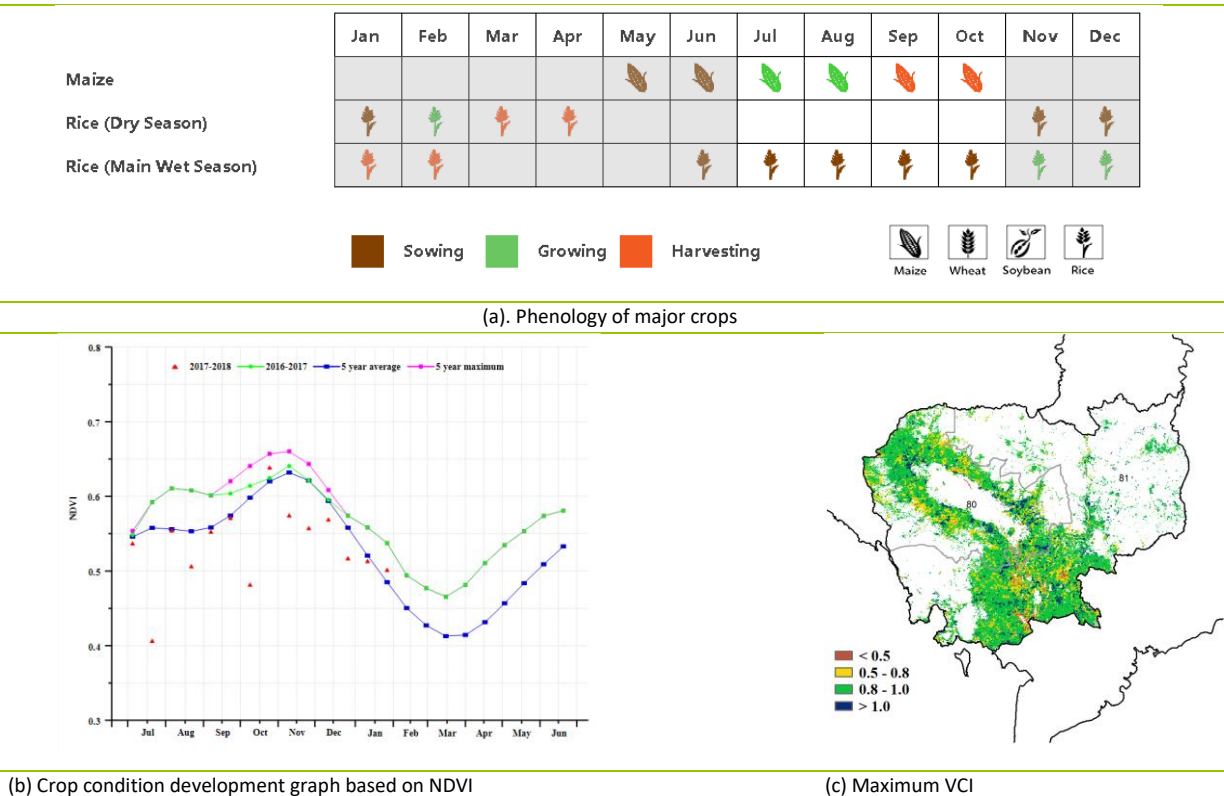
October to January covers the growing period of the main (wet season) rice crop, and the early stage of the second (dry season) rice in Cambodia. Crop condition is globally average. The fraction of cropped arable land was a slightly above the average of the previous five years (+1%). Compared to average, the CropWatch agro-climatic indicators show a sharp decrease in radiation (RADPAR, -8%) but nevertheless average temperature. Rainfall increased significantly (RAIN, +39%), causing a 34% increase in the biomass production potential (BIOMSS).

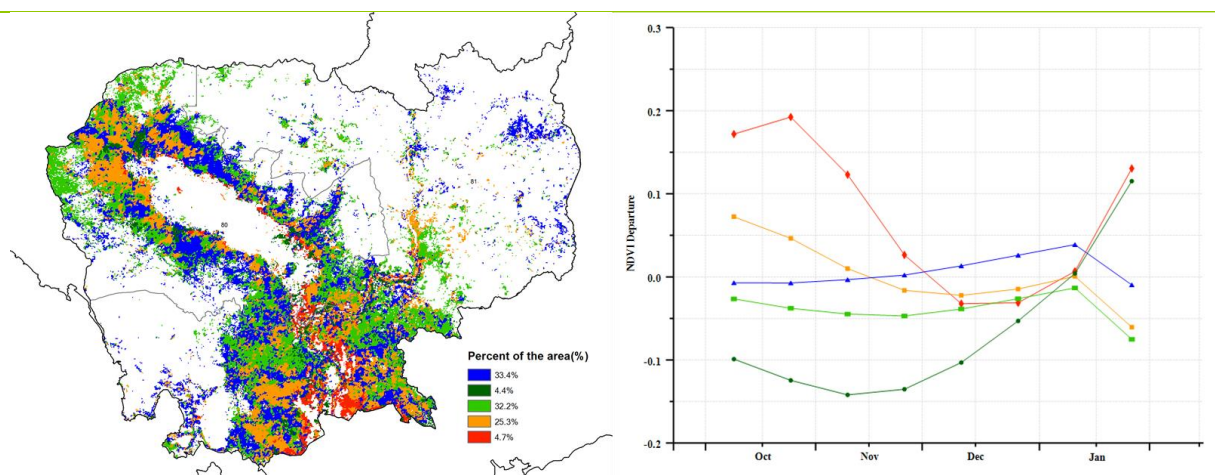
Favorable water supply conditions resulted in above average crops throughout the season. Abundant rainfall was beneficial for the sowing and emergence of the second rice crop. Vegetation condition indices (VCIx) are high (>0.8) in most parts of the country. Crop condition is favorable in the whole country, most areas enjoy above average NDVI which exceeded average by as much as 0.2 at the end of 2017 in some locations near Phnom Penh. Only about 4% of croplands suffers below average crop condition, but recovered before January. Altogether, the condition of crops in the country is better than average.

Based mostly on climate differences, two agro-ecological regions can be distinguished in Cambodia. Weather in the Tonle Sap lake area (especially rainfall and temperature) is mainly influenced by the lake itself. The second area, referred to as the "main crop area" covers areas outside the Tonle Sap basin along the border with Thailand and Laos in the north and Vietnam in the east.

For the current reporting period, the two major crop area share similar agro-climate conditions and similar crop condition can thus be expected. Under average NDVI recovered before February because of sufficient water supplying. Unusually low NDVI is partly due to cloud contamination.

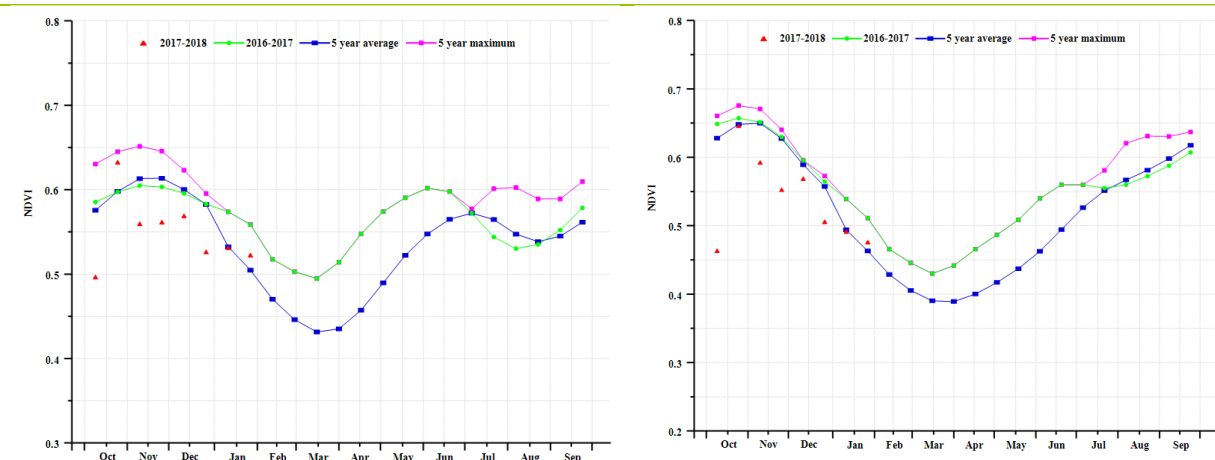
Figure 3.19. Cambodia crop condition, October 2017-January 2018





(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 3.33. Cambodia agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Main cropping area (Cambodia)	512	41.7	26.7	-0.9	937	-8.4
Lake plains (Cambodia)	545	31.6	26.6	-0.6	949	-8.3

Table 3.34. Cambodia agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		CALF		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current	Departure from 5YA (%)	
Main cropping area (Cambodia)	1169	34	0.98	0.7	0.9
Lake plains (Cambodia)	1307	34	0.96	1.4	0.9

[MEX] Mexico

During the monitoring period, maize has been harvested in the northwestern part of Mexico, while in other areas it was being harvested from January. Rice was being harvested, whereas winter wheat was still growing. Soybean has been harvested after December. Overall, crop condition was below average, as shown by the crop condition development graph based on NDVI.

Nationwide, the CropWatch agroclimatic indicators were all very close to average. The BIOMSS indicator nevertheless decreased by 11%. The VCIx on the national level was high, with a value of 0.89. However, there were differences for this indicator in different subnational regions. The map of VCIx spatial pattern showed that lower values mainly located in northwestern Mexico whereas higher values in other areas. The CALF increased by 1% compared to average. As indicated by the spatial NDVI patterns and corresponding profiles, 36.8% of crops were generally below average, predominantly located in southern, eastern and northwestern Mexico. On the contrary, 4.3% of planted areas were continuously above average condition in northeastern Mexico.

Regional analysis

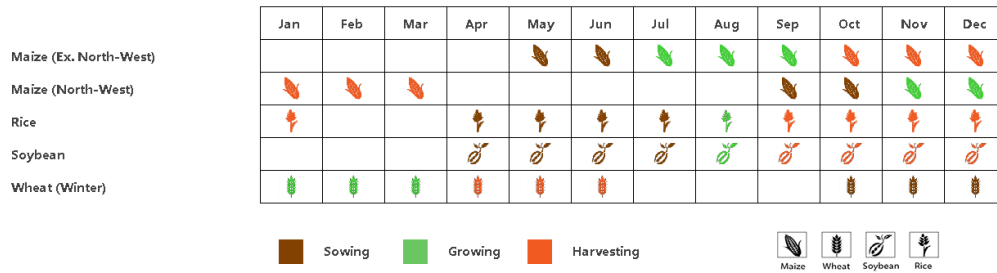
According to cropping systems, climatic zones, and topographic conditions, Mexico is divided into four agro-ecological zones (AEZ) , including the Arid and semi-arid regions, Humid tropics with summer rainfall, Sub-humid temperate region with summer rains, and Sub-humid hot tropics with summer rains.

Over this reporting period, wheat was growing in the Arid and semi-arid regions, Sub-humid temperate region with summer rains and Subhumid hot tropics with summer rains while rice was being harvested in Subhumid hot tropics with summer rains and Humid tropics with summer rainfall. Maize has been harvested in Arid and semi-arid regions whereas was being harvested in Subhumid hot tropics with summer rains and Humid tropics with summer rainfall. Soybean has been harvested in Subhumid hot tropics with summer rains and Humid tropics with summer rainfall.

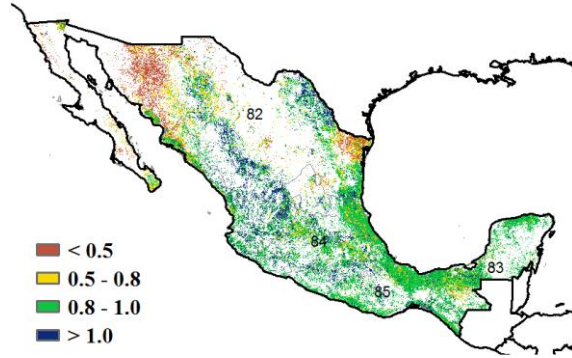
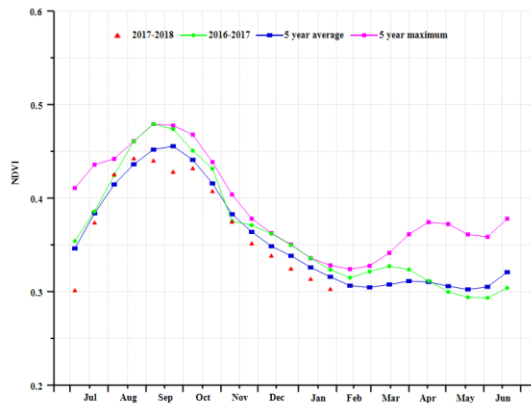
As shown by the crop condition development graph based on NDVI, crops condition was generally below average in the Arid and semi-arid regions, Sub-humid temperate region with summer rains and the Sub-humid hot tropics with summer rains. On the contrary, crops condition was average or close to average during October and January but significantly below average in the Humid tropics with summer rainfall since late January.

The CropWatch agroclimatic and agronomic indicators showed that rainfall was significantly below average in the Arid and semi-arid regions (-14%), Sub-humid temperate region with summer rains (-24%) and the Sub-humid hot tropics with summer rains (-12%), but above average in the Humid tropics with summer rainfall (+15%). Temperature and radiation were average or slightly departed from average, in all four AEZ, with the departures ranging between -0.8 °C and 0.2 °C, and -2% and 2%, respectively. BIOMSS was significantly below average in all the subnational regions, except in Humid tropics with summer rainfall (+2%). Compared to the recent five-year average, CALF increased in all AEZs with the departures between 0% and +3%. The maximum VCI was between 0.83 and 0.99 in these agroecological zones.

Figure 3.20. Mexico crop condition, October 2017-January 2018

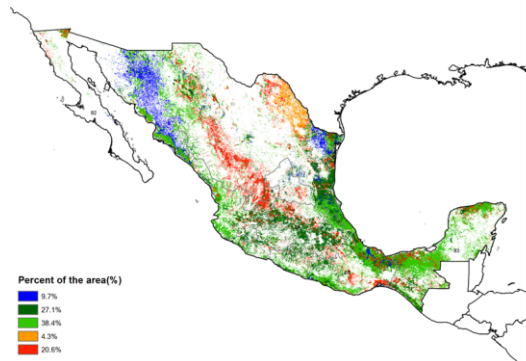


(a). Phenology of major crops



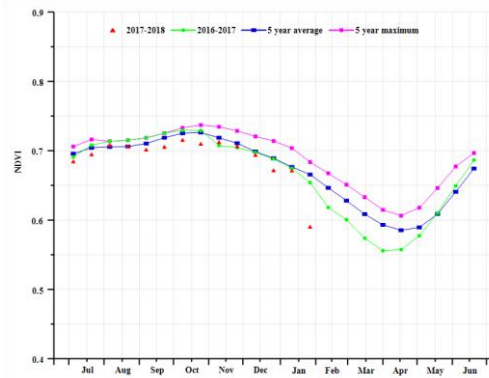
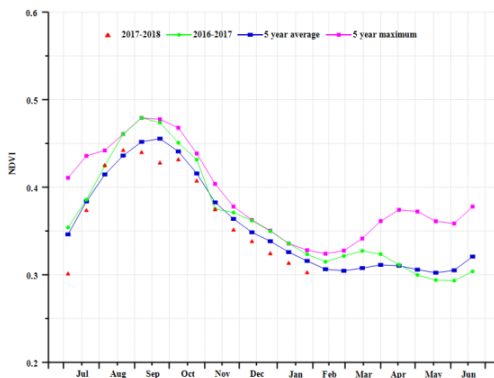
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

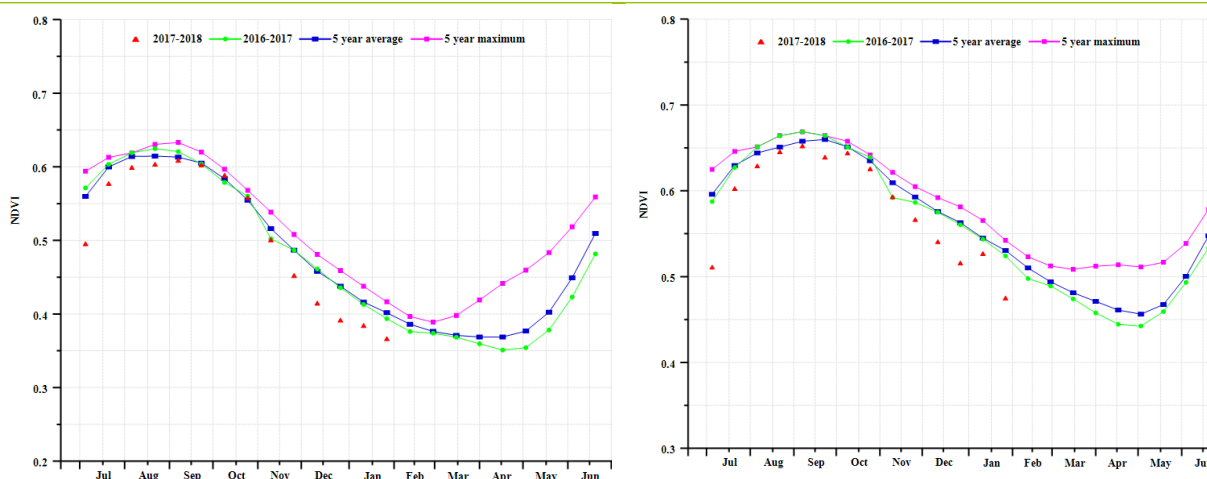


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

Table 3.35. Mexico agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Arid and semi-arid regions	84	-14	15.6	0.2	941	0
Humid tropics with summer rainfall	467	15	23.9	-0.8	886	-2
Sub-humid temperate region with summer rains	95	-24	17.1	-0.6	1064	2
Sub-humid hot tropics with summer rains	183	-12	20.5	-0.5	984	0

Table 3.36. Mexico agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	
Arid and semi-arid regions	291	-18	1	1	0.83
Humid tropics with summer rainfall	1009	2	1	0	0.88
Sub-humid temperate region with summer rains	360	-20	1	3	0.99
Sub-humid hot tropics with summer rains	527	-9	1	2	0.95

ARG AUS BGD BRA CAN DEU EGY ETH FRA GBR IDN IND IRN KAZ KHM MEX **MMR** NGA PAK PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF

[MMR] Myanmar

The reporting period covers the entire sowing season and early growing season of maize, wheat and second rice, as well as the harvest of the main rice crop. Maize is distributed mainly in the Hills region, while wheat and rice are planted across the country.

CropWatch agroclimatic indices which were similar to the previous monitoring period: compared to average, rainfall increased by 13%; temperature remained average, and radiation showed a marked drop (RADPAR, -5%). The fraction of cropped arable land (CALF) showed a slightly increase (1%) compared to the five-year average, and maximum VCI reached 0.98, indicating favorable crop condition over the country. Sufficient precipitation and average temperature led to an increase in BIOMSS (+19%). The crop condition development graph based on NDVI also shows a favorable situation. Crop condition, which was unsatisfactory in early October, recovered to average from mid-October to December and got better in January. Similar fluctuations of crop condition can also be seen for the agro-ecological regions described in the regional analysis below.

In terms of spatial distributions, cropland across the country displayed good conditions according to both NDVI and VCIx. The central areas of Mandalay and Magwe showed above average condition throughout the reporting period, while other parts of the country were average.

Regional analysis

For Myanmar, based on the cropping system, climatic zones, and topographic conditions, three sub-national agro-ecological regions can be distinguished. They are the Hill region, the Central plain, and the Coastal region.

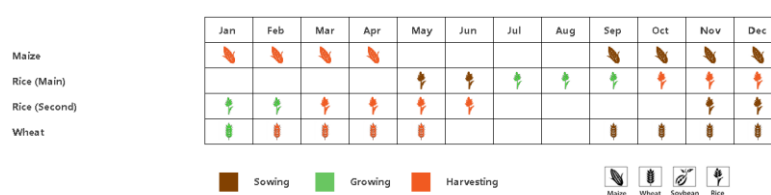
Maize, the major crop in the Hill region was planted during the monitoring period. Agroclimatic indicators were close to the national values. According to the NDVI development graphs, crop condition was slightly below average before December, after which it recovered rapidly and reached to the five-year maximum.

The Central plain is the main crop region of the country, and the area shows the most favorable values among the three agroecological zones discussed here. More precipitation compared with average and close to average temperature provided good condition for the crops which are, however, almost entirely irrigated.

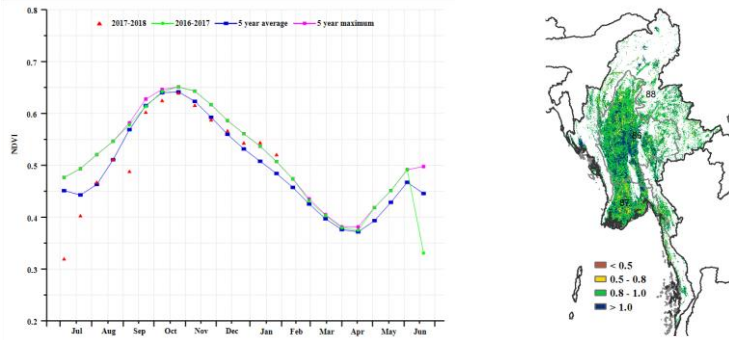
The coastal region shows the least favorable agroclimatic and crop conditions for the country but remain close to average. The crop condition before January was slightly below average and then recovered gradually, following the same trend as the Hill region. Rainfall was largely above average (RAIN 27%) while radiation was poor (RADPAR -7%).

CropWatch assesses overall crop condition as generally above average and possibly above the maximum of the recent five years.

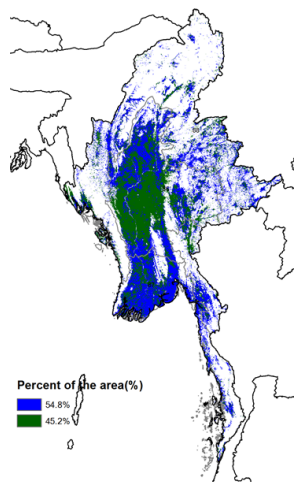
Figure 3.21. Myanmar crop condition, October 2017 - January 2018



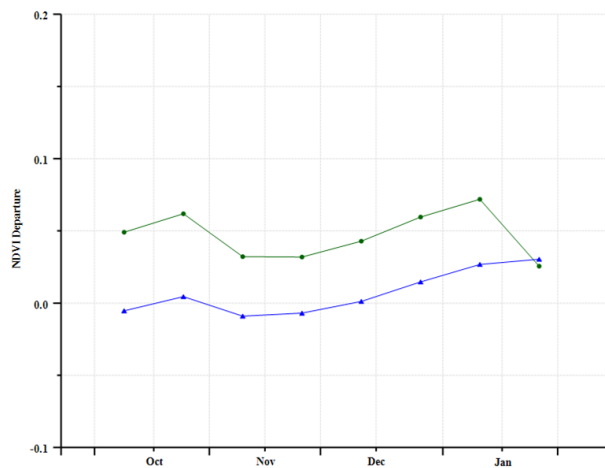
(a). Phenology of major crops



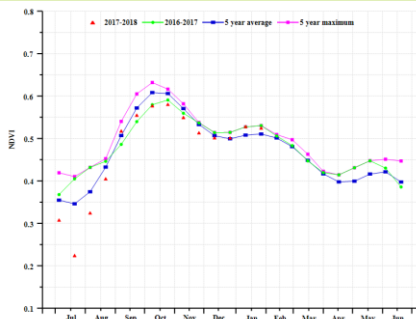
(b) Crop condition development graph based on NDVI



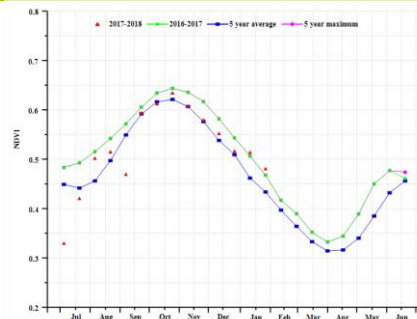
(c) Maximum VCI



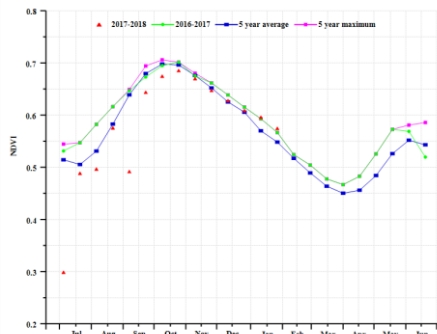
(d) Spatial NDVI patterns compared to 5YA



(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 3.37. Myanmar agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017 - January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Coastal region	355	27	27.2	0.1	958	-7
Central plain	245	13	23.4	0.1	896	-4
Hill region	232	5	20.5	0.3	866	-4

Table 3.38. Myanmar agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017 - January 2018

Region	BIOMSS		CALF		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	
Coastal region	893	24	1	1	0.97
Central plain	738	19	1	1	1.00
Hill region	748	16	1	0	0.97

[NGA] Nigeria

At the beginning of the reporting period, the north of the country harvested the very last millet and sorghum crops while the south harvested the main season maize. The second maize and irrigated rice crop were still growing, to be harvested early in 2018.

Overall climatic conditions were unfavorable for the whole country, where the agroclimatic indicators show a high reduction in rainfall (RAIN -26%). The temperature was relatively cool (TEMP 1.2°C below average) and sunshine was lower than expected (RAPDAR -6% compared to average. The combined effect is a reduction in the potential biomass index of 27%. The cultivated arable land fraction (CALF) also dropped 4% below the recent five-year average and the maximum vegetation condition index VCIx reached 0.86. Low values of VCIx were observed in the Sudano Sahelian region, especially in Sokoto, Borno, and Yobe states, while favorable values occurred over most other parts of the country.

The nation-wide NDVI development graph and the NDVI clusters show that crop condition was generally well below the average of the recent five years.

Regional analysis

Considering the cropping systems, climatic zones, and topographic conditions, Nigeria is divided into four agro-ecological zones (AEZ). They are referred to (from north to south) as Sudano-Sahelian, Derived savanna, Humid forest zone, and Guinean savanna.

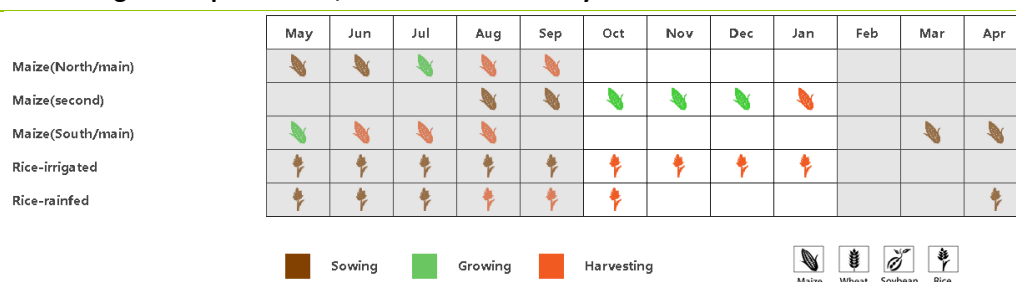
The Sudano-Sahelian region underwent a drop in rainfall and sunshine (RAIN -19% and RAPDAR -3%), while the temperature departure was positive. The biomass in this region decreased 38% and cropped arable land fraction (CALF) fell 16% below the recent five-year average. The maximum VCIx reached 0.79. The west and the north-east of the region enjoyed average conditions.

Contrary to the other AEZs, in the Derived savanna region, the Cropped arable land fraction (CALF) did not register any changes compared to the recent five-year average. The BIOMASS index was 28% below average and VCIx was 0.9. All agro-climatic indicators were below average (RAIN -34%, TEMP -1.1°C, RAPDAR -8%)

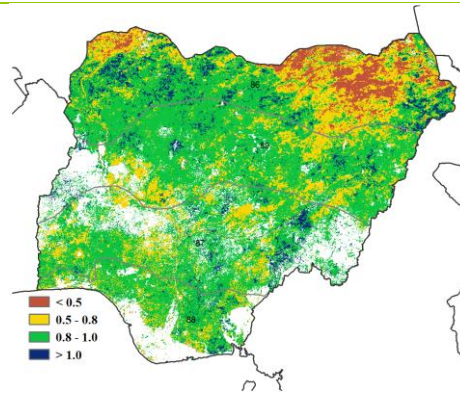
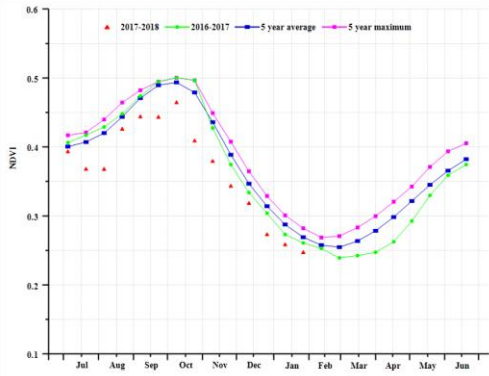
Below average values of all agro-climatic and agronomic indicators were also verified in the Humid Forest region (RAIN -13%, TEMP-0.9°C, RAPDAR -14% and BIOMASS -10%, CALF -1% and VCIx was 0.89.

The Guinean Savana recorded the largest RAIN and BIOMASS deficits (48% and 49%, respectively) together with cooler than average temperature (TEMP -1.4°C) and lower sunshine (RAPDAR -4%). The VCIx was 0.89.

Figure 3.22. Nigeria crop condition, October 2017-January 2018

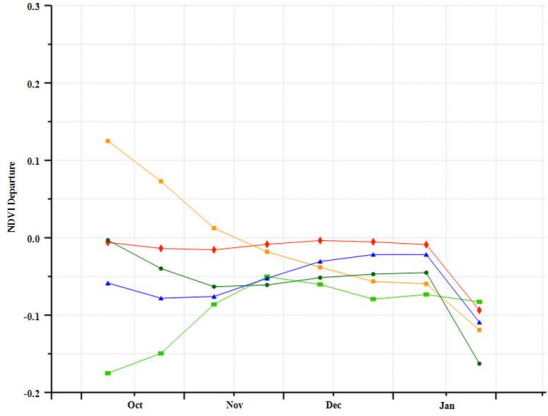
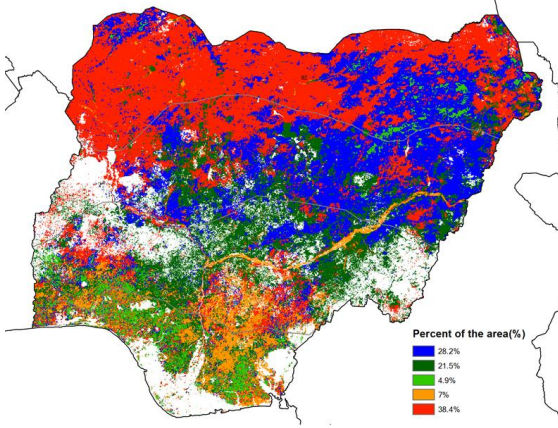


(a) Phenology of major crops



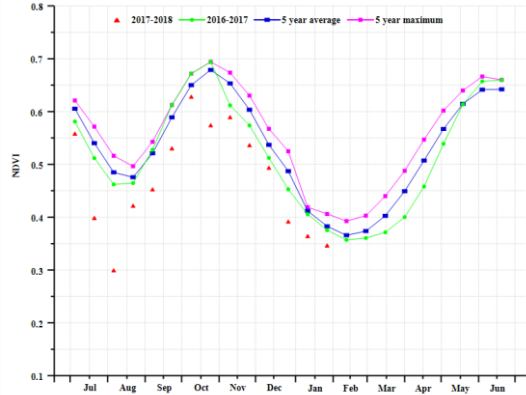
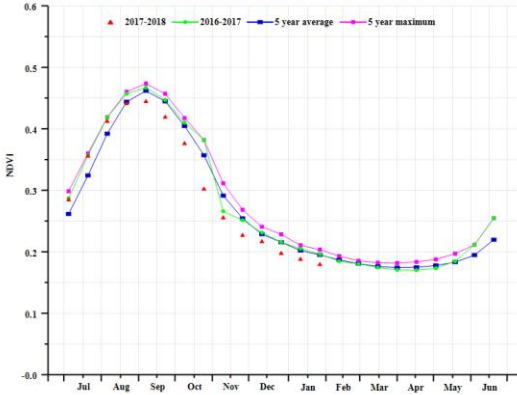
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

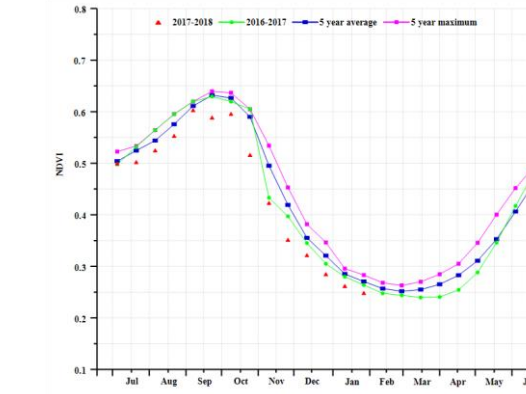
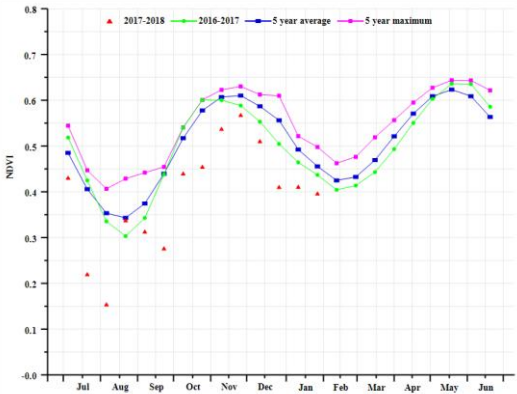


(d) Spatial NDVI patterns compared to 5YA

(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 3.39. Nigeria agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Sudano Sahelian	26	-19	25.8	1.2	1257	-3
Derived Savana	148	-34	26.3	-1.1	1104	-8
Humid Forest Zone	382	-13	27.1	-0.9	893	-14
Guinean Savanna	46	-48	25.2	-1.4	1236	-4

Table 3.40. Nigeria agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMASS		Cropped arable land fraction		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current	Departure from 5YA (%)	
Sudano Sahelian	76	-38	0	-16	0.79
Derived Savana	444	-28	1	0	0.9
Humid Forest Zone	994	-10	1	-1	0.89
Guinean Savanna	155	-49	1	-1	0.89

ARG AUS BGD BRA CAN DEU EGY ETH FRA GBR IDN IND IRN KAZ KHM MEX MMR NGA **PAK** PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF

[PAK] Pakistan

The Reporting period covers maturity and harvesting of summer/monsoon (Kharif) maize and rice, and the sowing and early growth of winter (Rabi) wheat. At 36mm rainfall was well below average (-48%). However, October to December is the driest part of the year in a country where the vast majority of crops are irrigated. As such, the deficit did not seriously impact crops. Temperature (14.9°C) was average and RADPAR (833 MJ/m²) was below. The combination of all the agroclimatic indicators resulted in very low (-38%) estimate of BIOMSS of only 118 gDM/m² but, as mentioned this is not dramatic at this time of the year. The water deficit probably accounts for NDVI remaining low throughout the period and below the 5YA. The country achieved marginally higher CALF (16% of 5YA), but a low VCix of only 0.67. However, the outcome of the Rabi season will largely depend on conditions later this year, from March onward.

Regional analysis

Country limits extend from the sea to the Himalaya and cover a large agro-ecological amplitude. CropWatch adopts four Agro-ecological zones (AEZ) for Pakistan, namely: Balochistan, the Lower Indus river basin, the Northern highlands and Northern Punjab. Since only 2 million Ha are cultivated in Balochistan, the region is not covered below:

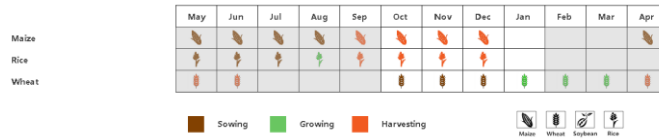
Nationwide, the Lower Indus river basin received the lowest rainfall (14mm) during the reporting period. Both temperature and RADPAR were lower than average (marginally so for TEMP: -0.4°C), which resulted in potential BIOMSS of only 64 gDM/m² (-24% of 5YA) which is irrelevant, since most of the area is irrigated. NDVI was low initially, but has improved in January month attaining average values. Potential cropped area reached 66% VCix was at 0.87. Current below average crop prospect for wheat will critically depend on spring weather conditions and irrigation water availability.

Highest rainfall (61mm) was received in Northern highlands, 49% below the average for this region which relies mostly on irrigation in two patches in the centre (Mardan, Charsada and Peshawar) and south (Bannu and Lakki Marwat). Other agroclimatic indicators like temperature (10.9 °C) being warmer than average (+0.9°C) and RADPAR of 763 MJ/m² (2% below average) resulted in the highest BIOMSS of 234gDM for any region. It is still lower than the average for this region. NDVI was low in the beginning of reporting period but improved in November. The cropped potential occupied area (32%) and VCix (0.58) during the period possibly indicate a shift in wheat crop sowing. The area will be important to watch.

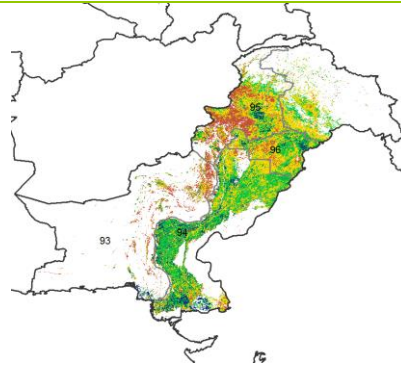
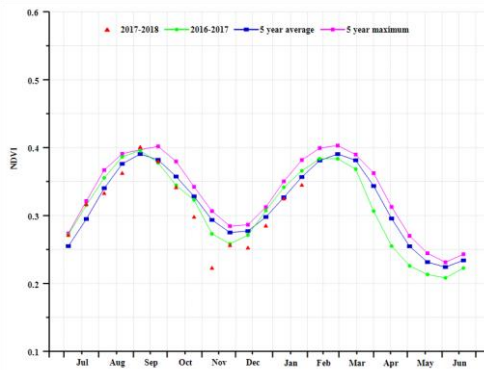
The lowest rainfall (-60%) was recorded for North Punjab region, the main agricultural area in Pakistan. Temperature (17.3°C) was average but the sunshine had a marked deficit (RADPAR, -6%). The resulting estimate of BIOMSS (107 gDM/m²) was (-55%) below average. The NDVI remained low throughout the period, though continuing to increase with time. The potential cropped area of 77% with low VCix (0.77) could be due to delay in sowing of wheat due to low rainfall. The area being fully irrigated, poor crop performance is unusual. The low rainfall and NDVI profile justify the close monitoring of the area later in the season.

At best, the overall condition of Rabi wheat for the country looks average but further monitoring is required.

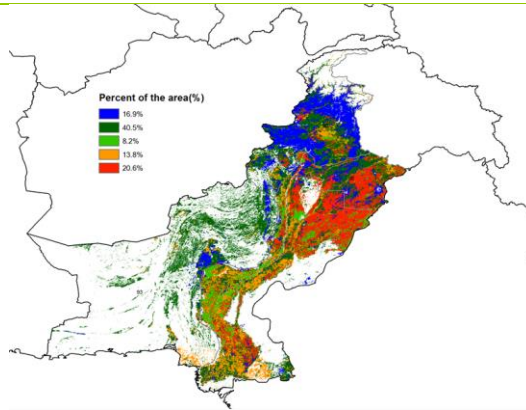
Figure 3.23. Pakistan crop condition, October 2017- January 2018



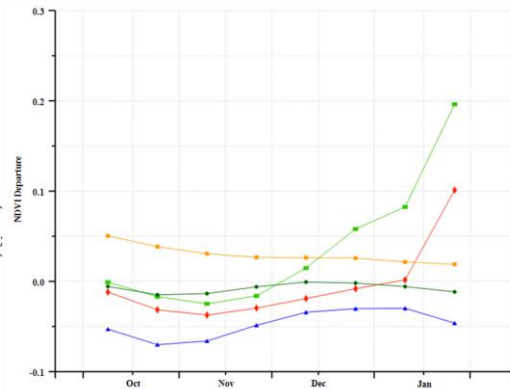
(a). Phenology of major crops



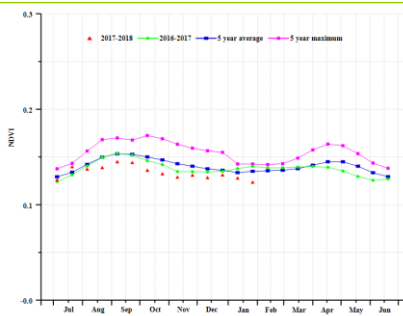
(b) Crop condition development graph based on NDVI



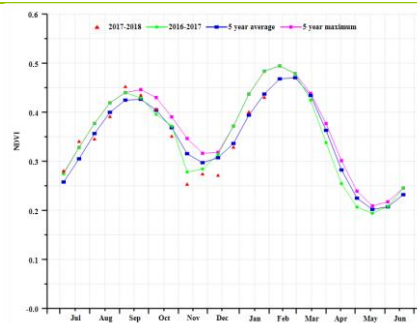
(c) Maximum VCI



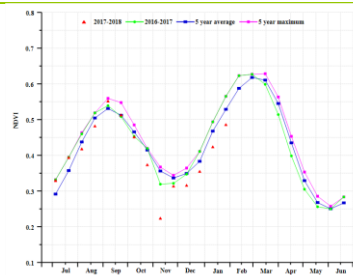
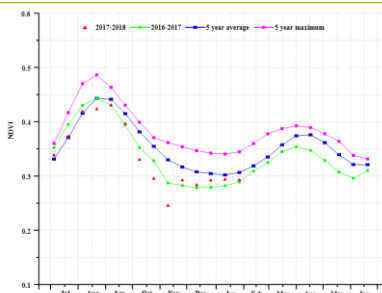
(d) Spatial NDVI patterns compared to 5YA



(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 3.41. Pakistan agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Balochistan	26	-44	14.5	-0.2	951	0
Lower Indus river basin	14	-35	20.2	-0.4	865	-7
Northern highland	61	-49	10.9	0.9	763	-2
Northern Punjab	24	-60	17.3	-0.3	761	-6

Table 3.42. Pakistan, agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		CALF		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	
Balochistan	109	-36	0	38	0.26
Lower Indus River Basin	64	-24	66	28	0.87
Northern Highland	234	-40	32	-9	0.58
Northern Punjab	107	-55	77	12	0.77

[PHL] The Philippines

In the Philippines, the monitoring period covers the harvesting stage of last year's main rice, as well as the sowing stage of secondary rice and maize. According to the NDVI profiles for the country, crop condition was below the five-year average, which may result for abundant cloudiness (below average radiation is attested by RADPAR 5% below average). Nationwide, precipitation (RAIN) presents a positive departure of 46% over average, accompanied by average temperature, which resulted in an increase of BIOMSS 20% over average.

Based on the VCIx indicator, favorable crop condition prevailed as the value mostly exceeded 0.90. The cropped arable land fraction (CALF) nation-wide was almost 100%. Considering the spatial patterns of NDVI profiles, 73.4% of the cropped area experienced average conditions, but other areas display very different profiles including (1) a marked drop in December and January in 9.3% of the areas, (2) a recovery to average condition from low values in October (10.0%) and (3) a decrease from October to December and a recovery thereafter in 6.4% of croplands. The behavior of NDVI can be explained at least partially by several typhoons that affected the Philippines, starting with Khanun in mid-October, Kai-tak and Tembin in December. Storms brought some heavy and short duration rain, causing flash floods in the Visayas, including Samar. Altogether, however, the outputs for maize and rice in the country are expected to be above average.

Regional analysis

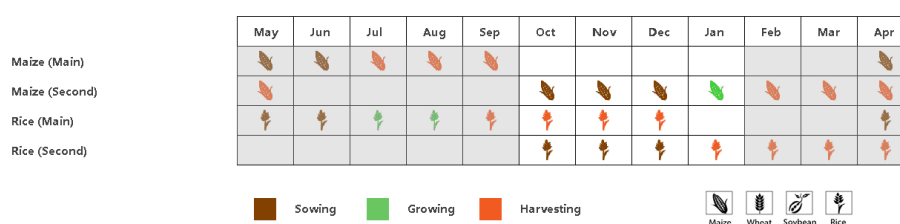
Based on cropping systems, climatic zones, and topographic conditions, three main agro-ecological regions can be distinguished for the Philippines. They are the Lowlands region, the Hills region, and the Forest region.

The Lowlands region experienced excessive rainfall (RAIN +46%), low radiation (RADPAR -6%) and average temperature. BIOMSS was 27% above compared to the average for the period and region. Regional CALF is 100%, and the VCIx was good at 0.97. Altogether, the outputs for secondary maize and rice are expected to be above average.

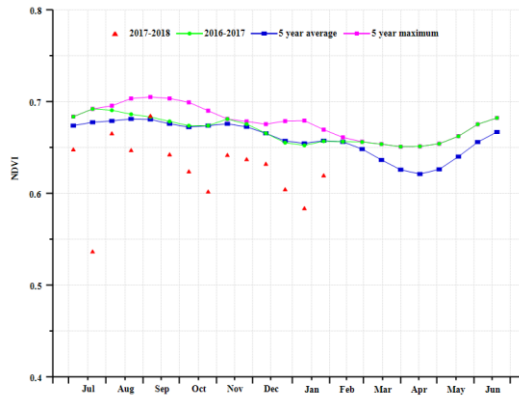
The Forest region also experienced excessive rainfall (RAIN +44%), low radiation (RADPAR -5%) mildly below average temperature (TEMP -0.5°C). BIOMSS was 15% above compared to the average for the period and region. Regional CALF is 100%, and the VCIx was good at 0.98. Altogether, the outputs for secondary maize and rice are expected to be above average.

The hills region recorded the highest rainfall departure (RAIN, +64%), low radiation (RADPAR -3%) and normal temperature (TEMP -0.1°C). BIOMSS is 27% above the five-year average. A high CALF (100%) and good VCIx (0.97) should result in above average secondary maize and rice seasons.

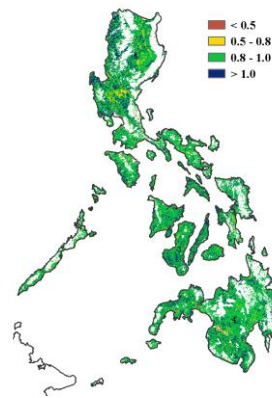
Figure 3.24. Philippines crop condition, October 2017 -January 2018



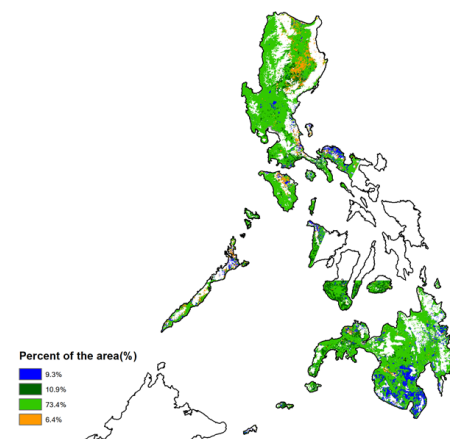
(a). Phenology of major crops



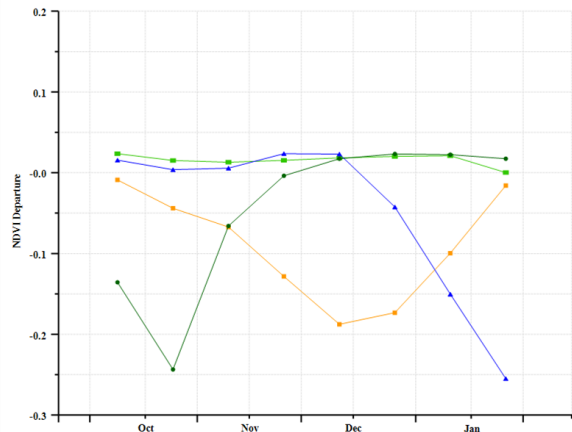
(b) Crop condition development graph based on NDVI



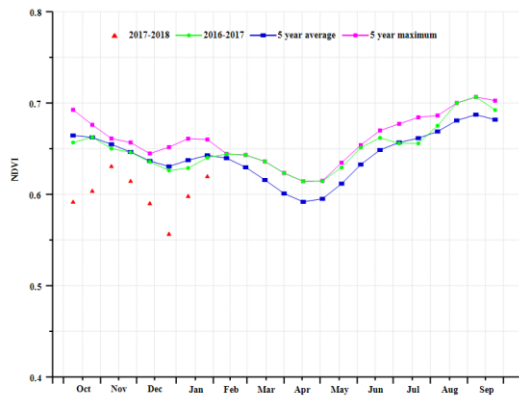
(c) Maximum VCI



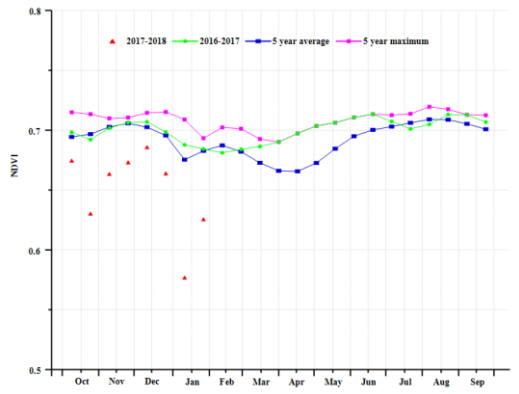
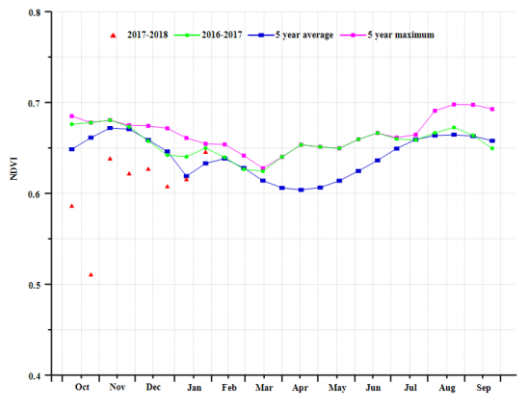
(d) Spatial NDVI patterns compared to 5YA



(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 3.43. Philippines agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Lowland agriculture region	1162	46	25	-0.3	815	-6
Hilly agriculture region	1240	64	26.3	-0.1	911	-3
Forest region	1579	44	25.7	-0.5	901	-5

Table 3.44. Philippines agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current	Departure from 5YA (%)	
Lowland agriculture region	1858	27	100	0	0.97
Hilly agriculture region	2231	27	100	0	0.97
Forest region	2298	15	100	0	0.98

ARG AUS BGD BRA CAN DEU EGY ETH FRA GBR IDN IND IRN KAZ KHM MEX MMR NGA PAK PHL **POL** ROU RUS THA TUR UKR USA UZB VNM ZAF

[POL] Poland

The monitoring period covers the harvest of maize (October) and the sowing of the winter wheat. The Cropped Arable Land Fraction (CALF) was close to average. Compared to last 5 years, weather conditions were wetter and warmer in the reporting period: rainfall was up 41% and temperature increased 1.4°C. RADPAR was below the average (-15%). Resulting from the wetter and warmer condition, the potential biomass (BIOMSS) increased 17%. The VCIx in Poland during the reporting period was 1.00.

As shown by the crop condition development graph, national NDVI values fell markedly in early December and late January due to the presence of snow. Only about 14.4% of the agriculture areas had below average condition from October 2017 to January 2018. However, in January 2018, NDVI was below average all over Poland due to country-wide heavy snow cover.

Overall, due to sufficient precipitation and suitable temperature, the condition of winter wheat in Poland is assessed by CropWatch to be at least average.

Regional analysis

The four Agro-Ecological areas examined more closely for CropWatch include the Central rye and potatoes area, Northern oats and potatoes areas, Northern-central wheat and sugarbeet area, and the Southern wheat and sugarbeet area.

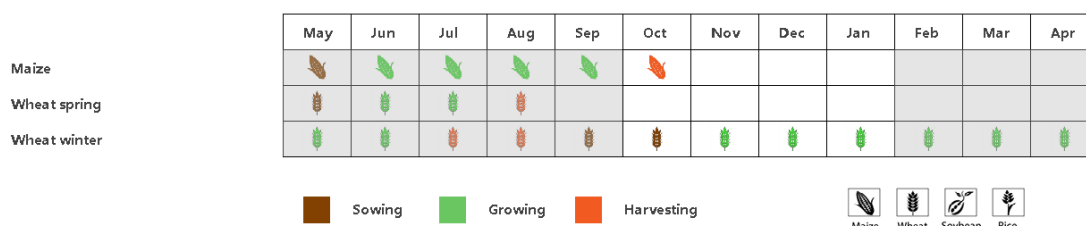
In the Central rye and potatoes area, the condition of crops was above the average of the last 5 years as higher rainfall (RAIN +41%) and temperature (TEMP +1.5°C), which accounts for the increase of biomass (BIOMSS +20%) compared to the five-year average. RADPAR was below average (-16%). The area has a high CALF (100%) as well as a very favorable VCIx (1.02)

Crop conditions in the Northern oats and potatoes area were also above the average as the wetter (RAIN +66) and warmer (TEMP +1.4°C) weather, resulting in the increased biomass (BIOMSS +12%). The area has a high CALF (100%) as well as a favorable VCIx (0.95).

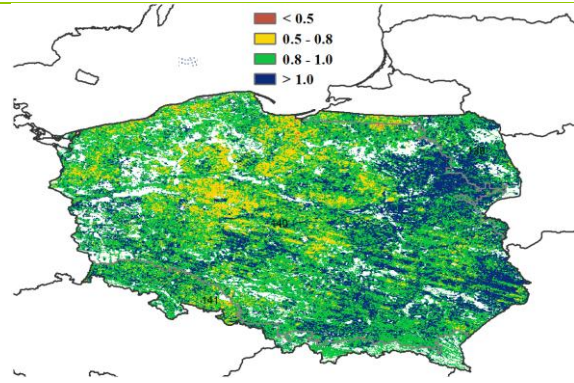
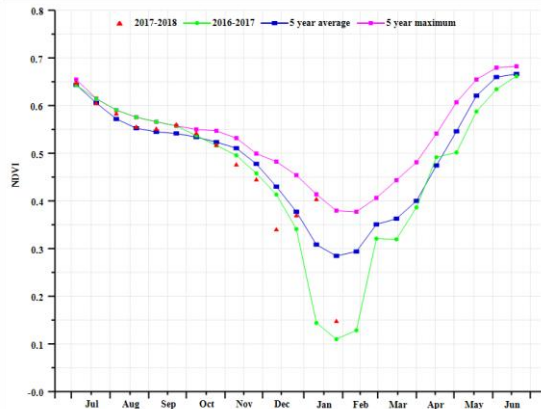
The Northern-central wheat and sugarbeet area experienced conditions similar to those in the Central rye and potatoes area: positive rainfall (RAIN +51%) and temperature (TEMP +1.3°C), and a deficient RADPAR (-14%). Due to favorable condition, biomass increased by 18% compared to the average of last 5 years. The area has a high CALF (100%) as well as a favorable VCIx (0.94).

The Southern wheat and sugarbeet area recorded rainfall and temperature increments over average (RAIN +25%, TEMP +1.4°C), leading to increased biomass (BIOMSS +14%) compared to the five-year average. The area has a high CALF (100%) as well as a favorable VCIx (1.04).

Figure 3.25. Poland crop condition, October 2017 -January 2018

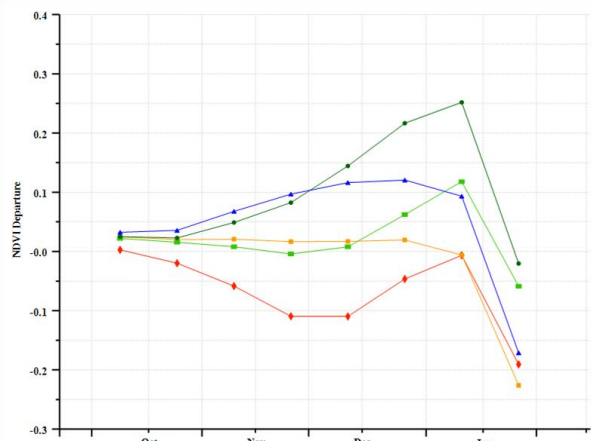
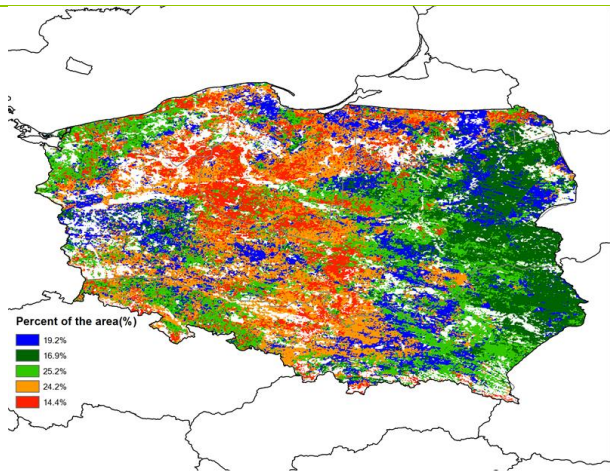


(a). Phenology of major crops



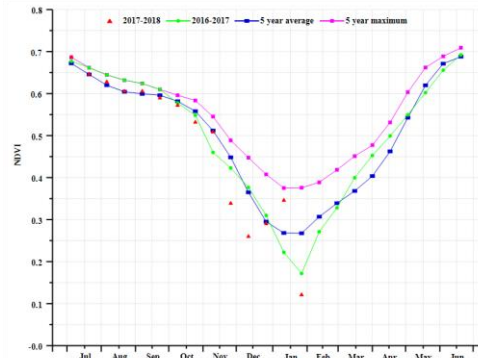
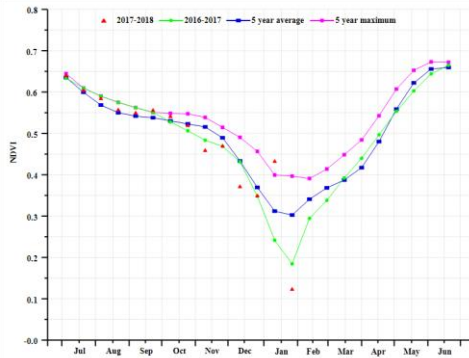
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

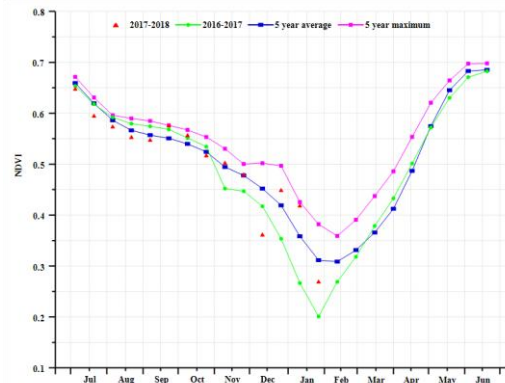
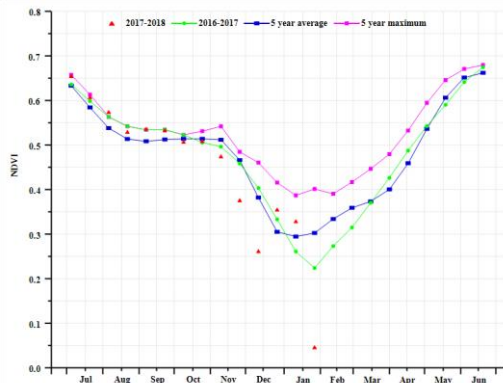


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



(f) Crop condition development graph based on NDVI (Central rye and potatoes area (left) and Northern oats and potatoes area (right))



(g) Crop condition development graph based on NDVI (Northern-central wheat and sugarbeet area (left) and Southern wheat and sugarbeet area (right))

Table 3.45. Poland agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Central rye and potatoes area	266	41	4.5	1.5	188	-16
Northern oats and potatoes areas	357	66	4.1	1.4	164	-15
Northern-central wheat and sugarbeet area	294	51	4.4	1.3	176	-14
Southern wheat and sugarbeet area	249	25	4.1	1.4	223	-14

Table 3.46. Poland agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current	Departure from 5YA (%)	
Central rye and potatoes area	963	20	100	1	1.02
Northern oats and potatoes areas	936	12	100	0	0.95
Northern-central wheat and sugarbeet area	961	18	100	0	0.94
Southern wheat and sugarbeet area	924	14	100	1	1.04

[ROU] Romania

Maize was harvested during the reporting season and winter wheat began vegetative growth after being sown from October. The overall condition of winter wheat was good (VCIx = 0.94). Rainfall was slightly higher than average (+9%) and so was temperature (+1.2°C). Sunshine radiation as assessed by RADPAR was 3% below the reference. Both biomass and CALF show better condition than average (BIOMSS +9%, CALF +9%), which indicate a favourable beginning of the 2018 winter wheat season.

Regional analysis

More detail is provided below for three main agro-ecological zones (AEZ) of the country. They include the Central mixed farming and pasture Carpathian hills; the Eastern and southern maize, wheat and sugar beet plains; the Western and central maize, wheat and sugar beet plateau.

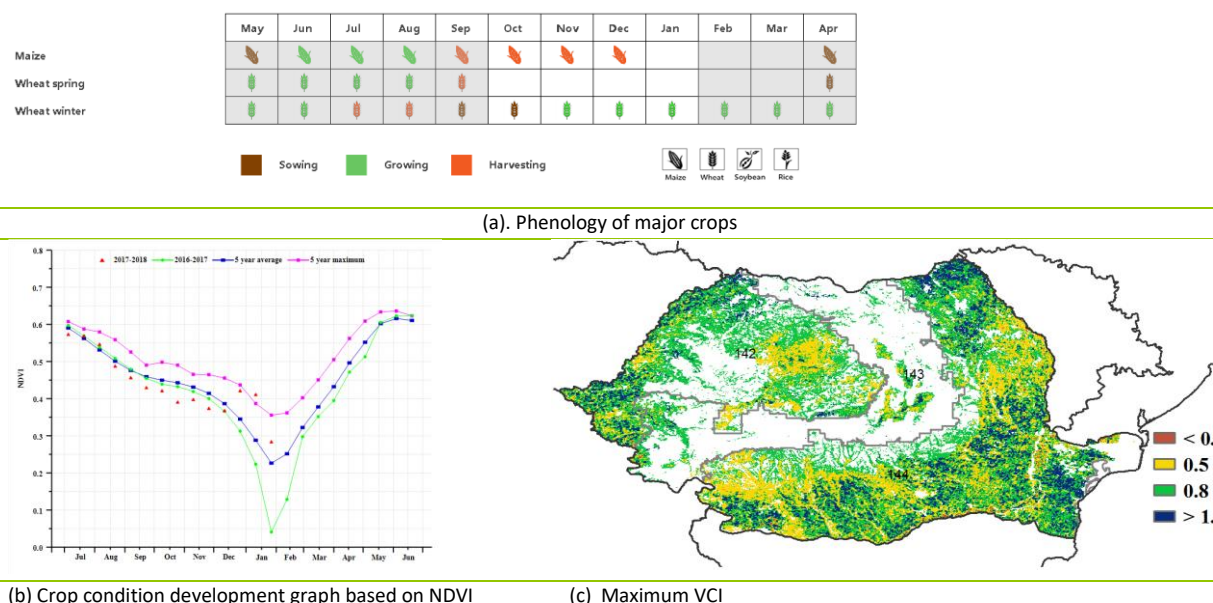
According to NDVI development profile, crop condition differed in the three regions. In the Central mixed farming and pasture Carpathian hills and the Western and central maize, wheat and sugar beet plateau, crop condition was below average over most of the reporting period while better condition prevailed for winter crops in the Eastern and southern maize, wheat and sugar beet plains, where crop condition was better than average and even exceeded the 5-year maximum in January. As for cultivated area, an increase of CALF occurred in all three regions compared with average.

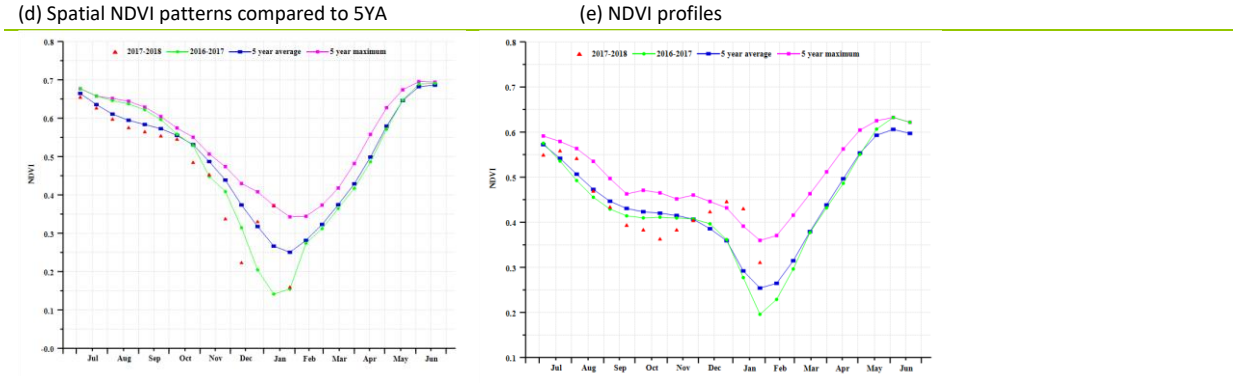
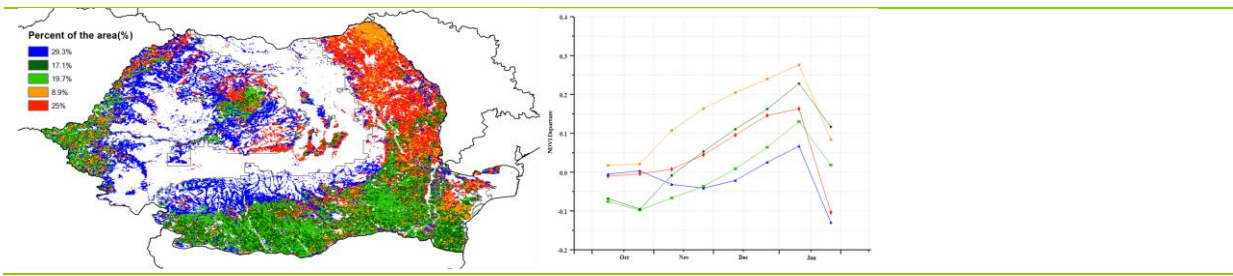
All AEZs regions suffered from a decrease below average of solar radiation (RADPAR -7%) which, however, should not have affected wheat much as the crop is dormant and partially snow-covered.

Temperature and rainfall were above average in all three regions. During previous reporting period (July to October 2017) CropWatch found a deficit of rainfall in Romania. The current increase of precipitation will improve the growing conditions for winter wheat. This is confirmed by the increase of the BIOMSS indicator.

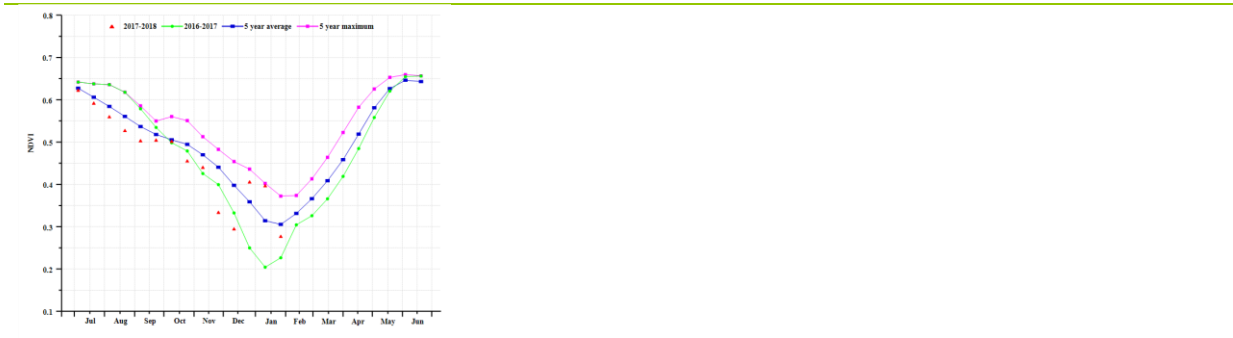
VCIx values were in excess of 0.90 in all AEZs. VCIx was lower than 0.8 near the central region and exceeds 1.0 in most parts of the northwest and southwest regions.

Figure 3.26. Romania crop condition, October 2017 -January 2018





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



(f) Crop condition development graph based on NDVI (Western and central maize, wheat and sugarbeet plateau)

Table 3.47. Romania agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Central mixed farming and pasture Carpathian hills	263	5	1.9	0.9	340	-7
Eastern and southern maize, wheat and sugar beet plains	209	6	5.2	1.1	370	0
Western and central maize, wheat and sugar beet plateau	272	16	4.1	1.4	330	-7

Table 3.48. Romania agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI Current
	Current (gD M/m ²)	Departure from 5 YA (%)	Current	Departure from 5YA (%)	
Central mixed farming and pasture Carpathian hills	760	6	1	0	0.91
Eastern and southern maize, wheat and sugar beet plains	844	11	1	13	0.95
Western and central maize, wheat and sugar beet plateau	845	8	1	5	0.91

[RUS] Russia

During the monitoring period, the sowing of winter wheat was delayed but nevertheless completed before November. Cropped arable land increased by a spectacular 7% compared to the last five-year average. Like parts of the Central Europe to Western Russia MPZ, the weather in Russia was warmer than average (0.9°C above). The rainfall departure was +9% above average and the RADPAR was -6% lower. The BIOMASS also increased 4% due to the favorable weather condition.

As shown in the NDVI crop condition development graph for the country, values follow those of last year and the recent five-year average from July to December, and exceed them in January due to the warm and rainy climate condition. In most parts of Southern Urals and the Southern Siberian area including almost 60% croplands of Russia, the NDVI was significantly lower than average from last December due to the snow cover. Crop condition was generally favorable in most parts of Russia’s croplands. Compared with the previous season, winter wheat yields are expected to increase (VCIx=0.86).

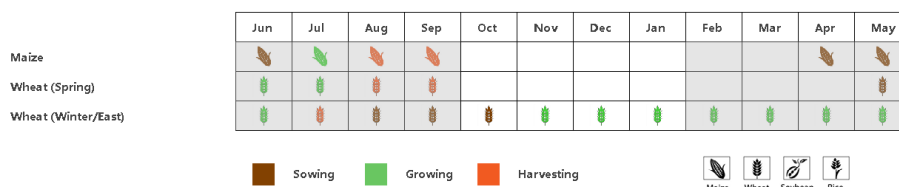
Regional analysis

A more detailed analysis is provided for seven agro-ecological zones (AEZ), namely the Kaliningrad oblast, the Caucasus, the Volga Basin, the Central Economic Region, the Southern Urals, the Southern Siberian area, and the Northwest region including Novgorod. The numbers correspond to the labels on the VCIx map.

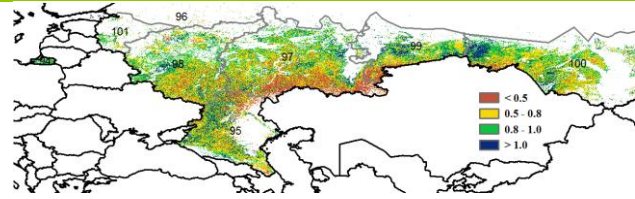
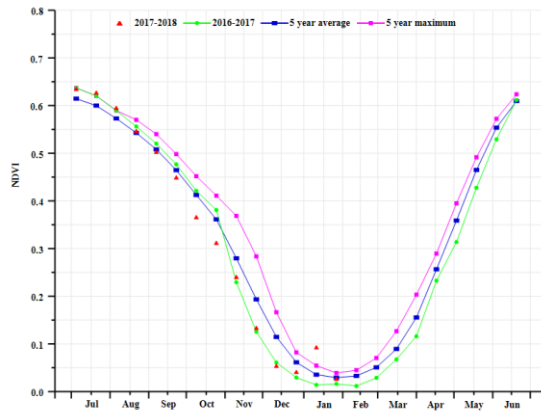
In the Caucasus, Central Economic Region (CER), Kaliningrad oblast, Northwest region including Novgorod and Volga Basin regions indicator patterns are close to the national ones, i.e. weather conditions were favorable for winter crops. Rainfall was abundant and spatially variable from +4% in Volga Basin to +67% in the Kaliningrad oblast and the positive temperature deviation varied from 0.8°C to 1.3°C. The NDVI values in those areas (see the map of spatial NDVI patterns) were higher than usual from July. In the Central Economic Region and Kaliningrad oblast, the excess of rainfall was significant (+36% and +67%, respectively) and accompanied by warm temperature. The BIOMASS was higher than expected (7% and 10%). The listed AEZs show CALF values that vary from 65% (Volga Basin) to values close to 90% or well above (86% in CER to 100% in the north-west region with Novgorod. Fair production can be expected.

Unlike most of Russia, the Southern Siberian area and Southern Urals regions experienced a shortage of rainfall (RAIN 13% and 35% below average, respectively), with BIOMSS both decreasing 7% accordingly. NDVI also decreased in these two regions, and CALF is low at 45% in the first and 59% in the second. Agricultural output will be negatively affected.

Figure 3.27. Russia crop condition, October 2017 -January 2018

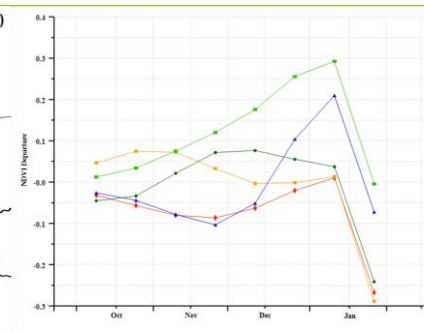
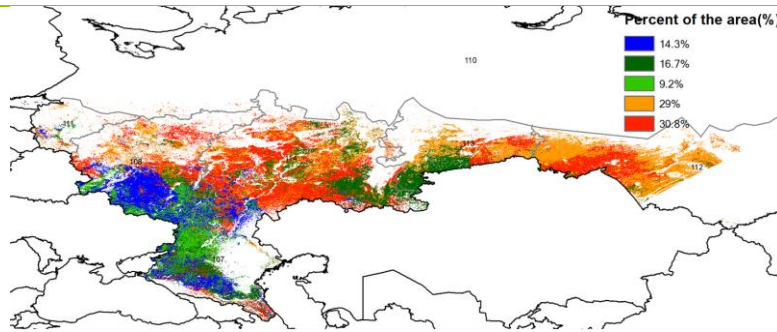


(a). Phenology of major crops



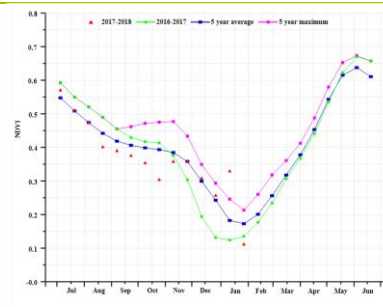
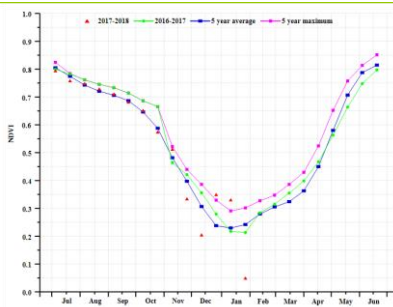
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

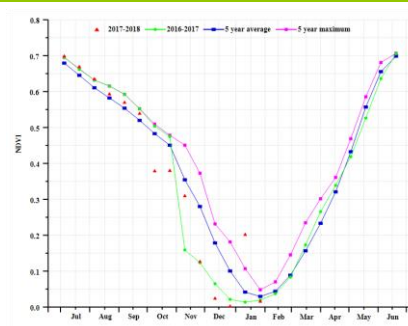
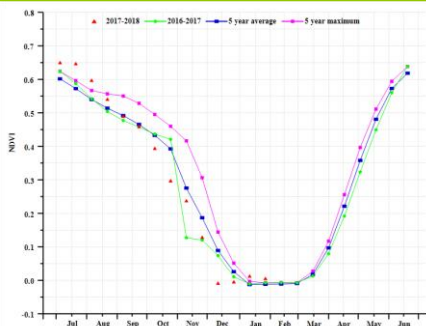


(d) Spatial NDVI patterns compared to 5YA

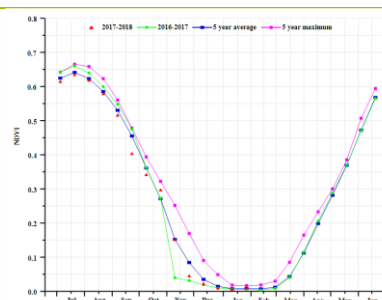
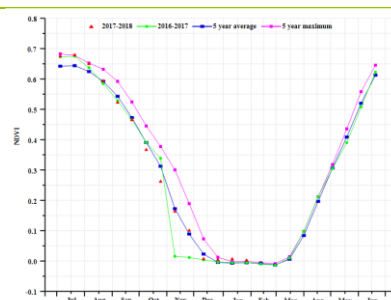
(e) NDVI profiles



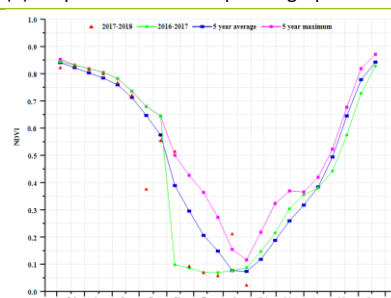
(f) Crop condition development graph based on NDVI (Kaliningrad oblast (left) and Caucasus (right))



(g) Crop condition development graph based on NDVI (Volga Basin (left) and Central Economic Region (right))



(h) Crop condition development graph based on NDVI (Southern Urals (left) and Southern Siberian (right))



(i) Crop condition development graph based on NDVI (Northwest region including Novgorod)

Table 3.49. Russia agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
The Caucasus	271	17	3.3	0.8	326	-6
Central Economic Region	281	36	-0.2	1.5	144	-19
Kaliningrad oblast	389	67	3.9	1.4	158	-13
Northwest region including Novgorod	263	11	0.5	1.5	103	-17
Southern Siberian area	106	-13	-11.9	0.1	257	2
Southern Urals	81	-35	-7.4	0.5	199	8
Volga Basin	196	4	-3.3	1.3	174	-8

Table 3.50. Russia agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	
The Caucasus	829	14	58%	19	1.03
Central Economic Region	661	7	86%	0	0.83
Kaliningrad oblast	927	10	99%	0	0.92
Northwest region including Novgorod	691	7	100%	0	0.84
Southern Siberian area	266	-7	45%	30	0.86
Southern Urals	364	-7	59%	11	0.87
Volga Basin	529	5	65%	-4	0.80

 ARG AUS BGD BRA CAN DEU EGY ETH FRA GBR IDN IND IRN KAZ KHM MEX MMR NGA PAK PHL POL ROU RUS **THA** TUR UKR USA UZB VNM ZAF

[THA] Thailand

The harvest of the main rice crop in Thailand was completed, while the planting of the second rice crop started in early January. According to CropWatch indicators, radiation (RADPAR, -8%) was below average, TEMP was average (-0.4°C, departure) while rainfall (RAIN, +29%) was significantly above the seasonal norm, which shows favorable meteorological condition and an increase of BIOMSS by 16%. Nationwide, from October to December, crop condition was below the five-year average, while in January condition was close to average. As shown by the NDVI departure clustering, 37.7% of the crop areas in Thailand (areas located in the patches around the whole country) experienced average condition. Other areas, accounting for 45.5% of the total agricultural land and located mostly in the Single-cropped rice north-eastern region, began with average condition, which subsequently deteriorated to below average in January. Before November, crop condition was close to average and dropped below average at the end of November in about 3.1% of croplands, situated mostly in the west of Angthong and Ayutthaya and east of Suphanburi. In another 1.4% of crop area, located in the center of Central double and triple-cropped rice lowlands, crop condition was worse before January and caught up with average in late January. Overall, crop condition during the monitoring period was close to five-year average.

Regional analysis

The regional analysis below focuses on some of the already mentioned agro-ecological zones of Thailand, of which some are mostly defined by the rice cultivation typology. Agro-ecological zones include Central double and triple-cropped rice lowlands, South-eastern horticulture area, Western and southern hill areas, Single-cropped rice north-eastern region. The numbers correspond to the labels in the VCix and NDVI profile maps.

Indicators for the Central double and triple-cropped rice lowlands follow the same patterns as those for the country as a whole: temperature (TEMP, -0.4°C) and radiation (RADPAR -8%) were below average, and accumulated rainfall was significantly above average (RAIN +42%), resulting in the largest biomass production potential increase in Thailand (BIOMSS +27%). The NDVI development graph, however, shows that crop condition was below average before December and improved in January. This is confirmed by the VCix map. Overall, the situation was close to average.

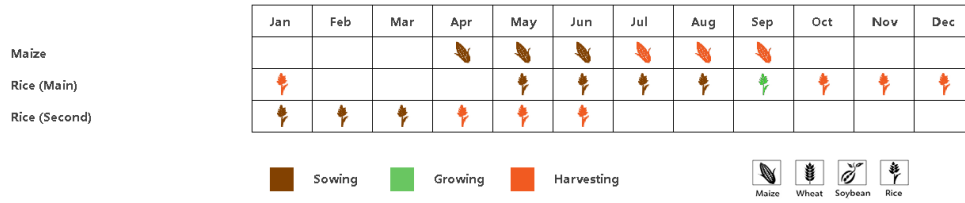
The temperature of the South-eastern horticulture area suffered a decrease of -0.8°C, while rainfall (RAIN, +35%) and radiation (RADPAR, -8%) experienced the same changes as the whole country. The VCix map, NDVI development graph, and BIOMSS indicators (39%) all lead to the conclusion that crop condition was close to but slightly above average.

Crop condition in Western and southern hill areas was favorable and same as the nationwide pattern: RAIN +24%, TEMP -0.3°C, RADPAR -8%, and BIOMSS +10% when compared to their respective averages. According to the NDVI development graph, crop condition was below average, while the NDVI profiles show that most of this region was slightly above average. Overall, the situation was slightly above but close to average.

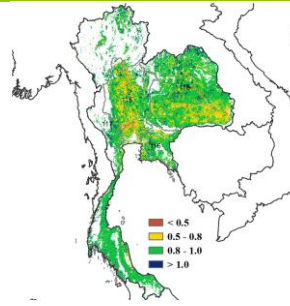
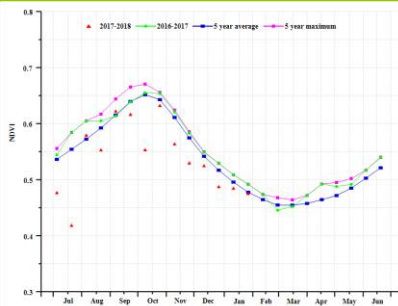
Finally, the situation in the Single-cropped rice north-eastern region was comparable to that of the country as a whole: rainfall was above average (RAIN +37%) with lower temperature (TEMP -0.5°C) and radiation (RADPAR -9%). BIOMSS (+19%) shows above average values. The NDVI development graph shows that crop condition was below average, probably due to excess precipitation and reduced sunshine. According to the NDVI profiles, crop condition in most of this region was close to average.

At the national level, most arable land was cropped during the season and had favorable VCIx values around 0.88. CropWatch projections are that the production of rice will slightly down compared to average.

Figure 3.28. Thailand crop condition, October 2017 -January 2018

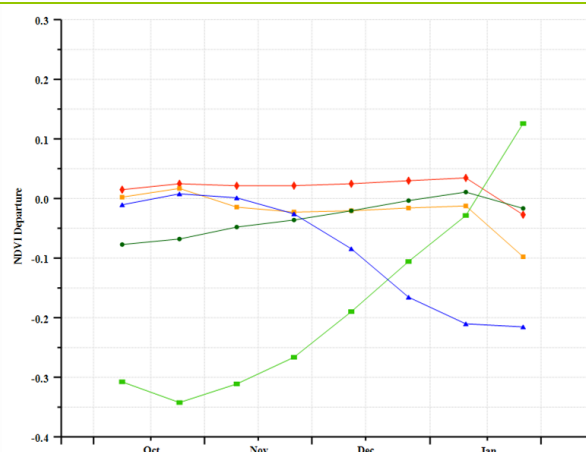
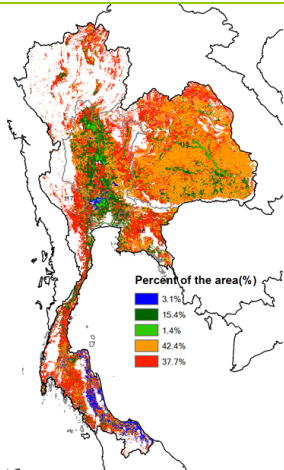


(a). Phenology of major crops



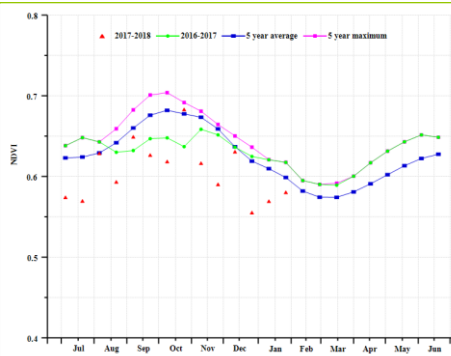
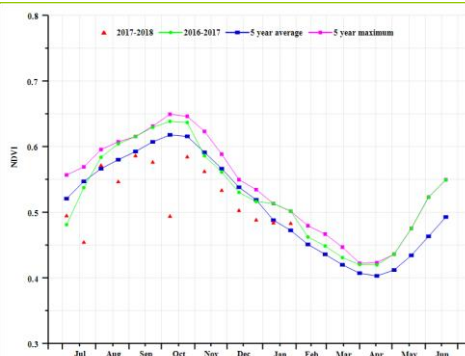
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

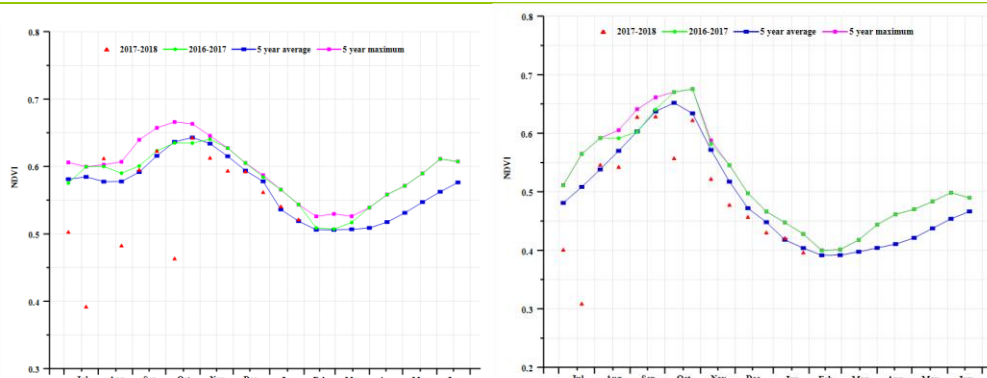


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



(f) Crop condition development graph based on NDVI (Central double and triple-cropped rice lowlands (left) and Western and southern hill areas (right))



(g) Crop condition development graph based on NDVI (South-eastern horticulture area (left) and Single-cropped rice north-eastern region (right))

Table 3.51. Thailand agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Central double and triple-cropped rice lowlands	311	42	25.7	-0.4	929	-8
South-eastern horticulture area	402	35	25.9	-0.8	954	-8
Western and southern hill areas	667	24	24.6	-0.3	883	-8
Single-cropped rice north-eastern region	221	37	25.1	-0.5	938	-9

Table 3.52. Thailand agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current	Departure from 5YA (%)	
Central double and triple-cropped rice lowlands	776	27	98	0	0.83
South-eastern horticulture area	1113	39	98	0	0.89
Western and southern hill areas	1171	10	100	0	0.94
Single-cropped rice north-eastern region	549	19	99	-1	0.86

[TUR] Turkey

During the monitoring period, maize and rice were harvested and the planting of winter wheat was completed.

The national NDVI profiles showed that the crop condition was below the 5YA average mainly in October and November, but it was above at the end of December and throughout January. As shown by the NDVI clustering map, crop condition was close to or above average during the entire reporting period in some parts of Marmara Aegean Mediterranean lowland zone and small parts of Southeast Anatolia. This result indicates favorable crop condition in these two areas. However, in most parts of Central Anatolia and Eastern Anatolia, NDVI was below or close to average. These results are consistent with the patterns illustrated by the VCIx map. Over the reporting period, Turkey experienced a 13% rainfall deficit and 2% drop in radiation, while the country received average temperature. The biomass was close to average and CALF was up 7%. The national average VCIx was 0.88 during the reporting period, indicating average crop condition in the whole country. The crop output is estimated to be favorable in Marmara Aegean Mediterranean lowland region, but mixed or unfavorable in other regions.

Regional analysis

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

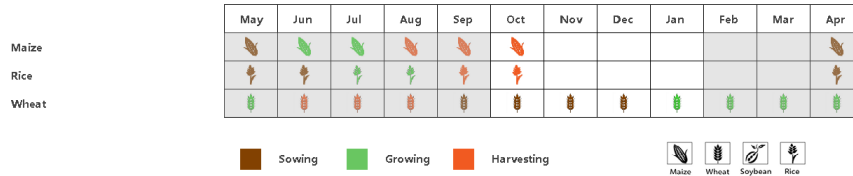
In the Black Sea zone, crop condition was poor. The NDVI profiles indicate that NDVI was below 5YA mainly in the first two months of entire reporting period, while it was close to the average in January. The Black Sea region was short in rainfall with a 10% drop in RAIN, suffered a radiation deficit (RADPAR, -3%) while temperature (TEMP, +0.9°C) and the biomass production potential (BIOMSS,+1%) were average. The CALF decreased by 3%, and the maximum VCI (VCIx) value was 0.88. As a result of the low RAIN and inadequate sunshine, CropWatch estimates that the crop production prospects are mostly unfavorable.

Central Anatolia also shows below average condition according to the regional NDVI profile. The region suffered a RADPAR drop of 2% and low CALF (CALF,-9%). The RAIN was average and the TEMP was slightly above (+0.9°C). The BIOMSS was close to 5YA and the VCIx was the same as in the Black Sea zone. As mentioned earlier, the crop condition was not very promising in this zone.

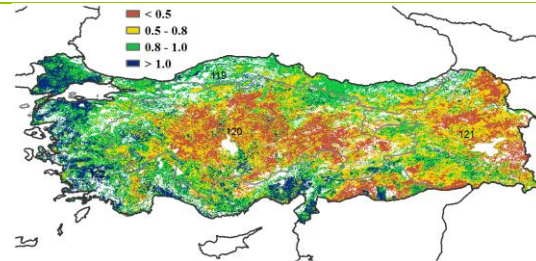
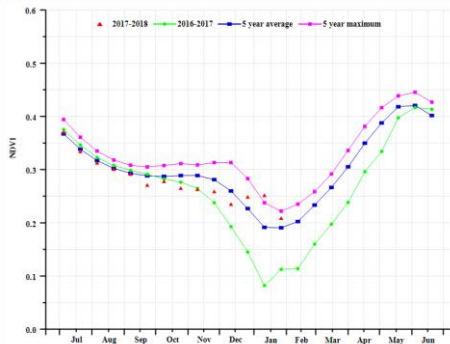
Very low NDVI values (sometimes as low as 0.05) in Eastern Anatolia shown in the NDVI profiles result mostly from snow at high elevation. This zone experienced a shortage of RAIN (-10%) and RADPAR(-3%), while the TEMP was above average(1.8°C). The VCIx in this zone was 0.69. The CALF was only 9%, significantly decreased by 33% compared to five years average, indicating a very low cropped area. At this stage, it is difficult to assess the situation in Eastern Anatolia due to the winter conditions.

As indicated by the NDVI profile, crop condition was below average in October, November, and December in the Marmara Aegean Mediterranean lowland zone. It improved in January. The AEZ recorded mildly above average TEMP (+0.6°C) and average RADPAR. The BIOMSS was 8% below average, while the CALF grew by 23% indicating an increase in cropped land. The VCIx was 1.01, indicating a favorable crop condition. CropWatch estimates the production prospects for the AEZ as favorable.

Figure 3.29. Turkey crop condition, October 2017 -January 2018

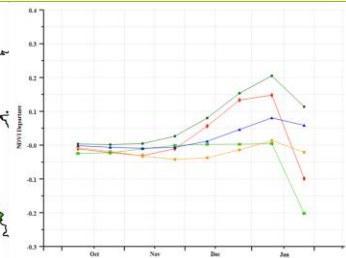
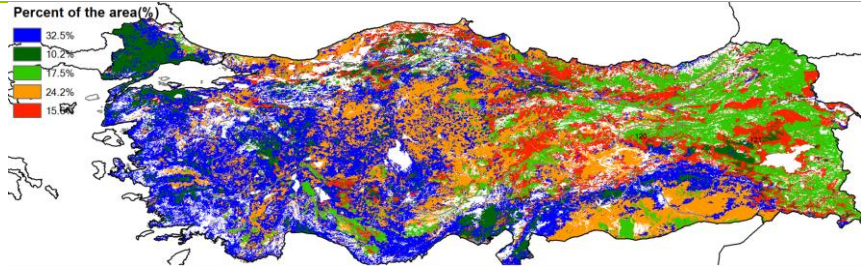


(a). Phenology of major crops



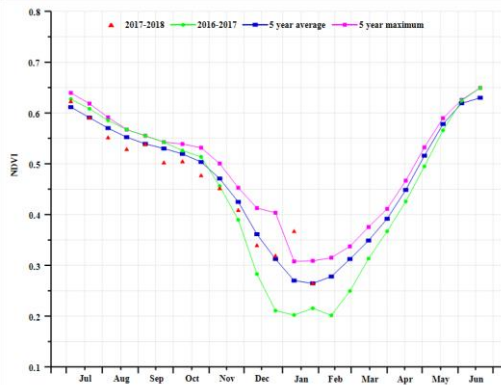
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

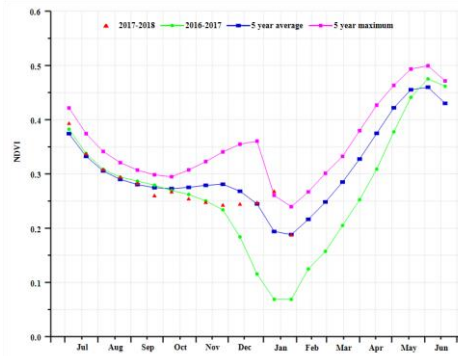


(d) Spatial NDVI patterns compared to 5YA

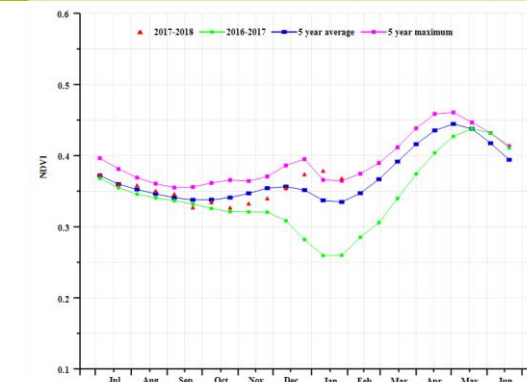
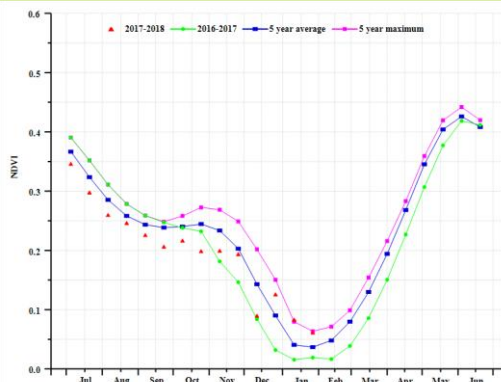
(e) NDVI profiles



4.85



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



(g) Crop condition development graph based on NDVI (Eastern Anatolia region (left) and Marmara_Agean_Mediterranean lowland region)

(right)

Table 3.53. Turkey agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	Rain		TEMP		RADPAR	
	Rain Current (mm)	Rain 15 YA Departure (%)	TEMP Current (°C)	Temp 15YA Departure (°C)	RADPAR Current (MJ/m ²)	RADPAR 15YA departure (%)
Black Sea region	323	-10	6.8	0.9	472	-3
Central Anatolia region	257	0	4.9	0.9	573	-2
Eastern Anatolia region	253	-10	2.6	1.8	594	-3
Marmara Aegean Mediterranean lowland region	275	-25	9.3	0.6	582	0

Table 3.54. Turkey agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		CALF		Maximum VCI
	BIOMSS Current (gDM/m ²)	BIOMSS 5 YA Departure (%)	CALF(%)	Departure from 5YA (%)	VCI Current
Black Sea region	1032	8	73	-3	0.88
Central Anatolia region	865	5	16	-9	0.88
Eastern Anatolia region	682	-3	9	-33	0.69
Marmara Aegean Mediterranean lowland region	936	-8	65	23	1.01

 ARG AUS BGD BRA CAN DEU EGY ETH FRA GBR IDN IND IRN KAZ KHM MEX MMR NGA PAK PHL POL ROU RUS THA TUR **UKR** USA UZB VNM ZAF

[UKR] Ukraine

During the current monitoring period Ukrainian farmers harvested maize and planted winter wheat which is currently overwintering.

Rainfall was satisfactory (RAIN, 226 mm, +18%) but accompanied by a very significant RADPAR deficit (-13%), while at 3.3°C temperature was above average by 1.4°C. Agronomic indicators also showed a very good maximum vegetation condition index (VCI, 1) and an increase in crop arable land fraction (CALF, +13%) compared to 5-year average. At national level, the crop condition development graph was close to or above the 5YA until late January, when snow led to low NDVI. According to the VCIx and NDVI spatial distribution maps, very favorable crop condition occurred in about 65% of Ukraine, mostly in the west and the centre. BIOMSS is expected to increase by 8% above average. Winter crop prospects are favorable.

Regional analysis

Based on cropping systems, climatic zones and topographic conditions, reports for four agroecological zones are provided: Central wheat area, Northern wheat area, Eastern Carpathian hills, and Southern wheat and maize area.

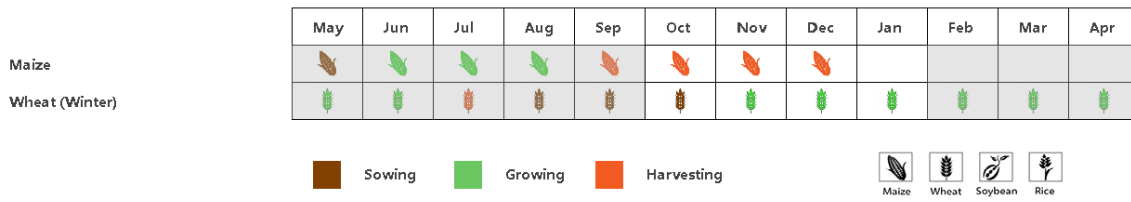
The Central wheat area includes Poltava, Cherkasy, Dnipropetrovsk and Kirovohrad oblasts. Agroclimatic and agronomic indicators suggested favorable conditions: 18% higher rainfall, 1.5°C higher temperature, 12% higher CALF and good VCIx (1) for wheat development over this period, which was also confirmed by generally higher NDVI profiles compared to 5-year average. Overall, projected biomass was 16% higher than 5-year average.

The Northern wheat area covers Rivne, Zhytomyr and Kiev oblasts. The crop condition in this area also showed an above average situation in rainfall (RAIN, +19%), temperature (TEMP, +1.4°C) and high CALF (99%) indicating that nearly all arable land is cultivated. Despite low radiation (RADPAR, -9%), near or above average NDVI confirms good biomass potential (BIOMASS, +14%).

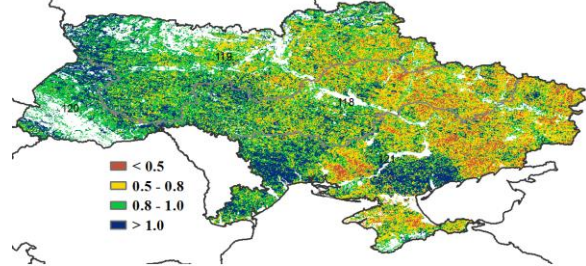
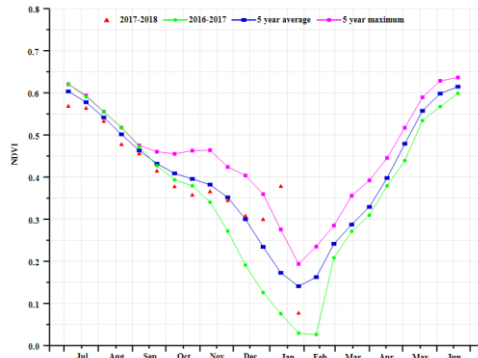
The Eastern Carpathian hills consist of Lviv, Zakarpattia and Ivano-Frankivsk oblasts. This area received substantial rainfall (RAIN, +53%), higher temperature (TEMP, +1.3°C) but rather low radiation (RADPAR, -16%). Considering the high fraction in crop arable land (CALF, 90%) and VCIx (0.93), the estimated biomass for this region is 15% higher than 5-year average but prospects are less favorable than in the previous AEZ.

The southern wheat and maize encompasses mainly contains Mykolaiv, Kherson and Zaporizhia oblasts. This is the only area where biomass is predicted to decrease (BIOMASS, -4%) due to a deficit in rainfall (RAIN, -18%). Other indicators were normal or better than average, for instance, temperature was slightly higher (TEMP, +1.4°C). CALF significantly increased by 29% and VCIx reached 1.17, which were favorable for crop. Due to contradictory indicators, the area will need close monitoring during the next reporting period.

Figure 3.30. Ukraine crop condition, October 2017 -January 2018

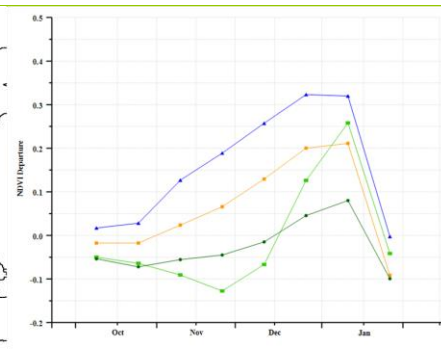
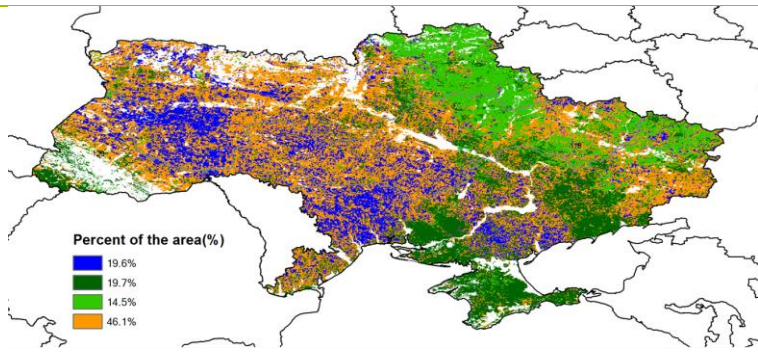


(a). Phenology of major crops



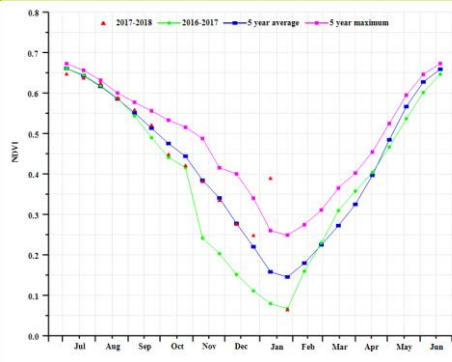
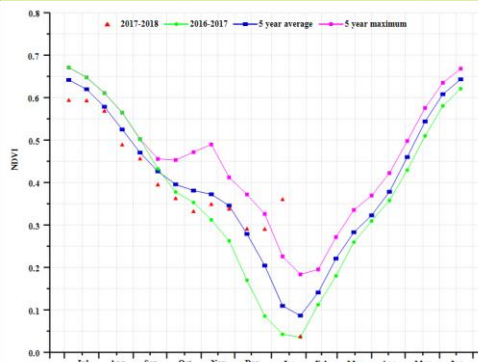
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

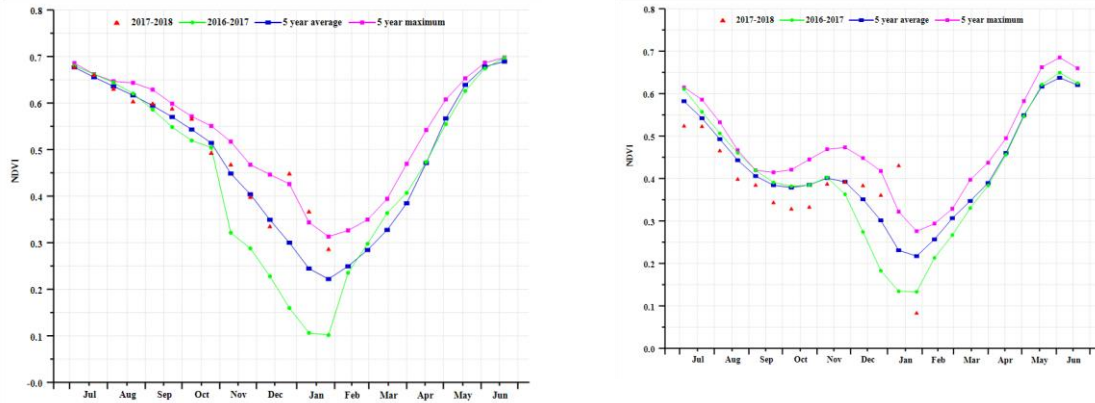


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

Table 3.55. Ukraine agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Cebntral wheat area (Ukraine)	219	18	2.9	1.4	227	-16
Northern wheat area (Ukraine)	259	19	3.0	1.4	262	-9
Eastern Carpathian hills (Ukraine)	275	53	2.6	1.3	206	-16
Southern wheat and maize area (Ukraine)	166	-18	4.4	1.4	282	-10

Table 3.56. Ukraine agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		CALF		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	
Cebntral wheat area (Ukraine)	828	16	68	12	1.00
Northern wheat area (Ukraine)	837	14	99	3	1.03
Eastern Carpathian hills (Ukraine)	831	15	90	6	0.93
Southern wheat and maize area (Ukraine)	710	-4	60	29	1.17

[USA] United States

This monitoring period covers the planting and overwintering period of winter crops. The national NDVI development profile illustrates initially below average crop condition.

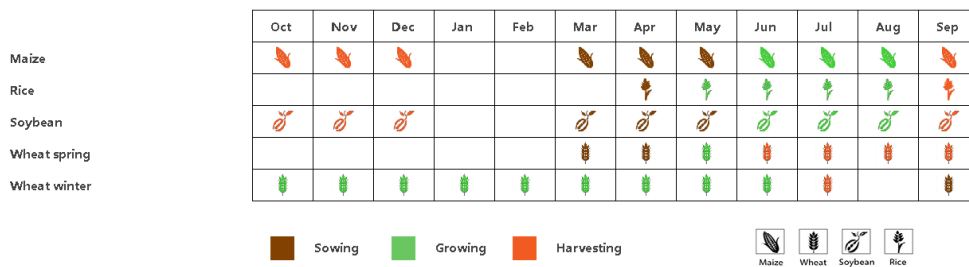
For the whole country, RAIN was 9% below average, temperature (5.5°C) was about average (-0.1°C), while radiation (RADPAR) was 1% below. The Southern Plains, Northwest, and California are the major winter wheat areas of the United States. Dry weather prevailed in the Southern Plains and California: -27% and -30% below average precipitation was experienced for both regions and resulted in -17% and -10% below average BIOMASS. The Northwest experienced RAIN 3% below the average, temperature 0.4 above the average, while RADPAR was below the average by a significant 7%.

Dry weather dominated the major winter wheat states. RAIN in Kansas, Oklahoma, Texas, California, and Oregon was 10%, 15%, 32%, and 33% below the average, respectively. Dry weather accelerated the soil moisture loss and will stress winter wheat growth after overwintering. Dry weather (13 to 14% below average) also prevailed in the lower Mississippi, southeast, and southwest.

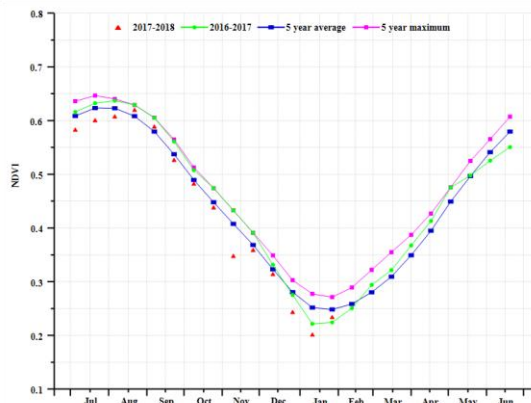
Dry weather and abnormally low sunshine caused the marked drop in CALF of California and the northwest (-12% and -14%, respectively). CALF was 10% above the average in the southern plains. NDVI profiles indicated that prevailing dry weather resulted in a significant decline of NDVI below average for the whole country after the middle of January.

Considering the prevailing dry weather and significant decline of CALF in some major winter crops regions, below average crop condition is currently estimated by CropWatch for the USA.

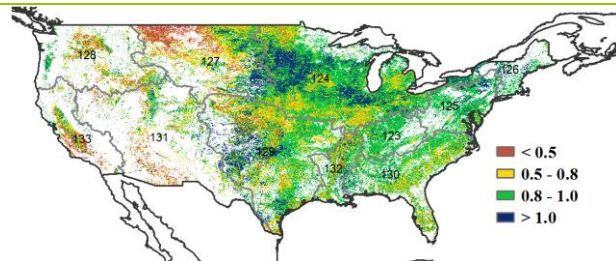
Figure 3.31. United States crop condition, October 2017 -January 2018



(a). Phenology of major crops



(b) Crop condition development graph based on NDVI



(c) Maximum VCI

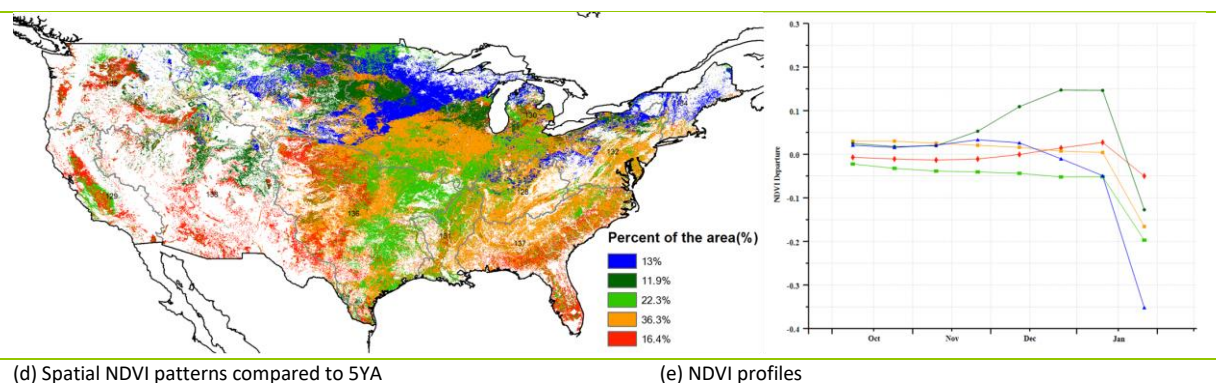


Table 3.57. United States agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP(°C)		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
California	171	-30	8.6	0.8	646	1
Lower Mississippi	357	-32	11.2	-0.8	657	0
Middle Atlantic	312	-16	4.4	-0.4	498	2
Northwest	288	-3	1.1	0.4	402	-7
Southern Plains	199	-27	9.5	-0.1	684	1
Southeast	279	-29	12.3	-0.7	676	0
Southwest	92	-15	5.4	1.9	750	1
California	171	-30	8.6	0.8	646	1
Lower Mississippi	357	-32	11.2	-0.8	657	0
Middle Atlantic	312	-16	4.4	-0.4	498	2
Northwest	288	-3	1.1	0.4	402	-7
Southern Plains	199	-27	9.5	-0.1	684	1

Table 3.58. United States agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMASS		CALF		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	
California	548	-10	0.46	-12	0.69
Lower Mississippi	1160	-13	0.89	3	0.92
Middle Atlantic	953	-2	1.00	0	0.94
Northwest	690	7	0.36	-14	0.89
Southern Plains	610	-17	0.70	10	0.94
Southeast	996	-13	1.00	0	0.86
Southwest	343	-14	0.24	1	0.85
California	548	-10	0.46	-12	0.69
Lower Mississippi	1160	-13	0.89	3	0.92
Middle Atlantic	953	-2	1.00	0	0.94
Northwest	690	7	0.36	-14	0.89
Southern Plains	610	-17	0.70	10	0.94

[UZB] Uzbekistan

The reporting period covers the sowing and early development stages of winter wheat, the most important cereal crop in Uzbekistan. Crop output may be below average because in spite of good crop condition (the national average VCIx was 0.95), the fraction of cultivated arable land fraction decreased by 45% compared to the five-year average. However, the decreased CALF can also result from snow cover on cropland. Among the CropWatch agroclimatic indicators, RAIN was below average (-7%), and TEMP and RADPAR above average. The combination of the factors resulted in decreased BIOMSS (-11%) compared to the five-year average.

Regional analysis

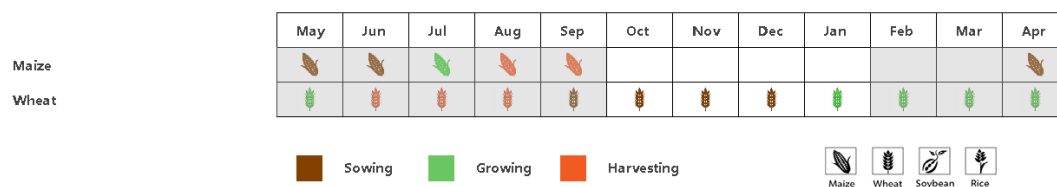
For the regional analysis, additional detail is provided for three agro-ecological zones (AEZ): the cereals zone (east), the cotton zone (Aral sea, west) and the central zone.

In the Eastern hilly cereals zone, NDVI was generally below the five-year average from October to January. RAIN was 22% below average, but TEMP and RADPAR were slightly above (0.4°C and +2%, respectively). The agroclimatic indicators also include a decrease of the BIOMSS index by 25%. The maximum VCI index was 0.95. Crop prospects are fair.

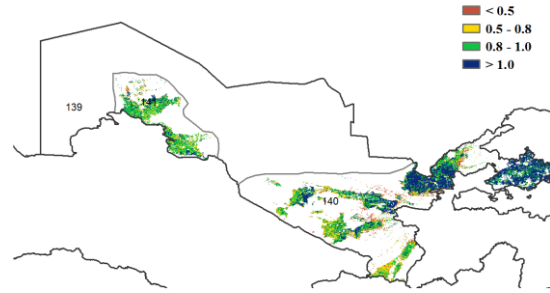
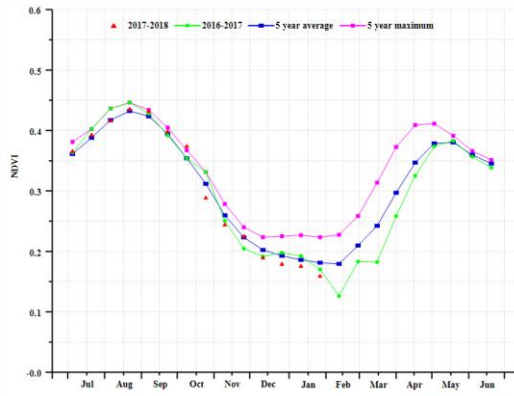
The Aral sea cotton zone grows only few winter crops. Crop condition was below average. Accumulated rainfall was about three times the average during the monitoring period (RAIN +197%), radiation was above average (RADPAR 1%), while temperature (TEMP -0.2°C) was just below. The agroclimatic indices for the current season indicate favorable weather conditions for crop growth, which is confirmed by the significant increase of the BIOMSS index by 65% compared to its five-year average. The regional average of the VCIx was 0.98. Overall prospects for the area are favorable and will mostly benefit rangelands and the planting of irrigated summer crops.

During the present monitoring period NDVI was generally below the five years average in the Central region. NDVI was above last year's value only till late November. Accumulated RAIN was 124% above average, but TEMP and RADPAR were close to average (-0.1°C and +2%, respectively). The agroclimatic indicators also include an increase of the BIOMSS index by 18%. The regional average of the VCIx was 0.77.

Figure 3.32. Uzbekistan crop condition, October 2017 -January 2018

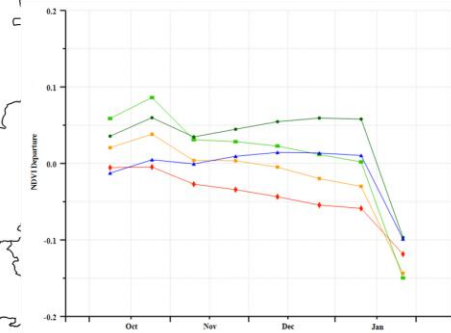
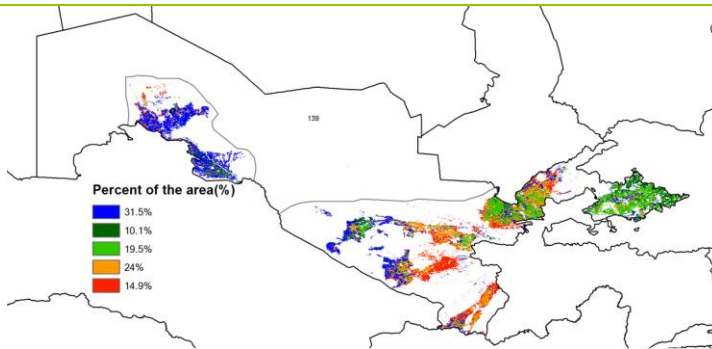


(a). Phenology of major crops



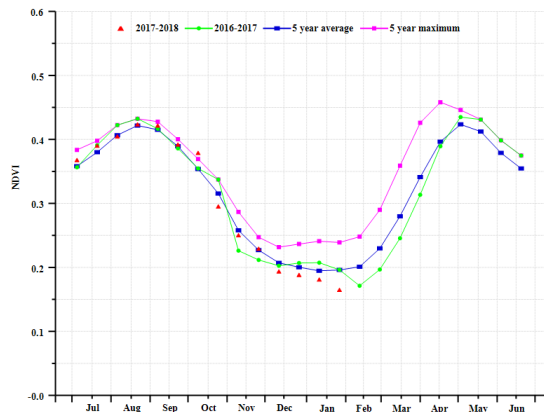
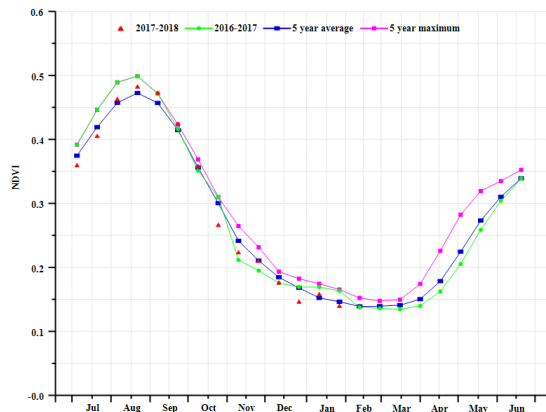
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

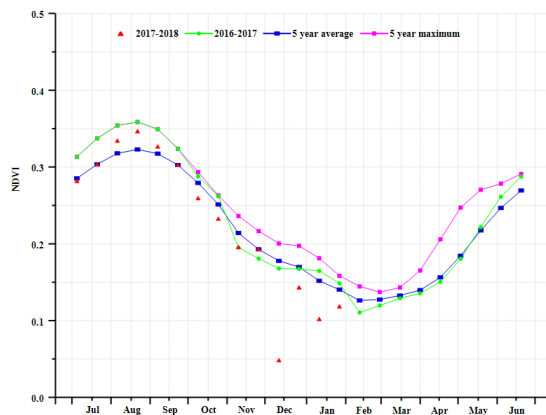


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

Table 3.59. Uzbekistan agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Aral Sea cotton zone (UZB)	296	197	2.1	-0.2	495	1
Eastern hilly cereals zone (UZB)	131	-22	5.2	0.4	582	2

Table 3.60. Uzbekistan agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		CALF		Max. VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	
Aral Sea cotton zone (UZB)	593	65	-	-	0.98
Eastern hilly cereals zone (UZB)	405	-25	-	-	0.95

ARG AUS BGD BRA CAN DEU EGY ETH FRA GBR IDN IND IRN KAZ KHM MEX MMR NGA PAK PHL POL ROU RUS THA TUR UKR USA UZB **VNM** ZAF

[VNM] Vietnam

The monitoring period covers the growth of the 10th month rice, as well as the sowing of winter and spring rice in Vietnam. Most of the rice cultivation regions are distributed in the northern Red River delta and the Mekong delta in the south. Overall, the condition is above the reference 5YA in 43.4% of croplands where a VCIx near 0.93 confirms the favorable situation. Unfavorable crops occur in about 11.5% of the arable land (mainly in the southwest and a small area in the north of the country). CropWatch agroclimatic indicators show that precipitation (+38%), BIOMSS (+27%) and VCIx (0.93) were above their respective reference averages (15YA and 5YA) while temperature (-0.4°C) and CALF (0.95) were about average. RADPAR was significantly below average (14%). Overall crop condition in the country is satisfactory.

Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, several agro-ecological zones (AEZ) can be distinguished for Vietnam, among which three are most relevant for crops cultivation: the Southern zone with the Mekong Delta, Northern zone with Red river Delta and Central coastal areas from Thanh Hoa to Khanh Hoa.

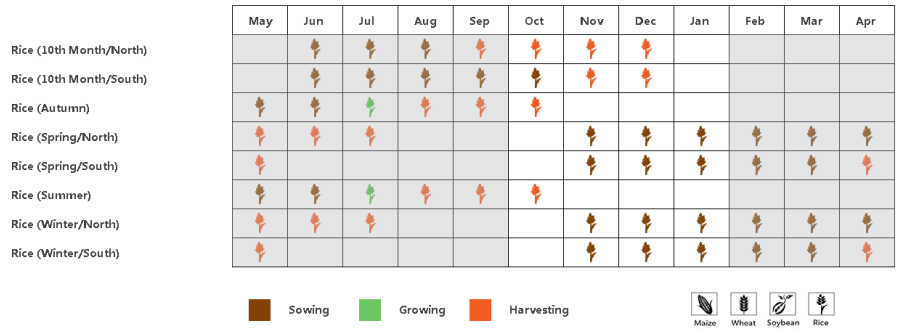
The fraction of cropped arable land (CALF) in the Southern zone for the reporting period is similar to the five-year average (+2%). Vegetation condition indices (maximum VCI) are quite favorable (0.96), accompanied by an increase in BIOMSS (+34%) resulting from good rainfall (RAIN, +35%) along with a decrease in radiation (RADPAR, -8%) and average temperature (TEMP, -0.3°C). CropWatch expects good production in the area.

The Northern zone recorded abundant rainfall (RAIN +58%), well below average RADPAR (-21°C) and average TEMP (-0.4°C). With the CALF and BIOMSS unchanged compared to the average (5YA), VCIx was high (0.93). While the crop condition development graph of NDVI indicates values below the average of 5 years, except in November and December. Based on the agroclimatic indicators and NDVI development graph, below average output is likely.

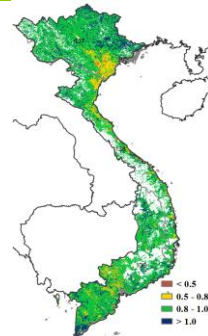
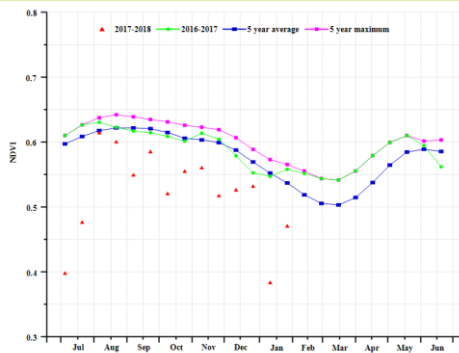
The situation and expected impact on crop production is almost identical to the Southern zone in the Central coastal areas with the exception of more abundant rainfall and average temperature: RAIN +32%; TEMP -0.5°C; RADPAR -18%; BIOMSS +27%; VCIx 0.89; and CALF, +30%. The crop condition development graph based on NDVI an erratic behavior and its interpretation is inconclusive. According to agroclimatic indicators, average output is expected.

Over 80% of the croplands show average or better than average crop condition, with unfavorable crops in some mountain areas such as Ha Nam, Hoang Mai, and Hung Yen. Overall, with the mentioned caveats, crop prospects are expect to be satisfactory.

Figure 3.33. Vietnam crop condition, October 2017 -January 2018

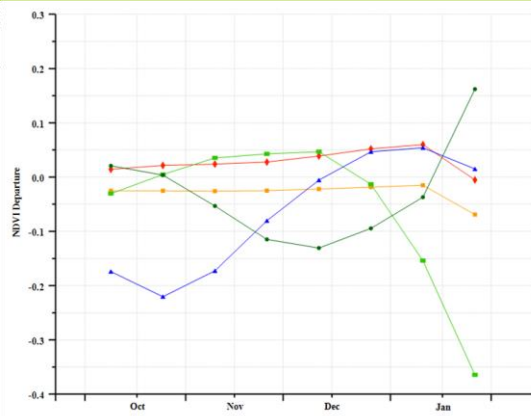
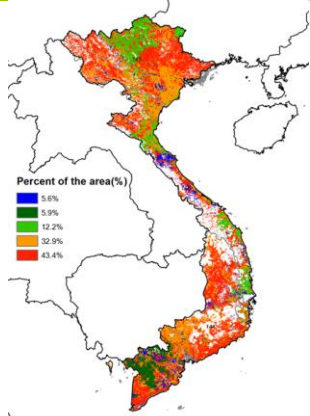


(a). Phenology of major crops



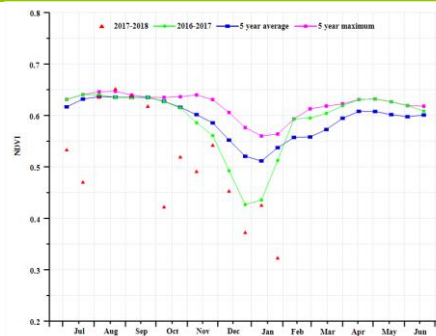
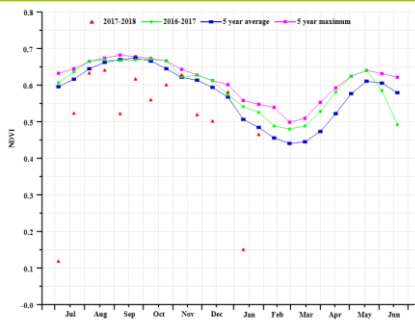
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

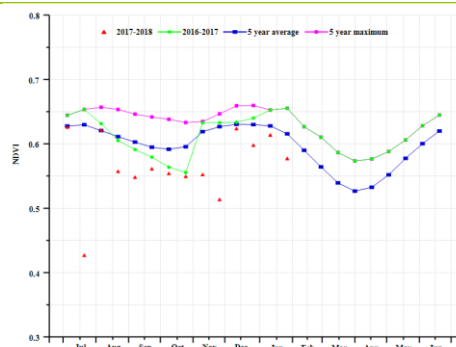


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



(f) Crop condition development graph based on NDVI (Southern zone with Mekong Delta (left) and Northern zone with RED river Delta (right))



(g) Crop condition development graph based on NDVI (Central coastal areas from Thanh Hoa to Khanh Hoa)

Table 3.61 Vietnam agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Southern zone with Mekong Delta	749	35	24.8	-0.3	904	-8
Northern zone with Red river Delta	293	58	17.9	-0.4	562	-21
Central coastal areas from Thanh Hoa to Khanh Hoa	910	32	22.4	-0.5	553	-18

Table 3.62 Vietnam agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Southern zone with Mekong Delta	1567	34	95	2	0.96
Northern zone with Red river Delta	630	9	97	1	0.93
Central coastal areas from Thanh Hoa to Khanh Hoa	1285	27	92	3	0.89

[ZAF] South Africa

The analysis period coincides with the maize planting and early development season in the eastern part of the country. According to NDVI clusters, the general condition of the crops was below average following rainfall deficits during the planting and slightly afterwards. The Eastern maize regions of Kwa-Zulu Natal and Mpumalanga areas had a VCI_{max} between 0.5-0.8. Overall production is likely to be less than the previous year's in some areas if drought conditions persist. Compared to last year's good rains, the current season so far shows a slightly less than average condition. Nonetheless, the CALF is generally stable with no significant reduction in the Humid Cape Fold Mountains and the Dry Highveld and Bushveld zones. A 30% below average reduction in CALF with a corresponding 33% reduction in Biomass were observed. Temperatures had dropped slightly across the entire growing areas. RADPAR was average or slightly below average.

Regional analysis

The analysis covers three agro-ecological zones (AEZs): Mediterranean wheat zone, Humid Cape Fold Mountains zone, and Dry Highveld and Bushveld maize zone.

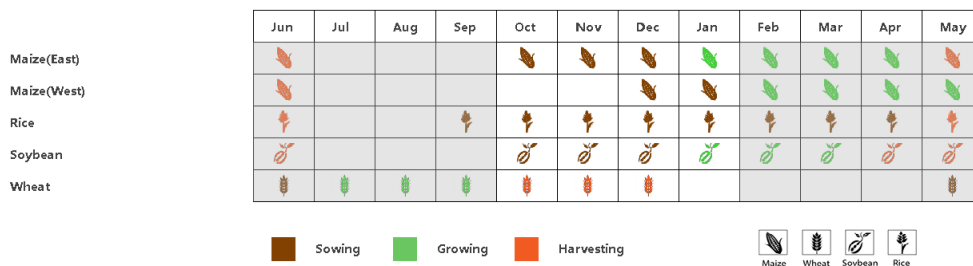
The period was planting period for summer crops (maize, spring wheat and soya beans) except in the Mediterranean wheat-growing zone which has reached maturity as observed from its VCI_{max} of 0.21. Most of the region suffered a high rainfall deficit (RAIN -44%) and a 30% reduction in CALF.

The Dry Highveld and Bushveld zones, the main maize producing area received 18% below average rainfall and 3% increment in RADPAR, and a 20% reduction in biomass and NDVI clusters confirm the slightly below average conditions experienced in the zone.

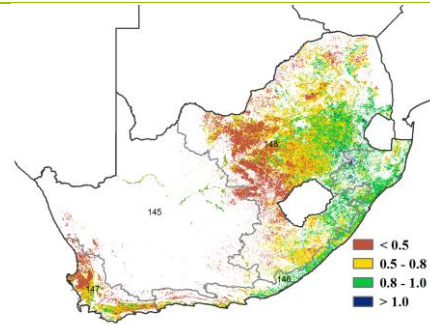
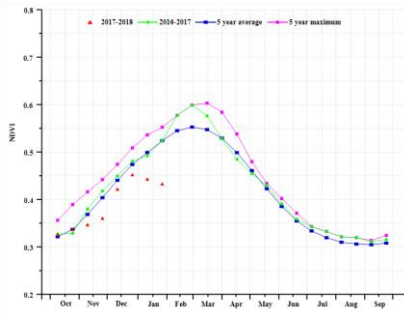
In the Humid Cape Fold Mountains, there was a 2% increment of RAIN, and 3% increment in CALF, with good crop condition as depicted by VCI_{max} of 0.85. BIOMSS is just 5% below average.

Overall, the crop condition in the growing area is fairly average. Should droughts set in, vegetative growth might be affected.

Figure 3.34. South Africa crop condition, October 2017 -January 2018

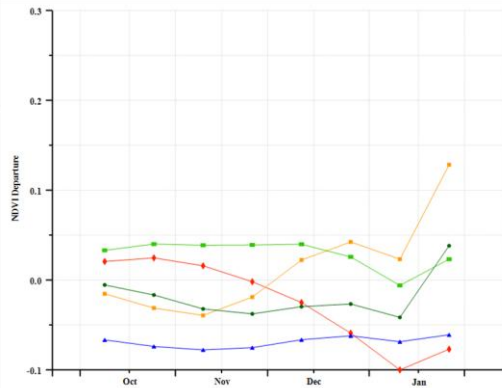
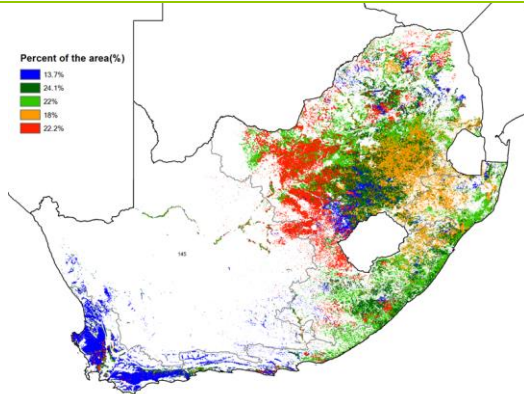


(a). Phenology of major crops



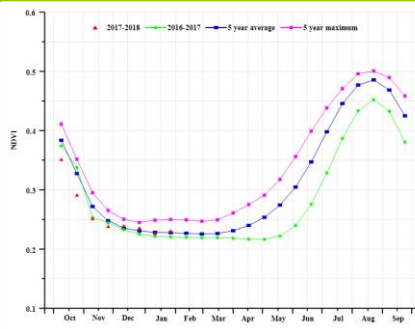
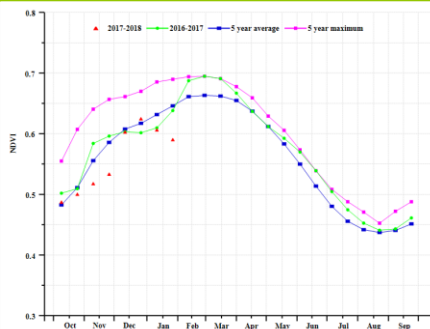
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

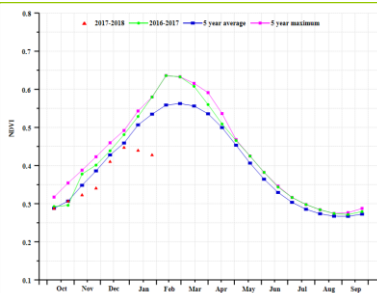


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



(f) Crop condition development graph based on NDVI (Humid Cape Fold Mountains (left) and Mediterranean wheat zone (right))



(g) Crop condition development graph based on NDVI (Dry Highveld and Bushveld maize zone)

Table 3.63. South Africa agroclimatic indicators by agroecological zones, current season values and departure from 15YA, October 2017-January 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Mediterranean wheat zone	391	2	19.7	-1.3	1276	1
Humid Cape Fold Mountains zone	53	-44	18.3	-0.4	1581	-1
Dry Highveld and Bushveld maize zone	324	-18	20.3	-1.0	1462	3

Table 3.64. South Africa agronomic indicators by agroecological zones, current season values and departure from 5YA, October 2017-January 2018

Region	BIOMSS		CALF		Maximum VCI Current
	Current (gDM/m ²)	Departure from 5YA (%)	Current	Departure from 5YA (%)	
Mediterranean wheat zone	1152	-5	90	3	0.85
Humid Cape Fold Mountains zone	243	-33	50	-30	0.21
Dry Highveld and Bushveld maize zone	1052	-20	60	-3	0.71

Table 3.65. CropWatch estimated wheat production for South Africa in 2017-2018 (thousands tons)

	Production 2016-2017	Yield variation %	Area variation %	Production 2017-2018	Production variation %
wheat	1704	-10.2	-11.4	1356	-20.4