Chapter 3. Main producing and exporting countries

Chapter 1 has focused on large climate anomalies that sometimes reach the size of continents and beyond. The present section offers, a closer look at individual countries, including the 41 countries that together produce and commercialize more than 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

The current reporting period recorded relatively few extreme conditions among the 30+11+1 countries specifically monitored by CropWatch and described in the current chapter. Some of them, however, are part of the large anomaly patterns described in Chapter 1 and they are often surrounded by less important countries in terms of agricultural production where conditions may be more extreme.

Rainfall anomalies

The current reporting period is characterized by an unusually large number of countries with anomalous rainfall. Interestingly, few water-related disasters were reported, including essentially drought in parts of South America (Uruguay with RAIN at -14% and N. Argentina, with the national RAIN departure at -18%) and some floods in Europe and, especially the Horn of Africa (Chapter 5.2). Table 3.1 provides an overview of countries and groups of countries with positive and negative rainfall departures in excess of 25%.

[LEGEND Table 3.1: Groups of countries with rainfall anomalies in excess of -25% and +25%. Numbers between square brackets indicate the number of countries where the departure for each variable has the same sign as the average. Countries and territories are identified by their ISO 3166-1 alpha-3 codes given at the end of the table.

Table 3.1: Groups of countries with rainfall anomalies in excess of -25% and +25%

	Region	N	Countries	ΔRAIN	ΔTEMP	ΔRADPAR	ΔBIOMSS
				%	**°C**	**%**	**%**
1	amc	2	DMA, TTO	-57 [2]	-1.0 [2]	-1 [2]	-41 [2]
2	asw	2	OMN, ARE	-51 [2]	-0.1 [1]	-1 [2]	-34 [2]
3	afo	3	MRT, NER, TCD	-47 [3]	-0.8 [3]	-5 [3]	-48 [3]
4	med	5	MNE, CYP, TUN, SVN, PRT	-37 [5]	+0.3 [4]	-7 [5]	-14 [4]
5	ass	1	JAK	−36	+2.0	−2	−8
6	ams	2	GUF, ECU	-35 [2]	-1.3 [2]	-3 [2]	-17 [2]
7	afe	2	ERI, SDN	-35 [2]	-1.3 [2]	0 [1]	-41 [2]

8	asc	1	MNG	+31	+1.5	−3	+27
9	eur	2	GBR, IRL	+36 [2]	-1.9 [2]	-12 [2]	-5 [2]
10	asse	1	PHL	+38	−0.5	−2	+18
11	asw	7	ISR, AZE, IRQ, JOR, ARM, YEM, KWT	+46 [7]	+1.0 [6]	-7 [7]	+29 [7]
12	afo	5	BFA, TGO, BEN, GMB, GNB	+52 [5]	-0.8 [5]	-7 [5]	+43.8 [5]
13	eur	1	MDA	+61	+0	+2	+28
14	afe	3	SSD, KEN, SOM	+66 [3]	-1.5 [3]	-5 [3]	44 [3]
15	amc	10	JAM, CRI, GTM, NIC, PAN, HTI, CUB, SLV, BLZ, MEX	+67 [10]	-0.3 [7]	-2 [10]	30 [10]

Notes. Region codes: afe east Africa, afo west Africa, amc central America and Caribbean including Mexico, ams south America, asc central Asia, ass southern Asia, asse south-east Asia, asw western Asia, eur Europe, med Mediterranean including Portugal. Country codes: ARE United Arab Emirates, ARM Armenia, AZE Azerbaijan, BEN Benin, BFA Burkina Faso, BLZ Belize, CRI Costa Rica, CUB Cuba, CYP Cyprus, DMA Dominica, ECU Ecuador, ERI Eritrea, GBR United Kingdom, GMB Gambia, GNB Guinea Bissau, GTM Guatemala, GUF French Guyana, HTI Haiti, IRL Ireland, IRQ Iraq, ISR Israel, JAK Jammu and Kashmir, JAM Jamaica, JOR Jordan, KEN Kenya, KWT Kuwait, MDA Macedonia, MEX Mexico, MNE Montenegro, MNG Mongolia, MRT Mauritania, NER Niger, NIC Nicaragua, OMN Oman, PAN Panama, PHL Philippines, PRT Portugal, SDN North Sudan, SLV Slovenia, SOM Somalia, SSD South Sudan, SVN Slovenia, TCD Chad, TGO Togo, TTO Trinidad and Tobago, TUN Tunisia, YEM Yemen.]

Table 3.2. CropWatch agroclimatic and agronomic indicators for January to April 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	-18	0.1	1	-11	-3	0.66
Australia	-7	0.3	0	-13	-34	0.45
Bangladesh	20	-1.0	-12	32	1	0.91
Brazil	1	-0.7	-2	0	1	0.75
Cambodia	4	-1.4	-7	6	16	0.78
Canada	25	-0.8	-3	-9	-49	0.62
China	-8	0.1	-8	7	-14	0.54
Egypt	-20	1.0	-6	20	1	0.74
Ethiopia	1	-1.3	-2	1	4	0.63
France	-13	-0.7	-11	-1	0	0.88
Germany	6	0.1	1	6	0	0.90
India	-15	0.2	-6	-4	5	0.79
Indonesia	-2	-0.6	-2	-1	0	0.83
Iran	-8	1.4	-9	-8	5	0.61
Kazakhstan	16	-1.2	-8	0	-46	0.52
Mexico	31	0.0	-4	9	-2	0.72
Myanmar	-9	-0.3	-9	0	12	0.86
Nigeria	25	-1.0	-11	21	-15	0.59
Pakistan	-16	0.9	-4	-10	-2	0.67
Philippines	38	-0.5	-2	18	0	0.87
Poland	-19	0.1	3	-11	-1	0.92
Romania	9	0.9	-3	14	0	0.86
Russia	9	-0.9	-2	-9	-57	0.67
S. Africa	1	-0.4	-1	0	4	0.65
Thailand	2	-1.1	-8	9	6	0.79
Turkey	0	2.8	-4	10	10	0.92
Ukraine	8	-1.9	-8	-11	1	0.89
United Kingdom	18	1.4	-13	8	13	1.04
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.

A first observation is that the 15 country groups based on their rainfall departures from average are rather consistent for other variables as well. For instance, in group 12 which groups five West African countries (BFA, TGO, BEN, GMB, GNB), the departures for TEMP, RADPAR and BIOMASS indicate colder than average weather, low sunshine and larger than average biomass production potential in all five countries.

The three first groups do not raise concern as they are currently in their dry seasons or normally do not practice much agriculture.

Group 4 (RAIN -37%), is part of the Mediterranean basin where the current winter season is also the main cereal growing period. Rainfall was nevertheless fair over Slovenia (201 mm), Montenegro (333 mm) and Portugal (179 mm) where evapotranspiration and crop water demand were low. In Cyprus and Tunisia, however, crop water requirement reaches 50 to 100 mm per month, so that the recorded amounts (97 mm and 74 mm over the 4 months JFMA reporting period) may result in crop water stress.

In Jammu and Kashmir (Group 5), the winter crop season is coming to an end in the lowlands. High temperature, however, which is part of the heatwave which has affected Pakistan and surrounding areas, has increased crop water requirements and water stress is likely to have occurred.

The two countries in Group 6 (French Guyana and Ecuador) are basically unrelated, and they are separated by countries with above average precipitation such as Colombia and Venezuela. The deficit should not have seriously affected crops, which are at the end of their growing season in the Pacific lowlands in Ecuador. The Amazonian (eastern) part of Ecuador and French Guyana has very long equatorial seasons which are rather resilient against water stress.

Group 7 (Eritrea and Sudan) are currently beyond harvest, with Sudan cultivating winter crops which are, however, mostly irrigated.

Among the remaining groups, many are semiarid and excess rainfall – with the exception of possible local floods – is mostly a useful source of soil moisture, even if present temperature (i.e. winter) conditions do not permit much biomass development. This applies, for instance, to Mongolia (Group 8). The countries of Group 11 (+46% RAIN on average) as well as 13 (Macedonia) mostly cultivate winter crops and the additional moisture is welcome, especially where irrigated crops dominate the agricultural landscape (Israel, Jordan…).

Some of the West African countries in Group 12 (Burkina Faso, Gambia and Guinea) are currently not in their rainy season, which will start in summer. The abundant rainfall can be interpreted as an early start of the season. Togo and Benin have two rainy seasons in the south, with the first starting around March. Both countries have benefited from the abundant precipitation which has provided a good start for the first season.

Of the countries of Group 14, two have large semi-arid stretches (Kenya, Somalia) where drought staples are livestock prevail. Both are at planting stage for their main season (long rains in Kenya and Gu season in Somalia). South Sudan normally enjoys much wetter conditions, especially in the west. Kenya and Somalia floods are mentioned in the section on disasters (Chapter 5.X) but much of the problems are linked to large displaced populations. In general, the abundant precipitation should have benefited farming and food production.

A wide diversity of crop situations exists among the 10 countries of Group 15. Most of them grow winter crops (including winter maize) and it can be assumed that the abundant precipitation was favourable to winter crops nearing the end of their cycles, especially in Mexico where normal winter rainfall tends to be low.

Temperature anomalies

Some below average temperatures close to larger than 2.0 °C occurred in Norway, Ireland (as part of the cold spell referred to as “The Beast from the East” (refer to Chapter 5.X on Disasters) and Yemen, where a marked excess of rainfall was recorded. The “Beast of the East” also affected much of western Russia and Kazakhstan, Scandinavia and Western Europe from France to Spain as well as Morocco.

The highest temperature departures are those associated with the late March- early April heat wave centered around Iran (refer to figure 5XB in the section on disasters). They include Syria (+2.9°C), Turkey (+2.8°C), Armenia (+2.4°C), Iraq and Jammu and Kashmir (both at +2.0°C). Other countries of the same group, although they report smaller temperature excesses, include Iran, Mongolia, Jordan, Tajikistan and Georgia with departures increasing from +1.4°C to +1.9°C. Spatially, the area is easy to recognize in Figure 5.2.

RADPAR anomalies

As stressed in chapter 1, at the global scale negative sunshine departures predominate. In India, for instance, all States had below average sunshine, resulting in a national departure of -6%. Individual States had record negative departures between 10 and 13% (Meghalaya, Mizoram, Manipur, Tripura, Nagaland, Assam, Sikkim and West Bengal). Neighbouring Bangladesh reached -12%, one of the lowest values at the national level, comparable to the United Kingdom and Ireland (also at -12%) and exceeded only by Liberia (-13%).

Countries with positive departures are few; they include Uruguay (+4% RADPAR) and Ecuador (+3%; both suffered drought conditions) and Poland (+3%, accompanied by a 19% drop in rainfall). Uruguay is part of an area that stretches from Buenos Aires to the north-western provinces of Argentina. Poland, on the other hand, is the westernmost part of an area that reaches north as far as Finland (+2%) and Norway (+1%) and east to Ukraine (+2%) and Russia (Mordovia +3% and the Oblasts of Kursk +3%, Ryazan +3%, Nizhny Novgorod +4% and Kirov 7%.

BIOMSS

Due to the dominant role of water as a limiting factor of biomass production, the distribution of the BIOMSS indicator closely follows the distribution of RAIN… at least as long as TEMP does not interfere too much. For the present reporting period, we noted in chapter 1 that, globally, “80% of its variations or BIOMSS can be ascribed to RAIN variations and 20% only to TEMP”.

Because of the large temperature anomaly associated with the “Beast from the East”, it appears clearly, when comparing figures 3.1 and 3.4, that rainfall excesses over Russia are associated with BIOMSS deficits. In fact, as clearly shown in Figures 3.5 and 3.6, temperature dominates BIOMSS: in the major production zones of Russia, the role of RAIN in the variability of BIOMSS is negligible during the current reporting period, just 1% (R^2=0.0079). TEMP, on the other hand, accounts for 72%. It is likely that higher percentages would be achieved if the reference periods for TEMP and RAIN (2003-2017) and BIOMSS (2013-2017) were identical.

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

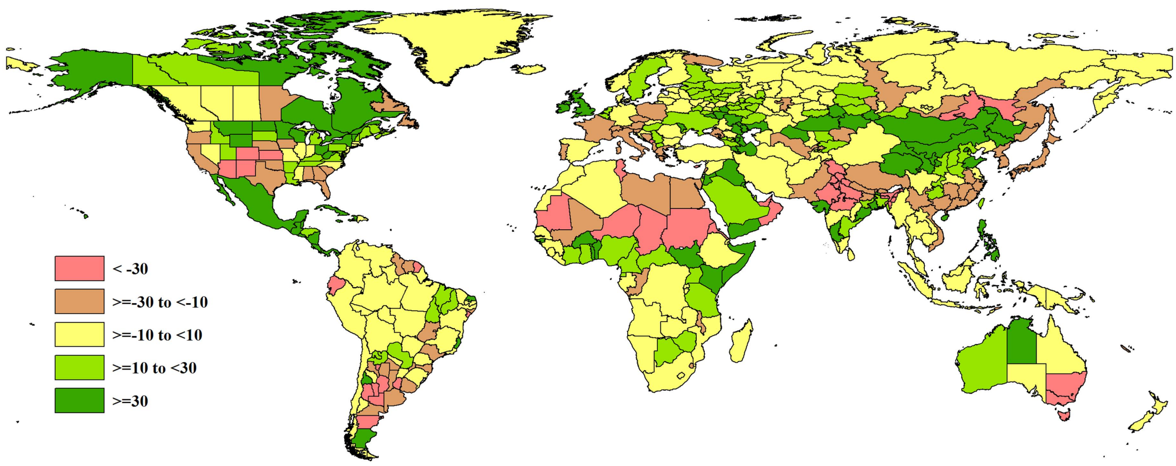


Figure 3.2. Global map of January to April 2018 temperature (TEMP) by country and sub-national areas, departure from 15YA (degrees)

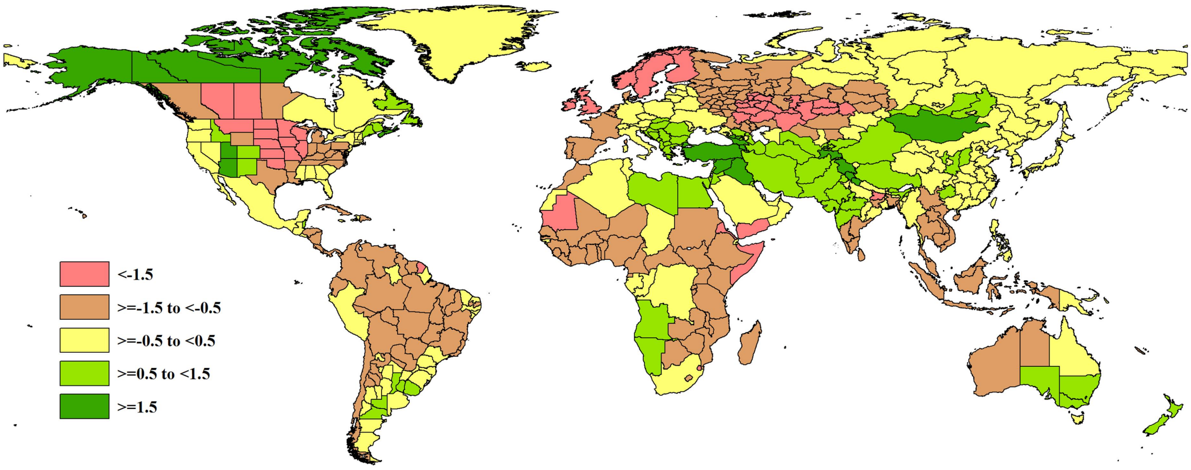


Figure 3.3. Global map of October January to April 2018 PAR (RADPAR) by country and sub-national areas, departure from 15YA (percentage)

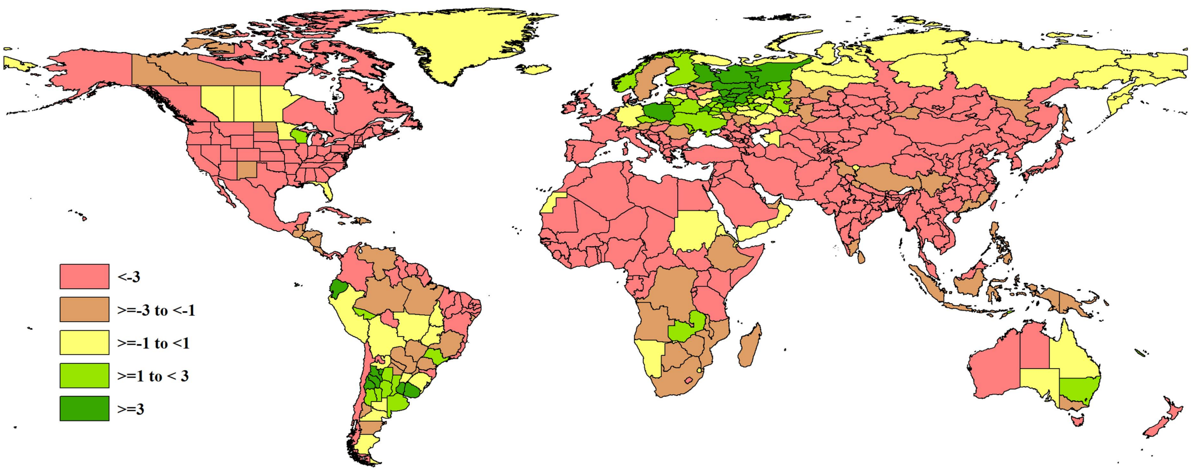


Figure 3.4. Global map of January to April 2018 biomass (BIOMSS) by country and sub-national areas, departure from 15YA (percentage)

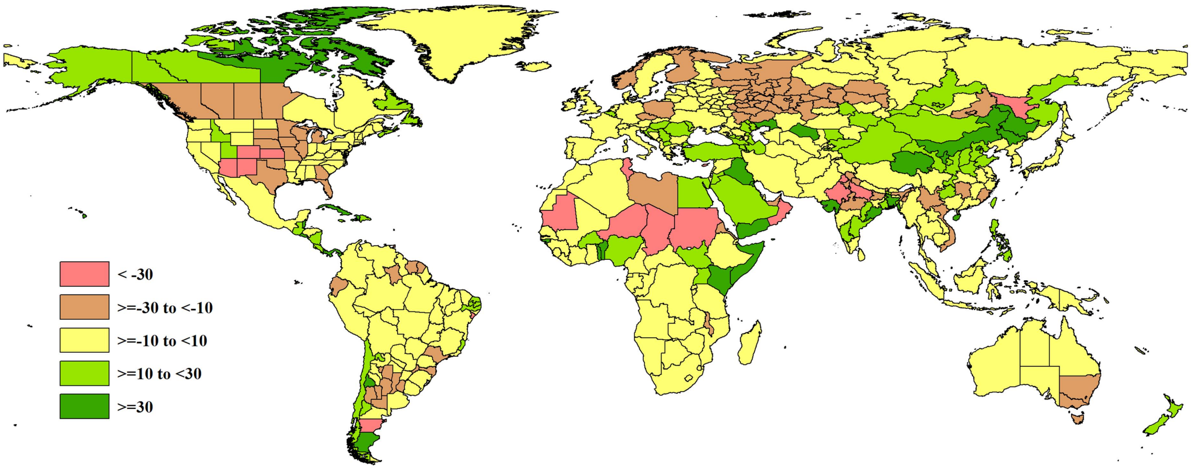


Figure 3.5 : Dependence of percent BIOMSS departure from 2013-17 average on RAIN percent departure from 2003-2017 average.

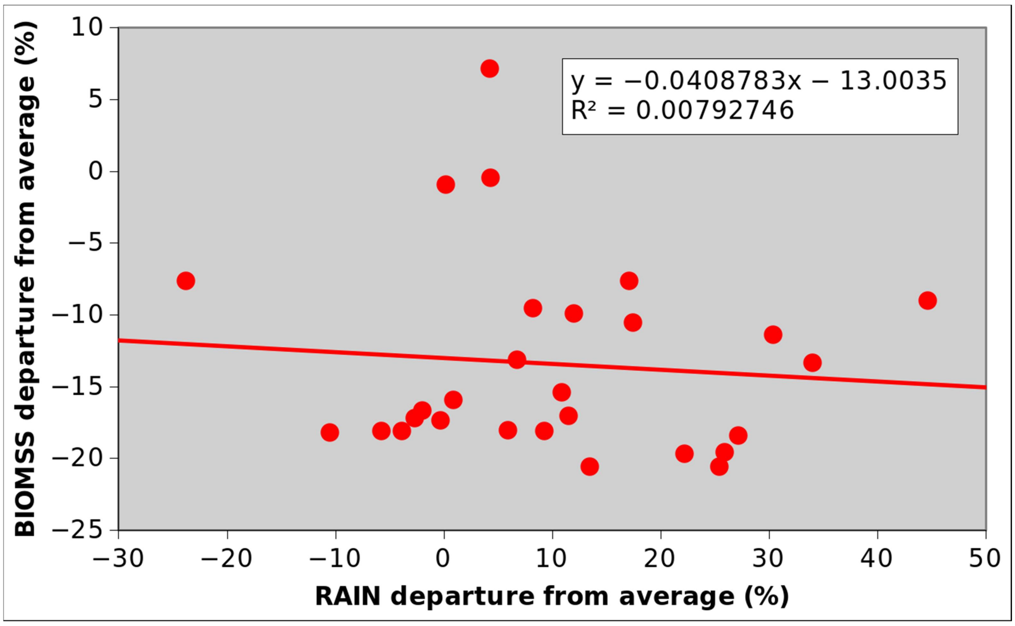
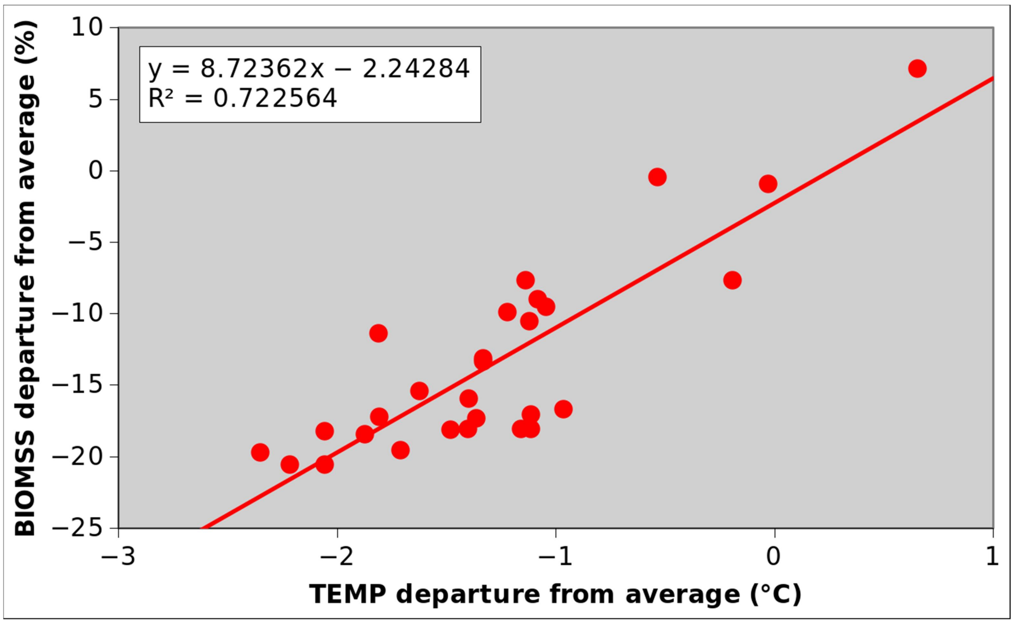


Figure 3.6: Dependence of percent BIOMSS departure from 2013-17 average on TEMP percent departure from 2003-2017 average.



3.2 Country analysis

This section presents CropWatch analyses for each of 41 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 January-April 2018 period to the previous season and the five-year average (5YA) and maximum; (c) Maximum VCI (over arable land mask) for January-April 2018 by pixel; (d) Spatial NDVI patterns up to April 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 January-April 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 3.7 - 3.47.; Crop condition for individual countries ([AFG] Afghanistan - [ZMB] Zambia) including sub-national regions during January-April 2018.

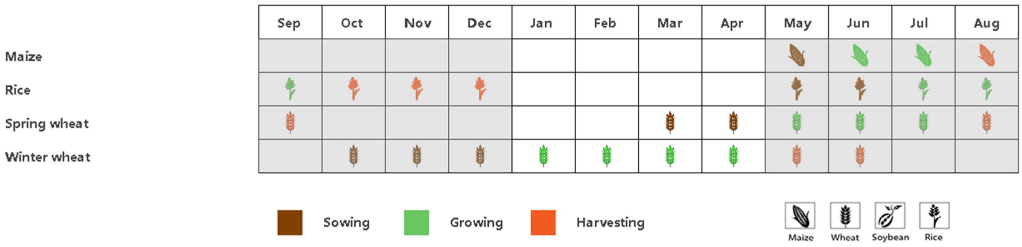
AFG AGO ARG AUS BGD BLR BRA CAN DEU EGY ETH FRA GBR HUN IDN IND IRN ITA KAZ KEN KHM LKA MAR MEX MMR MNG MOZ NGA PAK PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF ZMB

[AFG] Afghanistan

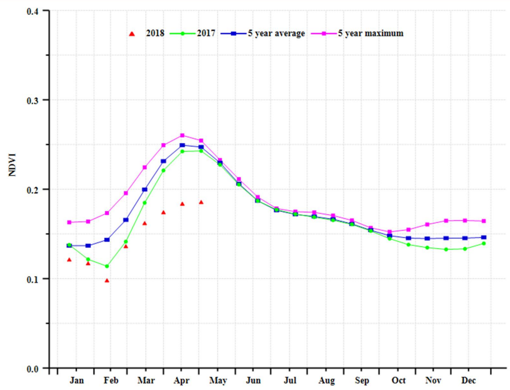
Afghanistan is a new inclusion in CropWatch system. The country is part of the semi-arid climate area that extends from the Sahara to central Asia. Wheat is by far the major cereal but maize, barley and rice are also grown. The reporting period corresponds to winter wheat and early spring wheat. The country recorded average rainfall (203 mm), above average TEMP (6.7°C, +0.8°C) and below average RADPAR (979 MJ/m², -5%), which resulted in average BIOMSS (640 gDM/m², +1%) .

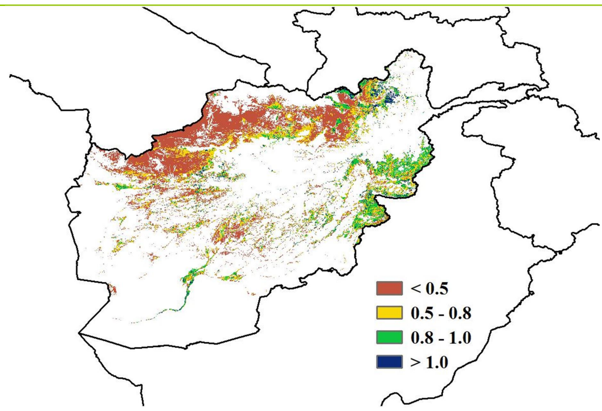
The cropped arable land fraction (CALF) was only 5%, which represents a very significant drop (-63%) below the 5YA. According to the NDVI profiles for the country, 74.6% of the areas had below average crop condition. NDVI was very low (below 5 year average), and it was below 0.2 even at its peak. Low VCIx (0.31) indicates poor crop condition; there are only some patches of high VCIx in the east. CropWatch estimates the production of wheat in the country to be 21.7% below last year's.

Figure 3.7. Afghanistan's crop condition, January-April 2018

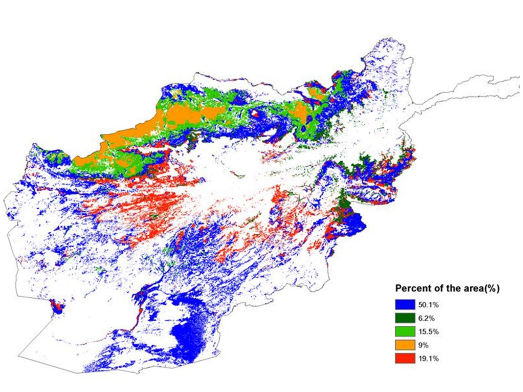


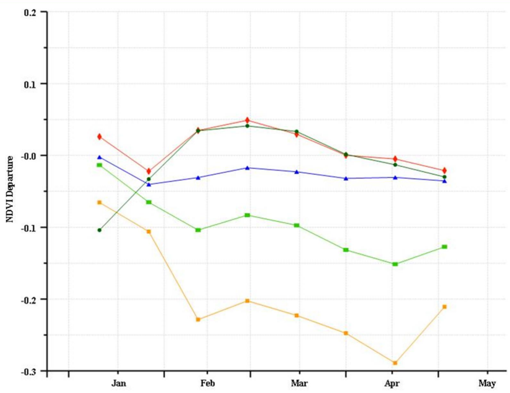
(a). Phenology of major crops





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





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

Table 3.3. CropWatch-estimated Wheat production for Afghanistan in 2018 (thousand tons)

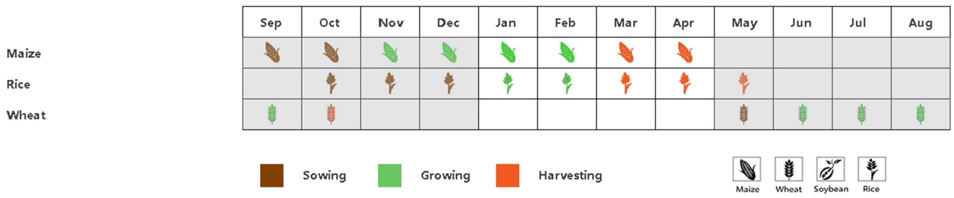
Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Wheat	4280.0	-24.6%	3.9%	3353	-21.7%

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

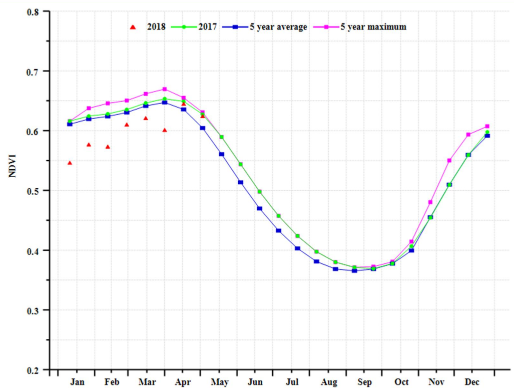
[AGO] Angola

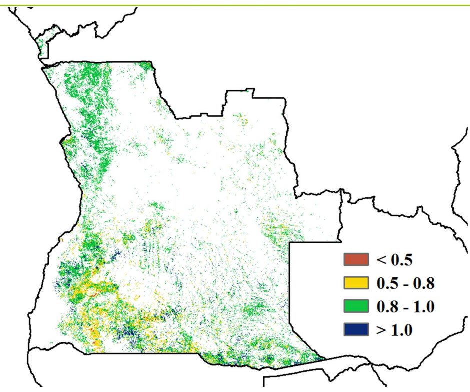
The majority of the maize, an important staple in Angola, was at peak growth stage at the commencement of monitoring period. Similarly rice, an equally important staple and export crop was at peak biomass development and both were being harvested in late April (VCIx 0.53) . Apart from these cereals, grain legumes such as soybeans play a growing role in the Angola agricultural sector. These crops mostly depend on a unimodal rainfall type, which is common to most countries in Southern Africa. Crop conditions were favorable between January and April as reflected in parts of Zaire, Bengo, Cuanza Sul, and Cuando-Cubango Provinces with VCIx between 0.8 and 1.0. Accumulated rainfall (RAIN) was above the average (+5%), while the temperature increased by 0.6°C. Radiation on the other hand (RADPAR) was slightly below average (-2%). The Biomass was above average (BIOMSS +3%) due to good conditions that prevailed during growing season as the crop water requirements were sufficiently met. The CALF was unchanged despite last season's droughts that ravaged the region. CropWatch's estimated production for maize is slightly, though not significantly higher than that of the previous season.

Figure 3.8. Angola's crop condition, January-April 2018



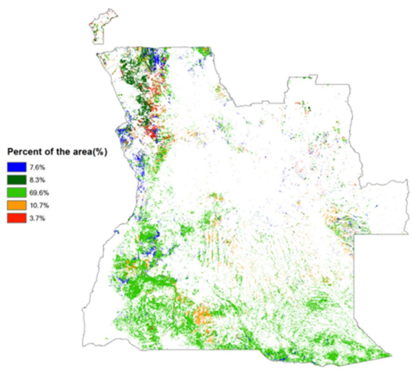
(a). Phenology of major crops

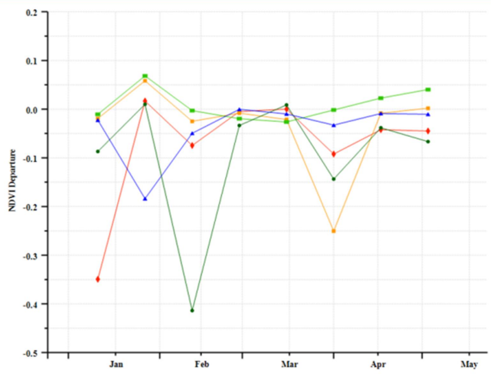




(b) Crop condition development graph based on NDVI

(c) Maximum VCI





(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles

Table 3.4. CropWatch-estimated Maize production for Angola in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Maize	2680	2.1%	2.0%	2791	4.1%

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

[ARG] Argentina

The peak of the summer crops (soybean, maize and rice) growing season of as well as maturity of early summer crops occurred during the period being reported on. Early summer crops were being harvested at the end of the period and late crops are near maturity.

Rainfall showed a marked negative anomaly (-18%), while temperature and radiation were close to average (+0.1°C and 1%, respectively). These conditions led to a significant reduction in BIOMSS of 11%.

The crop condition development graph based on NDVI shows much lower values than both average and last year, with a peak near 0.55 compared to an average peak near 0.65. The spatial distribution of NDVI profiles identify negative anomalies for all the groups over February to April, while two groups show negative values for most of the period. The strongest negative anomaly is observed in the South-West, north-eastern Pampas and South Mesopotamia.

Maximum VCI below 0.8 for almost half of the national cropland reflects the poor climatic conditions observed in the country. In particular, the lowest VCI values are observed in the south-eastern and north-eastern Pampas and the south of Mesopotamia. The CropWatch estimates for Soybean, Maize and Rice are 8%, 4% and 15% below 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.

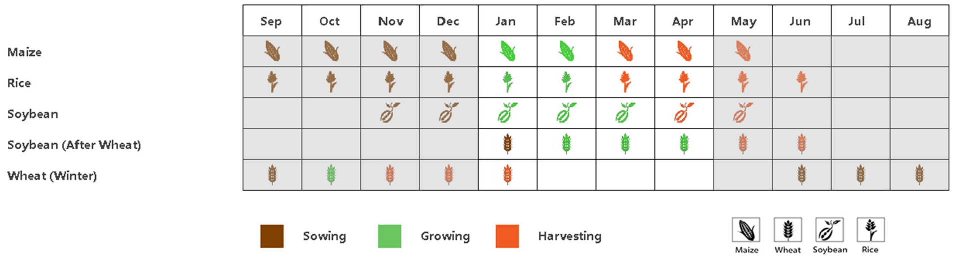
Two of the regions, the Pampas and Mesopotamia, showed a similar behavior with reductions in RAIN of 27% (Pampas) and 23% (Mesopotamia), minor increments in TEMP (0.4°C in the Pampas and 0.1°C in Mesopotamia) and an increase in RADPAR consistent with low rainfall (+2% for areas). The Chaco region showed a lower reduction in RAIN (-7%) and about average temperature and RADPAR (-1%).

The Subtropical highlands, however, recorded average RAIN with a slight reduction in TEMP (-0.5 degree) and an increment in RADPAR (1%). Changes in BIOMSS for each regions were associated to the magnitude and sign of the anomaly in RAIN, with a high decrease in the Pampas (-17%), followed by Mesopotamia (-14%) and the Chaco (-5%). The Subtropical Highlands show an increment in BIOMSS of 1%. Unexpectedly, VCIx was highest for the Pampas (0.72), with an average of 0.63 for the four regions.

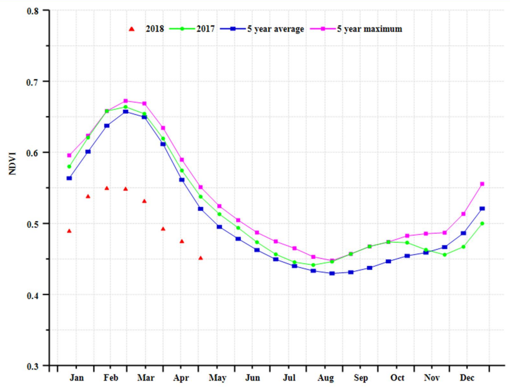
According to the cropped arable land fraction indicator (CALF), Mesopotamia and Chaco underwent almost no change, while the Pampas showed a reduction of 2% and Subtropical highlands an increment of 1%.

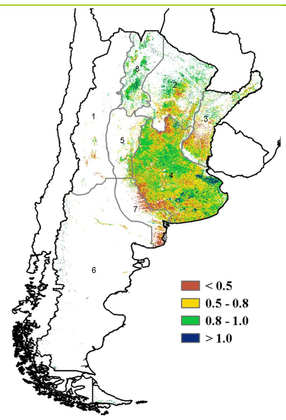
Regional NDVI profiles show a similar negative anomaly pattern during the first three months (critical period for growing) for the regions with negative RAIN anomaly (Pampas, Mesopotamia and Chaco). Subtropical highlands show a pattern that is near to average conditions.

Figure 3.9. Argentina's crop condition, January-April 2018

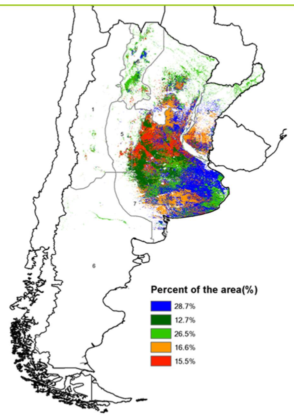


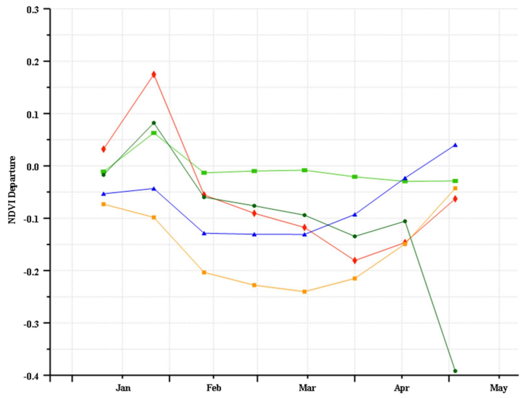
(a). Phenology of major crops



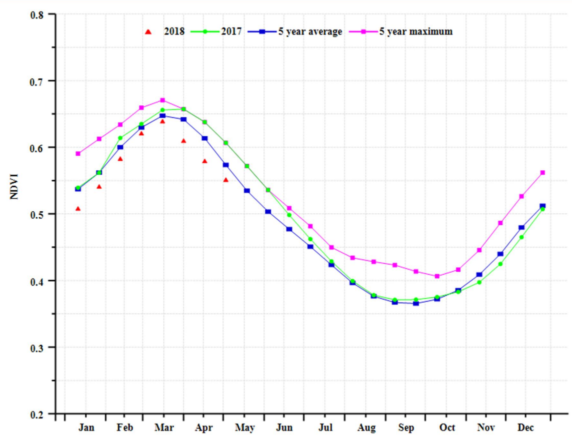


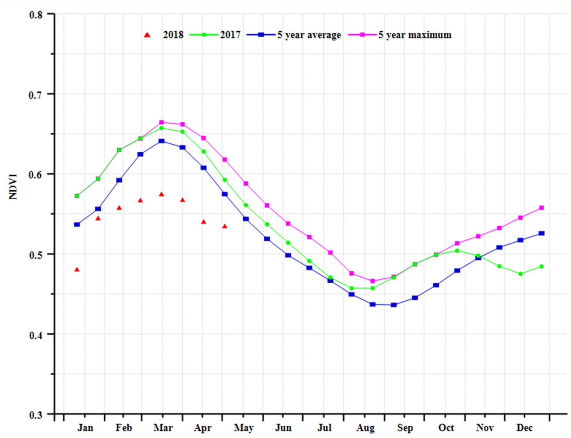
(b) Crop condition development graph based on NDVI (c) Maximum VCI



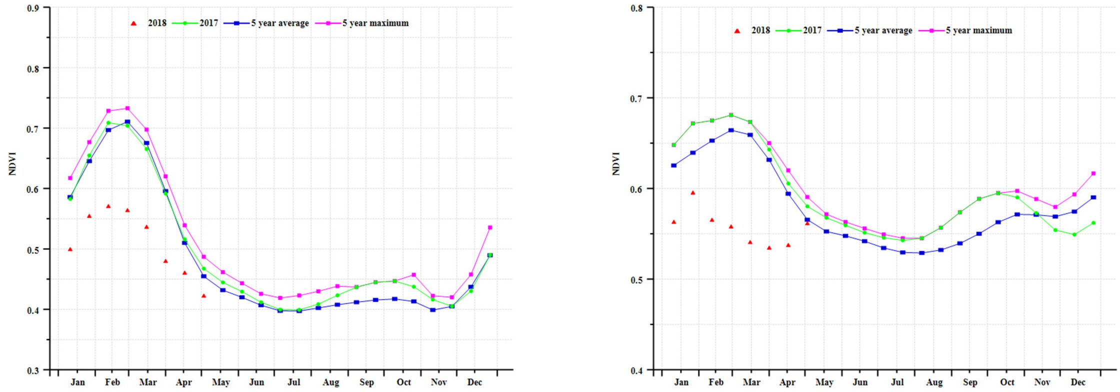


(d) Spatial NDVI patterns compared to 5YA (e) NDVI profiles





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



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

Table 3.5. Argentina's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m^2)	Departure from 15YA (%)
Chaco	517	-7	25.6	-0.1	1134	-1
Mesopotamia	499	-23	24.7	0.1	1178	2
Pampas	345	-27	21.9	0.4	1197	2
Subtropical_highland	516	0	23.7	-0.5	1029	1
Chaco	517	-7	25.6	-0.1	1134	-1
Mesopotamia	499	-23	24.7	0.1	1178	2

Table 3.6. Argentina's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Chaco	1412	-5	100	0	0.58
Mesopotamia	1368	-14	100	0	0.52
Pampas	1145	-17	97	-2	0.73
Subtropical_highland	1392	1	100	1	0.68

Table 3.7. CropWatch-estimated maize, rice and soybean production for Argentina in 2018 (thousand tons)

Crops	Production 2017	Yield variation (%)	Area variation (%)	Production 2018	Production variation (%)
Maize	29946	-3	0	28819	-4
Rice	1789	-15	0	1516	-15
Soybean	51116	-8	0	46942	-8

[AUS] Australia

Wheat and barley, the main cereal crops of Australia, are usually planted from May to July and harvested from October to January. The monitored period thus covers only the end of the last harvesting season with no crops in the field for most of the reporting period.

Agroclimatic indicators in Australia show overall average condition for January to April: RAIN 7%, TEMP +0.3°C, RADPAR 0%. As a result, the biomass accumulation potential shows a decrease of 13% compared with recent years. Positive departures of rain (+19%) were recorded in Western Australia, contributing to favorable soil moisture conditions for the planting of wheat and barley in the coming month. The maximum VCI is 0.45 all over the region, except for southeastern Queensland (0.8), where cotton has reached maturity. Although CALF decreased by 34 percentage points compared with the recent five-year average, this does not necessarily indicate a reduction of the planted area at this time of the season.

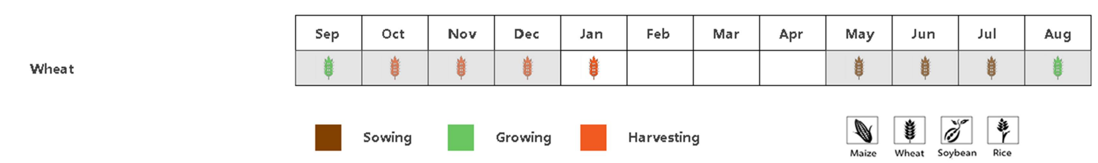
Regional analysis

This analysis adopts five agro-ecological regions for Australia, namely the Southeastern Wheat Zone, Southwestern Wheat Zone, Arid and Semi-arid Zone, Wet Temperate and Subtropical Zone, and Sub-humid Subtropical Zone.

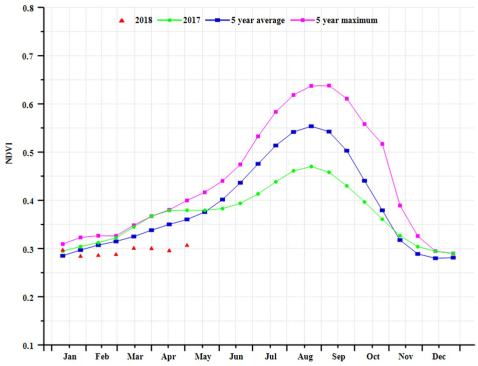
Compared with the last 15 year average, the rainfall for these 5 sub-regions was as follows: -31%, -14%, +48%, -11% and -14% respectively. Low rainfall, especially for the Southeastern Wheat Zone, will possibly have some negative impact on the soil moisture, while the Arid and Semi-arid Zone has enjoyed an increase of rainfall over average. The temperature and RADPAR both keep relatively stable for these 5 sub-regions with 0.7℃, -0.8℃, -0.6℃, 0.1℃, 0.7℃ for the former and 0%, -5%, -3%, 0%, 3% for the latter, which are within the normal fluctuation range. As a result, the potential accumulated biomass shows values of -18%, -11%, +7%, -14% and -13%, compared with the last 5 year average.

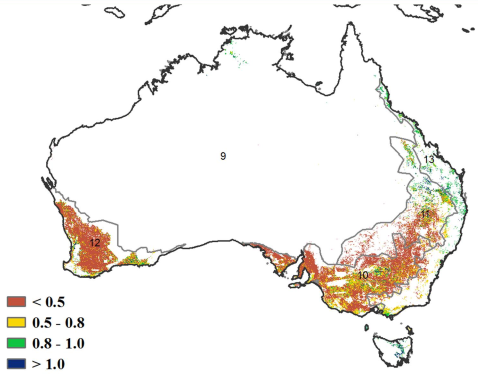
In summary, the agroclimatic conditions in Australia have been average so far, except for some low rainfall, which complementary irrigation can make up for. CropWatch will keep on monitoring the crop condition of the planting season in the next bulletin.

Figure 3.10. Australia's crop condition, January-April 2018

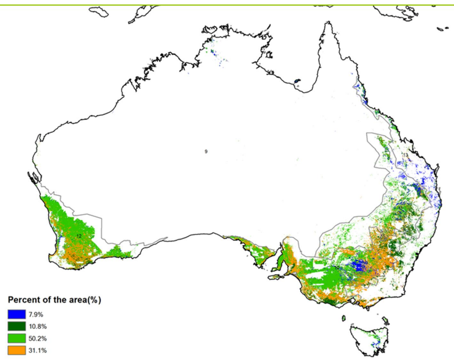


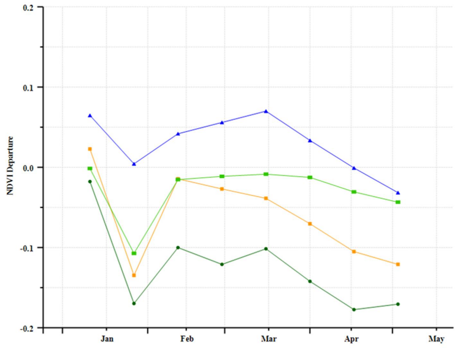
(a). Phenology of major crops



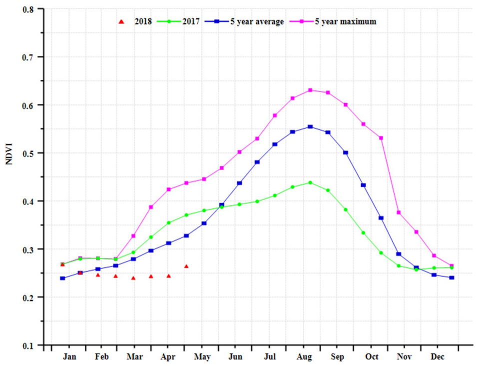


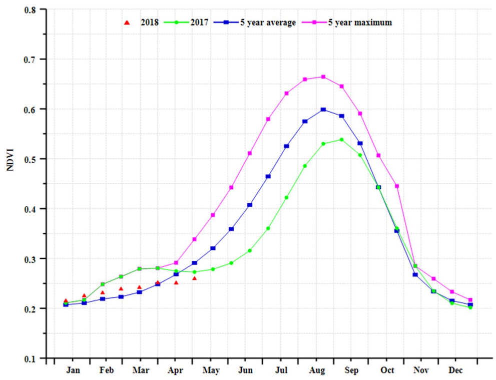
(b) Crop condition development graph based on NDVI (c) Maximum VCI



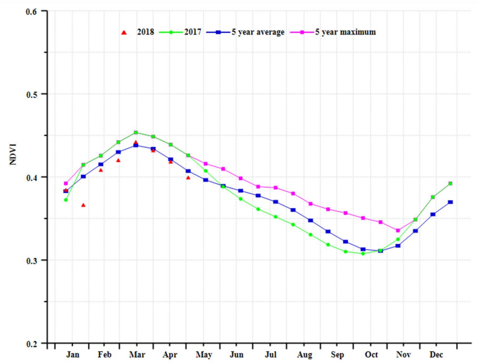


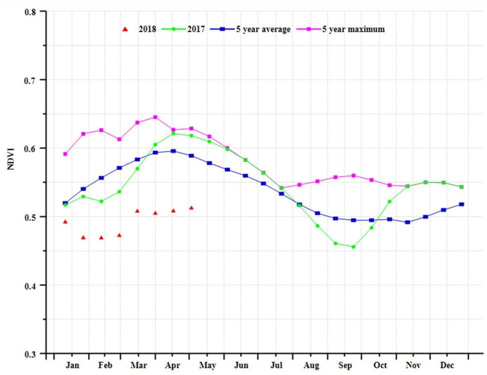
(d) Spatial NDVI patterns compared to 5YA (e) NDVI profiles



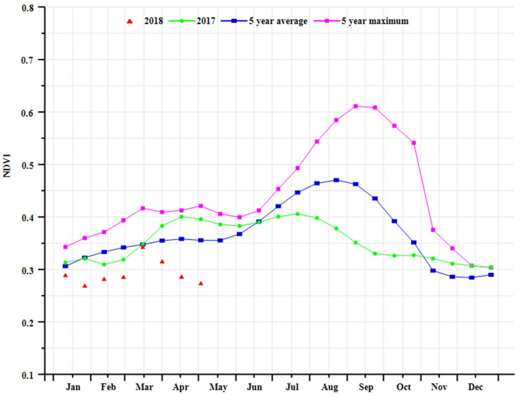


(f) Crop condition development graph based on NDVI (South-eastern wheat zone (left) and South-western wheat zone (right))





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



(h) Crop condition development graph based on NDVI (Sub-humid subtropical zone)

Table 3.8. Australia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 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	101	-31	21.7	0.7	1251	0
Southwestern wheat zone	88	-14	20.8	-0.8	1235	-5
Arid and semiarid zone	1239	48	27.2	-0.6	1156	-3
Wet temperate and subtropical zone	375	-11	21.2	0.1	1134	0
Subhumid subtropical zone	205	-14	24.8	0.7	1294	3

Table 3.9. Australia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Southeastern wheat zone	474	-18	15	-51	0.42
Southwestern wheat zone	387	-11	11	-49	0.35
Arid and semiarid zone	1416	7	66	-2	0.69
Wet temperate and subtropical zone	932	-14	88	-9	0.46
Subhumid subtropical zone	689	-13	31	-28	0.49

[BGD] Bangladesh

The Reporting period covers the full cycle of dry season rice (Boro) and wheat crops; both winter crops are irrigated. Field preparation and planting of rice (Aus) also took place. Although the period between January and April does not correspond to the monsoon the country nevertheless received 256mm rainfall which is about 20% above average. Temperature at 23.0°C was just 1.0°C lower than average and provided a good growing environment for the crops. Although Bangladesh is mostly cloudless during the reporting period, the recorded RADPAR of 972 MJ/m2 was lower than average by about 12%. Due to good growing environmental conditions CALF reached 96%; initially low NDVI eventually exceeded 0.6, a value above most years. Similarly, VCIx too remained high at 0.9. All the indicators point towards very good prospects for rice (Boro) as well as wheat crops for country.

Regional analysis

Bangladesh with its varied agro-ecological conditions is divided in four regions namely: the Coastal region, the Gangetic plain, the Hills and the Sylhet basin. Detailed analysis is reported below.

The Coastal region received excessive rainfall (237mm, +62% over average) and TEMP at 24.2°C (-0.8°C) was good for the crops. RADPAR reached 1014 MJ/m2 (-11%). The excessive rainfall resulted in 65% higher than 5YA BIOMSS accumulation potential. The NDVI was initially low in January and February but rose in March and April and almost reached the 5 year average. Low NDVI, CALF at 82% and VCIx at 0.74 indicate an average performance.

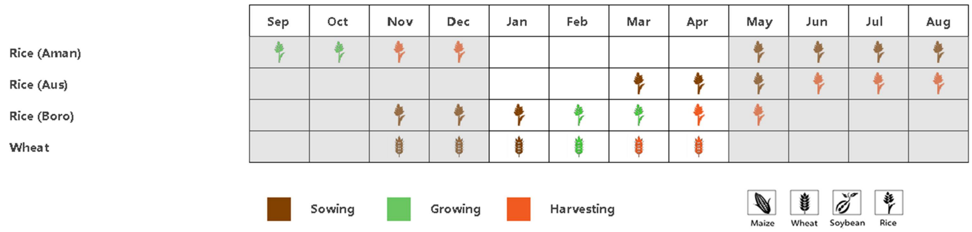
The Gangetic plains region received high rain (210mm, +42% over average) and TEMP remained 1.1°C below average, while RADPAR was down 12%. The NDVI was initially low in January and February but rose to nearly the 5 year average in March and April. High CALF (96%) and VCIx at 0.93 with BIOMSS up 39% (against 5YA) indicate good prospects.

The largest precipitation amount (336mm) was received by the Sylhet Basin, which is average for the region. TEMP was cooler by -0.8°C and RADPAR was -12% below average. The BIOMSS potential of 945 gDM/m^2(the highest for any region) is also 22% above the 5YA. NDVI was initially low but exceeded 0.6 in March- early April then decreased to average. With a CALF of 99% and VCIx of 0.9 (even higher than 1.0 in large patches in the region), crop prospects are probably the most favourable in the country.

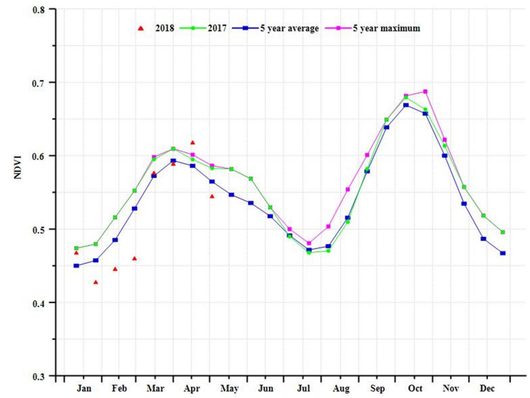
The Hills region recorded 209 mm, only 10% above average, with below average TEMP at 23.2°C (-1.1°C) and a below average RADPAR of 1016MJ/m2 (-11%), the highest in the country. NDVI was high at 0.6 in January, decreased to below average from January to February and increased to nearly the 5YA average from March to April. Although BIOMSS was above average and CALF as high as 98%, crop condition with poor at 0.69 VCIx.

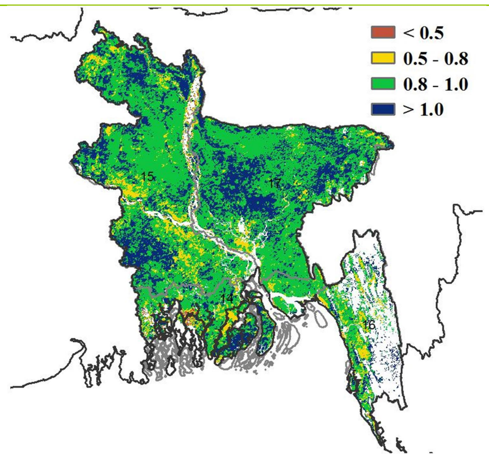
Overall, prospects for rice (Boro) and wheat crops are good in most parts of Bangladesh, barring the Hills region. It will be important to watch weather during May, which corresponds to the harvest of Boro rice and the planting of Aus, the early monsoon rice.

Figure 3.11. Bangladesh's crop condition, January-April 2018



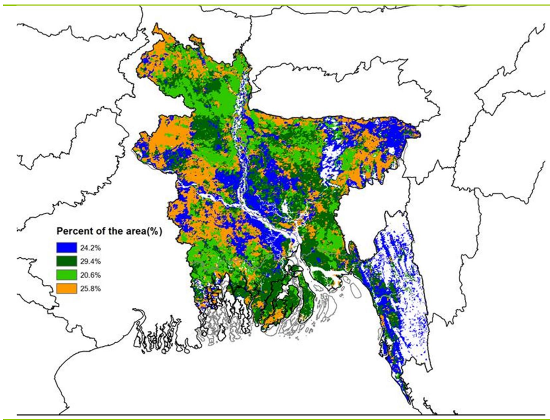
(a). Phenology of major crops

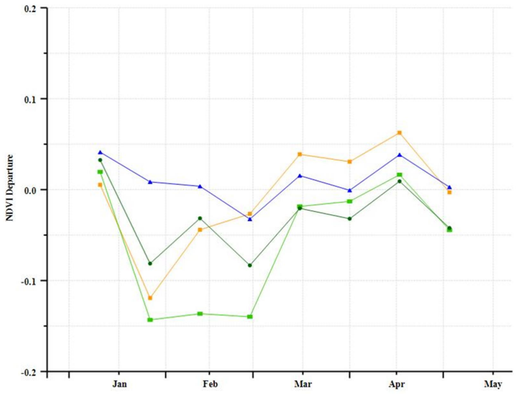




(b) Crop condition development graph based on NDVI

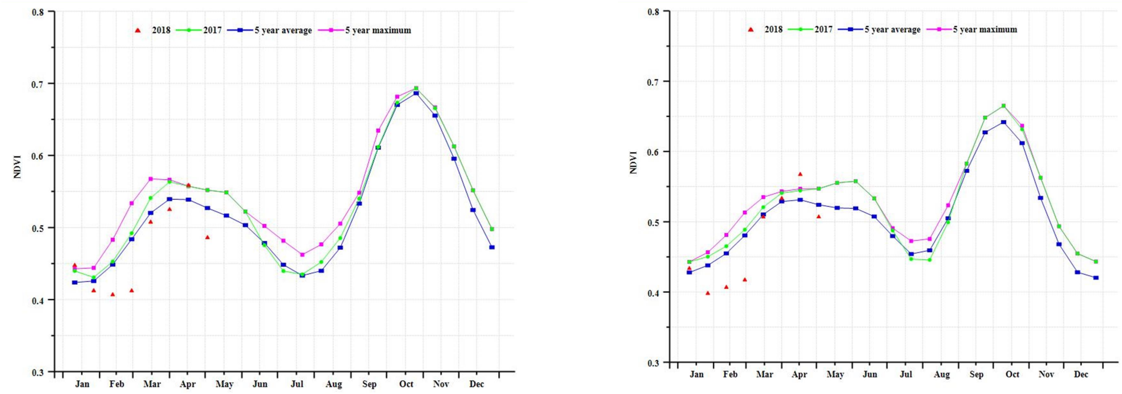
(c) Maximum VCI



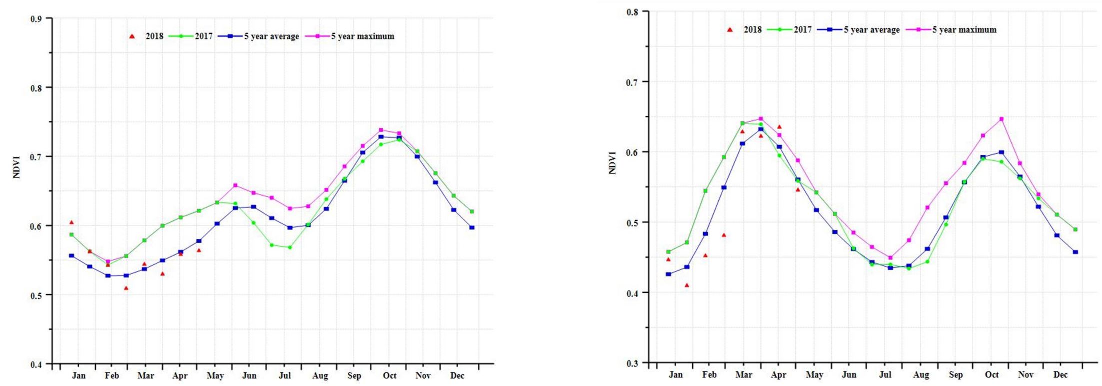


(d) Spatial NDVI patterns compared to 5YA

(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 3.10. Bangladesh's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 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 (Bangladesh)	237	62	24.2	-0.8	1014	-11
Gangetic plain (Bangladesh)	210	42	22.6	-1.1	977	-12
Hills (Bangladesh)	209	10	23.2	-1.1	1016	-11
Sylhet basin (Bangladesh)	336	1	22.6	-0.8	927	-12

Table 3.11. Bangladesh's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Coastal region (Bangladesh)	765	51	82	1	0.74
Gangetic plain (Bangladesh)	739	39	96	1	0.93
Hills (Bangladesh)	750	27	98	0	0.69
Sylhet basin (Bangladesh)	945	22	99	1	0.96

Table 3.12. CropWatch-estimated rice and wheat production for Bangladesh in 2018 (thousand tons)

Crops	Production 2017	Yield variation (%)	Area variation (%)	Production 2018	Production variation (%)
Rice	45274.0	3.6%	-0.3%	46724	3.2%
Wheat	1344.0	7.3%	0.4%	1448	7.7%

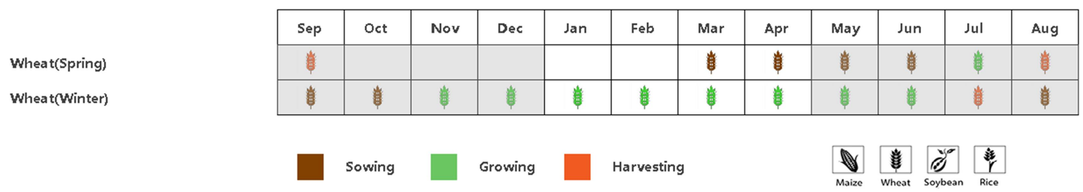
AFG AGO ARG AUS BGD **BLR** BRA CAN DEU EGY ETH FRA GBR HUN IDN IND IRN ITA KAZ KEN KHM LKA MAR MEX MMR MNG MOZ NGA PAK PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF ZMB

[BLR] Belarus

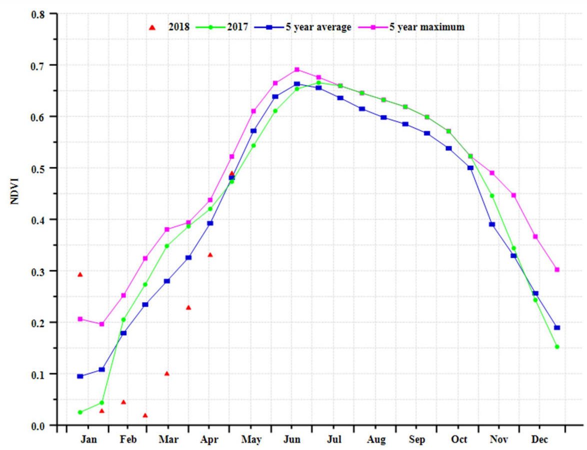
Winter wheat is still growing while farmers in Belarus started to sow spring wheat and summer crops in March.

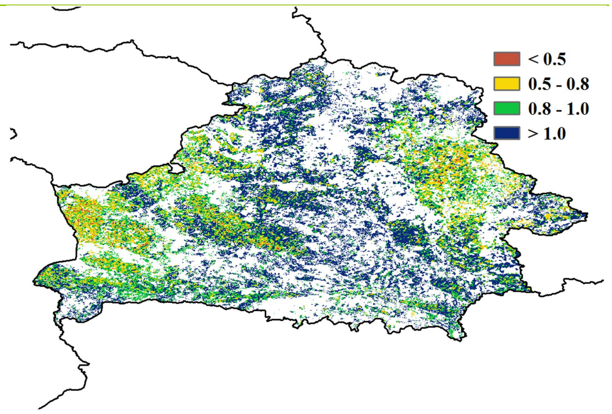
At the national level, CropWatch agroclimatic indices show that rainfall was abundant for winter wheat growth (RAIN 171 mm, +40%), with average temperature (TEMP) and radiation above average (RADPAR 488 MJ/m², +1.8%). The conditions result in a biomass production potential increase of 3.5% over the recent 5-year average. CALF reached 80%, with relatively low values (0.5 to 0.8) concentrated in western and eastern areas; a moderate maximum vegetation condition index (0.76) indicates overall moderate condition. Both national NDVI and spatial NDVI pattern showed that most areas of Belarus experienced a dramatic drop in January but subsequently recovered to 5-year average levels until late April. CropWatch forecasts the production of wheat to increase 9.7% in 2018, as compared to 2017.

Figure 3.12. Belarus's crop condition, January-April 2018

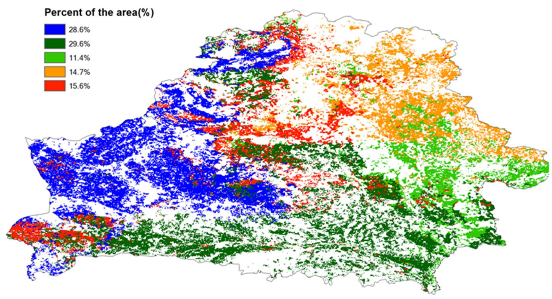


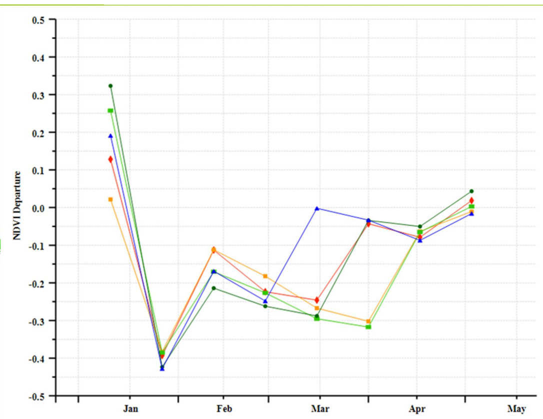
(a). Phenology of major crops





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





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

Table 3.13. CropWatch-estimated Wheat production for Belarus in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Wheat	2766	7.1%	2.4%	3033	9.7%

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

[BRA] Brazil

This bulletin covers the sowing of maize in northeastern Brazil and second maize in Central-South areas; the main maize crop in Central-South has reached harvest time. Rice in Central-South and soybean are also at harvesting stage. Wheat has been sown from the end of April.

Generally, crop condition in Brazil was average compared to the same period in the previous five years. Nationwide, the CropWatch agroclimatic indicators shown average weather conditions compared with average (15YA). Rainfall (870 mm) was 1% above average temperature (25.7 °C) was 0.7 °C lower than average. Together with 2% below average radiation, BIOMSS was at same level as the previous five years average. Most states received close to average rainfall except for Sao Paulo and Santa Catarina where rainfall was 22% and 19% below average. It needs to be highlighted that temperature in every major agricultural state was lower than average except Rio Grande Do Sul. RADPAR over each state was also generally lower than average, coinciding with the low-temperature areas. Rainfall dominates the potential Biomass accumulation as indicated by the same trend between rainfall departure and BIOMSS departure over each state.

In spite of average weather conditions, crops in Brazil were still at below average conditions according to the national NDVI profile for Brazil from January to April 2018. Spatial and temporal patterns of crop condition during the monitoring period are shown by NDVI departures cluster and map. Most areas with significantly below average crop condition are located in the Amazonas zone and south of Rio Grande Do Sul State (bordering similarly stressed areas in Uruguay and Argentina) while other areas stayed average or departed little from average. National maximum vegetation condition index (VCIx), however, presents lower value only in southern Rio Grande Do Sul State and the Southern Subtropical rangelands zone. Average VCIx value for Brazil was 0.75 during the monitoring period. Almost 99% of arable land was cultivated, 1% above 5YA.

Maize and soybean production for Brazil is projected at 86607 ktons and 97495 ktons, up 3% and 1% compared to that in 2017 season. Rice production is projected at 2% below 2017 mainly due to the lower rainfall.

Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, eight agro-ecological zones are identified for Brazil. They 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 one AEZ (Parana basin) received below average rainfall (-12%). RAIN in all other seven AEZ was above average, ranging from 2% in Central Savannas to 17% on the East Coast. Generally, above average rainfall resulted in lower or average temperature and RADPAR for all the AEZs.

Crop condition in the Central Savanna was generally below average throughout the monitoring period. Even if weather conditions were close to average, maximum VCI was just 0.54, indicating below-average crop condition mainly due to the significantly below average rainfall during the previous monitoring period. Average condition was insufficient for vegetation to recover.

In the Eastern coastal zone, sufficient rainfall softened the drought effect as described in the previous bulletin. Generally, 17% above average rainfall resulted in 10% above 5YA BIOMSS. Favorable conditions benefited crops there and almost all arable land is cultivated, 2% higher than 5YA. The VCIx value at 0.79

further confirms the favorable crop condition.

Shortage of rainfall in the Parana basin zone resulted in lower than average NDVI and crop condition from late February. BIOMSS was 9% below 5YA which also confirms the inadequate weather. CALF is nevertheless close to 100% because of favourable weather conditions during the previous monitoring period (covering sowing to growing period). Crops are now close to maturity and an average output is expected.

As indicated in national NDVI departure clustering map, crops in the Amazonas zone were generally below average due to lack of rainfall during the previous monitoring period. According to the NDVI profile of the zone, crop condition was significantly below average. Average VCIx is a low 0.63 and CALF is at 5YA level. Since this is still early season for the crops, the output will crucially depend on the weather conditions in the near future.

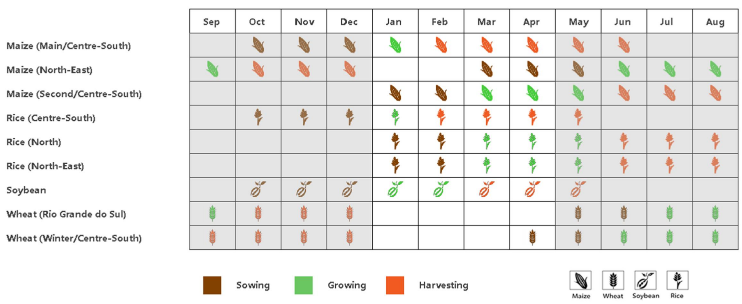
The Mato Grosso zone, as the top maize and soybean producer in Brazil, covers the states of Mato Grosso and Rondonia, as well as the northern part of Mato Grosso do Sul. Maize and soybean are at peak biomass development as indicated by the NDVI profile. Weather conditions were slightly above average, resulting in average NDVI but still slightly below that of same season in the previous year. Almost all cropland is cultivated and VCIx is 0.7, which confirms the fair crop condition.

Harvesting of wheat in Southern subtropical rangelands zone was concluded during the monitoring period and weather conditions no longer impact the output. NDVI profiles presented lower values and low VCIx values (less than 0.5) during the monitoring period indicating unfavorable conditions which may have negative impacts for the next season.

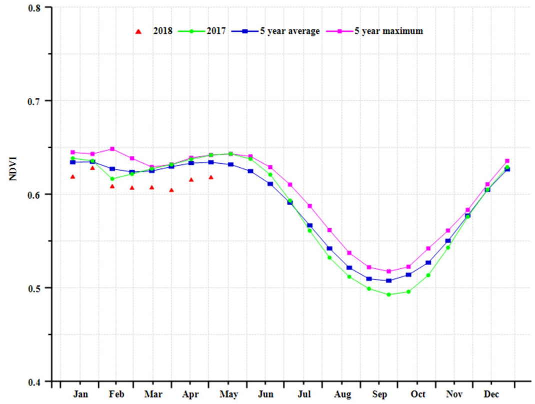
Rice in the Northeastern mixed forest and farmland zone is currently approaching the peak of the season. Favorable conditions with 10% above average rainfall, slightly below average temperature and RADPAR were observed during the monitoring period. However, the NDVI profile presents well below average NDVI mainly due to the late start of the season (see the delay of increasing NDVI). The delay was probably the result of abundant rainfall during the previous season, which hampered the sowing of rice.

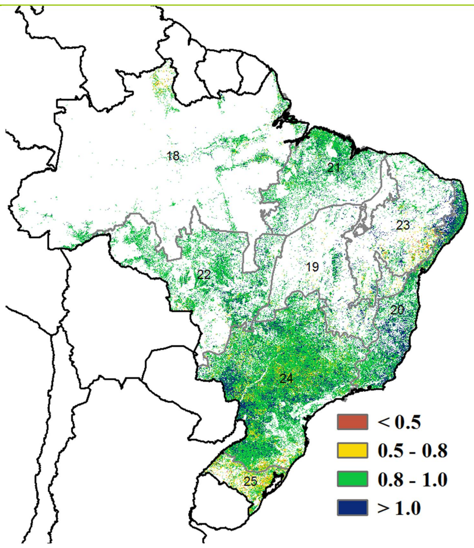
In the Nordeste, crops enjoyed favorable conditions with 9% above average rainfall. Rice recovered from the previous dry period and the NDVI profile was well above average. By the end of April, crops reached their development peak and caught up with the optimal condition during the last five years. Above average output of rice is expected.

Figure 3.13. Brazil's crop condition, January-April 2018



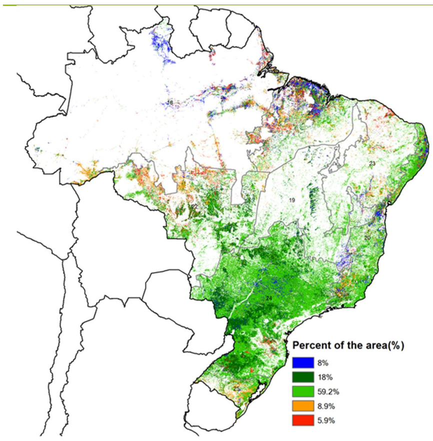
(a). Phenology of major crops

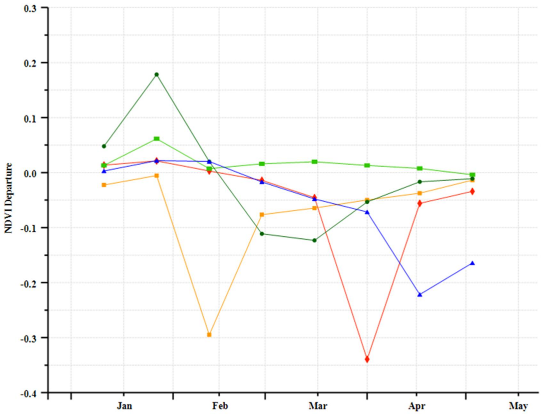




(b) Crop condition development graph based on NDVI

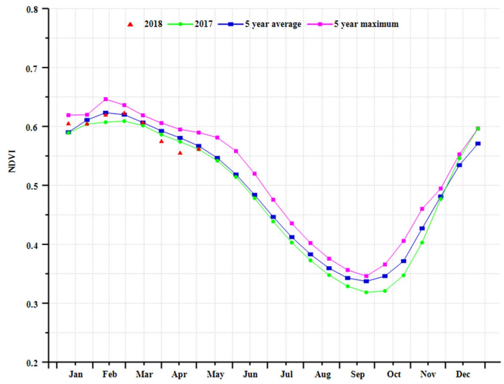
(c) Maximum VCI

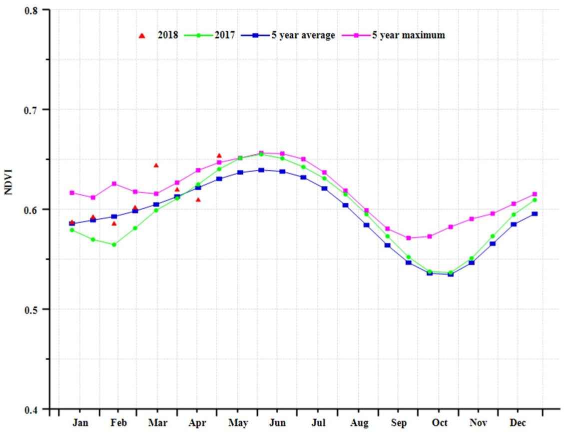




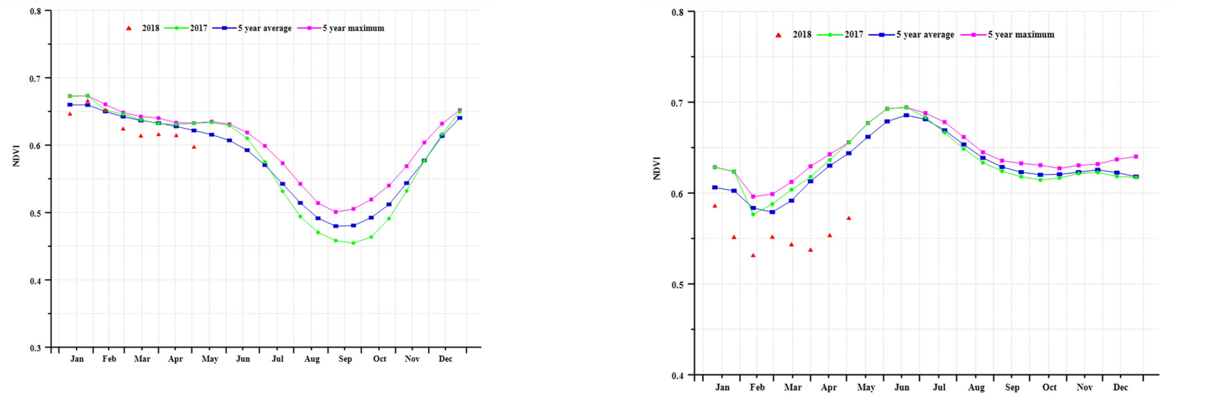
(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles

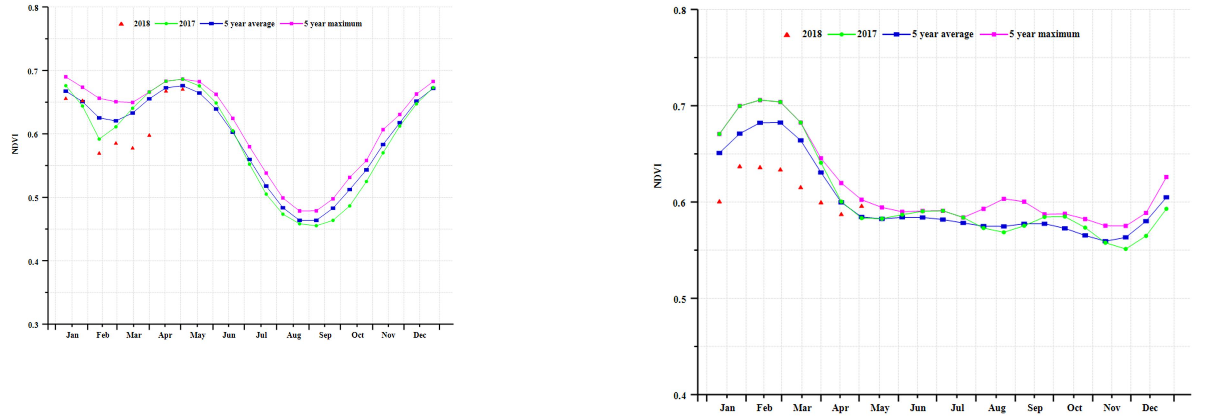




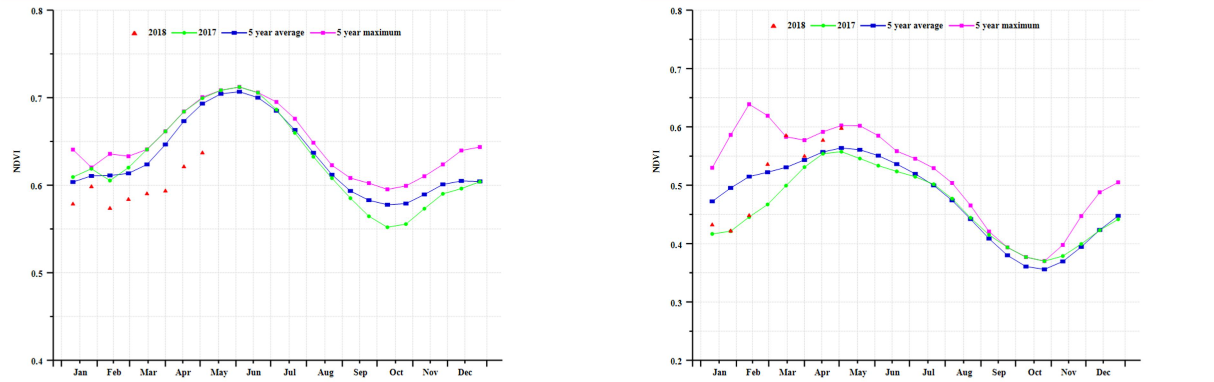
(e) Crop condition development graph based on NDVI ((Central Savanna) (left) and (East coast zone) (right))



(f) Crop condition development graph based on NDVI (Parana River (left) and Amazonas (right))



(g) Crop condition development graph based on NDVI (Mato Grosso region (left) and Sub-tropical rangeland (right))



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

Table 3.14. Brazil's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Amazonas	1200	3	26.9	-0.7	911	-3
Central Savanna	723	2	25.3	-1.0	1129	-1
East coast	561	17	25.4	-0.9	1095	-5
Northeastern mixed forest and farmland	1356	10	26.9	-1.0	927	-3
Mato Grosso	1091	5	26.5	-0.7	1025	0

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Nordeste	512	9	27.4	-0.2	1139	-6
Parana basin	646	-12	24.3	-0.5	1111	0
Southern subtropical rangelands	600	3	24.3	0.0	1145	1

Table 3.15. Brazil's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Amazonas	2281	1	99	0	0.63
Central Savanna	1797	4	100	0	0.54
East coast	1380	10	100	2	0.79
Northeastern mixed forest and farmland	2475	4	100	0	0.69
Mato Grosso	2351	3	100	0	0.70
Nordeste	1395	10	94	7	0.50
Parana basin	1719	-9	100	0	0.83
Southern subtropical rangelands	1570	-1	100	0	0.63

Table 3.16. CropWatch-estimated maize, rice and soybean production for Brazil in 2018 (thousand tons)

Crops	Production 2017	Yield variation (%)	Area variation (%)	Production 2018	Production variation (%)
Maize	84019	1	2	86607	3
Rice	11344	-4	2	11137	-2
Soybean	96726	0	0	97495	1

[CAN] Canada

The current reporting period covers winter wheat in Canada. Most agricultural areas were recorded snow, which limits the relevance of NDVI-based indicators.

Rainfall was 25% above average, which provided sufficient water for winter wheat. Both the temperature and radiation were below average (TEMP -0.9°C, RADPAR -3%), with a maximum VCI value of 0.62. The potential biomass was slightly below the recent five-year average (BIOMSS, -9%) due to low temperature.

Two of the three main production provinces recorded a shortfall of precipitation: Manitoba (with RAIN down 23%) and Saskatchewan (RAIN, -9%). The temperature of all the three provinces was markedly below average (Alberta -2.3°C, Manitoba -1.0°C, Saskatchewan -1.8°C). As a result, the tree provinces have below average biomass production potentials (Alberta -16%, Manitoba -17% and Saskatchewan -18%).

As a result, the overall condition of winter wheat in Canada is poor, and the production is unlikely to reach 2017 levels.

Regional analysis

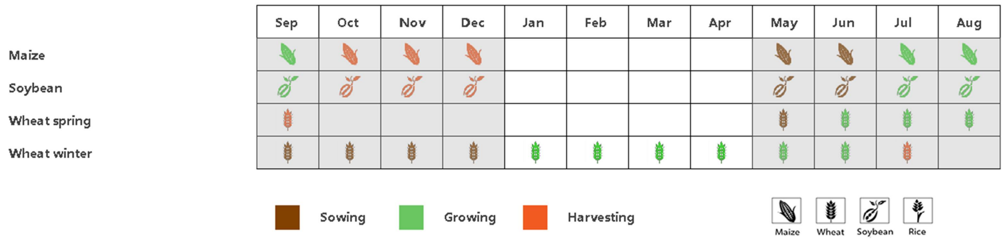
The Prairies (area identified as 30 in the maximum VCI map) and Saint Lawrence basin (26, covering Ontario and Quebec) are the major agricultural regions.

In the Prairies, the main food production area in Canada, rainfall was slightly below average (RAIN 104 mm, -6%), and colder than the last year (-2.0°C), while the radiation was equal. The potential biomass was below the five-year average (BIOMSS, -17%). Because of snow, the Cropped Arable Land Fraction (CALF) dropped dramatically (-87%), and the VCIx was 0.57. The NDVI values were also largely below the average from February to April. All these indicated that the production of winter wheat could be poor in the reporting period.

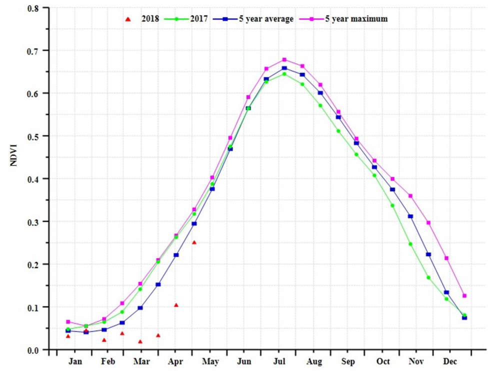
In the Saint Lawrence basin, rainfall was significantly above average (441 mm equivalent to +44%), which benefited winter wheat although water logging must have occurred locally; the temperature was slightly above average (TEMP, +0.6°C) and radiation was significantly below (RADPAR, -9%). The potential biomass was almost average (BIOMSS, -1%), and the Cropped Arable Land Fraction were largely below the average (CALF, -43%), while the VCIx was 0.74. Although, the NDVI profiles were similar to the Prairies, the agroclimatic indicators, especially the rainfall, indicate the winter wheat in this region could be favourable, if the conducive condition prevails in the next period.

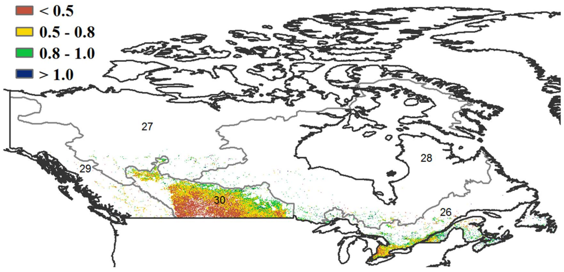
Overall, the crop condition of Canada is mixed: good in the Saint Lawrence basin and poor in the Prairies. As a result, the production of winter wheat could be affected. Current CropWatch estimates indicate a drop in wheat production (26,691 ktons, -13% below 2017).

Figure 3.14. Canada's crop condition, January-April 2018

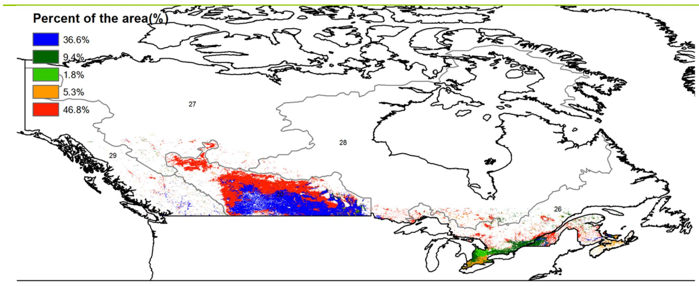


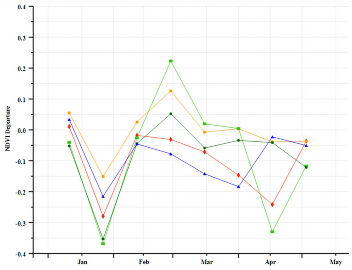
(a). Phenology of major crops



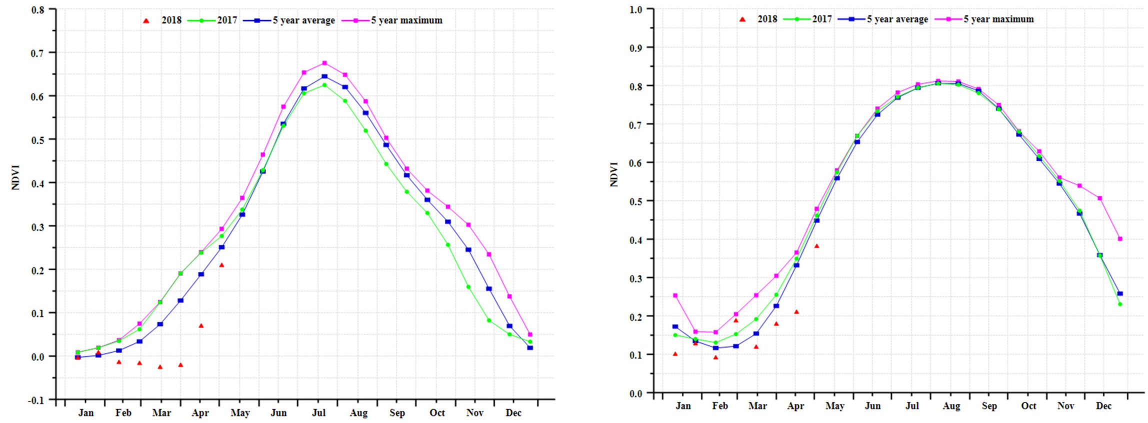


(b) Crop condition development graph based on NDVI (c) Maximum VCI





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



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

Table 3.17. Canada's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m²)	Departure from 15YA (%)
Prairies (Canada)	104	-6	-9.0	-2.0	643	0
Saint Lawrence basin (Canada)	432	44	-4.8	0.6	598	-9

Table 3.18. Canada agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Prairies (Canada)	337	-17	0	-87	0.57
Saint Lawrence basin (Canada)	441	-1	0	-43	0.74

Table 3.19. CropWatch-estimated wheat production in Canada for 2018 (thousand tons)

Crops	Production 2017	Yield variation (%)	Area variation (%)	Production 2018	Production variation (%)
Wheat	30679	0.0	-13.0	26691	-13.0

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

[DEU] Germany

Overall, the crops in Germany showed above average condition during the reporting period from January to April. Currently, winter wheat and winter barley are in the vegetative stages, and maize is being planted. The CropWatch agroclimatic indicators show that for the country as a whole, total precipitation (as measured by the RAIN indicator) was 6% above average, temperature was just average, and radiation was above average (RADPAR, +1%). Above average precipitation occurred throughout the country from January to early-February and after early March. Suitable temperatures prevailed over the entire country from January to early-February and after early-April, while most of Germany were under the influence of a cold spell, with minimum temperatures below -10.0°C during the end of February and the begin of March, and also under the influence of another cold spell in the second half of March, with minimum temperatures below -8.0°C. The cold spell is referred to as "The beast from the east" in Chapter 3.1 and the disasters section in Chapter 5. Such conditions caused delays to the start of spring sowing and hampered the growth and development of winter crops, but did not cause substantial damage. Due to appropriate rainfall and overall suitable temperature, biomass (BIOMSS) is expected to increase by 6% nationwide compared to the five-year average.

As shown in the national crop condition development graph and the NDVI profiles, national NDVI values were above average in early January, then below the average and the values of 2017 from mid-January to early-April, and then again above average after mid-April. These observations are confirmed by the NDVI profiles. Summer crops also are about average in most of the country according to the NDVI profiles, a spatial pattern again reflected by VCIx in the different areas, with a VCIx of 0.90 for Germany overall. The outlook of winter crops is above average.

Generally, the values of agronomic indicators show favorable condition for most summer crops and the sowing of winter crops in Germany. CALF during the reporting period was 100%, the same as the recent five-year average. Due to favorable condition, the production of wheat is estimated at 4.9% above 2017 values.

Regional analysis

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

Schleswig-Holstein and the Baltic coast is the major winter wheat zone of Germany. The CropWatch agroclimatic indicator RAIN was well above average (+33%), temperature was slightly below average (TEMP -0.4°C) and radiation significantly below average (RADPAR -3%). With sufficient precipitation, biomass (BIOMSS) in this zone is expected to increase by 12% compared to the five-year average. As shown in the crop condition development graph based on NDVI, the NDVI values were above average in early January, then below the average and the values of 2017 from mid-January to early-April, and then again above average after mid-April. The area has a high CALF (99%) as well as a favorable VCIx (0.86), indicating high cropped area and favorable crop prospects.

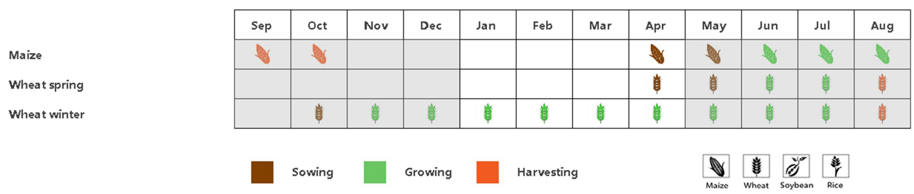
Wheat and sugar beet are major crops in the Mixed wheat and sugar beet zone of the north-west. The CropWatch agroclimatic indicators show that abundant RAIN (14% above average), temperature was slightly below average (TEMP, -0.3°C) and average radiation resulted in favorable crop condition for both crops. Biomass (BIOMSS) in this zone is expected to increase by 8% compared to the five-year average. As shown in the crop condition development graph based on NDVI, the NDVI values were above average in early January, then below the average and the values of 2017 from mid-January to early-April, and then again above average after mid-April. The area has a high CALF (100%) and crop condition for the region is good according to the high VCIx (0.91).

Central wheat zone of Saxony and Thuringia is another major winter wheat zone; it received about 11% above average rainfall and experienced average temperature condition. Due to favourable weather, the biomass potential (BIOMSS indicator) increased by 7% above average. As shown in the crop condition development graph based on NDVI, the values were above those of 2017 from early-January to early-March, then below the average and then again above average after mid-April. The VCIx of 0.89 for this region shows favorable crop prospects.

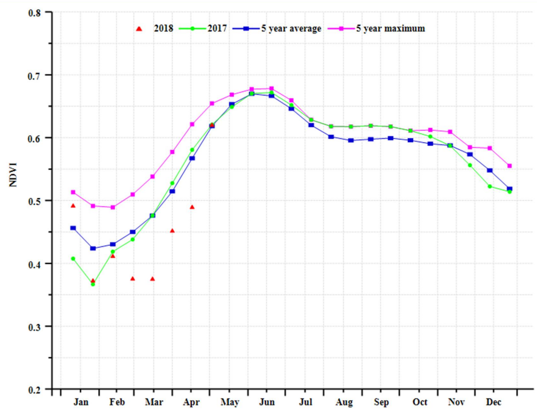
The sparse crop area of the east-German lake and Heathland district experienced average weather conditions but the western sparse crop area of the Rhenish massif was very wet (RAIN +14%) with slightly above average TEMP (+0.1°C) and radiation. BIOMSS was up by 4% and 9% respectively, while CALF was at 99% for both. As shown in the crop condition development graph based on NDVI, the NDVI values for those two regions were all above the values of 2017 from early-January to early-February, then below the average and then again above average after mid-April. Overall, favorable crop condition was recorded with high VCIx values of 0.86 for the eastern and 0.94 for the western areas, respectively.

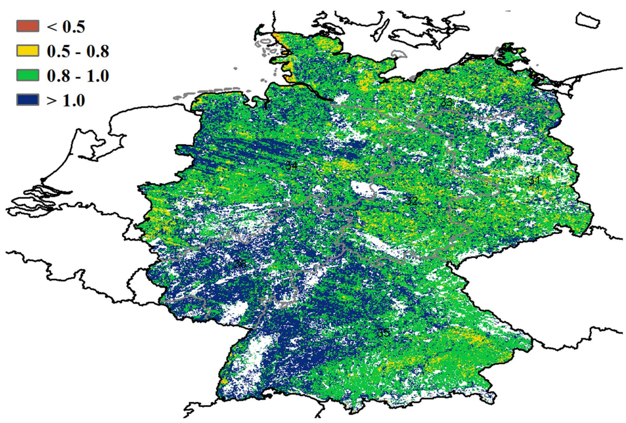
Rye and oats are major crops in the Bavarian Plateau. The CropWatch agroclimatic indicators show that normal weather was recorded for RAIN (-12%), TEMP (+0.5°C), and RADPAR (+2%). Compared to the five-year average, BIOMSS increased 1% and the Cropped Arable Land Fraction was at 99%. Due to the influence of cold spell in February and March and the rainfall deficit, the crop condition was below average from February to early-April. VCIx reached 0.90 over the whole region indicating favorable crop prospects at the end of the reporting period.

Figure 3.15. Germany's crop condition, January-April 2018

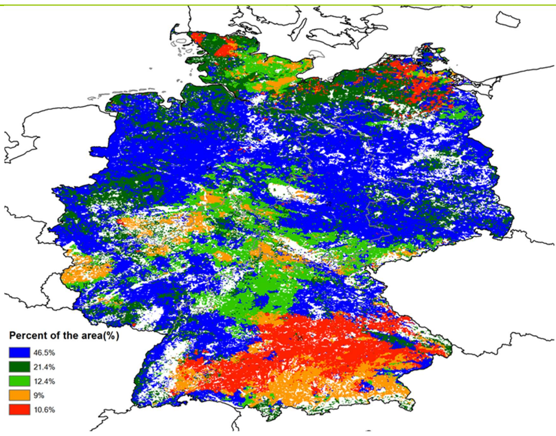


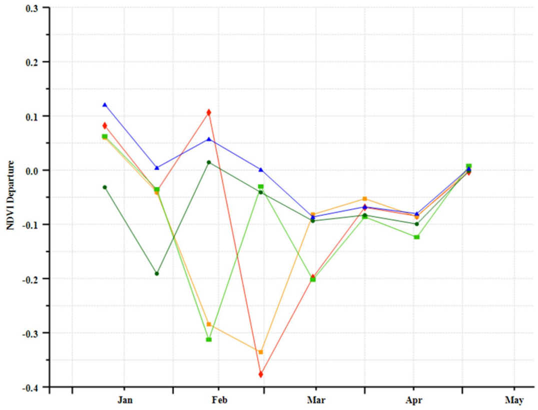
(a). Phenology of major crops





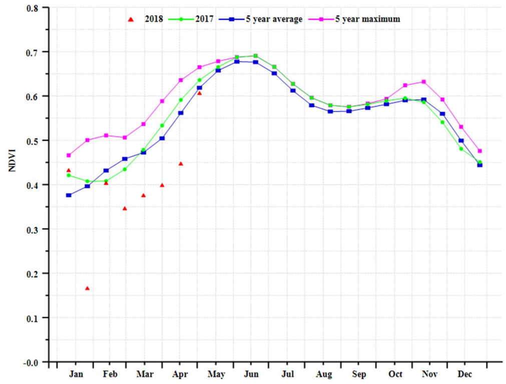
(b) Crop condition development graph based on NDVI (c) Maximum VCI

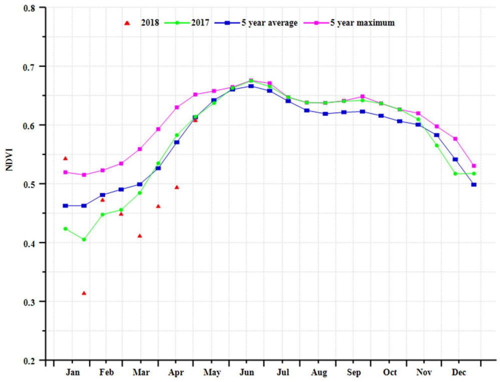




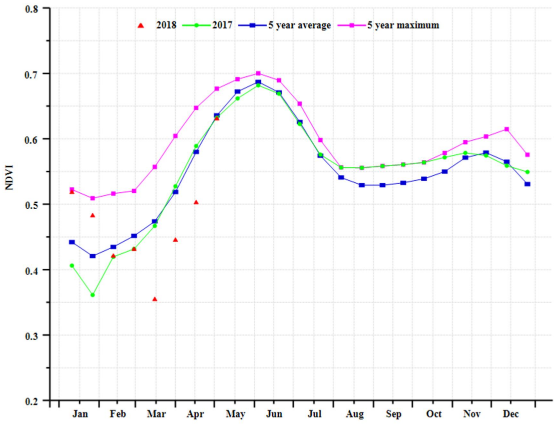
(d) Spatial NDVI patterns compared to 5YA

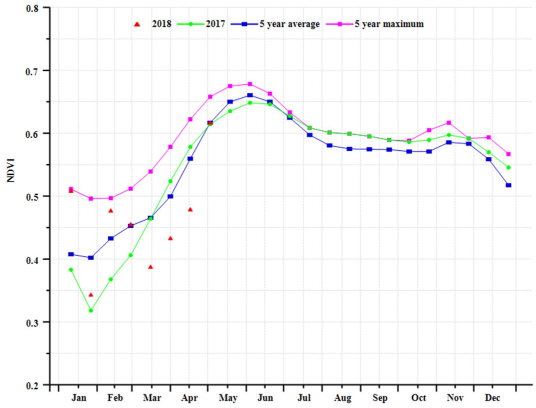
(e) NDVI profiles



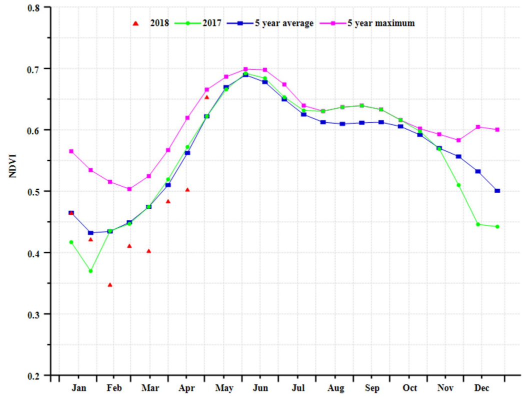


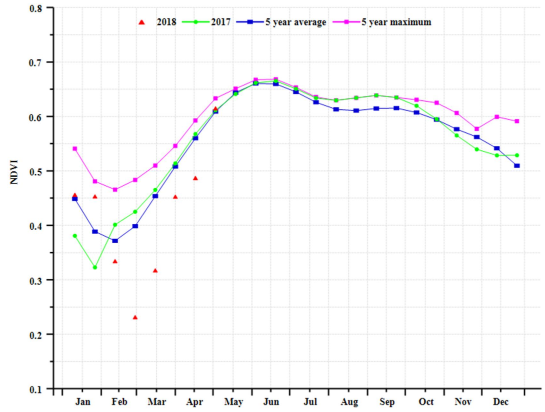
(f) Crop condition development graph based on NDVI (Wheat zone of Schleswig-Holstein and the Baltic coast (left) and Mixed wheat and sugar beets zone of the north-west(right))





(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 3.20. Germany's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Wheat zone of Schleswig-Holstein and the Baltic coast	244	33	3.7	-0.4	461	-3
Mixed wheat and sugar beets zone of the north-west	252	14	4.7	-0.3	485	0
Central wheat zone of Saxony and Thuringia	204	11	4.3	0.0	520	3
Sparse crop area of the east-German lake and Heathland	175	0	4.0	0.1	513	3
Western sparse crop area of the Rhenish massif	246	14	4.7	0.1	526	0
Bavarian Plateau	195	-12	4.0	0.5	583	2

Table 3.21. Germany's agronomic indicators by sub-national regions, current season's value and departure from 5YA, January-April 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	913	12	99	0	0.86
Mixed wheat and sugarbeets zone of the north-west	992	8	100	0	0.91
Central wheat zone of Saxony and Thuringia	868	7	100	0	0.89
Sparse crop area of the east-German lake and Heathland	822	4	99	0	0.86
Western sparse crop area of the Rhenish massif	964	9	99	0	0.94
Bavarian Plateau	828	1	99	0	0.90

Table 3.22. CropWatch-estimated wheat production for Germany in 2018 (thousands tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Wheat	28130	5.10	-0.20	29496	4.90

[EGY] Egypt

The reporting period covers the growing stage of winter wheat and the start of the sowing of both maize and rice. The recorded rainfall (RAIN) was 45mm, 20% less than the last 15 years average (15YA), the average temperature was 1.0°C above the 15YA. The radiation (RADPAR) was 1006MJ/m2, -6% below 15YA and the estimated biomass (BIOMSS) was 214gDM/m^2, 20% above 5YA.

The nation-wide crop development NDVI based graph shows that the condition of the crops was below the 5 years average. NDVI profile maps indicate that the condition of about 58% of cultivated areas were above average until February but ran below average till the end of April. Only 14% of the total cropped area conditions were about average throughout the whole reporting period.

The VCIx map indicates that the condition of the current crops, mainly the winter wheat, is fairly good. This agrees with the VCIx value (0.74) estimated for the whole country. There are no significant changes in both yield and cultivated area between 2017 and 2018 based on CropWatch estimates.

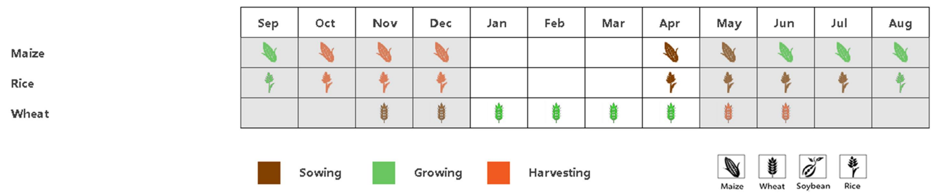
Regional analysis

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.

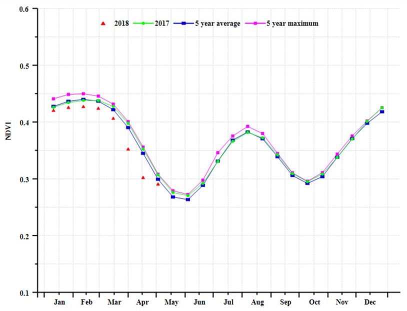
In the first the average rainfall was 34 mm (-34% below average), while in Nile Valley zone it reached 120 mm, an increase of 86% over average. Since virtually all Egyptian crop production is irrigated, rainfall makes little change in the outcome of the season, although additional water usually has a beneficial effect. RADPAR for both zones was about 6% below average and the BIOMSS index shows a decrease of -9% in Nile Delta and Mediterranean coastal strip zone, and 79% increase over Nile Valley zone compared to the 5YA.

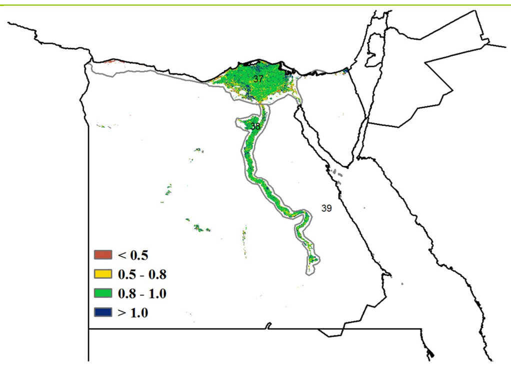
The NDVI-based Crop condition development graphs indicate below average conditions for both zones but, crop condition was lower in the Nile Delta and Mediterranean coastal strip zone than in Nile Valley zone, in agreement with the VCIx values (0.74 and 0.84, respectively).

Figure 3.16. Egypt's crop condition, January-April 2018

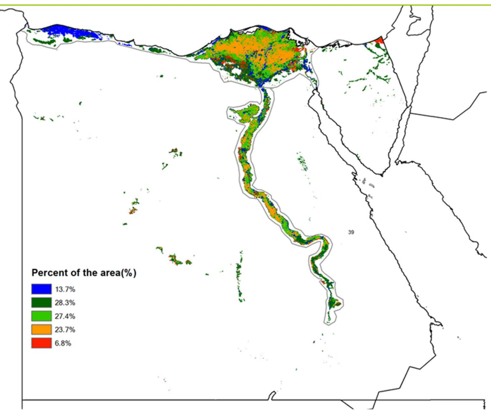


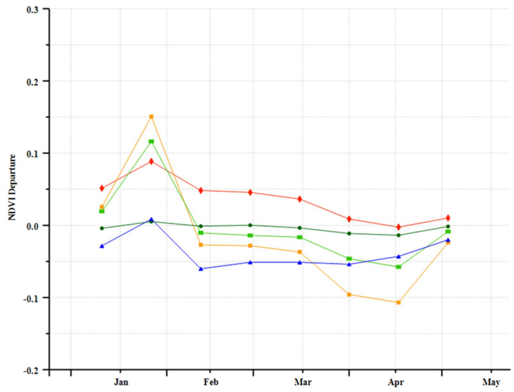
(a). Phenology of major crops



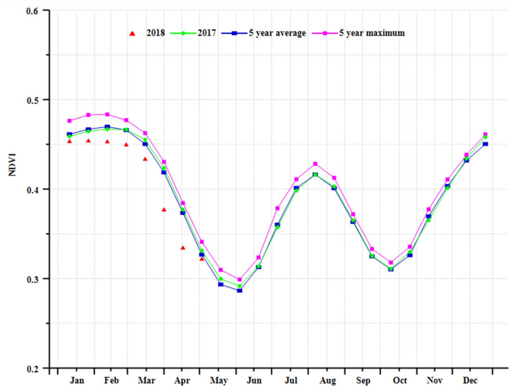


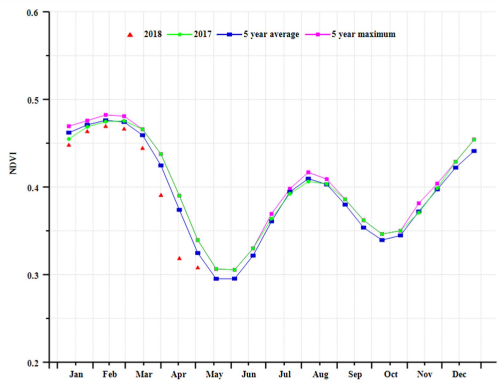
(b) Crop condition development graph based on NDVI (c) Maximum VCI





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





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

Table 3.23. Egypt's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

	RAIN		TEMP		RADPAR	
Region	**Current (mm)**	**Departure from 15YA (%)**	**Current (°C)**	**Departure from 15YA (°C)**	**Current (MJ/m2)**	**Departure from 15YA (%)**
Nile Delta and Mediterranean coastal strip	34	-34	17.5	1	988	-6
Nile Valley	120	86	18.6	1.2	1087	-7

Table 3.24. Egypt's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

	BIOMSS		CALF		Maximum VCI
Region	Current (gDM/m^2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Nile Delta and Mediterranean coastal strip	203	-9	0.7	0	0.74
Nile Valley	309	79	0.8	1	0.84

Table 3.25. CropWatch-estimated maize, rice, and wheat production for Egypt in 2018 (thousand tons)

	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Maize	5918	0	0	6295	6.4
Rice	6545	0	0	6897	5.4
Wheat	10963	0	0	11730	7.0

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[ETH] Ethiopia

Ethiopia has two major production seasons (Belg and Meher). The period covered (January- April) was the Belg season. The South-Eastern, Western and Central-northern parts of the country practices mostly maize, wheat, barley and beans production during the reporting period. Although only about 10% of maize is produced during Belg, the season plays an important role in terms of food security: this year's crops were generally good so far according to the NDVI-based season development graph.

CropWatch Agroclimatic indicators show that the reporting period recorded 188 mm total amount of rainfall which is an increase by 1% and 1.3°C decrease in temperature. RADPAR decreased by 2 percent below average, and the biomass production potential increased by 1 percent compared to the five-year average. The VCIx value of crop area showed that moderate crop health condition was recorded at national level with a value of VCIx 0.63, but in some part of the central and west of Oromia region VCIx exeeded1.00, which implies the area experienced few agricultural problems (disasters and diseases). The NDVI clusters and profiles provide additional spatial information: about 18.4% of the country (around central Oromia) enjoyed favourable crop condition, which is confirmed by high VCIx values. Other areas (Eastern Oromia, Amhara and Eastern Tigray) experienced less favourable vegetation condition (VCIx was close to or lower than 0.50).

Regional analysis

The reported period covers main rain-fed cereal producer areas found in the South eastern mixed-maize zone, Western mixed maize zone, and Central-northern maize-teff highlands zone.

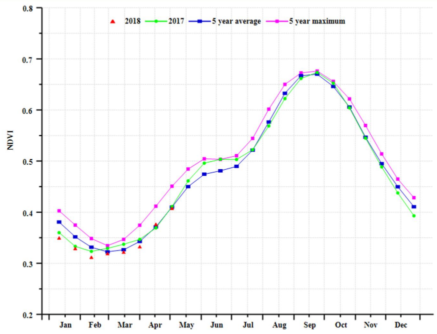
South-eastern mixed maize zone (47 in the VCIx map) is one of the major agricultural regions. Its rainfall was found to be significantly above the average (+74%) but the temperature in this zone was 0.8 degree below the average. The RADPAR was more significantly below average (-4%). The potential BIOMASS on the other hand was found to be 39% above average of five years, this is because of an increase in rainfall above the fifteen years average. The Cropped Arable Land Fraction reached 24% with VCIx of 0.60; NDVI started to increase in March and continued. Overall, the crop condition was favorable in the area.

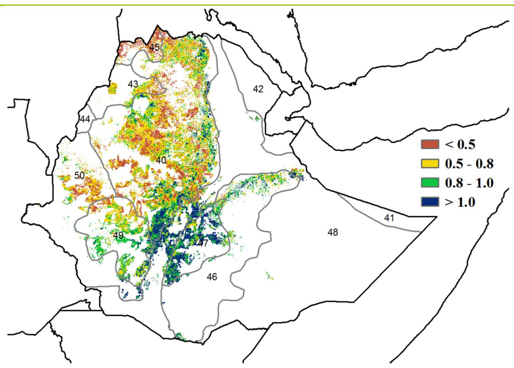
In the Western mixed maize zone, rainfall was below average (-7%), the temperature and radiation were also below average (TEMP, -1.5 and RADPAR, -1%). Both the potential biomass and Cropped Arable Land Fraction were below average (BIOMASS, -9%; CALF, -2%), whereas the VCIx was 0.49. Based on the NDVI profiles in the western mixed maize zone and Agroclimatic indicators, especially the rainfall decrease, NDVI profile showed average values. Conditions were generally unfavorable for maize during this period,

In Central-northern maize-teff highlands zone, the RAIN was reduced by -27%, which led to a drop in BIOMASS by -19 % below average. CALF and the RADPAR dropped as well, by -11% and -2% respectively. The NDVI profile was also below average. Overall the outlook in the Central-northern maize-teff highlands zone is poor due to shortage of water.

Figure 3.17. Ethiopia's crop condition, January-April 2018

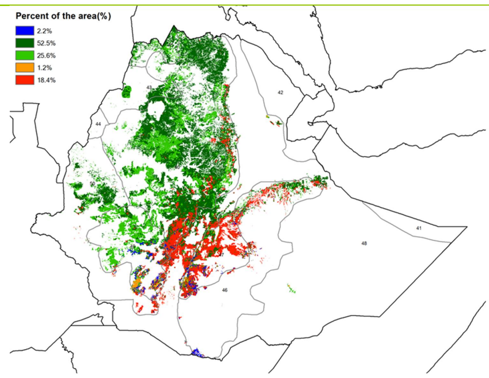
(a). Phenology of major crops

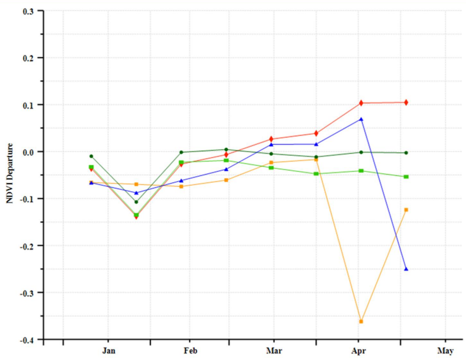




(b) Crop condition development graph based on NDVI

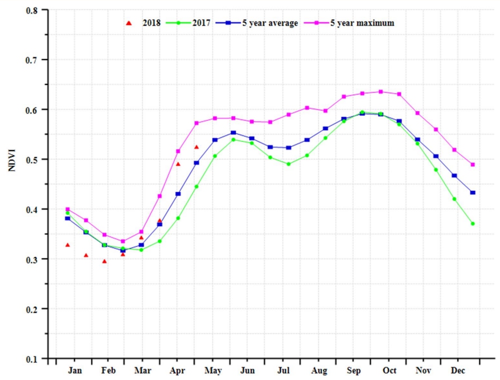
(c) Maximum VCI

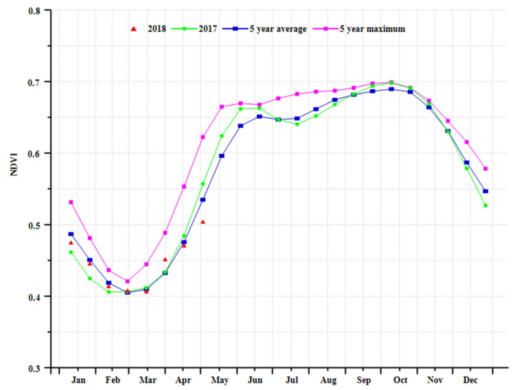




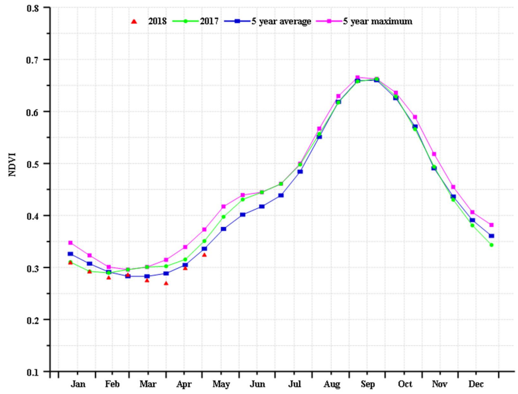
(d) Spatial NDVI patterns compared to 5YA

(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 3.26. Ethiopia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
South-eastern mixed maize zone	374	74	21.5	-0.7	1242	-4
Western mixed maize zone	143	-7	23.7	-1.5	1207	-0.8
Central-northern maize teff highlands	96	-27	18.9	-1.2	1274	-2

Table 3.27. Ethiopia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
South-eastern mixed maize zone	1018	39	81	24	0.60
Western mixed maize zone	528	-9	92	-2	0.49
Central-northern maize-teff highlands	434	-19	22	-11	0.57

Table 3.28. CropWatch-estimated Wheat production for Ethiopia in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Wheat	4180	9.8%	0.1%	459.5	9.9%

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[FRA] France

The analysis period coincides with the late dormancy stages of wheat and other winter crops, and the planting of maize and summer crops that started in April. 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 (10%) in RADPAR nationwide. Crop condition was close average, which is confirmed by a slight decrease for the BIOMSS indicator (-1%).

As shown by the crop condition development graph, national NDVI values were mostly below those for 2017 and the recent five-year average. The spatial NDVI patterns compared to the five-year average and corresponding NDVI departure cluster profiles further indicate that NDVI is above average in 61% 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 value of 0.88 and a slight drop in CALF (0.5%) 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.

Regional analysis

Considering cropping systems, 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: (50) Northern barley region; (51) Mixed maize/barley and rapeseed zone; (52) Maize, barley and livestock zone, (53) Rapeseed region; (54) Dry Massif Central zone; (55) Southwestern maize zone; (56) Eastern Alpes region, and (57), the Mediterranean zone.

In the Northern barley region, TEMP was 0.7°C and RADPAR 11% below average respectively, while RAIN was 29% above. As a result the BIOMSS indicator is 18% above the five-year average. High VCIx values are observed, reflecting overall favorable crop condition.

The most severe adverse weather conditions were observed in the Mixed maize/barley and rapeseed zone (RAIN -32%, RADPAR -14%). According to the NDVI profiles, crop condition has been continuously deteriorating since January. BIOMSS is 17% below its five-year average, but the VCIx value is high(0.94).

Generally, crop condition for the Maize, barley and livestock zone is close average, in spite of climate conditions being poor (RAIN -5%, TEMP -0.9°C, and RADPAR -12%). Almost all arable land in this region was cropped during the monitoring period, and the average VCIx is 0.92. The NDVI profile confirms the favorable conditions with close to average NDVI since April.

The Rapeseed region also had below average rainfall (RAIN, -13%). Temperature was average, but sunshine was low (RADPAR, -8%). 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.

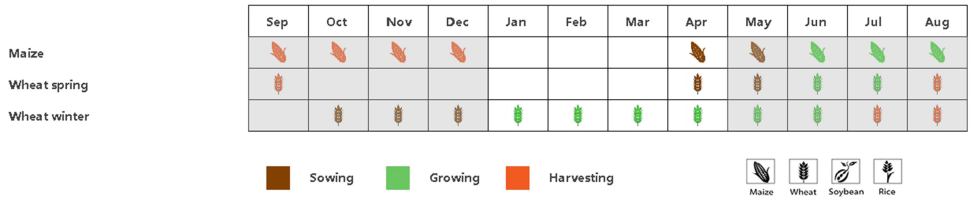
Mostly unfavorable climatic conditions dominated the Dry Massif Central zone over the reporting period. Rainfall was 31% below average (178 mm over four months). Temperature was normal, but radiation (RADPAR) was well below (-11%). The dry conditions have hampered crop growth, indicated also by a BIOMSS indicator 11% below average for the period.

The Southwest maize region had below average rainfall (RAIN, -13%) and radiation (RADPAR -12%), representing however average values for TEMP. BIOMSS for the region is close the five-year average, reflects the generally average crop condition.

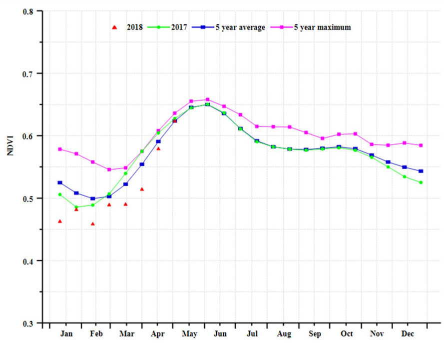
The crop condition for Eastern Alpes region is close to average. Rainfall fell 11% below average, temperature was average, but radiation was well below expectations (RADPAR -9%). Crop condition was close to average according to the NDVI development graph, an observation confirmed by the increase of BIOMSS (3%) and the small decrease in CALF (2%) compared to average. The VCIx map shows that the crop condition was close to average.

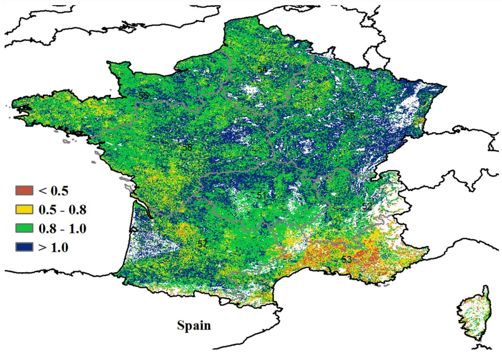
The Mediterranean zone recorded 238 mm of rainfall over four months (RAIN -3%). Temperature was average (TEMP-0.2°C) but RADPAR was 10% below. The increase in BIOMSS was 8% compared to the five-year average. Crop condition was favorable.

Figure 3.18. France's crop condition, January-April 2018

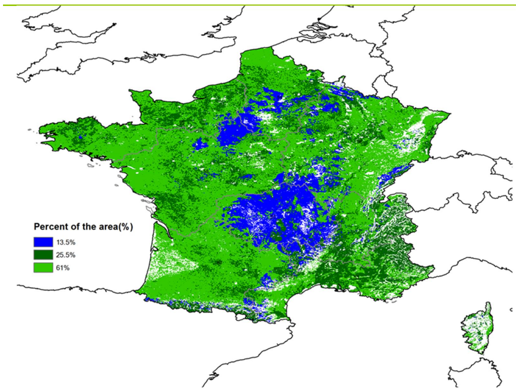


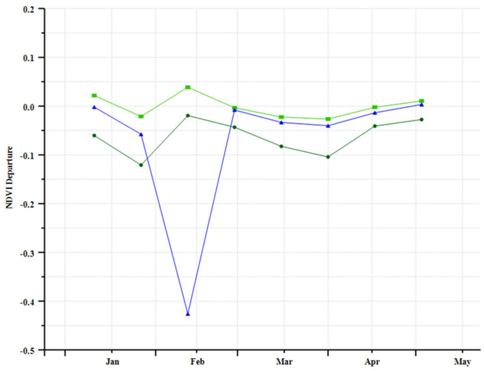
(a). Phenology of major crops



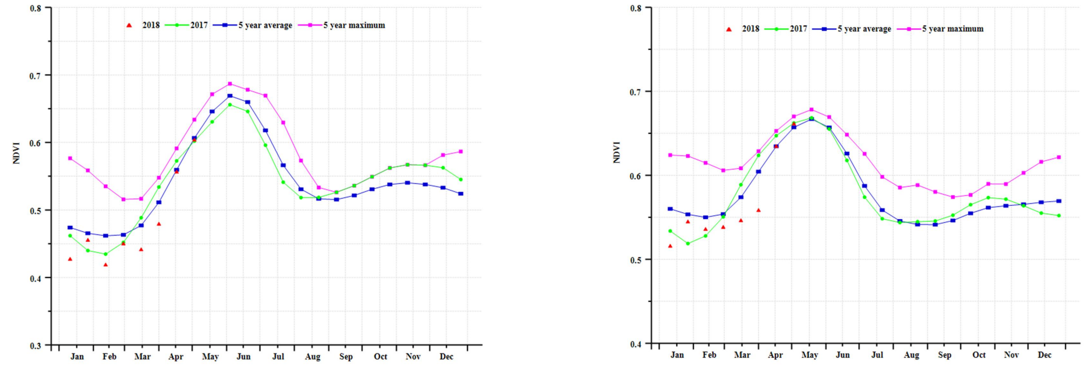


(b) Crop condition development graph based on NDVI (c) Maximum VCI

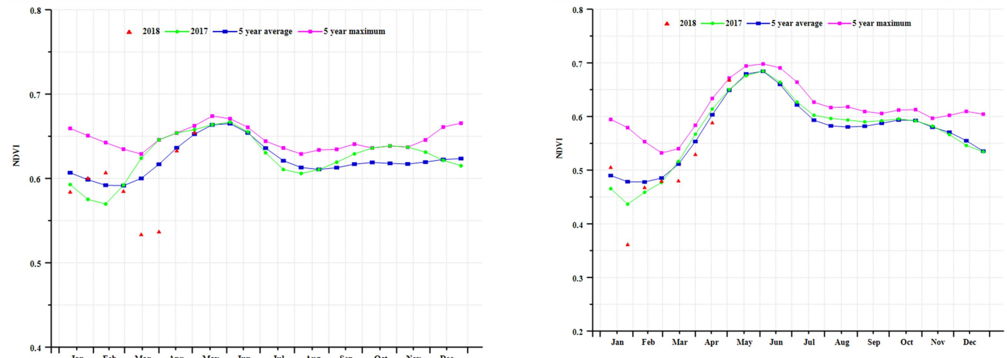




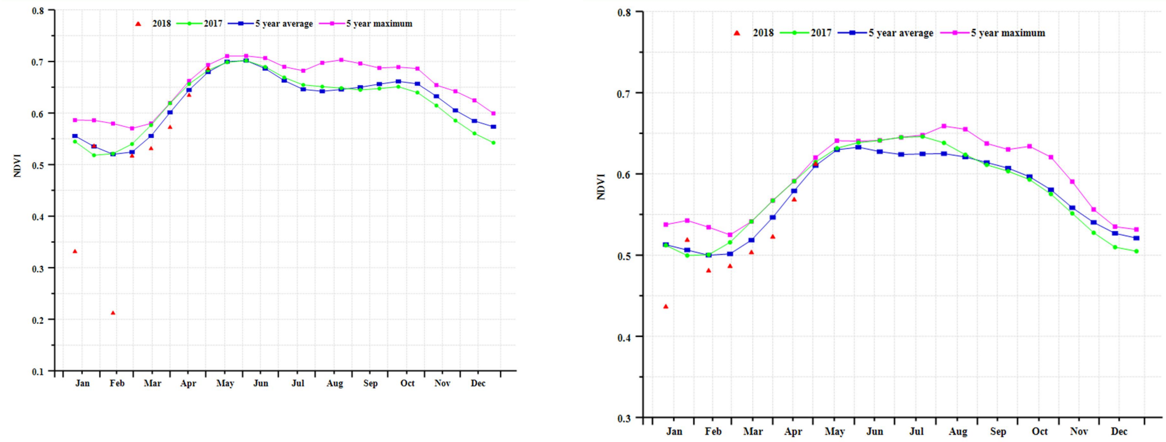
(d) Spatial NDVI patterns compared to 5YA (e) NDVI profiles



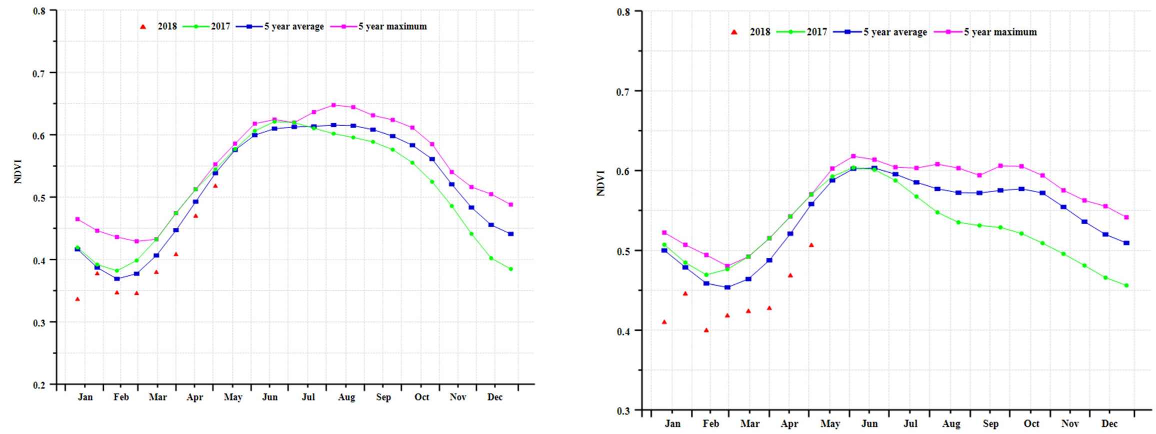
(f) Crop condition development graph based on NDVI (Northern barley region (left) and Mixed maize, Barley and Rapeseed zone (right))



(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 Southwest maize zone (right))



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

Table 3.29. France's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Northern barley zone (France)	256	29	6	-0.7	480	-11
Mixed maize/barley and rapeseed zone(France)	120	-32	7	-1.0	513	-14
Maize, barley and livestock zone(France)	192	-5	7	-0.9	497	-12
Rapeseed zone (France)	192	-13	6	-0.5	526	-8
Dry Massif Central zone(France)	178	-31	6	-0.5	556	-11
Southwest maize zone (France)	242	-14	8	-1.1	588	-12
Eastern Alpes region (France)	247	-11	4	-0.5	623	-9
Mediterranean zone (France)	238	-3	6	-0.2	678	-10

Table 3.30. France's agronomic indicators by sub-national regions, current season's value and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Northern Barley zone (France)	1029	18	100	0	0.93
Mixed maize/barley and rapeseed zone(France)	591	-17	100	0	0.94
Maize, barley and livestock zone(France)	859	2	100	0	0.92
Rapeseed zone (France)	846	-2	100	0	0.95
Dry Massif Central zone (France)	784	-11	100	0	0.94
Southwest maize zone (France)	937	-1	97	0	0.88
Eastern Alpes region (France)	806	3	84	-2	0.74
Mediterranean zone (France)	842	8	83	-5	0.60

Table 3.31. CropWatch-estimated wheat production for France in 2018 (thousand tons)

Crops	Production 2017	Yield variation (%)	Area variation (%)	Production 2018	Production variation (%)
Wheat	38051	4.3	-3.0	38484	1.1

[GBR] United Kingdom

Winter wheat and barley, spring barley and rapeseeds were in the field during the current reporting period. The CropWatch agroclimatic indicators show that for the country as a whole, temperature was below average (TEMP -1.7°C) and radiation dropped below average by 12%, while rainfall was up 32%.

Due to abundant rainfall and low temperature, the biomass accumulation potential BIOMSS was slightly below the recent five-year average. As shown by the NDVI profiles, the national NDVI values were lower than average from January to early April, but they picked up during late April due to abundant rainfall and favourable temperature. According to the crop condition map based on NDVI, close to 88% of the county indicated about average NDVI including Kant, Sussex, Wiltshire, Shropshire, Herefordshire, the east of Somerset and Suffolk, Gloucestershire, Oxfordshire, Northamptonshire, Bedfordshire. Only 8% of the region experienced below average crop condition from early March to early April in Middlesex, Berkshire, Derbyshire and eastern Banffshire, and Aberdeenshire. The VCIx was 0.77 and less than 4% of the arable land had below average NDVI. The area of cropped arable land fraction (CALF) is unchanged compared to its five-year average. CropWatch wheat production estimates are 1.5% above last years output due to a combination of increased yield (0.5%), and area (1.0%).

Regional analysis

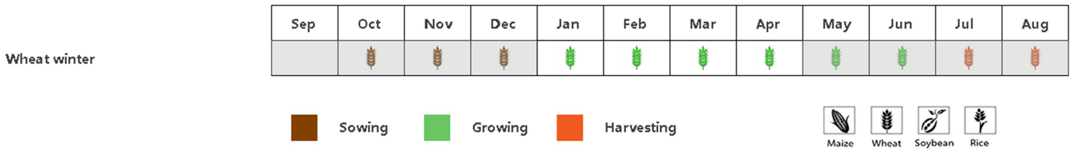
CropWatch has adopted three agro-ecological zones (AEZ) to provide a more detailed spatial analysis for the country; they include the Central sparse crop region (covering northern England, Wales, and Northern Ireland), the Northern barley region (Scotland and northern England), and the Southern mixed wheat and barley region (southern England). The Central sparse crop area and the Southern mixed wheat and barley region are characterized by unchanged fractions of cultivated arable land (CALF) compared to average. In the Northern barley region CALF decreased by 2%.

The central sparse crop region is one of the country's major agricultural regions in terms of crop production. NDVI values were lower than average and the five-year maximum according to the region’s crop condition development graph from January to April but NDVI was close to average in late April. Agroclimatic conditions include below average TEMP (-1.8°C) and RADPAR (-12%); in combination with above average rainfall (+38%), this resulted in below average BIOMASS (-8%). The VCIx was generally poor at 0.62.

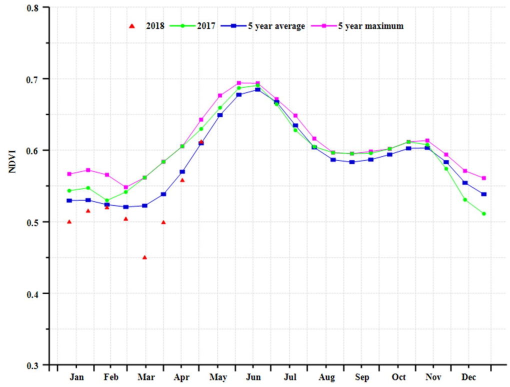
In the main barley region, the NDVI was below average according to the crop condition graphs. Compared to the fifteen-year average, RAIN was above average by 20%, while the temperature was below by 2.2°C and radiation by -8%. The biomass production potential was down 14% compared to its recent five-year average. The region had poor VCIx (0.59).

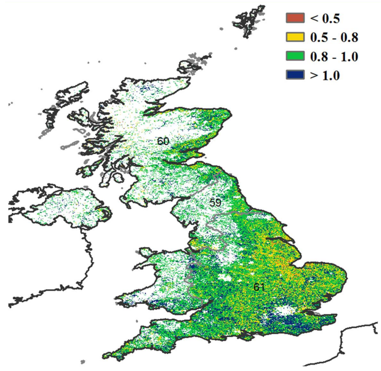
In the third region, the southern mixed wheat and barley region, NDVI was below average from early March to April, close to average on February and late April according to the crop condition graph for the zone. Agroclimatic conditions were: RAIN+40%, relatively close to average TEMP (-1.3°C) compared with other areas and rather low radiation (-15%). The regional VCIx (0.84) was well above average.

Figure 3.19. United Kingdom crop condition, January-April 2018



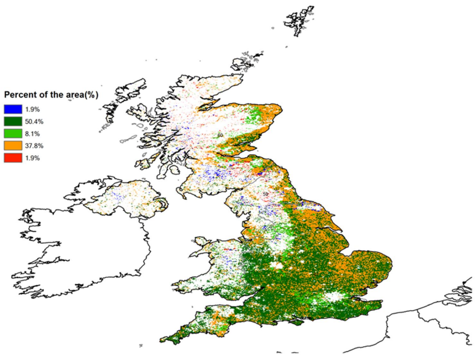
(a). Phenology of major crops

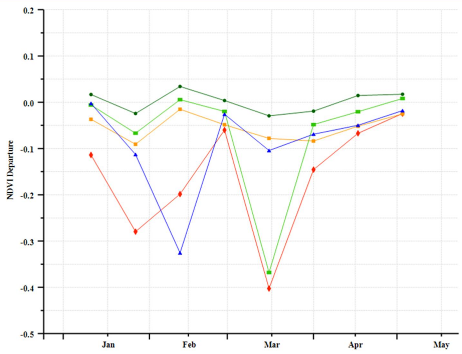




(b) Crop condition development graph based on NDVI

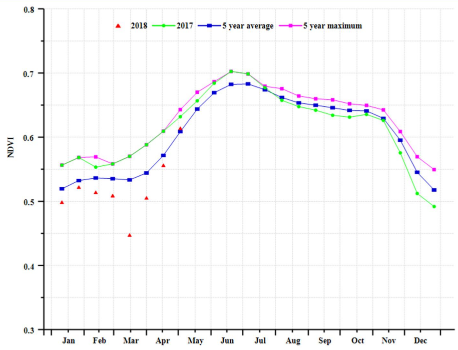
(c) Maximum VCI

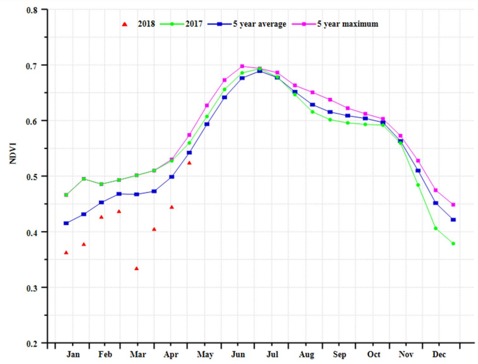




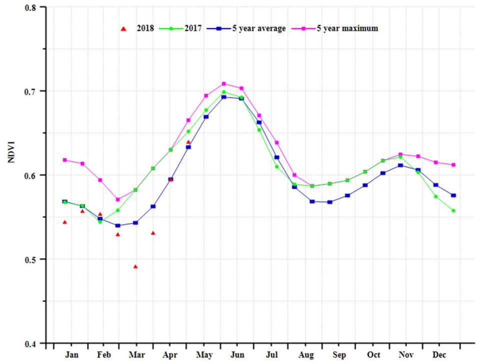
(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles





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



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

Table 3.32. United Kingdom's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 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)	429	20	3.1	-2.2	380	-7.6
Southern mixed wheat and Barley zone (UK)	310	40	5.7	-1.3	419	-15.1
Central sparse crop area (UK)	407	38	4.6	-1.8	408	-12.0

Table 3.33. United Kingdom's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Northern Barley area (UK)	852	-14	1	-2	0.59
Southern mixed wheat and Barley zone (UK)	1045	12	1	0	0.84
Central sparse crop area (UK)	961	-8	1	0	0.62

Table 3.34. CropWatch-estimated wheat production for United Kingdom in 2018 (thousand tons)

Crops	Production 2017	Yield variation (%)	Area variation (%)	Production 2018	Production variation (%)
Wheat	14521	0.5%	1.0%	14734	1.5%

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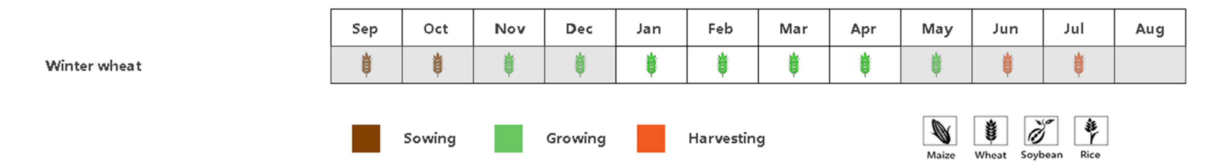
[HUN] Hungary

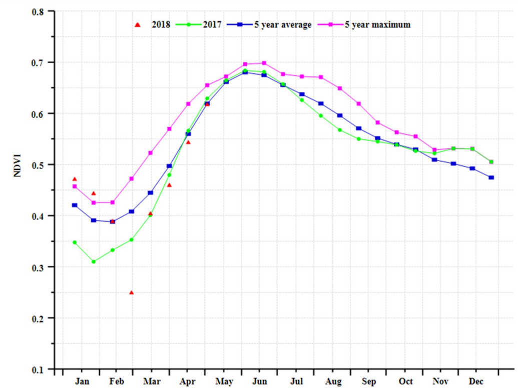
At the end of dormancy and early spring growth winter wheat showed generally favorable condition in Hungary. Agroclimatic indicators were above average for rainfall and the biomass production potential (RAIN +19% and BIOMSS +16%), about average for TEMP (+0.6°C) but low for radiation (-5.2%).

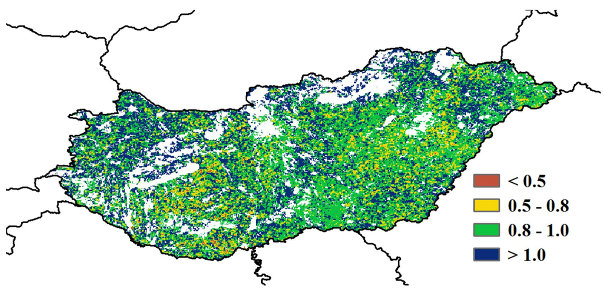
The National NDVI values were above average in January to February and increased again in March to late April after a sharp drop at the beginning of March. According to the NDVI cluster profiles and maps, crop condition was above average throughout the reporting period in 17.8% of arable land and about average in 37% of the total arable land. In general, the east of the country experienced better overwintering conditions than the western half, up to the counties of Nograd, Pest and Bacs-kiskun. The national average VCIx was 0.87, and the cropped arable land fraction (CALF) increased by 1% compared to its five-year average. CropWatch estimates wheat production to increase 2.8% over 2017 values (yield up 4.2%, area 1.4% down).

Figure 3.20. Hungary's crop condition, January - April 2018



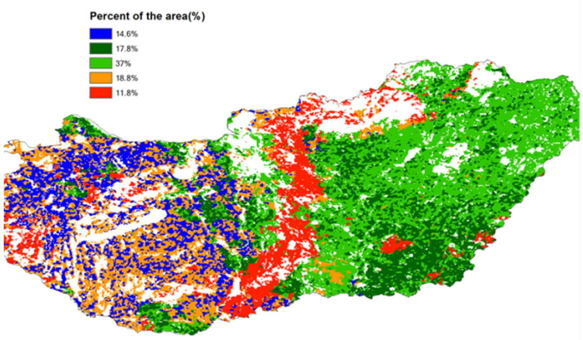
(a). Phenology of major crops

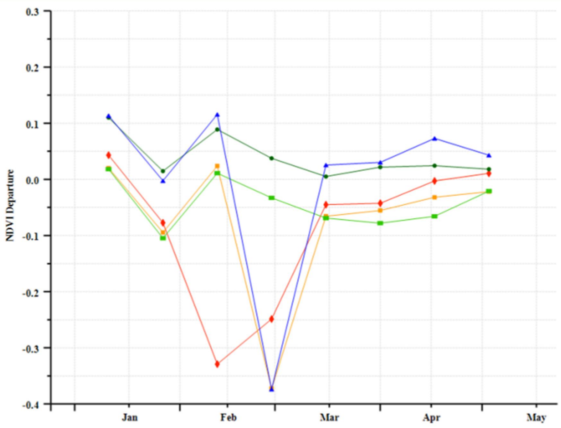




(b) Crop condition development graph based on NDVI

(c) Maximum VCI





(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles

Table 3.35. CropWatch-estimated wheat production for Hungary in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Wheat	5237	4.2%	-1.4%	5382	2.8%

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

[IDN] Indonesia

During this monitoring period, the harvest of rainy season maize was completed in Java and Sumatra, while the main rice harvest started in March. Crops condition was average from January to April, with the maximum VCI (VCIx) value on the national level reaching 0.83. The area of cropped arable land (CALF) in the country is comparable with the five-year average. All agroclimatic indicators were slightly below average (RAIN - 2%, TEMP -0.6°C and sunshine, expressed as RADPAR -2%. Due to persistent cloudiness, the NDVI values of most pixels are invalid. This leads to unrealistically low values in the national NDVI development graph compared to the recent five-year average in January and February. According to NDVI profiles, 48.2% of the arable land enjoyed average crop condition, including Java, which has the largest share of cropped areas in the country. 14.8% of the country (mostly in the equatorial areas of Kalimantan Barat and Kalimantan Tengah) had initially below average NDVI which however improved to near average values in February. In other area, NDVI fluctuated over a large range, possibly due to cloudiness. According to the biomass production potential BIOMSS, which is average, and other indicators, crop condition was slightly below but close to average in the whole country.

Regional analysis

For more spatial detail, CropWatch also prepares a regional analysis for four agro-ecological zones within the country, covering the main islands groups: Sumatra (64), Java (the main agricultural region in the country, 62), Kalimantan and Sulawesi (63) and West Papua (65). The numbers correspond to the labels in the VCIx and NDVI profile maps.

The agroclimatic conditions of Java follow the same patterns as the country as a whole: accumulated rainfall (RAIN,-1%) ,temperature (TEMP, -0.5℃) and radiation (RADPAR -2%) were below average, resulting in the biomass production potential decrease in this region (BIOMSS -11%). According to the NDVI development graph, crop condition was below 5-year average. Overall, the crop condition in Java was unfavorable.

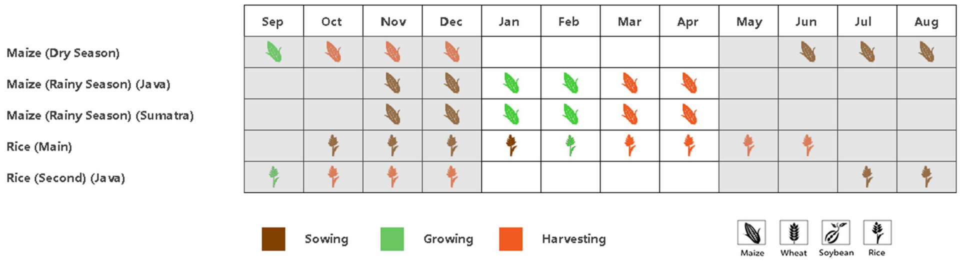
Crop condition was below average in Sumatra. The island experienced average conditions (RAIN +2%, TEMP -0.5℃ and RADPAR -2%) and the biomass production potential increased by 1% compared to the recent five-year average. According to the NDVI development graph, crop condition was slightly below average.

In Kalimantan and Sulawesi agroclimatic indicators were more markedly below average: TEMP -0.8°C, RAIN -8%, RADPAR -4%, and BIOMSS -3%, According to the NDVI development graph, crop condition was below average.

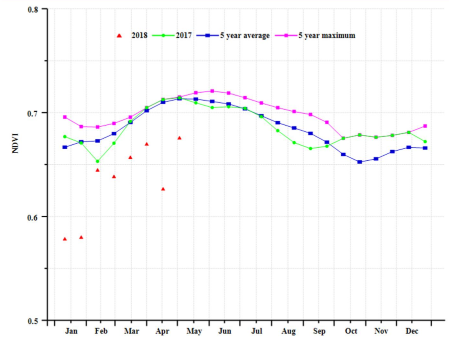
Finally, the situation in the West Papua was also close to average with TEMP (-0.6°C) and RADPAR (-1%) slightly down and RAIN up just +3%. The resulting BIOMSS was average but the NDVI development graph shows that crop condition was below average.

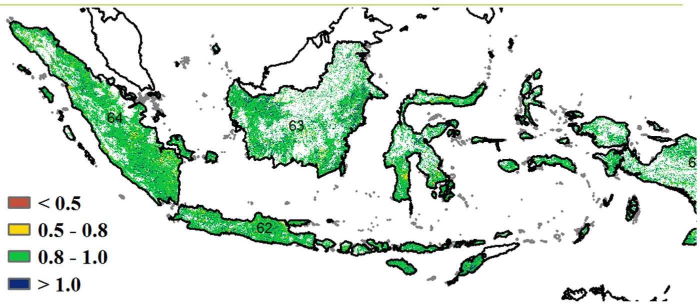
CropWatch anticipate that the yield of maize and rice in Indonesia in 2018 will decrease by 0.1% and 1.1%, respectively.

Figure 3.21. Indonesia's crop condition, January-April 2018

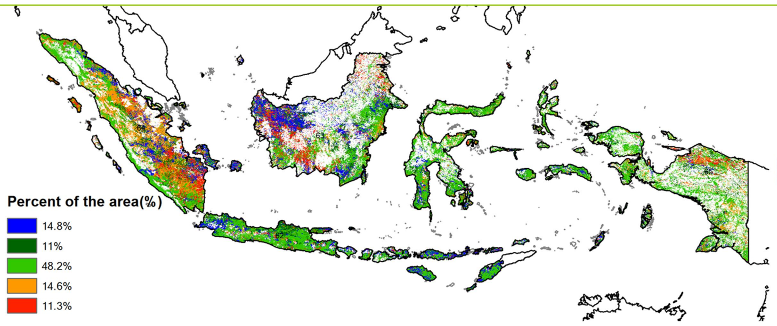


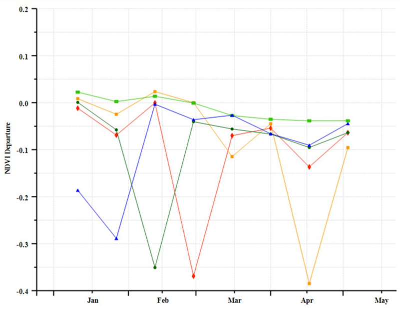
(a). Phenology of major crops



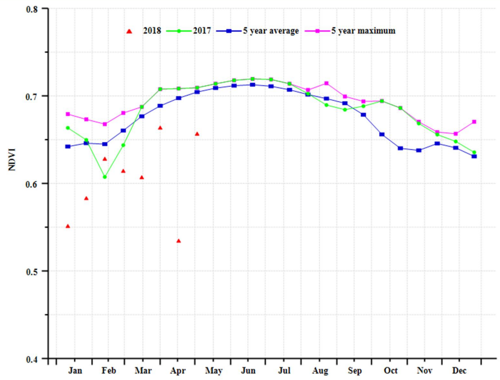


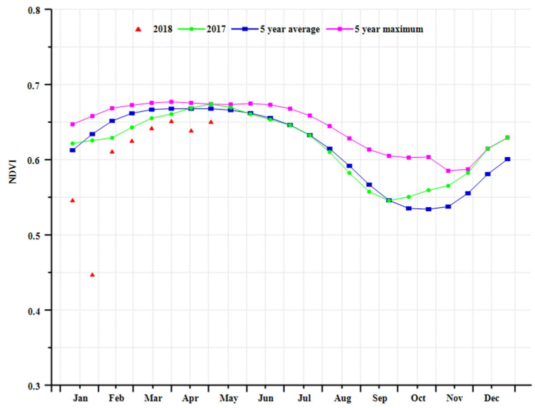
(b) Crop condition development graph based on NDVI (c) Maximum VCI



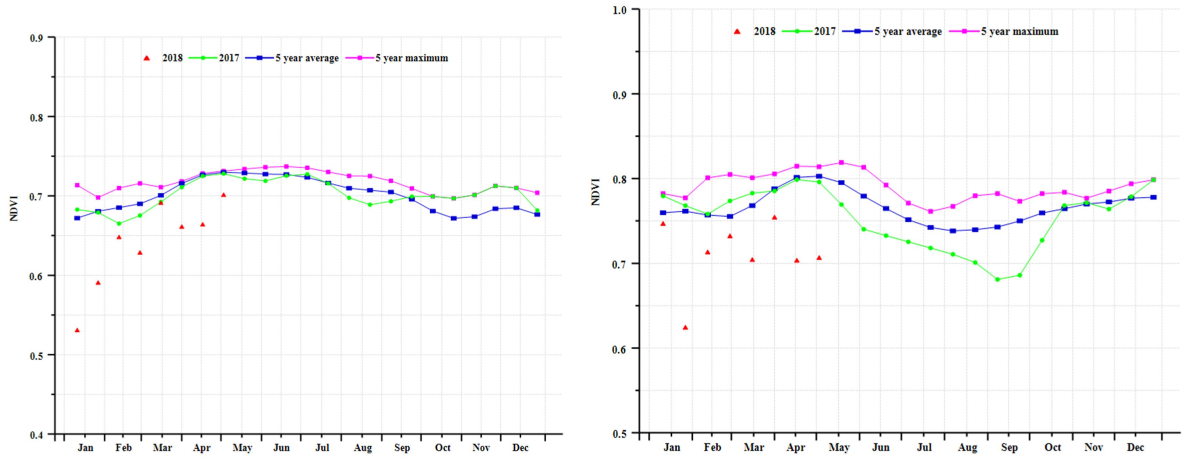


(d) Spatial NDVI patterns compared to 5YA (e) NDVI profiles





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



(g) Crop condition development graph based on NDVI (Kalimantan-Sulawesi (left) and West Papua(right))

Table 3.36. Indonesia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure (%)	Current (°C)	Departure (%)	Current (MJ/m^2)	Departure (%)
Java	985	-18	25.5	-0.5	1033	-2
Kalimantan and Sulawesi	1141	2	25.9	-0.5	947	-2
Sumatra	1008	-8	25.4	-0.8	964	-4
West Papua	1383	3	25.2	-0.6	939	-1

Table 3.37. Indonesia's agronomic indicators by sub-national regions, current season's value and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure (%)	Current (%)	Departure (%)	Current
Java	1967	-11	99	-0.1	0.87
Kalimantan and Sulawesi	2318	1	100	0.0	0.80
Sumatra	2160	-3	100	0.0	0.86
West Papua	2358	0	100	0.0	0.73

Table 3.38. CropWatch-estimated maize and rice production for Indonesia in 2018 (thousands tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Maize	17791.0	-0.2%	0.1%	17769	-0.1%
Rice	68411.0	-1.1%	0.0%	67665	-1.1%

[IND] India

The reporting period correspond mainly to growing of wheat and rice (Rabi/Winter) besides harvesting of maize and rice (Kharif) crops. The country received 86mm (-14%) rainfall, TEMP at 24.5°C was higher than average by 0.2°C and the RADPAR of 1124 MJ/m2 was -12% below average. The resulting BIOMSS of 295 gDM/m^2 was 4% down compared with average. The cropped agricultural area was 65% (+5%), VCIx at 0.79 with NDVI remaining low throughout the period indicate that conditions were not good for crops.

Rainfall distribution across the country had a large range: the Dtaes of Daman & Diu +189%, Gujarat +149%, Odisha +66%, Karnataka +39%, West Bengal and Goa both +37%, Andhra Pradesh +21% and Jharkhand +19% received higher than average rainfall. While Puducherry, Kerala, Tamilnadu, Chhattisgarh, Maharashtra and Tripura received near average precipitation, the remaining parts of the country recorded below average values ranging from -25 to -73% of average. The States with cooler and warmer TEMP were equally distributed. States in the north-east received lower than average RADPAR (-10% or below), while sunshine ranged from -9% to -2% of average i remaining areas. The biomass accumulation potential was below expectations in most of the northern and north-eastern States but above in the southern half of the country. NDVI was consistently lower than average in most parts, particularly in the northern belt. VCIx was low in central and southern states, while it was above 0.8 in the north.

Overall, the production prospects can be termed below average for winter wheat and rice crops in the country.

Regional analysis

India has varied topography, rainfall, temperature and soils giving rise to a variety of Agro-ecological conditions. The country has been divided into the following zones: 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. CropWatch addresses six of the seven regions for crop assessment; results are reported below.

The Central Indian region known as Deccan Plateau received low rains of 49mm (-20%), 26.5°C TEMP (-0.6°C) and 1163 MJ/m² RADPAR (-6%). BIOMSS dropped 9% in the region which also recorded persistently low NDVI. Only 73% of agricultural areas were cropped and VCIx (0.73 on average) showed large areas between 0.5 and 0.8, indicating poor crop condition.

The only AEZ to receive higher than average rainfall (+41%), the Eastern coastal region had near average TEMP and RADPAR of 1210 MJ/m² but higher than average BIOMSS (had +29%). NDVI was average in January-February, dropped below average in March and regained in April. The region recorded 5% higher than average cropped area and a VCIx of 0.8 indicating fair crop condition.

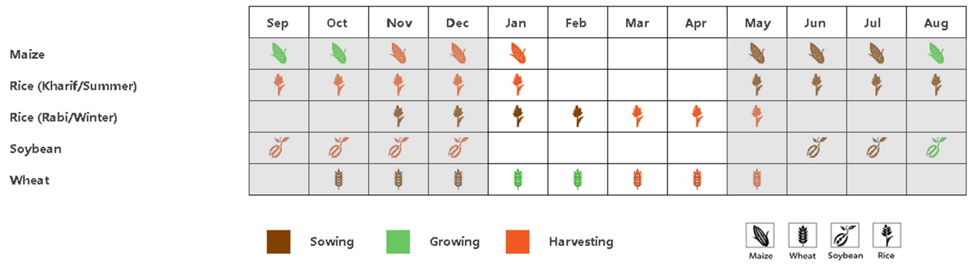
The Gangetic plain region was among the RAIN deficit regions (-11%) but TEMP (23.0°C) was nearly average and RADPAR was 8% lower than average, resulting in 16% below average BIOMSS. NDVI remaining below average throughout the reporting confirms low crop prospects with only 83% of agricultural area being cropped, with average VCIx at 0.87 VCIx and, generally, large spatial variability of indicators.

With highest the rainfall recorded for any AEZ (226mm, though still 37% below average), near normal TEMP and RADPAR at -12% Assam and the Northeastern region underwent an 11% drop below average of BIOMSS. NDVI followed a near average pattern with a dip in late February and April. Though 91% of arable land was cropped, crop condition was below average as reflected by VCIx (0.78).

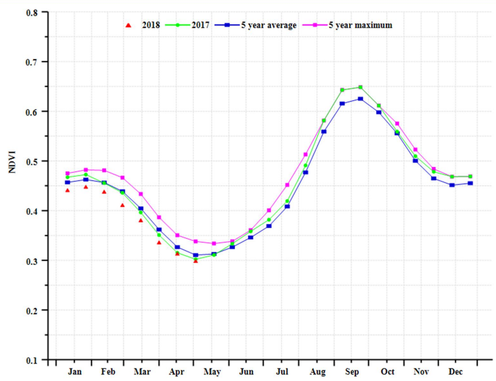
The Western coastal region received 18% higher than average rainfall, average TEMP and RADPAR of 1221 MJ/m² (-5%). This region had 14% higher than average BIOMSS. NDVI remained higher than average over the reporting period, but cropped area was only 51% and VCIx reached 0.84. Production may drop due to low hectarage in spite of fair yields

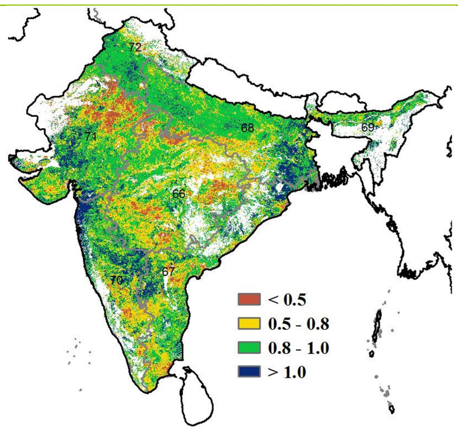
The North western region recorded seasonally low rainfall (only 20mm, -9%) and experienced near average TEMP and marginally low (-5%) RADPAR. Similarly BIOMSS was down (-9%) and only 45% of the area was cropped, With VCIx at 0.76 crop prospect are rather poor.

Figure 3.22. India's crop condition, January-April 2018

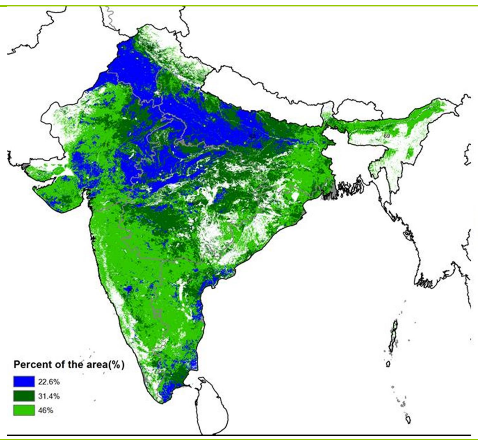


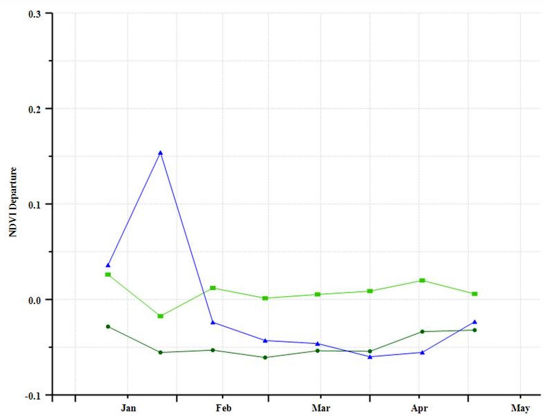
(a). Phenology of major crops



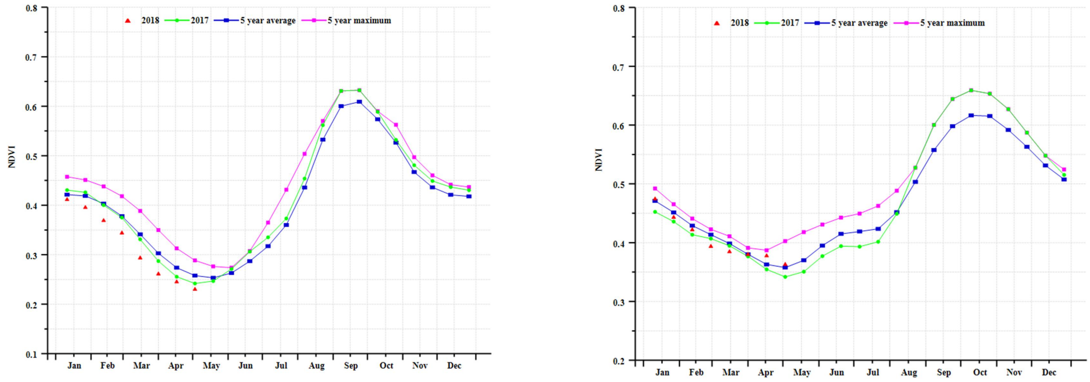


(b) Crop condition development graph based on NDVI (c) Maximum VCI

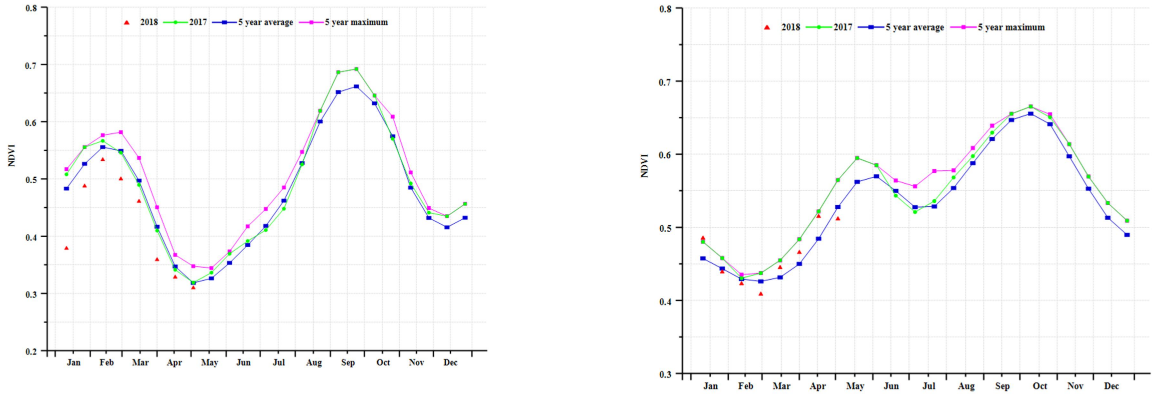




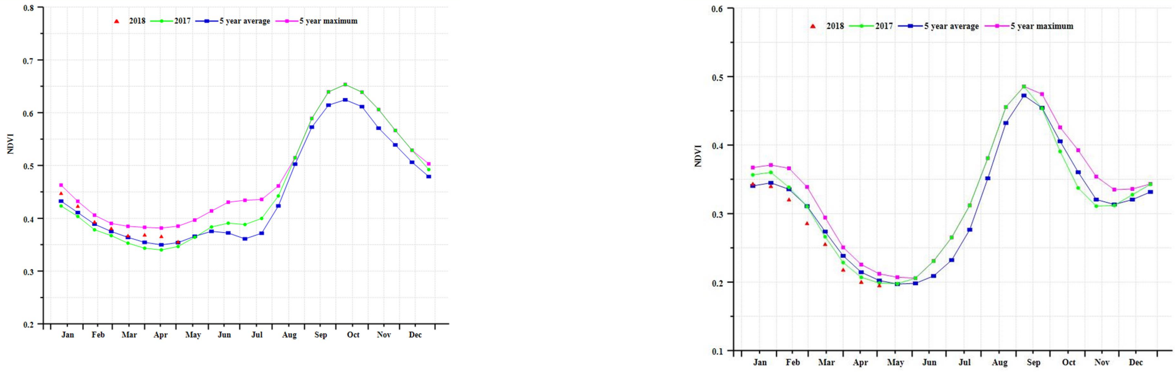
(d) Spatial NDVI patterns compared to 5YA (e) NDVI profiles



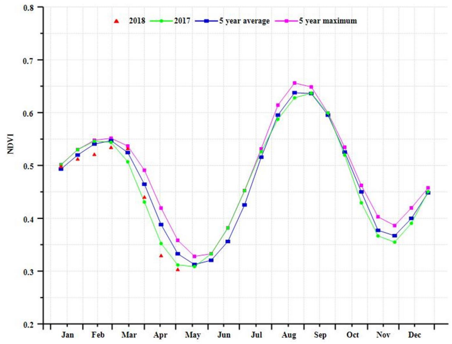
(f) Crop condition development graph based on NDVI (Deccan Plateau (left) and Eastern Coastal Region (right))



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



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



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

Table 3.39. India's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Deccan Plateau (India)	49	-20	26.5	0.6	1163	-5
Eastern coastal region (India)	110	41	26.8	-0.5	1201	-3
Gangatic plain (India)	72	-12	23.0	-0.6	1077	-8
Assam and north-eastern regions (India)	226	-37	20.3	0.3	888	-12
Western coastal region (India)	93	18	26.3	-0.1	1221	-5
North-western dry region or Rajastan and Gujarat (India)	20	-7	25.4	0.8	1168	-5
Western Himalayan region (India)	127	-40	12.8	1.7	1036	-4

Table 3.40. India's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Deccan Plateau (India)	229	-9	61	3	0.73
Eastern coastal region (India)	381	29	68	5	0.80
Gangatic plain (India)	289	-16	83	2	0.87
Assam and north-eastern regions (India)	800	-11	91	2	0.78
Western coastal region (India)	306	14	51	15	0.84
North-western dry region or Rajasthan and Gujarat (India)	98	-9	45	12	0.76
Western Himalayan region (India)	432	-23	92	0	0.83

Table 3.41. CropWatch-estimated rice and wheat production for India in 2018 (thousand tons)

Crops	Production 2017	Yield variation (%)	Area variation (%)	Production 2018	Production variation (%)
Rice	163146	-2.1	4.8	167323	2.6
Wheat	93496	-6.0	-0.3	87584	-6.3

[IRN] Iran

Crop condition from January to April 2018 was generally below average in Iran. Winter wheat is still growing and barley was harvested, while rice was planted from April. Accumulated rainfall (RAIN, -8%) and radiation (RADPAR, -9%) were below average over the last four months, while temperature (TEMP, +1.4°C) was above average. The unfavorable agroclimatic conditions resulted in a decrease in the BIOMSS index by 8% compared to the five-year average. The national average of maximum VCI index was 0.61, but the Cropped Arable Land Fraction (CALF) increased by 5% compared to the recent five-year average.

According to the national NDVI development graphs, crop conditions was above average throughout the monitoring period in about 10.3% of croplands, mainly in Ardabil, East and West Azerbaijan provinces, and some areas of Mazandaran and Golestan provinces. About 41% of arable land experienced unfavorable crop condition from late January to early February, and then recovered to close to or above average from March to April. Crop condition was below average during the monitoring period in most of the south and southwest regions, North Khorasan and Razavi Khorasan provinces in the northeast region.

Overall, crop condition was fair in Iran during the current winter season. The increase of both wheat area (+1.3%) and yield (+4.9%) resulted in more production by 6.2% compared to last year.

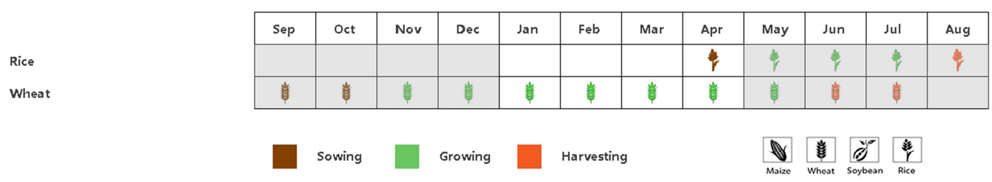
Regional analysis

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.

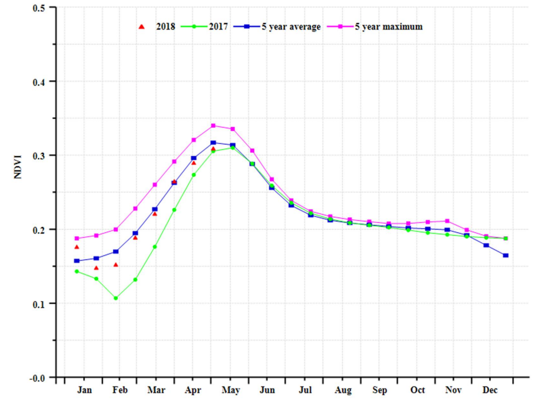
In the Semi-arid to sub-tropical hills of the west and north region, the accumulated rainfall (RAIN -7%) and radiation (RADPAR -10%) were below average, while temperature (TEMP +1.5°C) was above. The unfavorable weather conditions resulted in a decrease of BIOMSS by 8% compared to the recent five years average. The CALF increased by 8%. According to the NDVI profiles, the crop condition was close to or above average from the end of February. The outcome for winter crops of this season is estimated to be favorable.

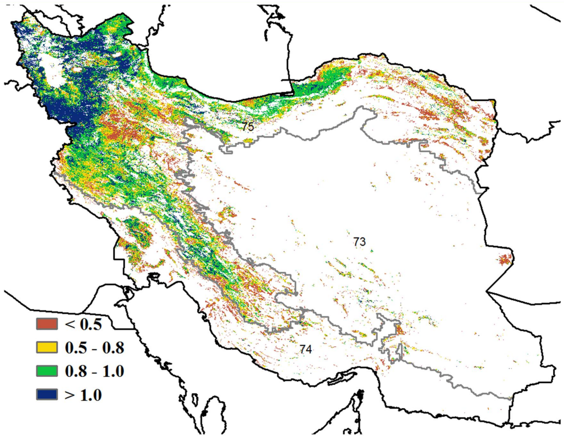
Crop condition in the Arid Red Sea coastal low hills and plains region was far below average. The region received only 140 mm rainfall during this report period. The water shortage (RAIN,-18%) and low radiation (RADPAR, -5%) resulted in a significant drop of BIOMSS by 12%. The CALF decreased significantly by 27% compared to five-year average, and the national VCIx (0.35) was lower. Therefore, the outcome for winter crops of this region will be very poor.

Figure 3.23. Iran's crop condition, January-April 2018



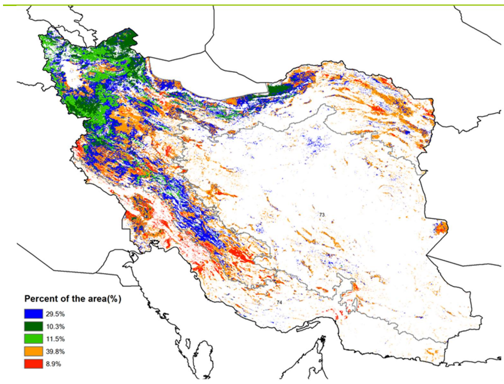
(a) Phenology of major crops

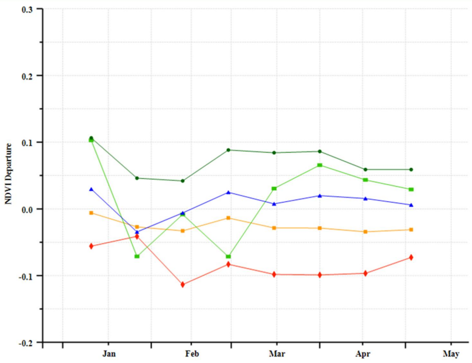




(b) Crop condition development graph based on NDVI

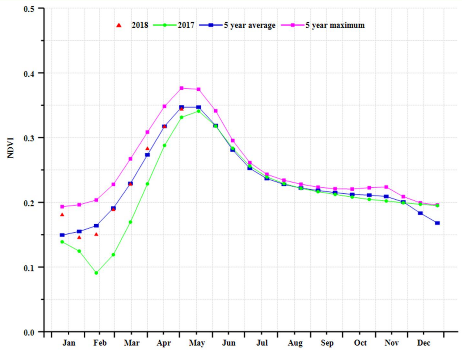
(c) Maximum VCI

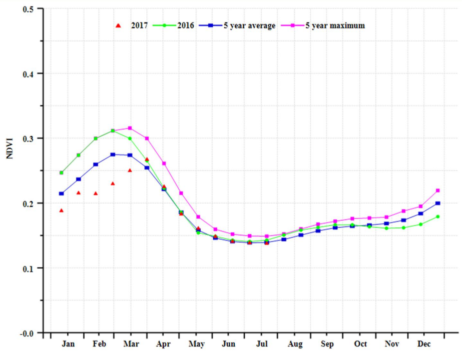




(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles





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

Table 3.42. Iran's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 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	207	-7	6.8	1.5	870	-10
Arid Red Sea coastal low hills and plains	140	-18	17.2	1.0	1017	-5

Table 3.43. Iran's agronomic indicators by sub-national regions, current season's value and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Semi-arid to sub-tropical hills of the west and north	679	-8	25	8	0.68
Arid Red Sea coastal low hills and plains	510	-12	15	-27	0.35

Table 3.44. CropWatch-estimated wheat production for Iran in 2018 (thousands tons)

Crops	Production 2017	Yield change(%)	Area change (%)	Production 2018	Production change (%)
Wheat	12735	4.9	1.3	13529	6.2

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

[ITA] Italy

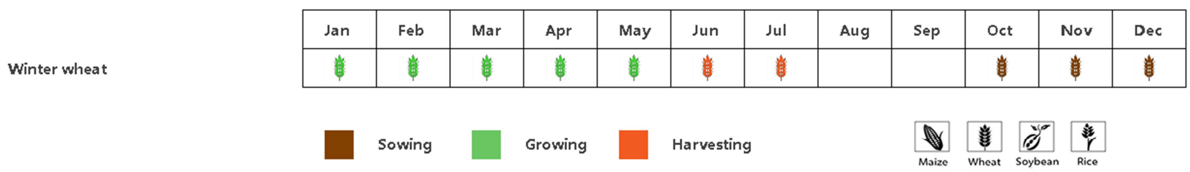
Winter wheat is sown between October and December to be harvested during the early summer months.

NDVI values close to 0.5 and generally below average and below 2017 experienced a sudden drop at the end of February. In the middle of March, values started to rise but were still lower than both 2017 and average at the end of the reporting period. Rainfall (186 mm) was well below average (-40%), the temperature was average; RADPAR (657 MJ/m²) was 8% below average as well. s a result, BIOMSS dropped 7% and VCIx was relatively low (0.73).

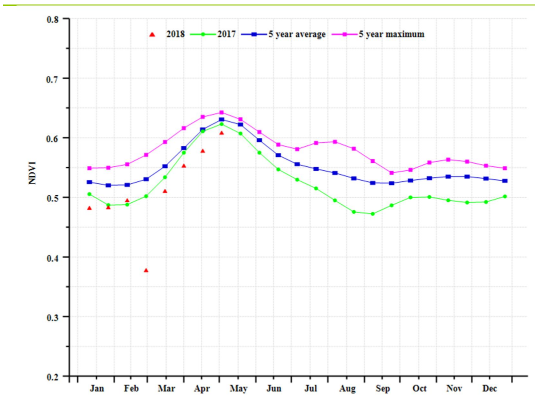
Italy can be divided into three regions based on the spatial variation patterns of NDVI: (1) the Po valley, (2) the Adriatic coast and adjacent southern Campania around Avellino province and (3) most of the Tyrrhenian coast, southern Italy and the islands (Sicily and Sardinia). Most of Tuscany appears as a patchwork of (1) and (3). (1) The northern Po basin had almost average NDVI throughout the reporting period (21,3% or arable land) while the southern part of the basin (about 20% of arable lands) had stable below average NDVI with the departure varying from about -0.10 to about -0.05 at the end of April. The area had mixed VCIx values and crop condition. (2) The Adriatic coast and the east of Cuneo province (Upper Po valley), representing together 28.9% of arable land experienced a drop in NDVI around the end of February. The low values persisted throughout the reporting period in the upper Po valley. VCIx was mostly average (0.5 to 0.8) along the coast but high in the south (1.0 and above), indicating favourable crops. (3) Southern Italy and the islands (29.7% or arable lands) had average NDVI with a short lived positive departure peak (+0.075) at the end of January. There are some patches of low VCIx in Sicily and some high values in Sardinia.

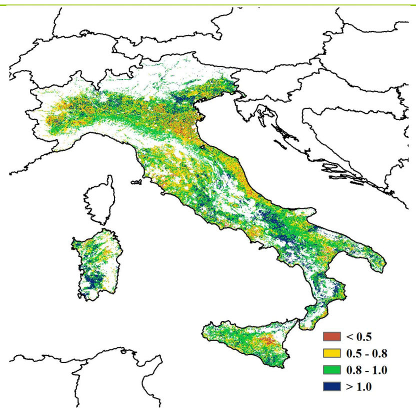
The current crop condition appears to be mostly average. However, if the water supply situation does not improve after April, CropWatch expects a decrease in winter wheat production of 5.3% compared with 2017 values.

Figure 3.24. Italy's crop condition, January 2018 - April 2018.



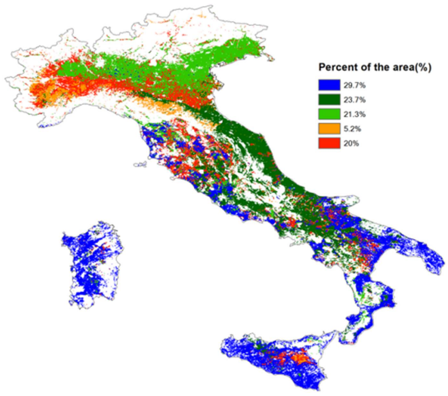
(a). Phenology of major crops

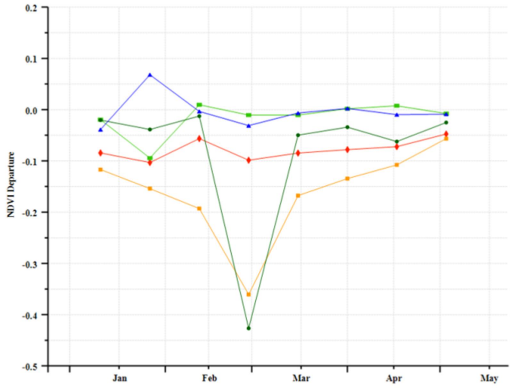




(b) Crop condition development graph based on NDVI

(c) Maximum VCI





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

Table 3.45. CropWatch-estimated Wheat production for Italy in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Wheat	7200	-0.90%	-4.40%	6820	-5.30%

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

[KAZ] Kazakhstan

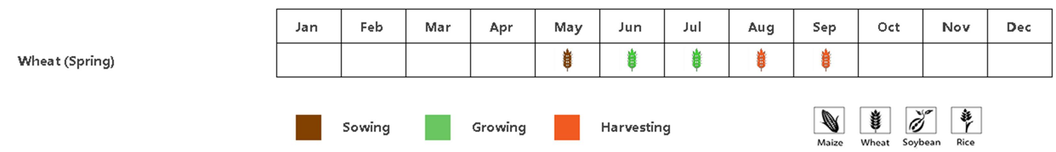
Winter wheat is cultivated during the reporting period in the south and south-east of Kazakhstan, while spring wheat is planted from May. The national average VCIx was 0.52 and the Cropped Arable Land Fraction decreased by 45% compared to the last five-years' average. Among the CropWatch agroclimatic indicators, RAIN was above average (+16%), while TEMP and RADPAR were below (-1.5°C and -8%). BIOMSS was close to the five-year average at the national scale. As shown by the NDVI development graph, conditions (including snow cover) were average from January to late February, but below average from the beginning of March to the end of April. The spatial NDVI pattern and profile show that the crop condition in 79.0% (8.9%+48.0%+22.1%) of the cropped areas was slightly above average only from February to late February in most of Kustanay, North Kazakhstan, Kokchetav, Tselinograd, Turgay, north part of Aktyubinsk provinces. Above average conditions occurred around late March in parts of East Kazakhstan, Semipalatinsk, Pavlodar, Karanganda, Taldy Kurgan, Almta Zhambyl and Kzylorda provinces. Generally, the agroclimatic indicators mentioned above show favorable condition for crop areas of Kazakhstan for the forthcoming summer crop.

Regional analysis

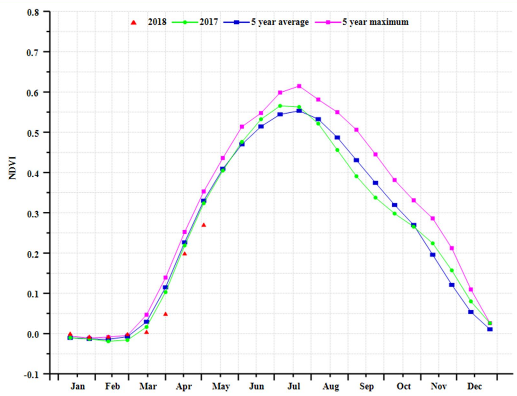
Kazakhstan has four agro-ecological regions: (1) Northern, (2) Eastern plateau and southeastern zone, (3) South and (4) Central non-agriculture regions. Only the Eastern plateau and southeastern region had crops during this monitoring period.

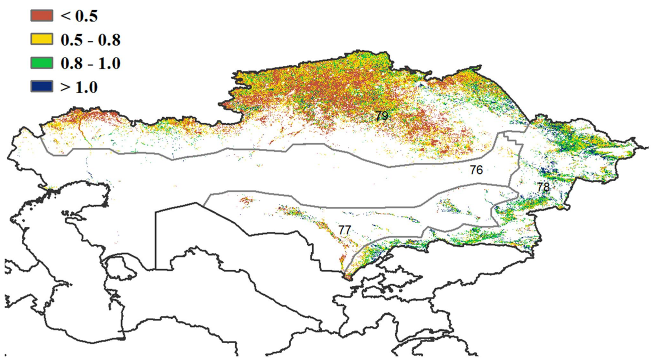
The Eastern plateau and southeastern region had close to average NDVI during the reporting period. RAIN was 12% above average, but TEMP and RADPAR were normal and below average, respectively (0°C and -12%). The agroclimatic variables resulted in an increase of the BIOMSS index by 4%. The maximum VCI index was 0.65, while the cropped area decreased by 17% compared to the five-year average.

Figure 3.25. Kazakhstan's crop condition, January-April 2018

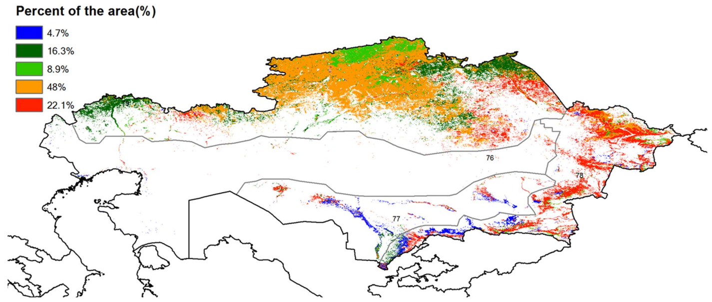


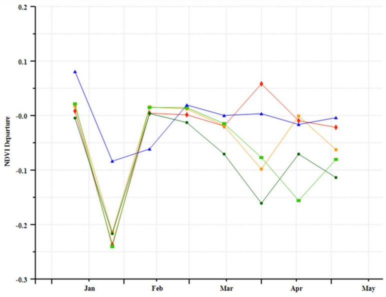
(a). Phenology of major crops



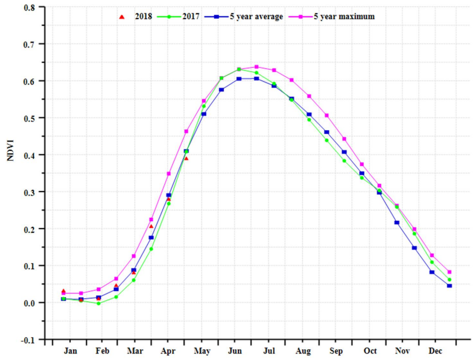


(b) Crop condition development graph based on NDVI (c) Maximum VCI





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



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

Table 3.46. Kazakhstan's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m^2)	Departure from 15YA (%)
Eastern plateau and southeastern region	164	12	-4.8	0.0	677	-11.8

Table 3.47. Kazakhstan's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Eastern plateau and southeastern region	478	4	32	-17	0.65

Table 3.48. CropWatch-estimated Wheat production for Kazakhstan in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Wheat	16595	0	-12.9%	14451	-12.9%

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

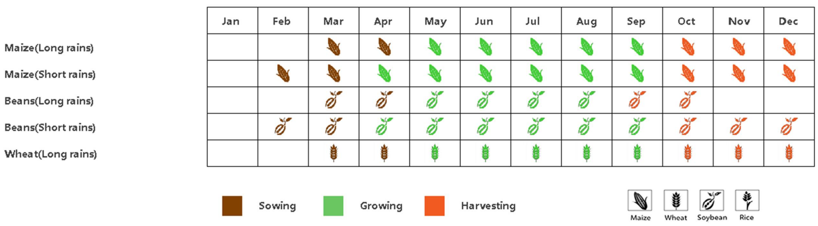
[KEN] Kenya

Farmers start to sow "short rain" crops in October and November, depending on the timing of the rains, to be harvested late January or February. "Long rains" start during the last third of the reporting period, to be harvested over the next reporting period, sometimes as late as early July or later, depending on location and, especially, elevation. Beans and short-cycled and drought staples (sorghum, millets) are usually planted early, including in the lowlands. Maize (the main cereal) is a typical long rains crop; it is cultivated in much of southern Kenya. Wheat (the second cereal crop in terms of production) is grown mostly in the high elevation areas of the south-west where seasons can be longer than six months.

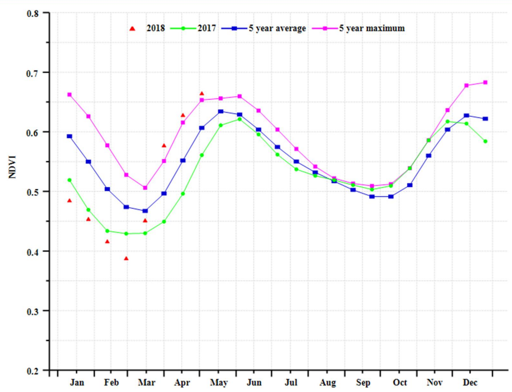
At 522 mm, the current nationwide rainfall exceeded the average by 70%, which is significant. The average temperature (22.3℃) was below average by 1.4 ℃ and so was RADPAR (1224 MJ/m², or -7%). Due to abundant precipitation, BIOMSS reached 1245 (g DM /m²), an increase of about 33% above the 5-years average. The current cropped arable land fraction is 0.99, 5% above the 5YA and VCIx is about 1.0, indicating the best crops of the recent years.

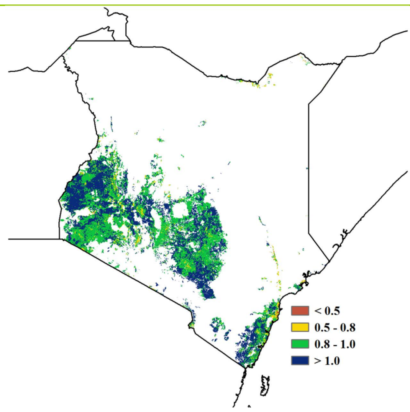
According to clusters and the map of NDVI profiles, crop condition was below average until mid-February, which indicates a poor short rain crops at the time of harvest. This is confirmed by the national graph of crop condition development which stayed below average and below 2017 values until February. Thereafter, NDVI jumped to high values with the start of the long rains, except in limited areas which make up just 11.5% of croplands. For the time being, NDVI profiles and VCIx agree: with few exceptions, rather good wheat and maize crops are expected from the major production areas. With yield up 27.5% and a 4.7% increase in cultivated area, CropWatch puts the long rains output 32.9% above the 2017 production.

Figure 3.26. Kenya's crop condition, January 2018 - April 2018.

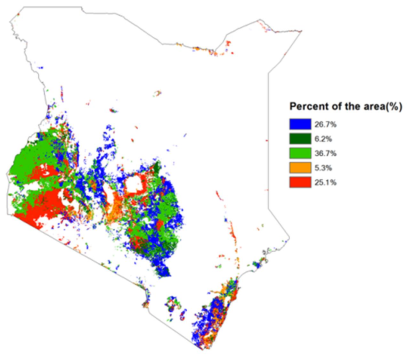


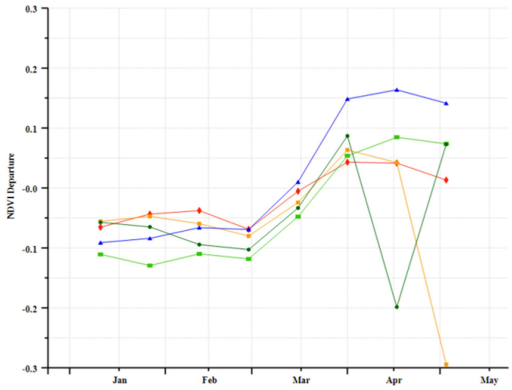
(a). Phenology of major crops





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





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

Table 3.49. CropWatch-estimated maize production for Kenya in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Maize	3000	27.50%	4.20%	3986	32.90%

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

[KHM] Cambodia

January to April covers the growing period of irrigated maize, and the planting time of rainy season rice. Crop condition is globally average. The fraction of cropped arable land was above the average of the previous five years (+15%). Compared to average, the CropWatch agroclimatic indicators show a sharp drop in radiation (RADPAR, -7%) and in air temperature (-1.4℃). Rainfall increased slightly (RAIN, +4%), causing a 6% increase in the biomass production potential (BIOMSS) and rather high VCIx country-wide (VCIx 0.92).

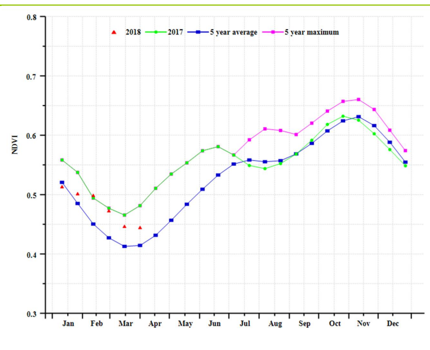
Most regions in the country experienced favourable VCIx values above 0.8, except a small region in the west of Tongle Sap. NDVI clusters show 80% of the crop area is slightly over average, only 20% of the area at the average condition. Altogether, the condition of crops in the country is better than average.

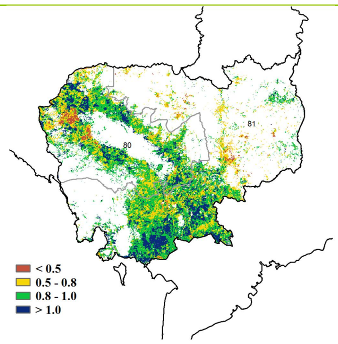
Based mostly on climate differences, two agro-ecological regions can be distinguished. Weather in the Tonle Sap lake area (especially rainfall and temperature) is mainly influenced by the lake itself. The second area, referred to as the "main crop area" covers areas outside the Tonle Sap basin along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

For the current reporting period, the two major crop areas share similar crop condition; both are above average according to the NDVI profile. The lake plain suffered a reduction of rainfall below average (-6%) compared with abundant water supply in the Main Crop Area (+16%). The marginal drought caused a 1% reduction in BIOMSS near Tongle Sap. However, maximum VCI is rather favourable in this region (0.89). Although both regions suffered from cloudy weather with cool temperature and reduced solar radiation, CALF increased markedly (+13% around Tonle Sap and +20% elsewhere. Overall, crop condition in Cambodia is at least fair.

Figure 3.27. Cambodia's crop condition, January-April 2018

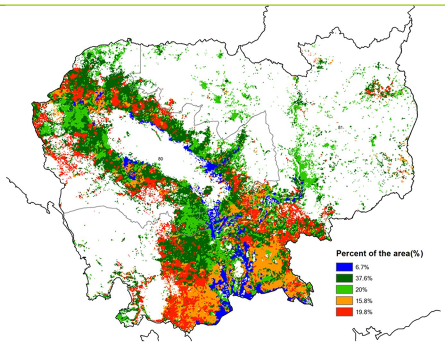
(a). Phenology of major crops

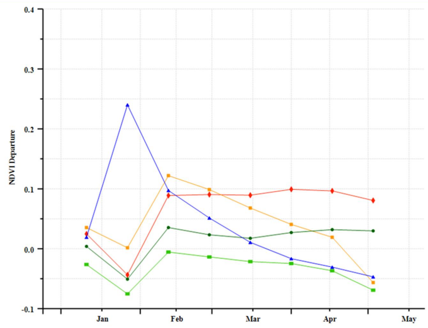




(b) Crop condition development graph based on NDVI

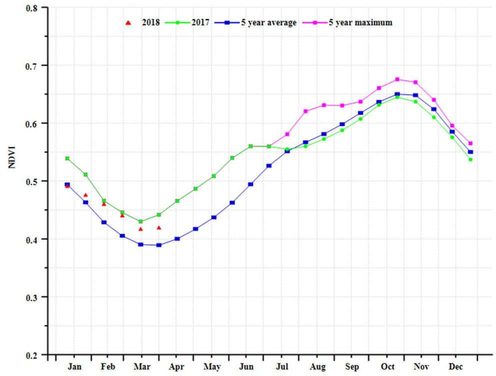
(c) Maximum VCI

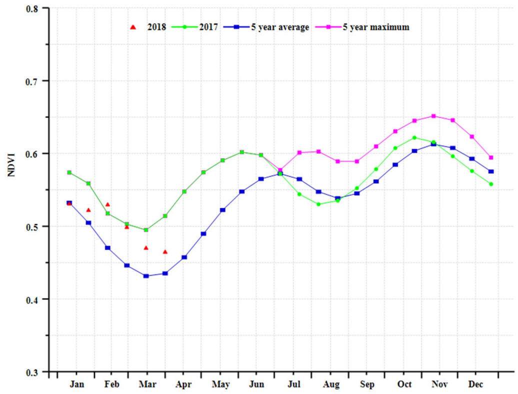




(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles





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

Table 3.50. Cambodia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 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)	203	17	27.6	-1.6	1074	-8
Lake plains (Cambodia)	152	-6	27.4	-1.3	1117	-6

Table 3.51. Cambodia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Main cropping area (Cambodia)	745	16	81	20	0.97
Lake plains (Cambodia)	584	-1	92	13	0.89

Table 3.52. CropWatch-estimated rice production for Cambodia in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Rice	8792	5%	2.9%	8596	-2.2%

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

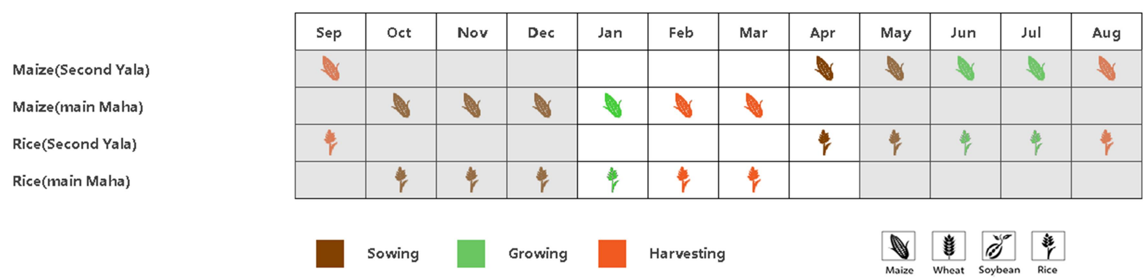
[LKA] Sri Lanka

The reporting period covers the entire growing and harvesting season of Maha rice and maize, as well as the early sowing season of Yala crops (rice and maize). CropWatch assesses the overall crop condition to be below both the average of the previous five years and 2017.

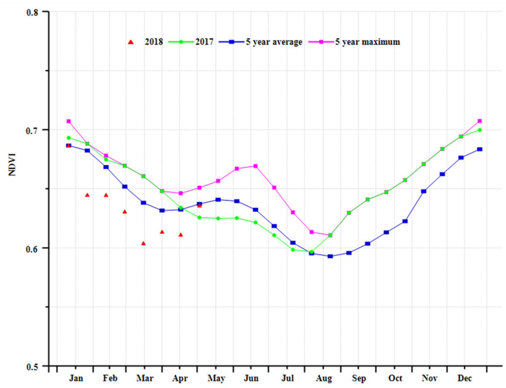
Compared to average, rainfall increased 26%, while temperature and radiation were slightly below (0.6℃ and 2%, respectively). The fraction of cropped arable land (CALF) remained stable compared with the five-year average. Excess precipitation may have had a negative influence on crop condition and led to a decrease in BIOMASS compared with the five-year average. The crop condition development graph based on NDVI describes an unfavourable situation. Crop condition dropped below average after January and remained so up to mid-April. The condition recovered to normal compared to average in late April.

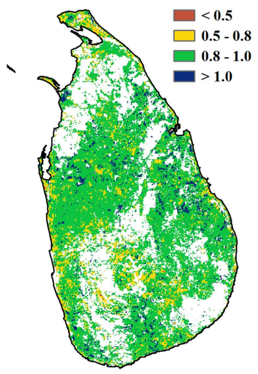
There were, however, some spatial differences according to NDVI profile clusters and map. In southern Sri Lanka, crop condition fluctuated around the average while all other regions experienced departures from average to some extent. The North-western Province suffered bad conditions from February to mid-April except for its eastern part. In the east of the country, the North-Central province and the Eastern Province crops did unsatisfactorily in late January and mid-April. The maximum VCI (VCIx) map displays patterns of spatial distribution that are similar to the NDVI clusters, with low and high values occurring throughout the country. The average VCIx value for Sri Lanka, however, is rather high at 0.86. CropWatch therefore puts the productions of rice during 2018 slightly above the output of 2017.

Figure 3.28. Sri Lanka's crop condition, January - April 2018



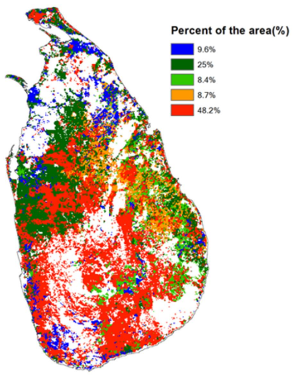
(a). Phenology of major crops

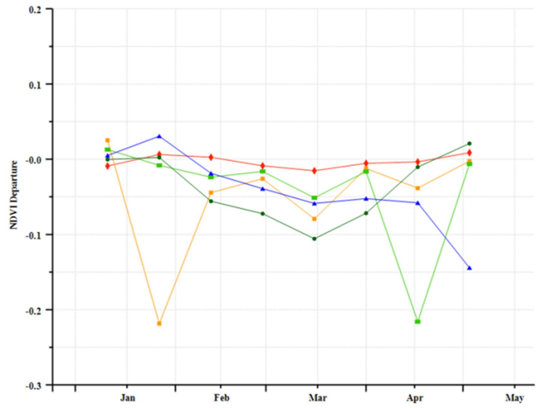




(b) Crop condition development graph based on NDVI

(c) Maximum VCI





(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles

Table 3.53. CropWatch-estimated rice production for Sri Lanka in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Rice	2499	0	0.1%	2501	0.1%

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

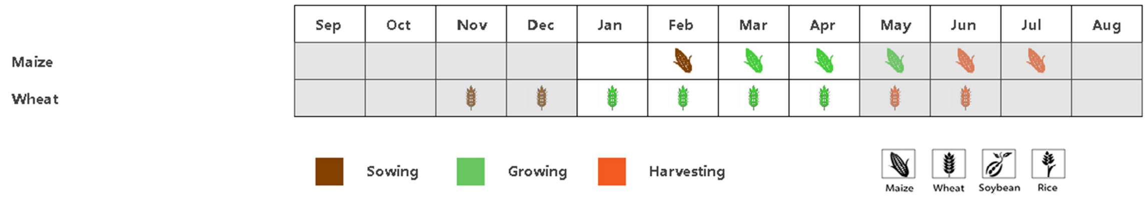
[MAR] Morocco

Morocco produces mostly rainfed winter cereals (wheat and barley) as well as summer crops such as maize, potatoes and sunflower where sufficient irrigation water is available.

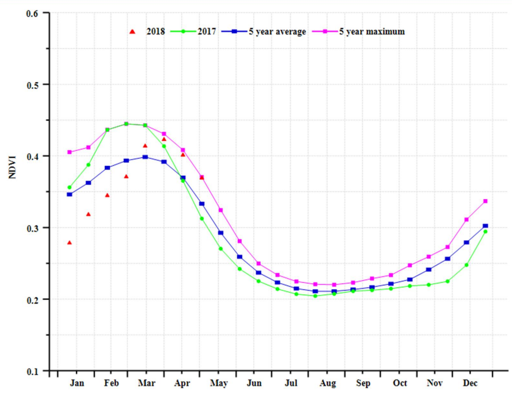
Nationwide RAIN was about average (164 mm, -2%) but both TEMP and RADPAR were below (-0.9°C and -11%, respectively). BIOMASS increased by 3 percent compared to the 5YA. Crop condition development graphs based on NDVI show below average values during winter but picked up at the time of harvest, when they were close to the 5-year maximum. The VCIx of 0.76 showed fair crop condition. In addition, the cropped arable land fraction increased by 15 percent compared to its five-year average.

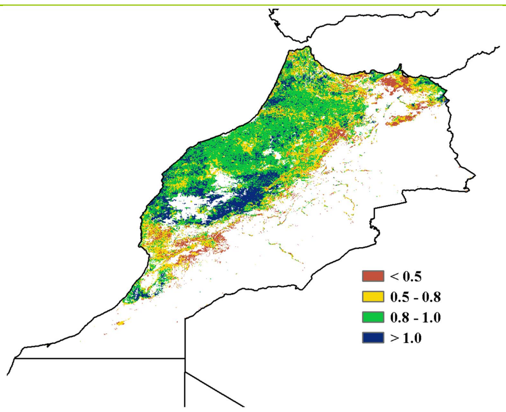
NDVI clusters and profiles provide additional spatial information about the condition of crops. NDVI varied smoothly during the reporting period and remained close to average, with the exception of a sharp and short-lived drop at the beginning of March around the provinces of Chefchaouen, Sidi Kacen, Taza and Taounate in the north of the country (2.9% of cropped areas). The lowest values were very close to average (around -0.05 in NDVI units) and occurred in some high elevation areas of the provinces of Boulmane, Kenifra, Errachidia and Ourazazate, representing 18.8% of arable land. At the end of the reporting period, the most favourable conditions compared with average were those prevailing in a large area (19.5% of arable lands) centered around the mountains of Beni Mellal and Azilal. Altogether, the available data indicate at least average output expectations for winter crops.

Figure 3.29. Morocco's crop condition, January-April 2018



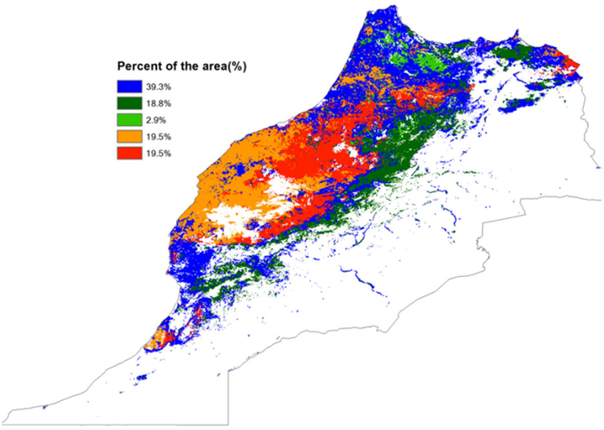
(a). Phenology of major crops

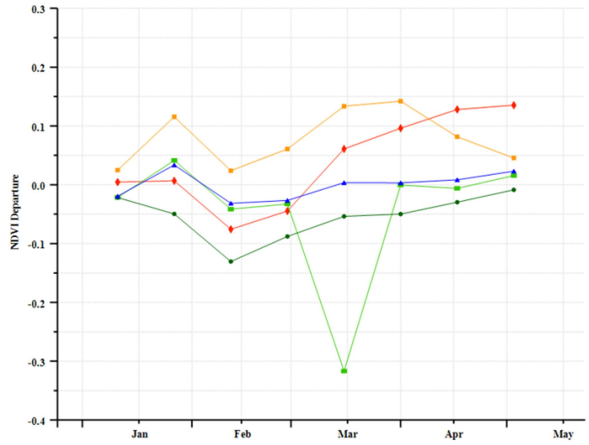




(b) Crop condition development graph based on NDVI

(c) Maximum VCI





(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles

Table 3.54. CropWatch-estimated wheat production for Morocco in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Wheat	7100	-0.6%	-3.5%	6814	-4.0%

[MEX] Mexico

Winter wheat in Mexico was still growing from January to March; the harvest started in April. During the same period, the maize harvest was ongoing in northwestern Mexico. As shown by the crop condition development graph based on NDVI, at the national scale the condition of crops was mostly below the five years' average. It improved during late April and reached a level comparable to last year's, while remaining below average.,

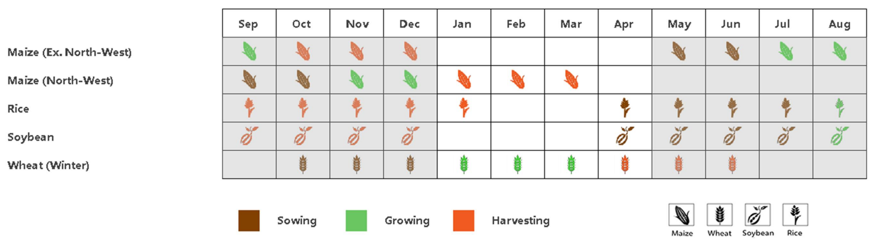
The CropWatch agroclimatic indicators show that rainfall increased by 31% compared to average whereas RADPAR decreased by 4%. Temperature was average. All the above agroclimatic condition resulted in a relatively high BIOMSS, with the value surpassing average by 9%. As indicated by the agronomic indicators, CALF in the whole country was 2% below average. Moreover, VCIx was relatively low, with a value of 0.72. According to the VCIx pattern map, low values (less than 0.5) occur in most areas of the country except the south-east. The spatial NDVI pattern and corresponding NDVI profiles show that about 66.4% of the cropped areas experienced below-average crop condition, which is consistent with the VCIx pattern. Considering the crop situation and the agroclimatic and agronomic condition, CropWatch estimates that the maize production of this season was 23439 thousands tons, down1.8% compared to 2017.

Regional analysis

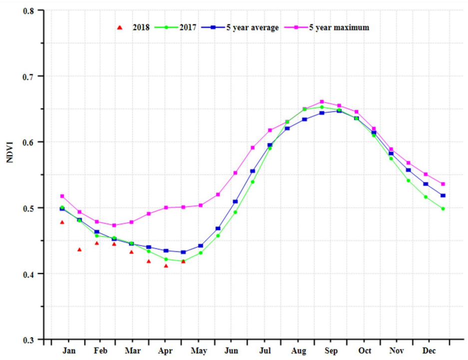
According to the crop condition development graphs based on NDVI, the Mexican AEZs display conditions similar to those prevailing at the national level. This applies to the Arid and semi-arid regions, the Humid tropics with summer rainfall, the Sub-humid temperate region with summer rains and the Sub-humid hot tropics with summer rains.

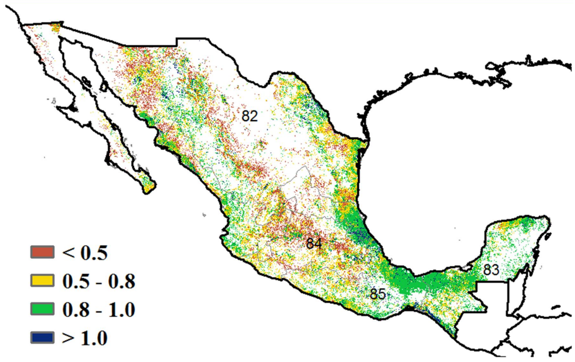
The agroclimatic indicators show that rainfall was significantly above average in almost all the regions (+20% to +75%), except in the Arid and semi-arid regions (-7%). In contrast, RADPAR was below average in all the regions (-4% to -2%). Temperature was close to average, with the departures ranging between -0.4°C and +0.3°C. As for the agronomic indicators, BIOMSS increased respectively by 34%, 19% and 22% in the Humid tropics with summer rainfall, Sub-humid temperate region with summer rains and the Sub-humid hot tropics with summer rains; it decreased by 14% in the Arid and semi-arid regions. CALF was 10% and 3% below average in the Sub-humid temperate region with summer rains and the Sub-humid hot tropics with summer rains whereas it was 3% above average in the Arid and semi-arid regions. CALF was average in Humid tropics with summer rainfall. Among all the regions VCIx varied between 0.63 and 0.86.

Figure 3.30. Mexico's crop condition, January-April 2018



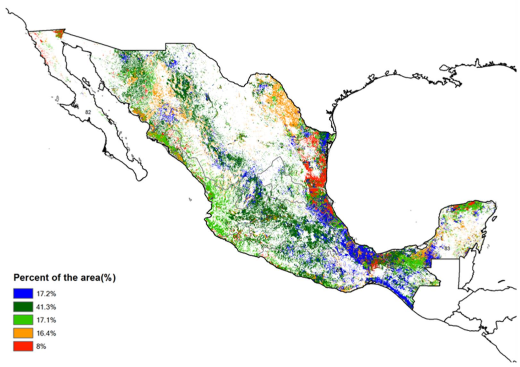
(a). Phenology of major crops

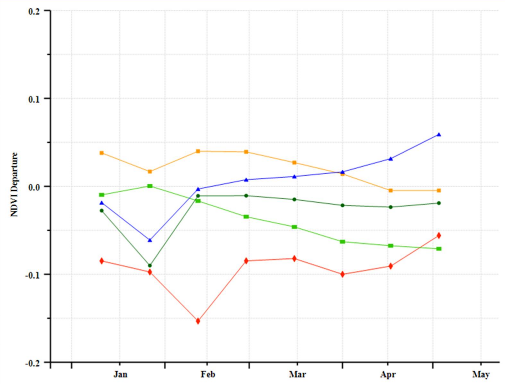




(b) Crop condition development graph based on NDVI

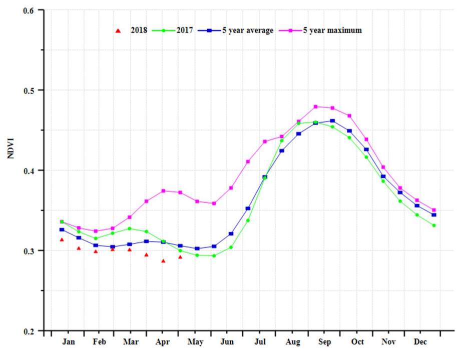
(c) Maximum VCI

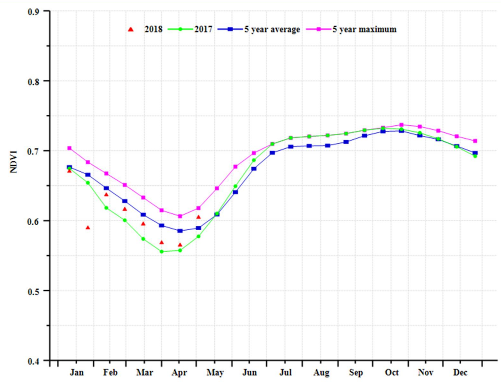




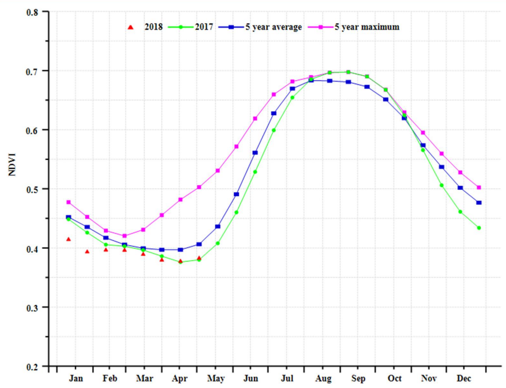
(d) Spatial NDVI patterns compared to 5YA

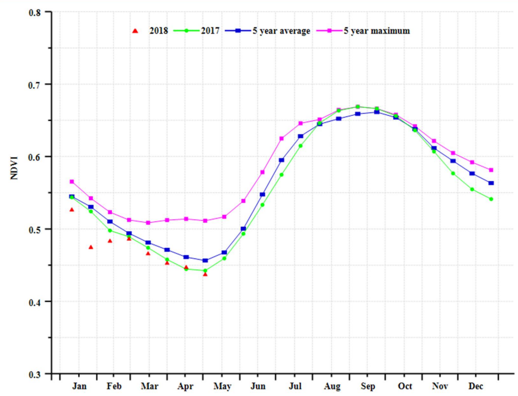
(e) NDVI profiles





(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 3.55. Mexico's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 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	63	-7	16.5	0.3	1146	-4
Humid tropics with summer rainfall	264	75	25.0	-0.4	1078	-2
Sub-humid temperate region with summer rains	91	20	18.8	-0.1	1211	-4
Sub-humid hot tropics with summer rains	97	21	21.2	-0.3	1156	-4

Table 3.56. Mexico's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Arid and semi-arid regions	224	-14	0	3	0.66
Humid tropics with summer rainfall	741	34	1	0	0.86
Sub-humid temperate region with summer rains	359	19	0	-10	0.63
Sub-humid hot tropics with summer rains	360	22	1	-3	0.78

Table 3.57. CropWatch-estimated maize production for Mexico in 2018 (thousands tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Maize	23858	-4.1%	2.4%	23439	-1.8%

[MMR] Myanmar

Myanmar is a major agricultural country that cultivates several main crops every year. Maize is distributed mainly in the Hills region, while wheat and rice are planted across the country. The reporting period covers the entire harvesting season of maize, as well as the growing season and early harvesting season of the second rice and wheat. The main rice was harvested before this monitoring period and will be planted in the next monitoring period. CropWatch assesses crop condition throughout the country as generally above the average of the previous five years throughout the period, sometimes reaching the maximum of last five years in January and February.

As shown by the CropWatch agroclimatic indices, compared to average, both rainfall and RADPAR decreased by 9%, with TEMP close to average. The fraction of cropped arable land (CALF) showed an increase of 12%. Poor climatic condition and improved CALF led to no change in BIOMASS compared with five-year average. The crop condition development graph based on NDVI shows a favorable situation. Crop condition, which had been satisfactory already in January and remained so in February, slightly declined to average in March and April. 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 mostly good condition except for several southern provinces. The central areas of Myanmar, including Mandalay, Magwe, southern Bago and some scattered parts of Shan, enjoyed above average condition throughout the reporting period except for a transitory below average spell in late January. The southern provinces such as Ayeyarwady, Yangon and the north of Bago displayed the same condition as others while suffering from poor crop condition after mid-February. The VCIx map displays a similar pattern of spatial distribution with high values all over the country, accompanied by low values in scattered distributed regions.

Regional analysis

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

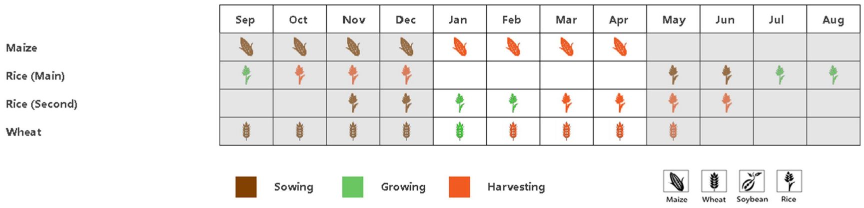
The Coastal region shows the least favorable agroclimatic and crop conditions for the country, but the crop condition was still above average through the whole period except for late April. The unfavorable agroclimatic indices of this sub-national region may substantially impact the growing of second rice. Rainfall was somewhat below average (RAIN -7%) and radiation was poor (RADPAR -6%).

The Central plain is the main crop region of the country, and the area shows the most favorable values among the three sub-national regions discussed here. The crop condition was above average all the time and even reached the maximum level in first two month. Abundant precipitation compared with average provided good conditions for the growth of the second rice and wheat.

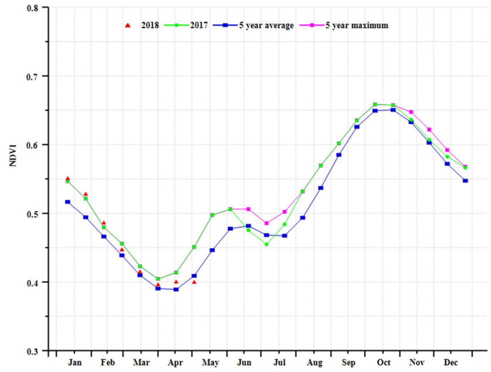
The Hill region cultivates maize as its main crop; it was harvested during the monitoring period. Agroclimatic indicators were close to the national values but for rainfall dropped 21% below average. According to the NDVI development graphs, crop condition was above average before mid-April. The maize output of this sub-national region is deemed to average.

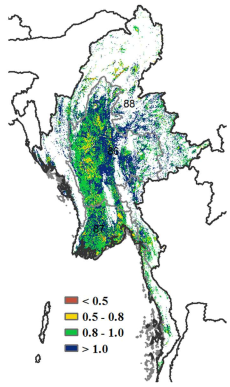
CropWatch puts the production of maize and second rice during 2018 slightly above those of 2017.

Figure 3.31. Myanmar's crop condition, January-April 2018

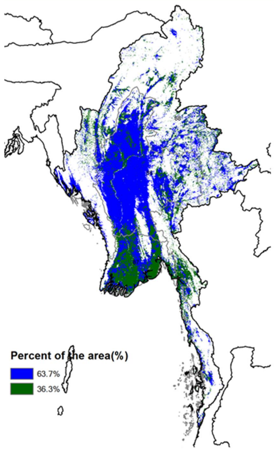


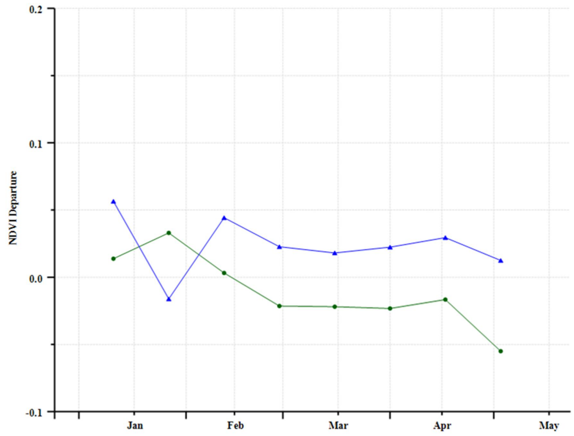
(a). Phenology of major crops



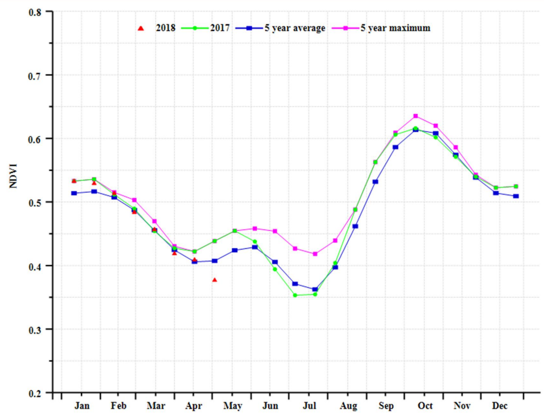


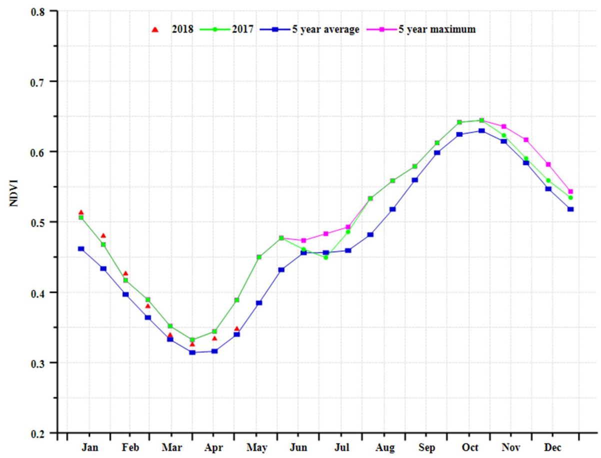
(b) Crop condition development graph based on NDVI (c) Maximum VCI



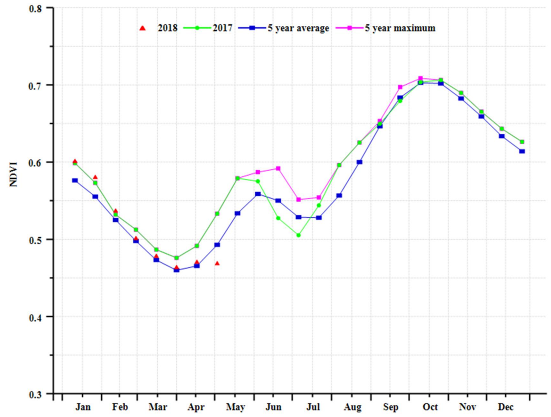


(d) Spatial NDVI patterns compared to 5YA (e) NDVI profiles





(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 3.58. Myanmar's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 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	81	-7	28.4	-0.1	1175	-6
Central plain	70	18	25.0	-0.5	1093	-10
Hill region	95	-21	21.4	-0.3	1031	-10

Table 3.59. Myanmar's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Coastal region	302	-2	88	2	0.95
Central plain	313	25	80	25	0.99
Hill region	401	-11	93	2	0.96

Table 3.60. CropWatch-estimated rice production for Myanmar in 2018 (thousand tons)

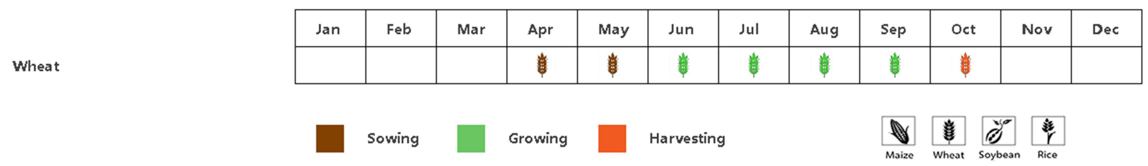
Crops	Production 2017	Yield variation (%)	Area variation (%)	Production 2018	Production variation (%)
Rice	25407	1.2	0.3	25790	1.5

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

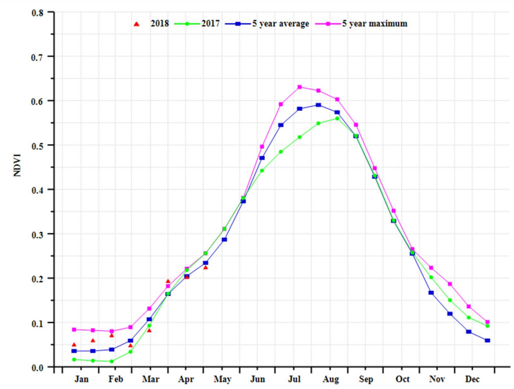
[MNG] Mongolia

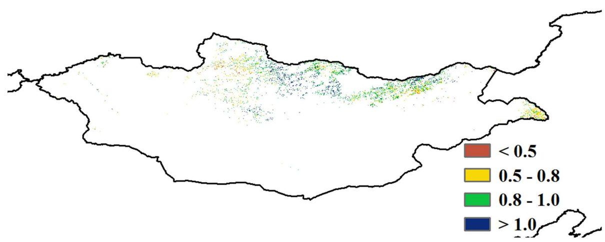
No crops were in the field during most of this monitoring period due to low temperature, but the sowing of summer wheat has started from late April. Among the CropWatch agroclimatic indicators, RAIN and TEMP were above average (+31% and +1.5°C), while RADPAR was down 3%. The combination of factors resulted in high BIOMSS (+27%) compared to average. Overall, the agroclimatic variables indicate favorable soil moisture conditions for crops and rangelands of the forth coming season.

Figure 3.32. Mongolia's crop condition, January-April 2018



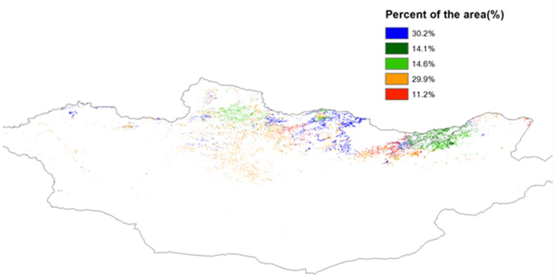
(a). Phenology of major crops

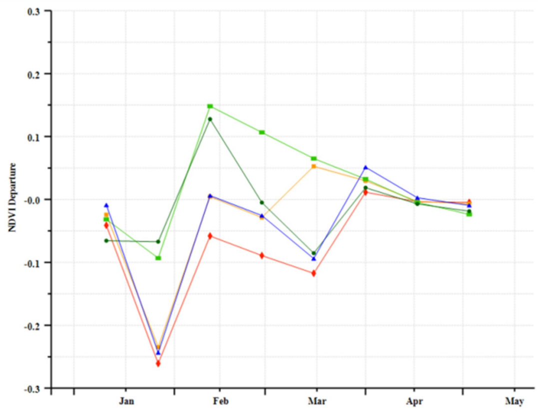




(b) Crop condition development graph based on NDVI

(c) Maximum VCI





(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles

Table 3.61. CropWatch-estimated wheat production for Mongolia in 2018 (thousand tons)

Crops	Production 2017	Yield variation (%)	Area variation (%)	Production 2018	Production variation (%)
Wheat	231	0.0	0.7	233	0.7

[MOZ] Mozambique

Overview

Mozambique is a mainly agricultural country, with more than 70% of its population living in the rural area spracticing agriculture. According to last agriculture census (2009-2010), there are 3.9 million small-scale farmers in Mozambique who represent 98.6% of the total production of the country. A considerable portion (28%) of these households is female-headed, going up to 40-45 % in Gaza and Inhambane province. These households grow about 5 million hectares of (largely annual)crops, of which 45% is in Nampula and Zambézia. Both Nampula and Zambézia are considered two of the higher food and cash crops productions provinces.

According to data from Ministry of Agriculture and Food Security of Mozambique, Maize, Rice, Sorghum, Cassava,Cotton, and Sugarcane are the main crops grown on several farms. Most farms grow corn (76.86%), 28.74% grow small peanuts, 24.31% cultivate sorghum,16.27%grow rice.

The agriculture predominant are subsistence and mainly characterized by low yields due to the lack of inputs (quality seeds, fertilizer, pesticides, and irrigation system). The lack of timely and frequently agroclimatic information and analysis also affect the farmers and delay actions. The main season start in October to March. With the large majority of agricultural production being rain-fed. Weather variability is a major factor in determining crop performance. Data available show that the north side of the country tends to have higher rainfall of 150 to 300 mm per month between December and March while the southern part has 50 to 150 mm per month.

National Analysis

The monitoring period covers the sowing and growing season of maize and rice for the north region and growing and starts harvesting season for the central and south region. At the start of the season in late 2017 farmers faced problems with water scarcity in some areas of the south and central parts of the country, especially in the provinces of Gaza, Inhambane, Maputo (north), Tete (south) and parts of Manica and Sofala. Some early crops were lost and had to be replanted. Compared with their averages, the agroclimatic indicators showed a slight increase in rainfall (+1%) and a decrease of both temperature (-0.9ºC) and sunshine(RAPDAR, -2%). BIOMASS rose 2% over the 5YA.

For the current season, Mozambique has experienced below average rainfall in the southern (Maputo, Gaza, Inhambane) and some central parts (Tete and Sofala) provinces, while above average rainfall has been received over the northern (Nampula, Cabo Delgado, and Niassa)provinces. Highlights can be addressed to Tete province where a reduction on rain and temperature (RAIN -24% and TEMP-0.7ºC) and biomass (-17%)were significant when compared to the average of previous fifteen and five years respectively. Nampula and Zambézia, the major producer provinces of the country were below average rainfall. The other provinces, including, Gaza and Inhambane received favorable rainfall with 12% and 35% above average respectively.

Most parts of the regions received good rains briefly in late January and February. comparing with last 15 years average, From October to early December, the rain was below average and coincides with growth stage. These February rains provided some moisture which contributed slightly to pasture re-growth were still insufficient toeliminate the prevailing rainfall deficits. Dry conditions in the south and some center parts affected maize and rice production. The infestation of Fall Army worm (FAW)in Inhambane, Sofala and Tete provinces, as reported by Ministry of Agriculture and Food Security will further impact the outputs.

The spatial NDVI departure pattern sassociated with the NDVI profiles indicate a variety of behaviors before February, with parts of the provinces of Cabo Delgado, Nampula, Tete and Inhambane above average and other areas below (only 5.6% of arable land in February). From February, NDVI patterns were remarkably close to average.

The national crop condition development graph based on NDVI show that crop condition was unfavorable from the beginning of the monitoring period. After mid-March, crops recovered and caught up with the five-year average. CALF, the cropped arable land fraction did not register any changes and in most of the areas, favorable vegetation condition prevails with VCIx values situated between 0.8 and 1.0.

In general, crop condition in Mozambique was slightly below average compared to the same period in the previous years and 5 YA. Compared to the output of 2017, the maize production is expected to increase by 2%.

Provincial analysis

According to the Ministry of Agriculture and Food Security of Mozambique, the country has two major production provinces: Zambézia and Nampula classified according to the historical productivity.

Zambézia

According to the crop phenology during the monitoring period, the growing season of maize and rice was ongoing, while their harvesting started in April and will extend to May. Considered to be the one of major production zone in Mozambique, during the period under analysis,the Zambézia Province registered a decrease in rainfall and temperature in 16%and 0.8ºC respectively when compared to the average of previous 15 years while the radiation was about the average of fifteen years. The reduction in rainfall and temperature led to a reduction in biomass (BIOMASS -6%). In contrast, the agro-climatic conditions did not have any impact on the cropped arable land fraction (CALF) which was about the average of previous 5 years. For this region, better maximum vegetation condition index (VCI=0.94) was verified.

The crop condition development graph based on NDVI for this region shows that from early February to mid-March, the crop condition was below the average of previous 5 years as well as the same monitoring period of the year 2017. Afterward, crops situated about the average from mid-March to the end of the monitoring period. In addition, The NDVI clusters show that excepting scatter the area coastal zone, the crop condition was above the average during the entire monitoring period in all province.

In general, the crop condition in Zambézia region was average during the January-April 2018 monitoring period.

Nampula

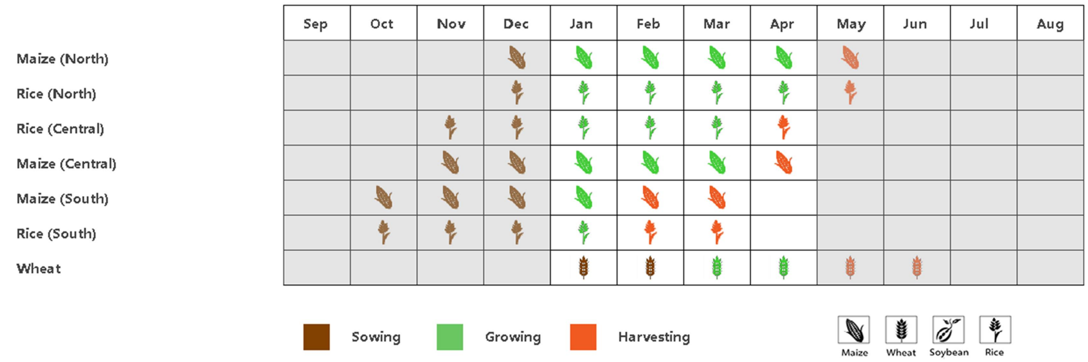
Nampula province is divided into three agronomic zones: interior, intermediate and coastal zones (south and north).The coastal zone is potential for rice production and the interior zone is potential for maize production and in the intermediate zone, maize can be produced. The productivity of these two crops is very low due to the weak management. In general, the sowing period started from last week of November to the first week of January for maize and from December to January for rice.Maize and rice are cultivated by small farms, where their fields are less than 2 (two) hectares.

Analyzing the agroclimatic indicators, in general, Nampula province registered a decrease in rain and temperature(RAIN-7% and TEMP -0.7ºC) compared with last 15 YA, but the radiation was about the average. The reduction of this factors affected the biomass, which reduced by4% compared to the last 5YA. According to the average rainfall profile,the rain season started from November and end by April. In the current crop season, rain in Nampula province was below the average of the last 15 years,but above average from first October to end of December, mid-January, and April.

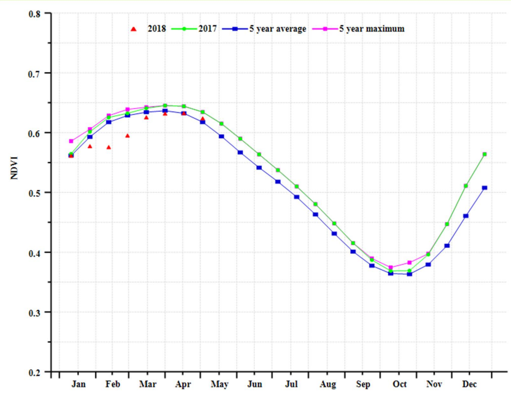
According to the NDVI profiles of Nampula province, the NDVI was below of average of the last 5 years but catch up with the last cropping season from March. The peak of the growing season was at the same level of the five-year average and previous monitoring period. The Maximum VCI (0.93) indicates good crop condition. The cropped arable land fraction (CALF) increased in 3% compared with last 5 YA, and this will cover the decrease of biomass. Most parts of Nampula recorded high VCIx values, but in the western part of the province(Malema, Ribaue, and Murrupula) shows slightly lower values.

In general, the province was below average weather conditions for crop growth during the current season, but the production will be compensated by the increase of crop arable land fraction.

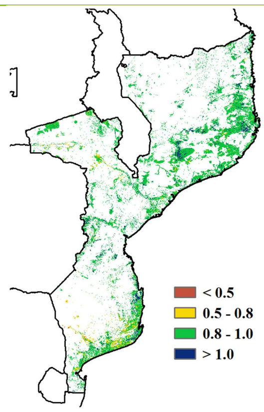
Figure 3.33. Mozambique's crop condition, January 2018-April 2018



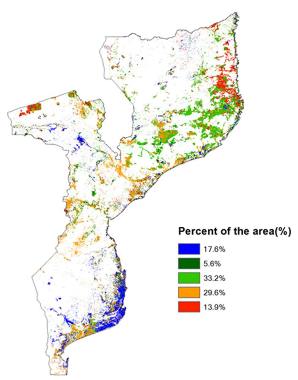
(a). Phenology of major crops

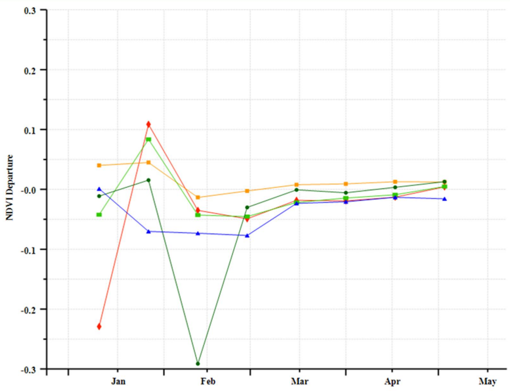


(b) Crop condition development graph based on NDVI



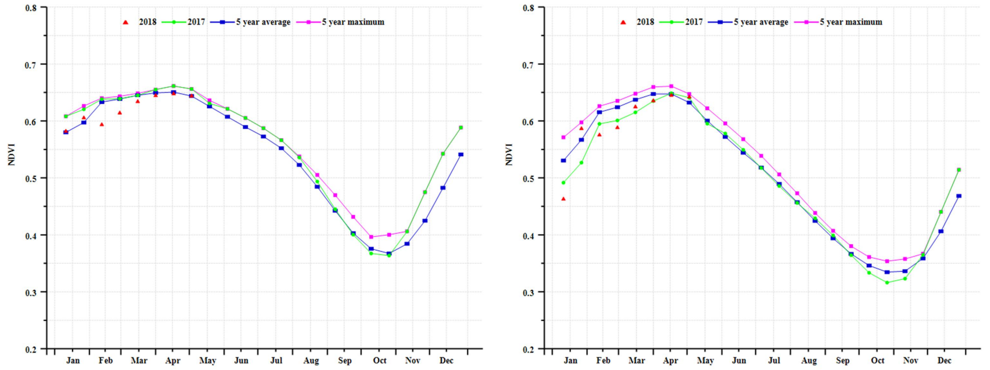
(c) Maximum VCI



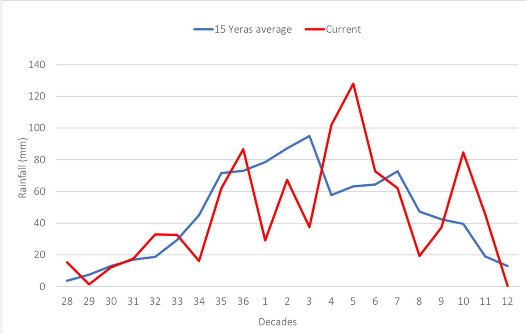


(d) Spatial NDVI patterns compared to 5YA

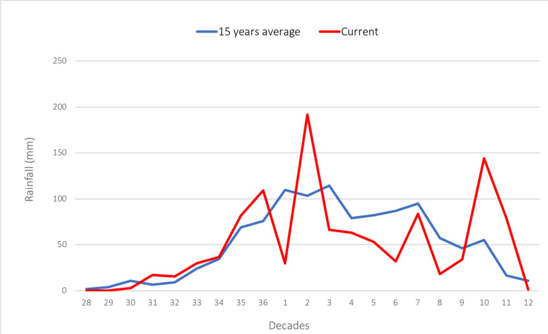
(e) NDVI profiles



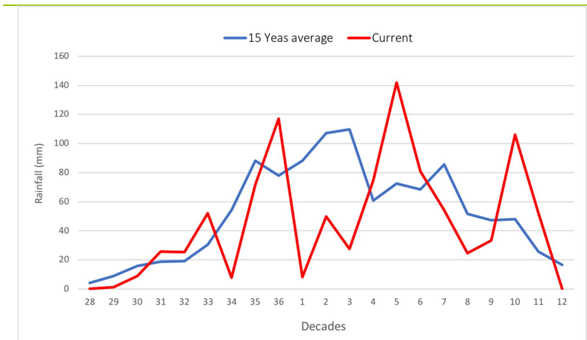
(f) Crop condition development graph based on NDVI (left: Zambézia, right: Nampula)



(g) Mozambique decade rainfall profile



(h) Nampula decade rainfall profile



(i) Zambezia decade rainfall profile

Table 3.62. Mozambique agroclimatic indicators by major production zones, current seasonvalues, and departure from 15YA, January 2018-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m^2)	Departure from 15YA (%)
Maputo	356	0	25.7	-1.2	1095	-2
Gaza	382	12	26.2	-1.3	1140	-2
Inhambane	533	35	26.9	-0.9	1143	-3
Sofala	818	37	27.4	-1.2	1115	-3
Manica	848	45	25.6	-1.2	1135	-4
Tete	436	-24	25.2	-0.7	1166	2
Zambézia	654	-16	26.6	-0.8	1118	0
Nampula	796	-7	26.8	-0.7	1108	0
Cabo Delegado	870	5	26.3	-0.7	1071	-2
Niassa	719	-13	24.4	-0.7	1047	-4

Table 3.63. Mozambique agronomic indicators by major production zones, current seasonvalues, and departure from 5YA, January 2018-April 2018

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Maputo	1141	8	97	5	0.89
Gaza	1081	13	97	5	0.85
Inhambane	1144	7	96	1	0.89
Sofala	1488	6	99	3	0.94
Manica	1402	1	100	1	0.94
Tete	1223	-17	99	1	0.90
Zambézia	1640	-6	100	1	0.94
Nampula	1755	-4	99	3	0.93
Cabo Delegado	1972	3	99	3	0.95
Niassa	1878	-2	100	2	0.94

Table 3.64. CropWatch-estimated Maize production for Mozambique in 2018 (thousand tons)

Crops	Production 2017	Yield variation (%)	Area variation (%)	Production 2018	Production variation (%)
Maize	2040	0.0	2.3	2085	2.2

[NGA] Nigeria

The January-April period covers the sowing season of maize (south/main) as well as the rainfed Rice. During this period, the agroclimatic indicators show that while the temperature and radiation registered a decrease (TEMP -1ºC and RAPDAR -11%), a significant increase in the percentage of Rainfall (RAIN +25%) was verified. The increase in the percentage of rainfall led to an increase in biomass (BIOMASS +21%), as shown in agronomic indicators. However, the Cropped Arable Land Fraction (CALF) at the same period decreased in 15% due to normal phenology (no crops in the field).

The crop condition development graph show conditions close to both average and 2017. The scenario changed from early March to the end of the monitoring period, when the crop condition was below the average of the previous five years as well as below the five years maximum. While the southern region of the country registered good maximum vegetation condition index (VCIx), the northern region - which is currently in its dry season - showed low VCIx (0.5 or below). During this period the maximum VCI was 0.59. For the entire county, the NDVI clusters show that the crop condition was unfavorable during the entire monitoring period. An increase of 1% in maize production over 2017 is nevertheless expected.

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 and by increasing rainfall) as Sudano-Sahelian, Derived savanna, Humid forest zone, and Guinean savanna.

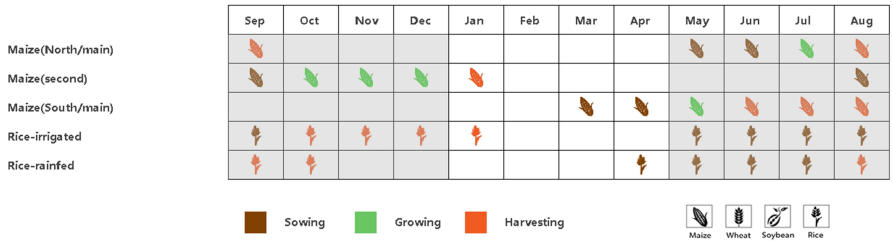
A decrease in both agroclimatic (RAIN -7%, TEMP -0.7ºC and RAPDAR -6%) and agronomic (BIOMASS -12%, CALF -13%) indicators was observed in the Sudano Sahelian region. However, since the cropping season in northern Nigeria lasts from June to September, the current values are irrelevant as far as crop production is concerned. They may, however directly and indirectly impact rangelands.

In the Derived Savana region an increase in rainfall (RAIN +24%) was accompanied by a decrease in temperature and radiation (TEMP -1.1ºC and RAPDAR -14%). The increase in rainfall led to a 25% increase in BIOMASS. The CALF registered a reduction of 15% and the maximum VCI for this region was 0.63. During this period, the crop condition development was above the average of previous 5 years from mid-February to mid-March, dropping to below the average at the end of April.

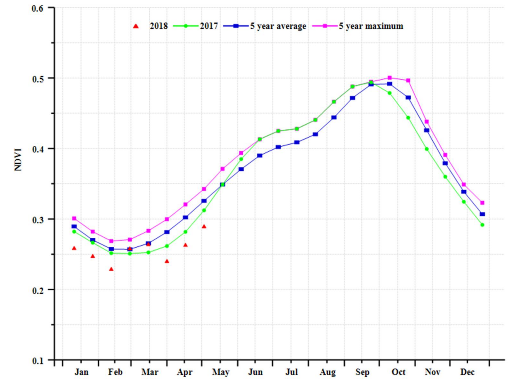
The crop condition development for the Humid forest zone region was below the average most of the time during the monitoring period, being above the average of previous 5 years in early of February. The agroclimatic indicators for this region, show an increase in rainfall (RAIN +24%) and a decrease in temperature and radiation (TEMP -1.2ºC and RAPDAR -18%). An increase in biomass production potential (BIOMASS +18%) and a decrease in cropped arable land fraction (CALF -1%) were verified. In this region, the maximum VCI was 0.8.

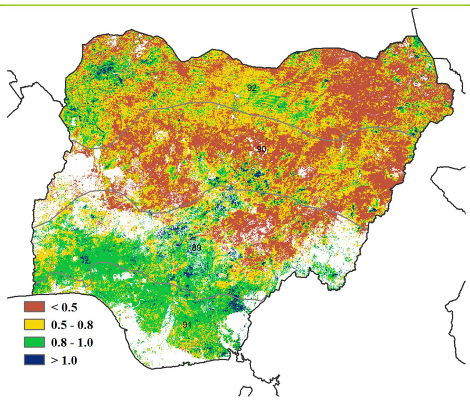
The crop condition development was below the average of the past five years in the Guinean savanna region which recorded a large increase in rainfall (RAIN +33%) and drop in both temperature (TEMP -0.9ºC) and RADPAR (-9%). Compared with the recent 5YA the biomass production potential increased by 23% while CALF decreased by 53%. For this region, the maximum VCI registered was 0.50 on average.

Figure 3.34. Nigeria's crop condition, January-April 2018



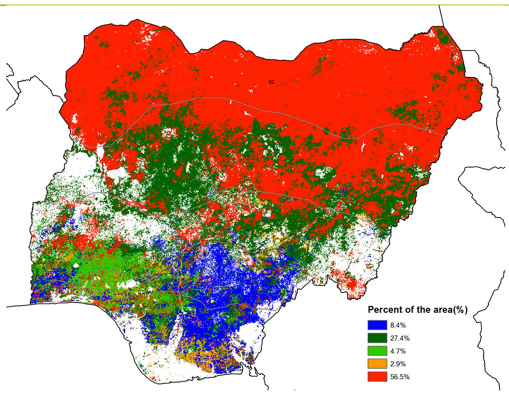
(a) Phenology of major crops

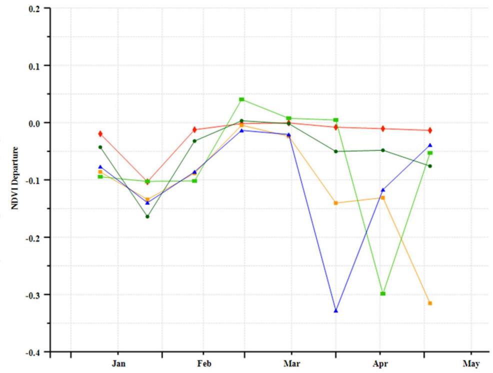




(b) Crop condition development graph based on NDVI

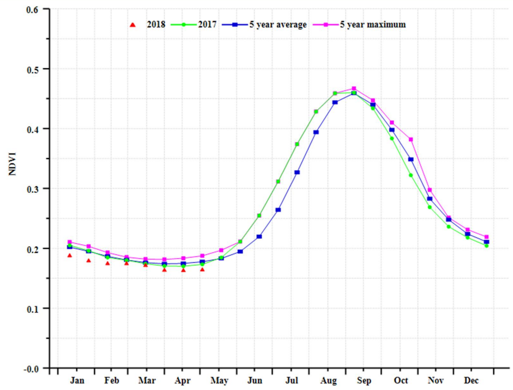
(c) Maximum VCI

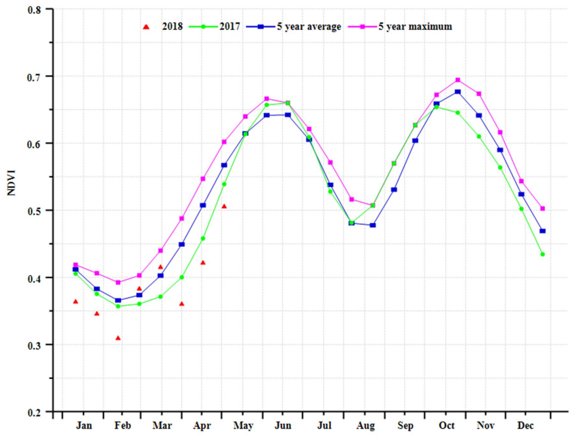




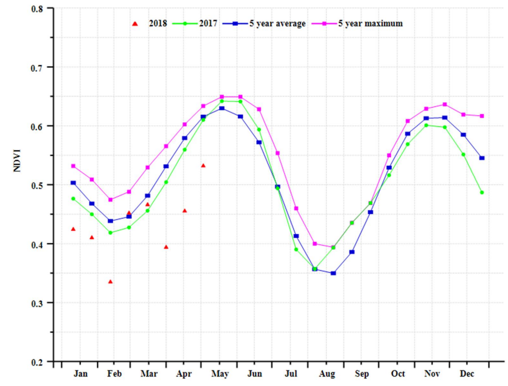
(d) Spatial NDVI patterns compared to 5YA

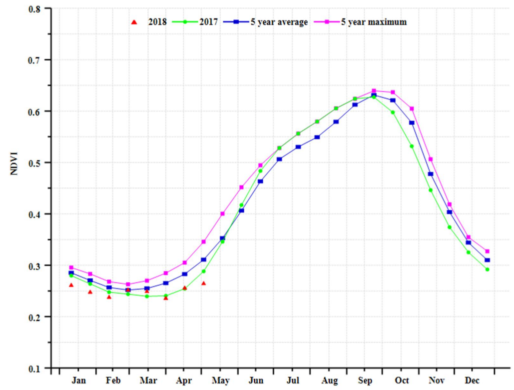
(e) NDVI profiles





(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 3.65. Nigeria's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 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	13	-7	29.1	-0.7	1313	-6
Derived Savana	214	24	28.4	-1.1	1091	-14
Humid Forest Zone	476	24	28.1	-1.2	892	-18
Guinean Savanna	95	33	28.4	-0.9	1251	-9

Table 3.66. Nigeria's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMASS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Sudano Sahelian	51	-12	0.01	-13	0.58
Derived Savana	751	25	0.66	-15	0.63
Humid Forest Zone	1342	18	0.97	-1	0.80
Guinean Savanna	327	23	0.06	-53	0.50

Table 3.67. CropWatch-estimated maize production for Nigeria in 2018 (thousands tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Maize	11165	1.3%	-0.3%	11276	1.0%

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

[PAK] Pakistan

The reporting period covers most of the winter wheat cycle from vegetative growth to harvest. It also touches the field preparation and sowing of maize. A national average of 143 mm of rainfall (which is 15% lower than average) fell on mostly irrigated winter crops. TEMP at 16.9 °C was +0.9°C higher than average and RADPAR was near average. BIOMSS accumulation was expected to be 384gDM/m2, -10% lower than average. NDVI was lower than average throughout the reporting period in most parts of the country. With only 49% of agriculture area being occupied by crops, coupled with a low VCIx of 0.67, prospects for winter wheat are not good.

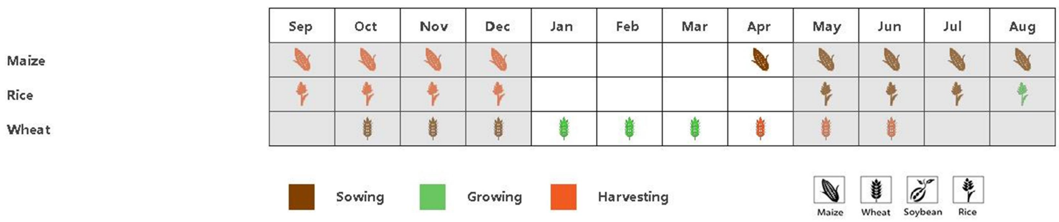
Regional analysis

To account for the country's large diversity of topography, soil and weather, CropWatch partitions Pakistan into four agro-ecological regions. They are referred to as Balochistan, the Lower Indus river basin, the Northern highlands and Northern Punjab. Balochistan, with only 2 million ha cultivated land is not included in the CropWatch analysis.

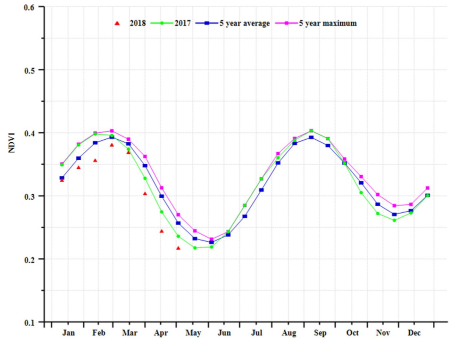
The lowest rainfall (52 mm of RAIN, 14% below average) fell over the Lower Indus river basin while Northern Punjab recorded more than twice as much rainfall, which represented nevertheless a deficit of 28% compared with average. The Northern Highlands received the highest rainfall among all the regions (248 mm) which was -15% below average. The Northern highlands were warmer than average (+1.2ºC) while other regions had near average TEMP. All the regions received near average RADPAR and except for the Northern highlands other regions had a reduced biomass production potential (-18%). Actually cropped arable land ranged between 42% (Northern highlands) and 86% remaining within -7% of average. All the three regions had persistently lower than average NDVI, with patches of low as well as high VCIx for an average around 0.80.

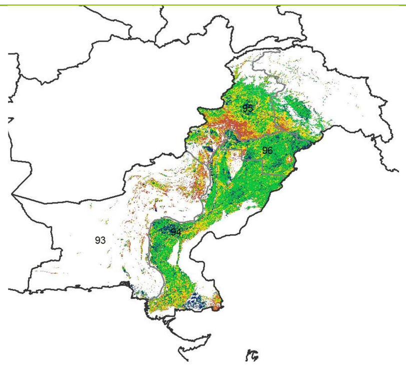
All the agroclimatic and agronomic indicators show lower than average values for winter wheat. However, since most of the crop is irrigated, CropWatch project a minor reduction in production (a 1.4% drop below 2017).

Figure 3.35. Pakistan's crop condition, January-April 2018



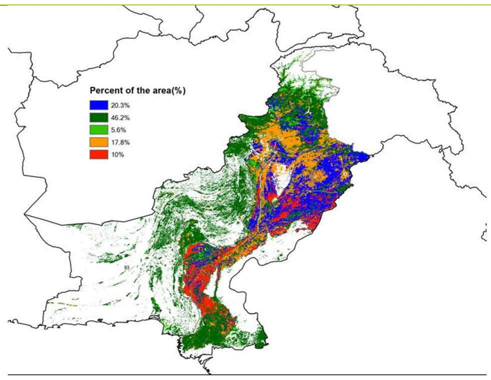
(a). Phenology of major crops

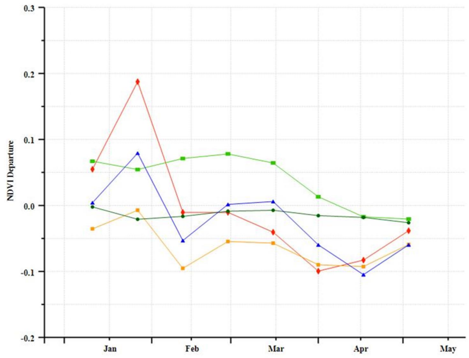




(b) Crop condition development graph based on NDVI

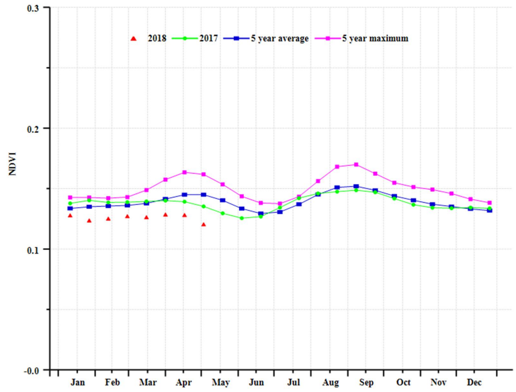
(c) Maximum VCI

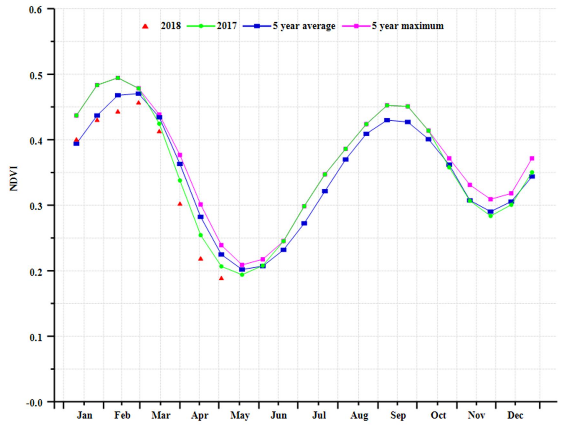




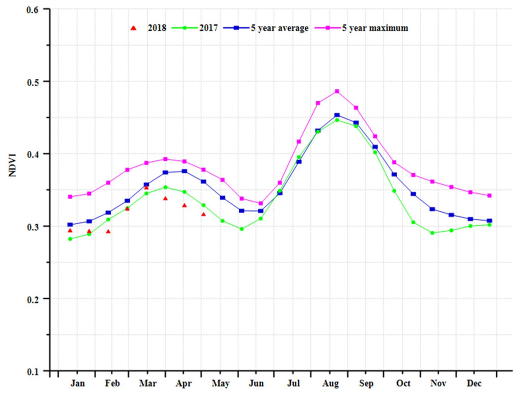
(d) Spatial NDVI patterns compared to 5YA

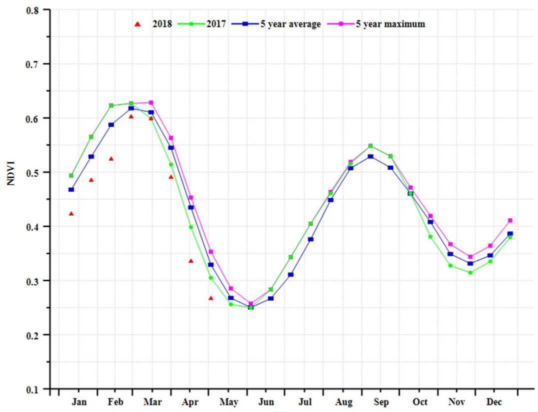
(e) NDVI profiles





(f) Crop condition development graph based on NDVI (Balochistan Region (left) and Lower Indus river basin in south Punjab and SindRegion (right))





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

Table 3.68. Pakistan's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m^2)	Departure from 15YA (%)
Balochistan	89	-9	16.8	0.9	1112	-4
Lower Indus river basin in south Punjab and Sind	52	-14	23.0	0.7	1075	-6
Northern highlands	248	-15	12.0	1.2	957	-3
Northern Punjab	117	-28	19.6	0.4	960	-5

Table 3.69. Pakistan's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Balochistan	313	-13	1	22	0.20
Lower Indus river basin in south Punjab and Sind	197	-18	63	1	0.81
Northern highlands	791	0	42	-7	0.67
Northern Punjab	507	-18	86	-2	0.87

Table 3.70. CropWatch-estimated wheat production for Pakistan in 2018 (thousand tons)

Crops	Production 2017	Yield variation (%)	Area variation (%)	Production 2018	Production variation (%)
Wheat	24283.0	-0.8%	-0.5%	23946	-1.4%

[PHL] The Philippines

In the Philippines, the monitoring period covers the harvesting stage of secondary rice and maize, as well as the sowing stage of main rice and maize crops. According to the NDVI profiles for the country, crop condition was close to the five-year average from February to April, but below average in January and the final months of 2017. Nationwide, precipitation (RAIN) presents a positive departure of 38% over average, accompanied by below average radiation (-2%) and temperature (-0.5°C), which resulted in an increase of BIOMSS 18% over average.

Based on the VCIx indicator, favorable crop condition prevailed as the value mostly exceeded 0.80. The cropped arable land fraction (CALF) nation-wide was almost 100%. Considering the spatial patterns of NDVI profiles, 86% of the cropped area experienced average conditions, but other areas display different profiles including (1) a marked drop in January in 9.6% of the areas and in February in 4.4% of the areas, (2) a recovery to average condition in March and April.

The behavior of NDVI can be explained at least partially by several typhoons of minor magnitude that affected the Philippines, starting with Bolaven in January. 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

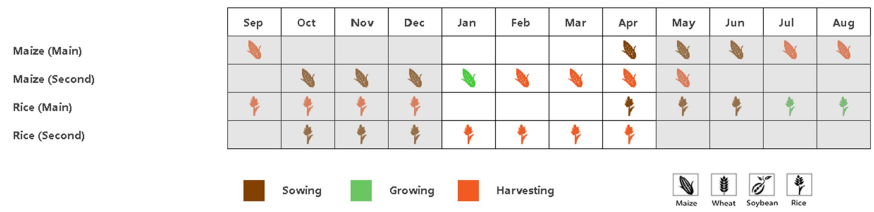
Based on cropping systems, climatic zones, and topographic conditions, three main agro-ecological regions can be distinguished for the Philippines. They are the Lowlands region, the Hills region, and the Forest region.

The Lowlands region experienced excessive rainfall (RAIN +50%), low radiation (RADPAR -3%) and mildly below average temperature (TEMP -0.5°C). BIOMSS was 25% above the average. Regional CALF is 100%, and the VCIx was good at 0.89. Altogether, the outputs for main maize and rice are expected to be above average.

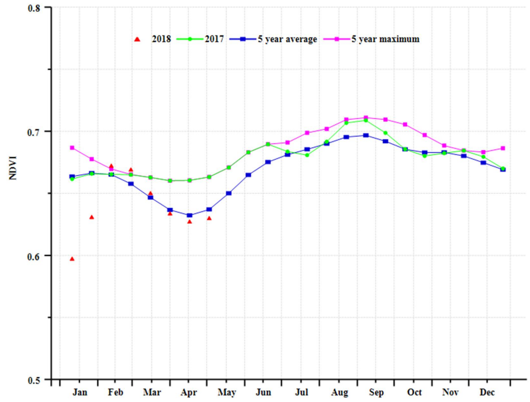
The Forest region also experienced excessive rainfall (RAIN +32%), mildly below average radiation (RADPAR -1%) and temperature (TEMP -0.5°C). BIOMSS was 15% above compared to the average for the period and region. Regional CALF is 100%, and the VCIx was good at 0.85. Altogether, the outputs for main maize and rice are expected to be above average as well.

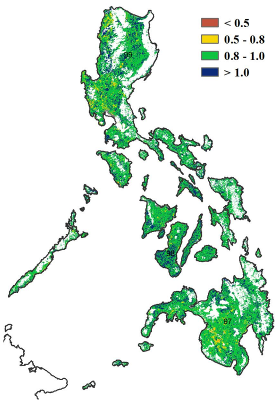
The hills region recorded the highest rainfall departure (RAIN, +77%) but nevertheless average radiation and temperature. BIOMSS is 15% above the five-year average. A high CALF (100%) and good VCIx (0.94) should result in above average main maize and rice seasons.

Figure 3.36. Philippines's crop condition, January-April 2018



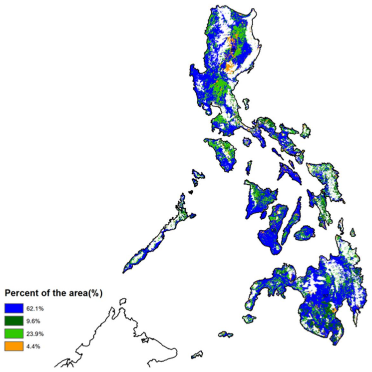
(a). Phenology of major crops

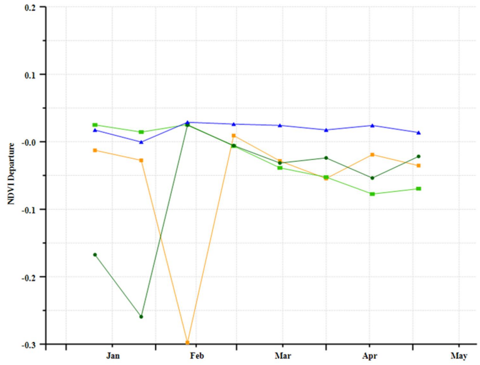




(b) Crop condition development graph based on NDVI

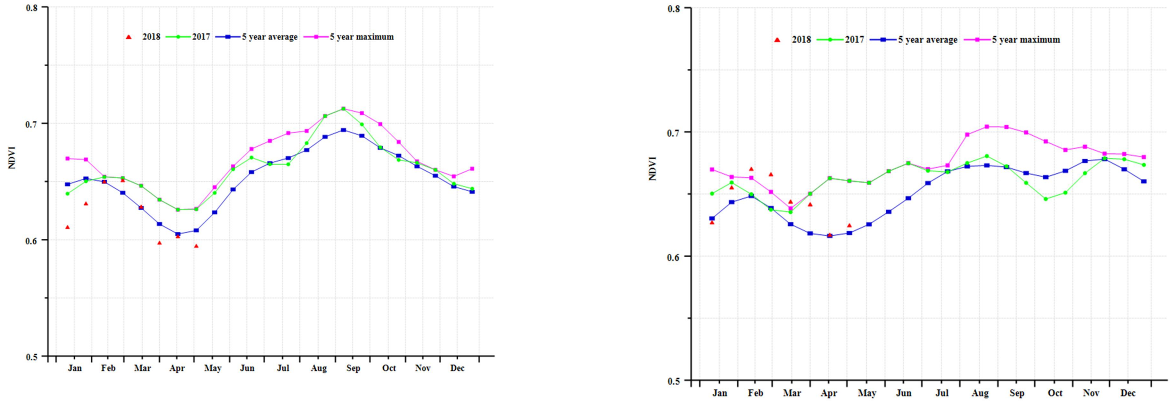
(c) Maximum VCI



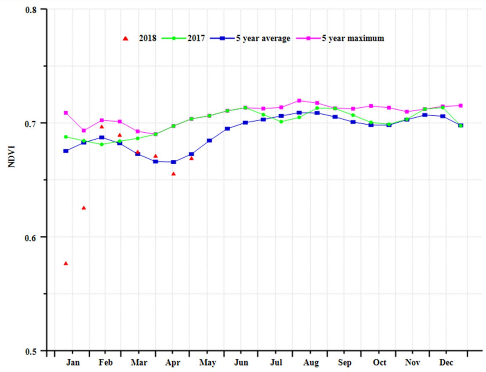


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

Table 3.71. Philippines's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m^2)	Departure from 15YA (%)
Lowlands region	424	50	25.2	-0.5	1034	-3
Hills region	721	77	26.4	-0.2	1106	0
Forest region	1131	32	25.9	-0.5	1049	-1

Table 3.72. Philippines's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Lowlands region	973	25	100	0	0.89
Hills region	1277	15	100	0	0.94
Forest region	1815	15	100	0	0.85

Table 3.73. CropWatch-estimated maize and rice production for Philippines in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Maize	7626	2.2%	0.0%	7791	2.2%
Rice	20188	3.8%	0.0%	20950	3.8%

[POL] Poland

The monitoring period covers the cultivation of winter wheat. Relative to average values, rainfall was below (-19%), temperature was close and RADPAR was above by +3%. Resulting from the dry conditions, the potential biomass (BIOMSS) decreased 11%. As shown in the crop condition development graph, national NDVI was below the average of last 5 years from January to April resulting from several frosts episodes. Only about 69.3% of the areas had above average condition in early February, while all the agricultural areas were below the average most of the time. Crop condition generally improved in April and resulted in a favorable VCIx of 0.9. The Cropped Arable Land Fraction (CALF) was slightly below the average. The production of wheat is estimated at 11.9% above 2017 values.

Regional analysis

For the purpose of crop monitoring, Poland can be divided into four agro-ecological zones (AEZ) referred to as 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 below the average of the last 5 years due to low rain (RAIN -19%) which led to a decrease of the biomass production potential (BIOMSS -13%) below the average of the last five-years. RADPAR was slightly above average (+4%). The area has a high CALF (98%) and a favorable VCIx (0.92).

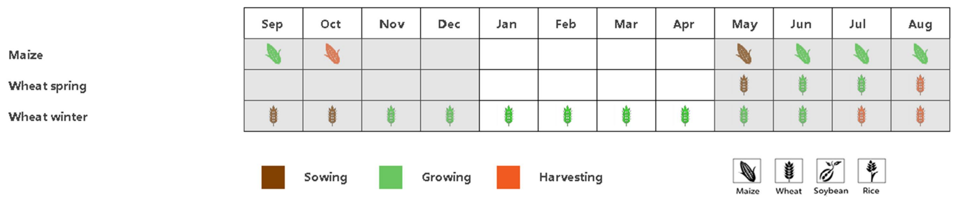
Contrary to the previous AEZ, the Northern oats and potatoes area had close to average RAIN (-1%), TEMP (-0.2ºC) and RADPAR (+1%). The area had a high CALF (94%) as well as a favorable VCIx (0.85).

RAIN was 7% below average with average temperature in the Northern-central wheat and sugarbeet area, where BIOMSS decreased 4% compared to the last five years. Similar to the other areas, the area has a high CALF (96%) and VCIx (0.91).

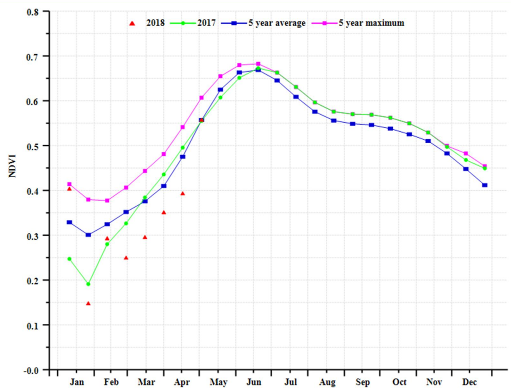
The Southern wheat and sugarbeet area recorded a slight but positive temperature departure (TEMP +0.4°C) as well as the largest rainfall deficit (-29%), which led to decreased biomass (BIOMSS -16%) compared to the five-year average. The area has a high CALF (99%) as well as a favorable VCIx (0.94).

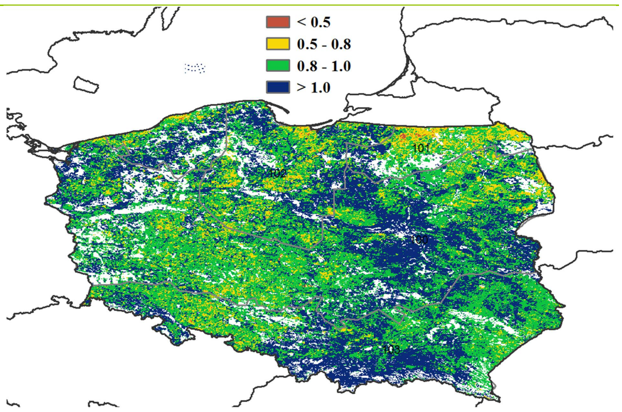
Overall, drier than usual weather conditions mostly prevailed in central and south of Poland, leading the decreased biomass in the central rye and potatoes area and Southern wheat and sugarbeet area.

Figure 3.37. Poland's crop condition, January-April 2018



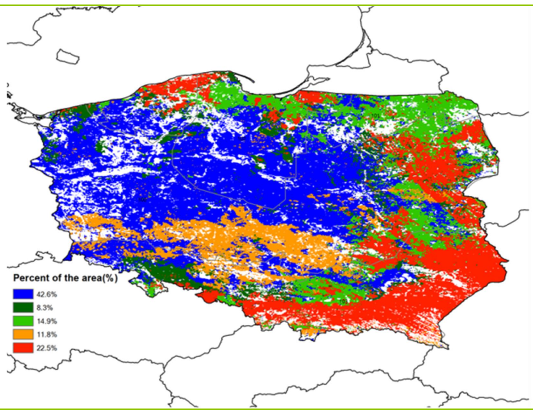
(a). Phenology of major crops

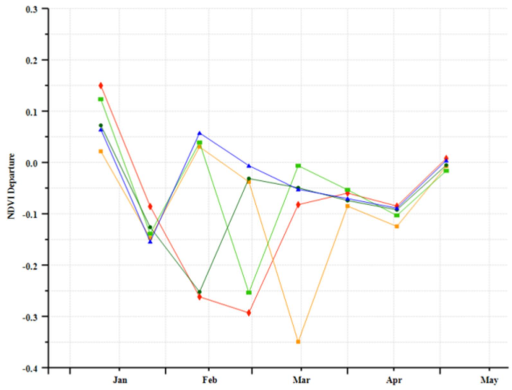




(b) Crop condition development graph based on NDVI

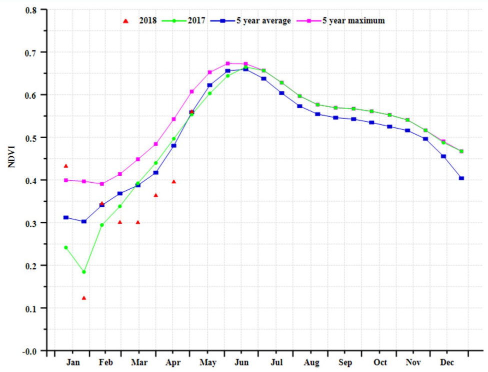
(c) Maximum VCI

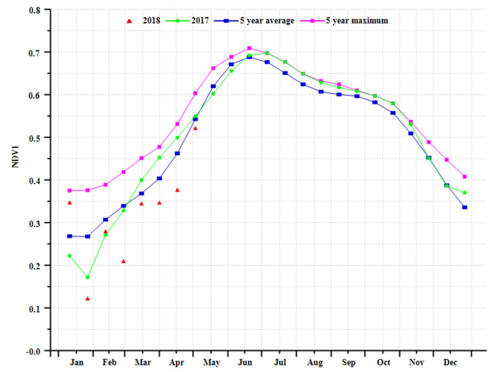




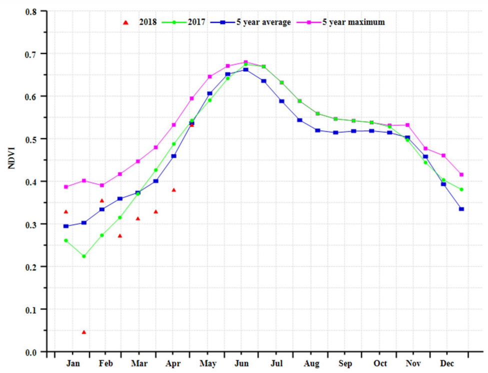
(d) Spatial NDVI patterns compared to 5YA

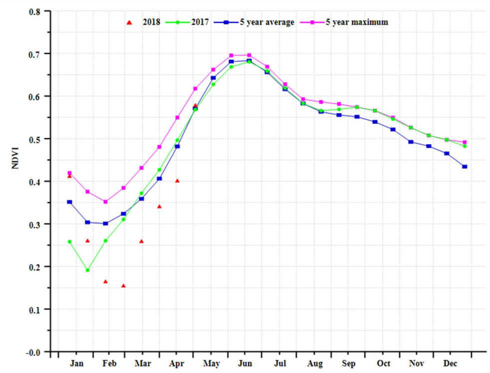
(e) NDVI profiles





(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 sugar beet area (left) and Southern wheat and sugar beet area (right).

Table 3.74. Poland's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Central rye and potatoes area	136	-19	2.6	0.1	510	4
Northern oats and potatoes areas	171	-1	1.5	-0.2	472	1
Northern-central wheat and sugarbeet area	150	-7	2.0	-0.3	487	1
Southern wheat and sugarbeet area	139	-29	2.7	0.4	545	4

Table 3.75. Poland's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Central rye and potatoes area	663	-13	98	-1	0.92
Northern oats and potatoes areas	751	0	94	-4	0.85
Northern-central wheat and sugarbeet area	717	-4	96	-2	0.91
Southern wheat and sugarbeet area	676	-16	99	0	0.94

Table 3.76. CropWatch-estimated Wheat production for Poland in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Wheat	10931	11.00	0.80	12236	11.90

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

[ROU] Romania

Winter wheat began vegetative growth after being sown from October. The overall condition of the crop 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%), and indicate a favourable beginning of the 2018 winter wheat season. The winter wheat production of Romania in 2017 is 7670 kton and the field variation is 8.4% together with the area variation is -1.7%. Accordingly, Cropwatch predict the winter wheat production of Romania in 2018 is 8172 kton, increasing by 6.5%.

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.

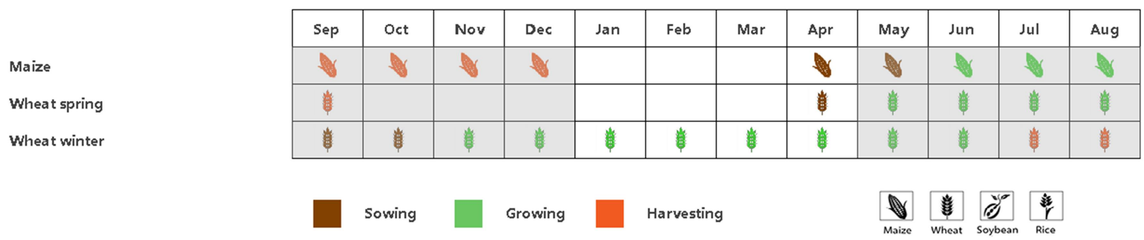
According to NDVI development profile, crop condition differed in the three regions. In the Central mixed farming and pasture Carpathian hills and the Western and central maize, wheat and sugar beet plateau, crop condition was below average over most of the reporting period while better condition prevailed 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 low solar radiation (RADPAR -7%) which, however, should not have affected wheat much as the crop is dormant and partially snow-covered.

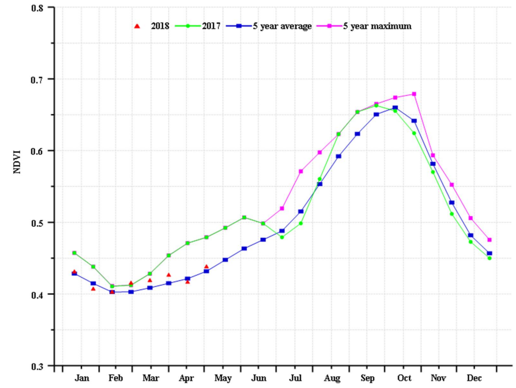
Temperature and rainfall were above average in all three regions. During previous reporting period (July to October 2017) CropWatch found a deficit of rainfall in Romania. The current increase of precipitation will improve the growing conditions for winter wheat. This is confirmed by the increase of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

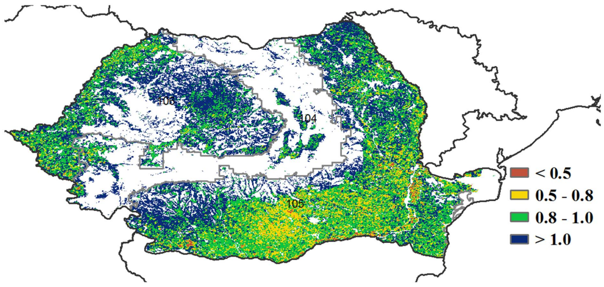
VCIx values were in excess of 0.90 in all AEZs. VCIx was lower than 0.8 near the central region but exceeds 1.0 in most parts of the northwest and southwest regions.

Figure 3.38. Romania's crop condition, January-April 2018



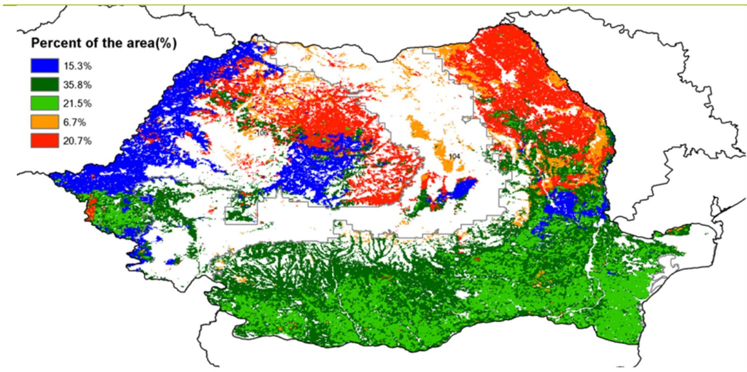
(a). Phenology of major crops

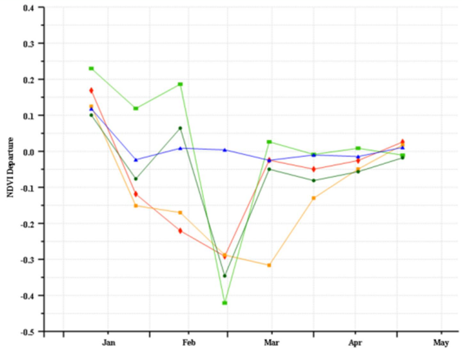




(b) Crop condition development graph based on NDVI

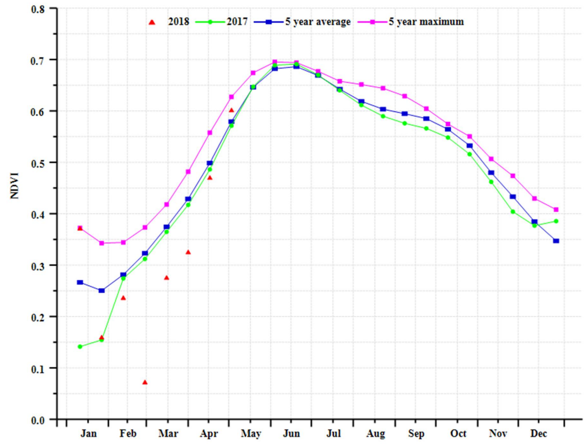
(c) Maximum VCI

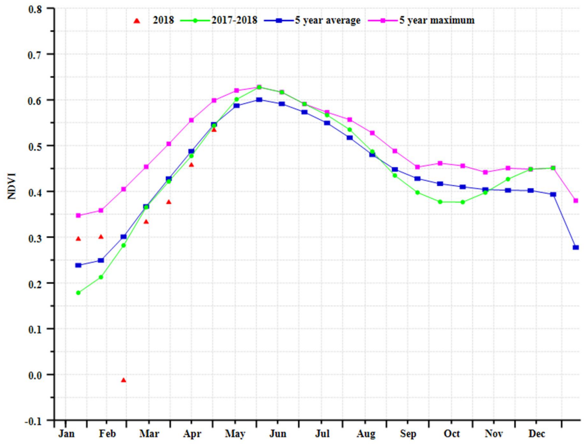




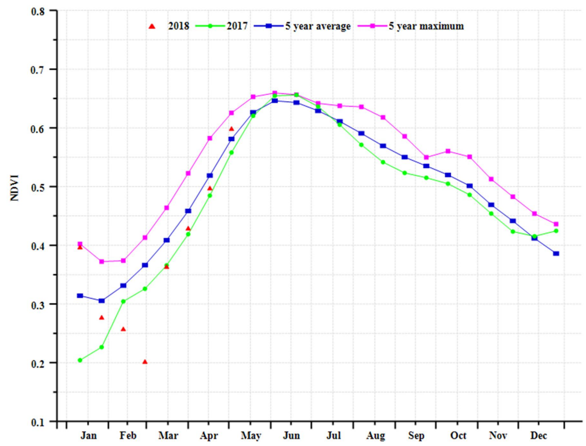
(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles





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



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

Table 3.77. Romania's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Central mixed farming and pasture Carpathian hills	239	-1	1.9	1.2	620	-2
Eastern and southern maize, wheat and sugar beet plains	234	20	4.5	0.5	630	-3
Western and central maize, wheat and sugar beet plateau	214	-1	4.4	1.4	594	-3

Table 3.78. Romania's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Central mixed farming and pasture Carpathian hills	764	9	98	-36	1.19
Eastern and southern maize, wheat and sugar beet plains	900	19	94	35	1.11
Western and central maize, wheat and sugar beet plateau	823	6	99	78	1.25

Table 3.79. CropWatch-estimated Wheat production for Romania in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Wheat	7670	8.40	-1.70	8172	6.50

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

[RUS] Russia

During the monitoring period, winter wheat was in late dormancy or early spring growth stages and maize was planted from April. The fraction of cropped arable land (CALF) was low (- 57%) due to the serious snow cover but it will recover with spring. Overall Russia experienced relatively unfavorable climate conditions in these four months because of unusually low temperature (-0.9ºC), even if the rainfall was up 9%; the BIOMSS indicator dropped 9% compared with the last five-year average.

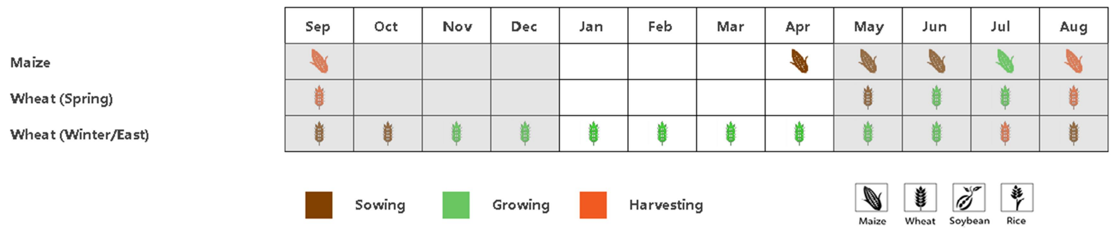
As shown in the NDVI-based crop condition development graph, values were lower than the average of the last five years. In about 58.5% of the croplands in Russia, mainly in the center (Volga, South Urals and South Siberia), the NDVI was significantly lower than average in January and February. As stressed below in the regional analysis, cold was a major issue in several areas. Compared with the previous season, winter wheat yields are expected to decrease (VCIx=0.67).

Regional analysis

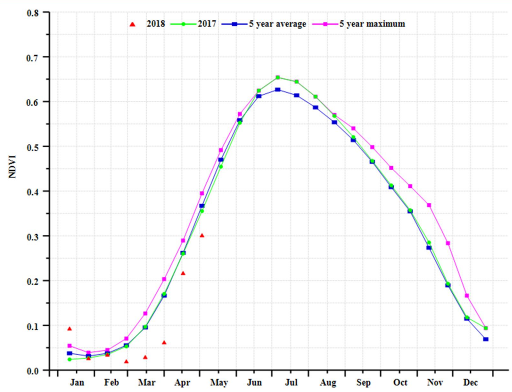
A more detailed analysis is provided for seven agro-ecological zones (AEZ), namely the Kaliningrad oblast (94), the Caucasus (95), the Volga Basin (97), the Central Economic Region (100), the Southern Urals (99), the Southern Siberian area (98), and the Northwest region including Novgorod (101). The numbers correspond to the labels on the VCIx map.

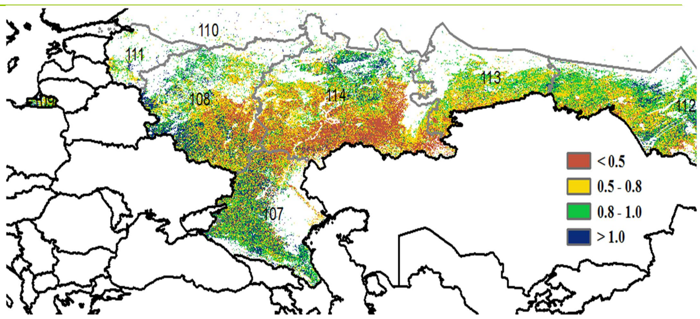
In the Caucasus, Central Economic Region (CER), Kaliningrad oblast, Northwest region including Novgorod and Volga Basin regions, rainfall was abundant and the departure from average exceeded 10%. In the Central Economic Region (CER), Northwest region including Novgorod, Southern Siberian area, Southern Urals and Volga Basin, the temperature was low, especially in Southern Siberian area, Southern Urals and Volga Basin (TEMP -11.8°C, -9.4°C, -7.1°C below average, respectively). NDVI also dropped in these areas as shown in Crop condition development graph.

Figure 3.39. Russia's crop condition, January-April 2018



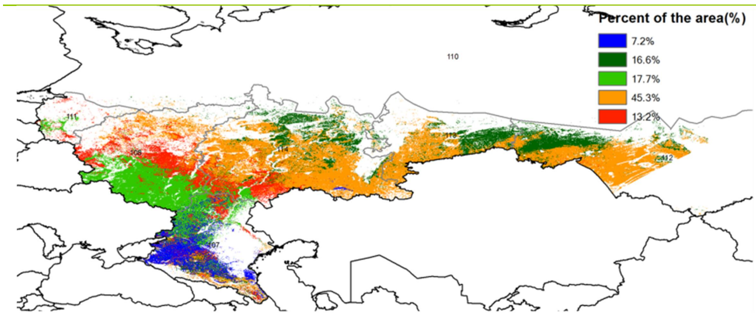
(a). Phenology of major crops

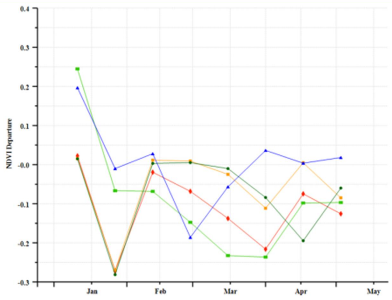




(b) Crop condition development graph based on NDVI

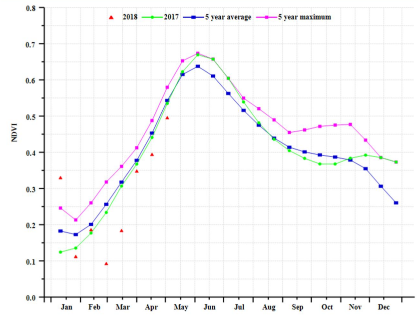
(c) Maximum VCI

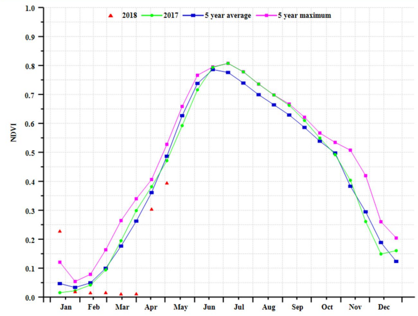




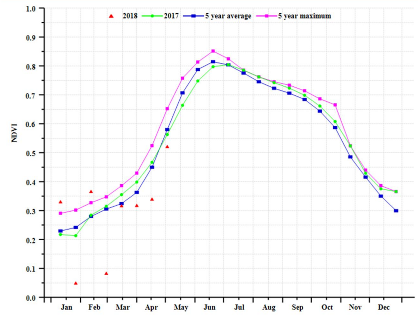
(d) Spatial NDVI patterns compared to 5YA

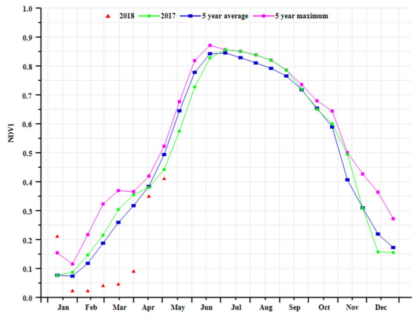
(e) NDVI profiles



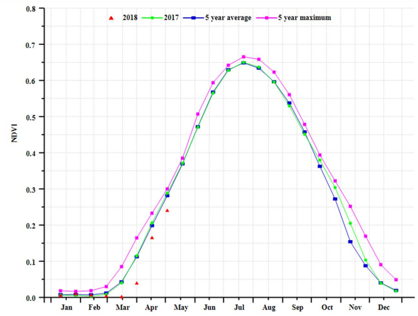


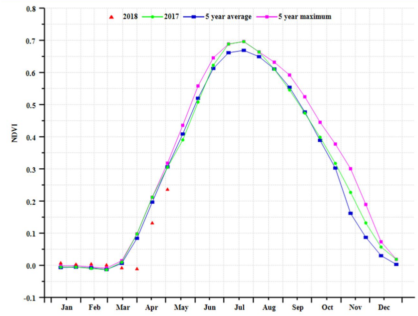
(f) Crop condition development graph based on NDVI (The Caucasus (left) and Central Economic Region (right))



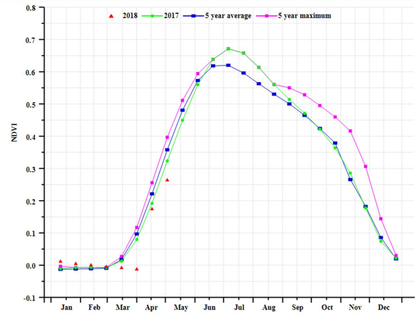


(g) Crop condition development graph based on NDVI (Kaliningrad oblast (left) and Northwest region (right))





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



(i) Crop condition development graph based on NDVI (Volga Basin)

Table 3.80. Russia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
The Caucasus	239	9	1.6	-0.1	594	-6
Central Economic Region	196	18	-3.6	-0.9	490	3
Kaliningrad oblast	172	-2	0.9	-0.4	466	2
Northwest region including Novgorod	185	12	-2.8	-0.5	392	-4
Southern Siberian area	96	5	-11.8	-0.5	562	-6
Southern Urals	100	-3	-9.4	-1.4	497	-3
Volga Basin	170	10	-7.1	-1.7	518	2

Table 3.81. Russia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
The Caucasus	719	1	60%	-19.1	0.78
Central Economic Region	540	-8	25%	-63.3	0.71
Kaliningrad oblast	761	3	77%	-15.2	0.70
Northwest region including Novgorod	563	-4	30%	-61.1	0.56
Southern Siberian area	284	-6	1%	-77.6	0.69
Southern Urals	334	-18	1%	-88.4	0.67
Volga Basin	399	-18	5%	-86.8	0.58

Table 3.82. CropWatch-estimated Wheat production for Russia in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Wheat	58912	-4.2%	-3.8%	54264	-7.9%

[THA] Thailand

The harvest of Thailand's main rice was completely in early January, while the second season rice was ready for harvest in April, at the time when maize was being sowed.

According to Agroclimatic indicators, rainfall was close to average over the reporting period (RAIN, +2%), while temperature (TEMP, -1.1°C) and radiation (RADPAR, -8%) were below. The biomass production potential (BIOMSS) is up by 9%, and the fraction of cropped arable land (CALF) also increased by 6% over its average for the period. Nationwide Crop condition based on NDVI was above average and reached the 5-year maximum before April. It slightly decreases later but remained above average. According to the NDVI departure clustering map, 25% of the arable land was below average over the monitoring period although it partially recovered from February (in the south and northeast of Thailand and in Nakhon Sawan). 20.6% of the crop areas were slightly better than 5-year average before March and decreased to slightly below average later (middle of Central double and triple-cropped rice lowlands and south of Western and southern hill areas). Other areas, accounting for 54.4% of cropland was below average before mid-January and recovered to above average in February. The areas under consideration include patches over the whole country except for Prachuap Khilikhan, Chumphon, Ranong, Phangnga, Krabi, Trang, Satun, Songkhla and Yala in south of the country. To sum up, crop condition is anticipated to be average or above but below last year's. For rice, Cropwatch projects that the production will decrease 5.2% compared to last years output.

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 (115), South-eastern horticulture area (116), Western and southern hill areas (117) and the Single-cropped rice north-eastern region (118). 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 -1.1ºC) and radiation (RADPAR -10%) were below average, and accumulated rainfall was significantly above (RAIN +21%), resulting in the largest biomass production potential increase in Thailand (BIOMSS +26%). According to the NDVI development graph, crop condition was above the 5-year maximum before April and reached to 5-year maximum in April. This is confirmed by a favorable VCIx index of 0.86. Overall, the situation was above average and may reach to maximum of previous 5 years.

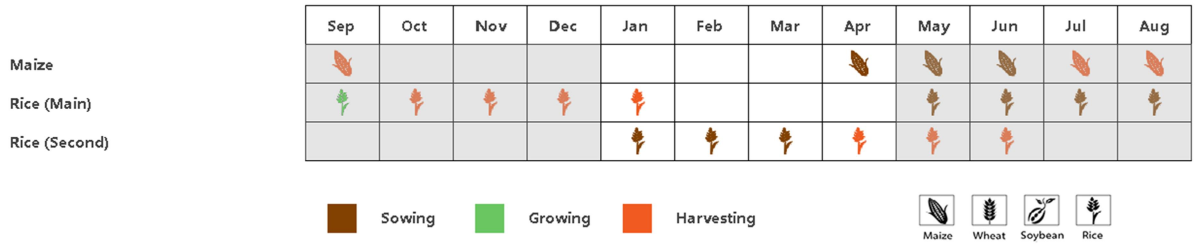
The temperature of the South-eastern horticulture area suffered a decrease of 1.4ºC, while rainfall (RAIN, +54%) and radiation (RADPAR, -9%) experienced the same changes as the whole country. The VCIx map, NDVI development graph, and BIOMSS indicators (+45%) all lead to the conclusion that crop condition was close to 5-year maximum.

Crop condition in the Western and southern hill areas was average according to the Agroclimatic indicators: TEMP -0.8°C, RADPAR -8%, and BIOMSS +1% when compared to their respective averages; rainfall (-6%) was below average. According to the NDVI development graph, crop condition was close to average.

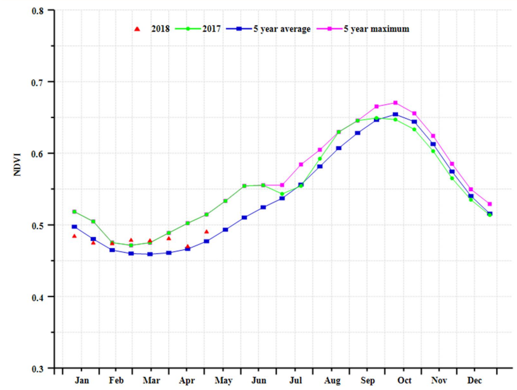
Finally, the situation in the Single-cropped rice north-eastern region was close to average. According to Cropwatch indicators rainfall (RAIN -5%), temperature (TEMP -0.5°C) and radiation (RADPAR -9%) were below average. BIOMSS (+7%) shows above average values. The NDVI development graph shows that crop condition was close to average, which is confirmed by the NDVI profiles.

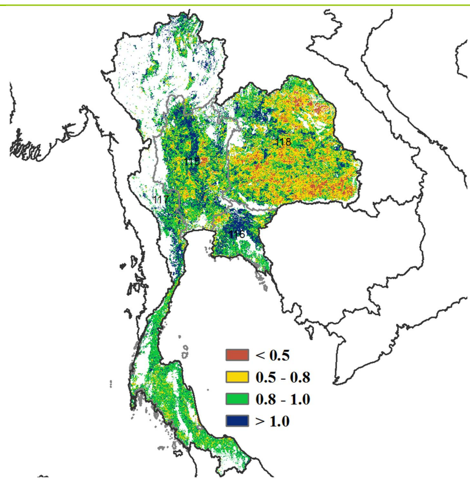
At the national level, most arable land was cropped during the season and had favorable VCIx values around 0.79. CropWatch projects that the production of rice will be above average.

Figure 3.40. Thailand's crop condition, January-April 2018

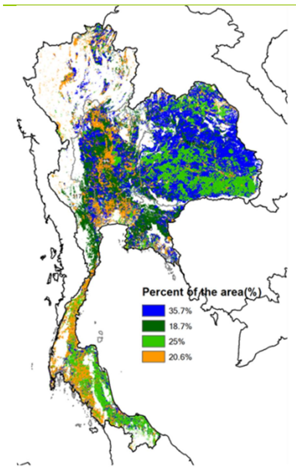


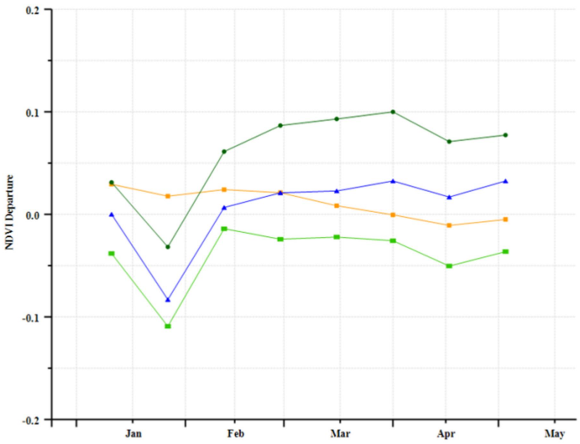
(a). Phenology of major crops



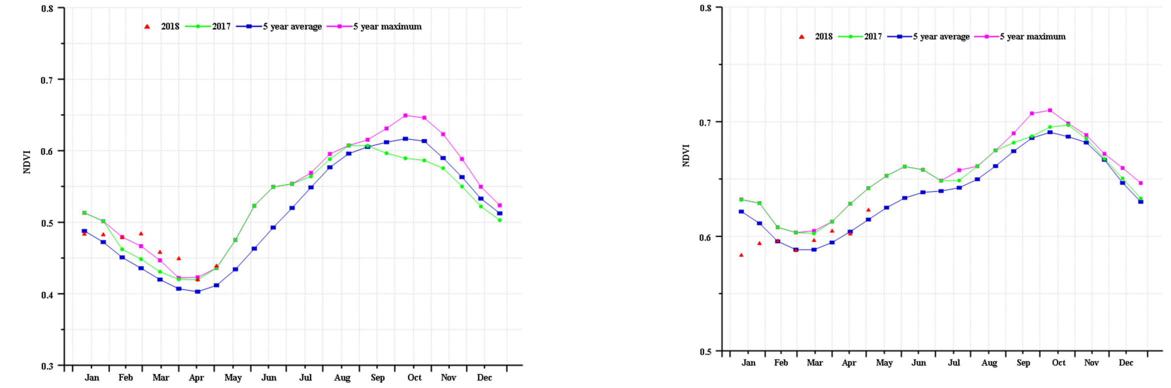


(b) Crop condition development graph based on NDVI (c) Maximum VCI

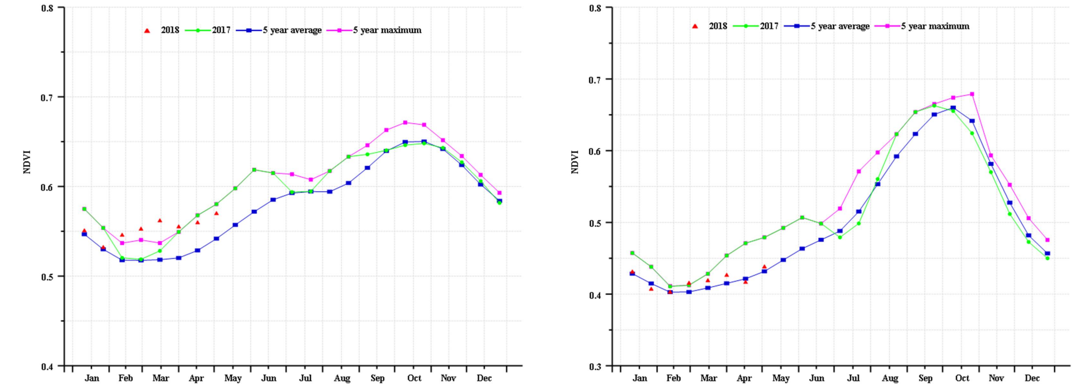




(d) Spatial NDVI patterns compared to 5YA (e) NDVI profiles



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



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

Table 3.83. Thailand's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 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	170	21	26.9	-1.1	1060	-10
South-eastern horticulture area	347	54	26.6	-1.4	1044	-9
Western and southern hill areas	237	-6	25.8	-0.8	1068	-8
Single-cropped rice north-eastern region	150	-5	26.1	-1.3	1061	-8

Table 3.84. Thailand's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Central double and triple-cropped rice lowlands	670	26	94	8	0.86
South-eastern horticulture area	1172	45	97	4	0.90
Western and southern hill areas	703	1	99	3	0.79

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Single-cropped rice north-eastern region	618	2	69	7	0.74

Table 3.85. CropWatch-estimated rice production for Thailand in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Rice	38495	-4.7%	-0.5%	36502	-5.2%

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

[TUR] Turkey

Winter wheat was still in the fields during the monitoring period, while maize and rice were being planted from April. Nationwide, RAIN was close to average and TEMP 2.8℃ above. These favorable climate conditions resulted in the increase of cropped arable land fraction (CALF, +10%) and led to a national average VCIx of 0.92. According to both NDVI profile clusters and map and the VCIx map, spatially coherent below average conditions occur only in south-eastern Anatolia (along the Syrian border) centered around Şanlıurfa and Gaziantep.

CropWatch assesses the crop condition as above the average of the previous five years and puts the yield for wheat 7.5% above the 2017 value, and the cropped area 0.3% above. The resulting wheat production is estimated to be 7.9% up.

Regional analysis

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

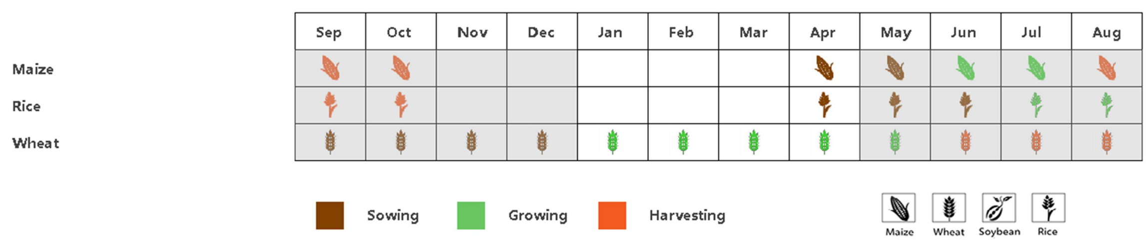
In the Black Sea zone, crop condition was above 5YA average according to NDVI profiles. The rainfall and the temperature were above average (RAIN +12%, TEMP +2.4°C), which led to favourable BIOMSS (+16%) compared with average. The maximum VCI (VCIx) reached 0.89.

The Central Anatolia zone also enjoyed good crop condition during the reporting period. Rainfall and the temperature were conducive to crop growth (RAIN, +14%; TEMP, +3.0°C). The CALF is up 25%, and so is BIOMSS (+12%). The VCIx was 0.90 in the Central Anatolia zone.

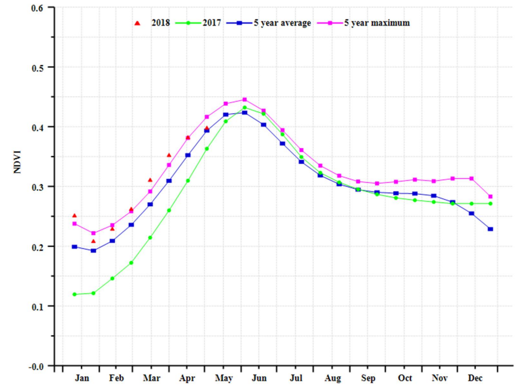
In the Eastern Anatolia zone, CropWatch puts the crop condition above average, which is confirmed by the NDVI profile. Although the zone experienced a slight drop in rainfall and radiation compared to average, current values remained high (RAIN 278mm, RADPAR 834 MJ/㎡). The temperature was significantly above average (+3.8°C). Altogether, the biomass and the cropped arable land fraction were above average (BIOMSS, +14%; CALF, +4%). The VCIx was 1.02, the highest on record so far.

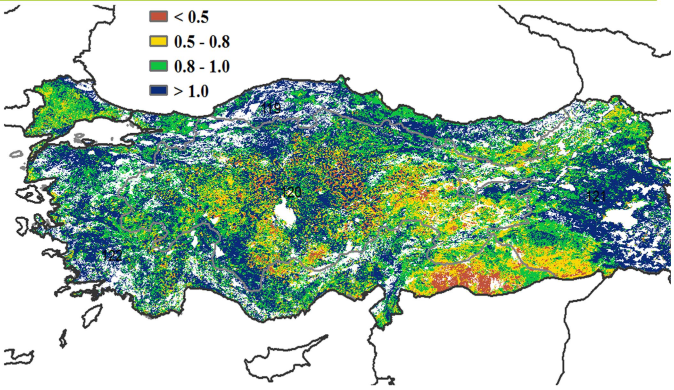
As shown in Table 3.74, the Marmara Agean Mediterranean lowland zone, recorded temperature 2.2℃ above average. Both rainfall and the radiation have suffered a slight decrease, but current values were still high (RAIN 300mm, RADPAR 799 MJ/㎡). BIOMSS increased 5%, and the CALF rose 4%. VCIx (0.87) and NDVI agree in assessing the crop condition as above average.

Figure 3.41. Turkey's crop condition, January-April 2018



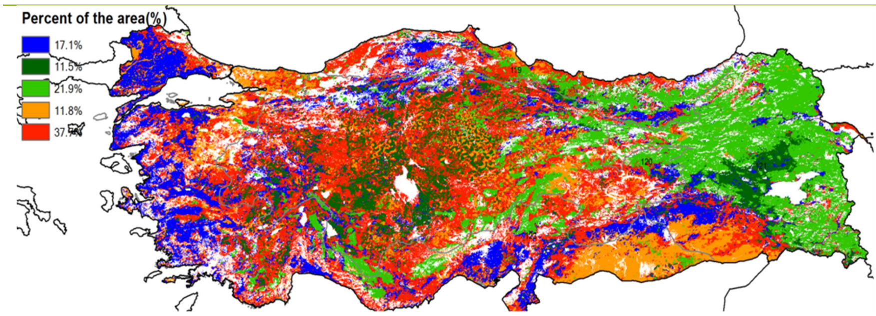
(a). Phenology of major crops

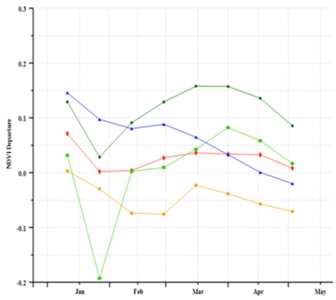




(b) Crop condition development graph based on NDVI

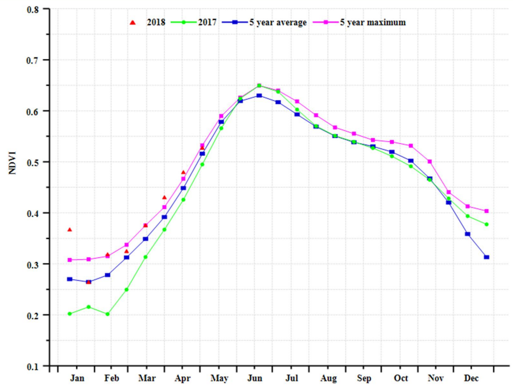
(c) Maximum VCI

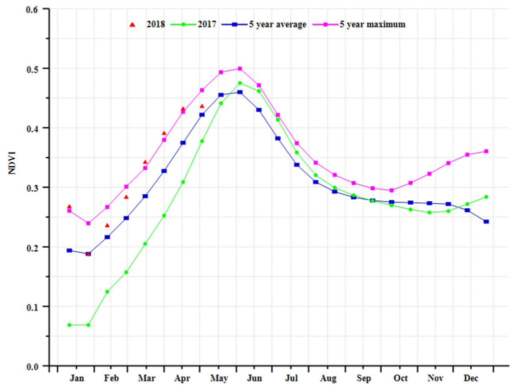




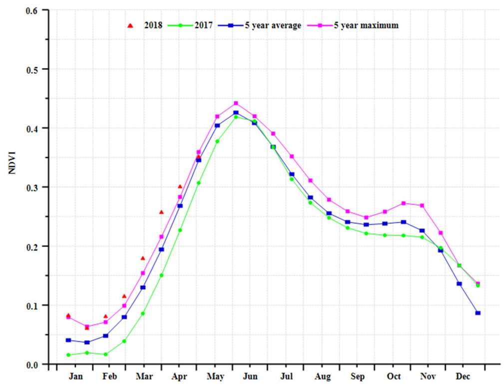
(d) Spatial NDVI patterns compared to 5YA

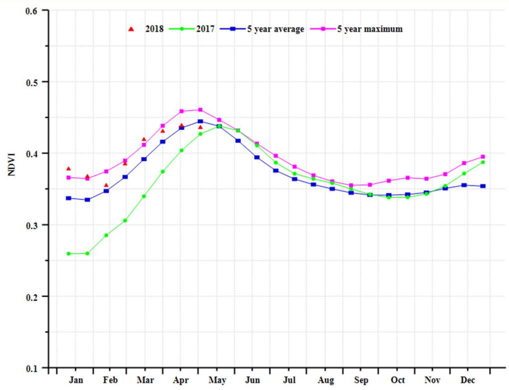
(e) NDVI profiles





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





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

Table 3.86. Turkey's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m^2)	Departure from 15YA (%)
Black Sea region	355	12	6.4	2.4	728	-4
Central Anatolia region	301	14	6.5	3.0	817	-4
Eastern Anatolia region	278	-9	3.5	3.8	834	-5
Marmara Agean Mediterranean lowland region	300	-10	9.7	2.2	799	-5

Table 3.87. Turkey's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Black Sea region	995	16	76	-1	0.89
Central Anatolia region	924	12	55	25	0.90
Eastern Anatolia region	765	14	43	4	1.02
Marmara Agean Mediterranean lowland region	1020	5	77	4	0.87

Table 3.88. CropWatch-estimated Wheat production for Turkey in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Wheat	19174	7.5	0.3	20682	7.9

[UKR] Ukraine

During the monitoring period, only winter wheat was in the filed while maize will not be planted until May.

According to the agroclimatic indicators, rainfall was abundant (RAIN 208 mm, +18%), with above average temperature (TEMP, 1.5℃, +0.1℃). At 568 MJ/m² RADPAR was 2% above average, further contributing to providing favorable conditions for crop growth. Agronomic indicators include a favourable maximum vegetation condition index at the national level (VCIx, 0.86). Even if the cropped arable land fraction was just fair (CALF , 69%), overall crop condition was good, which was confirmed by a significant increase for the BIOMSS indicator (778 g DM/m2, +8.2%).

As shown in the crop condition development graph, national NDVI was persistently below the 5-year average until late April, possibly due to temperature. The spatial NDVI pattern also shows that NDVI was consistently lower than the 5-year average during this monitoring period (in about 65.5% of Ukraine, concentrated in northern areas). NDVI recovered to average in late April. According to maximum VCI, the cropped arable land in most central and west area reached 80-100%, while it is 50-80% in the east.

CropWatch predicts that wheat production will increase by 4.1% in 2018.

Regional analysis

Regional analyses are provided for four agroecological zones (AEZ) defined by their cropping systems, climatic zones and topographic conditions. They are referred to as Central wheat area, Northern wheat area, Eastern Carpathian hills, and Southern wheat and maize area.

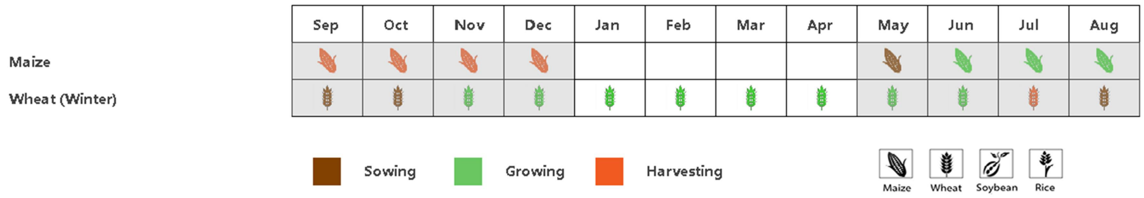
The Central wheat area (Poltava, Cherkasy, Dnipropetrovsk and Kirovohrad oblasts) received abundant rainfall (RAIN 227mm, +33%), normal temperature (TEMP 0.9℃, -0.2℃) and sunshine (RADPAR 562 gDM/m², +2%). In spite of low CALF (58%, 21% below the 5Y reference), high VCIx (0.87) and BIOMSS (+9%) indicate favorable crop condition.

The Northern wheat area (Rivne, Zhytomyr and Kiev oblasts) experienced basically normal agroclimatic conditions for rainfall (RAIN 180 mm, +6%), temperature (TEMP 0.8℃, -0.1℃) and radiation (RADPAR 553 gDM/m2, +5%). BIOMSS is up 5% above the 5-year average. NDVI, CALF (0.74) and VCIx (0.89) all indicate favorable condition for crops.

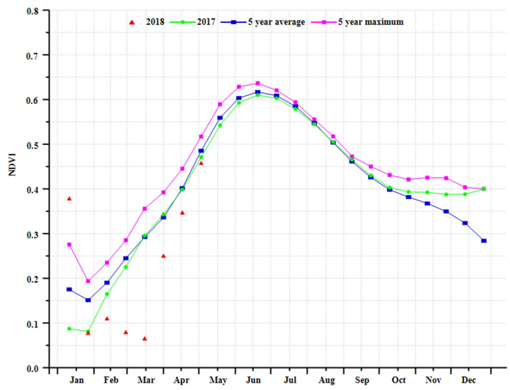
The Eastern Carpathian hills (Lviv, Zakarpattia and Ivano-Frankivsk oblasts) were 6% short in rainfall, but temperature and sunshine were high (TEMP 2.0℃, +0.5℃; RADPAR 580 gDM/m², +4%). Compared with the recent 5YA, agronomic indicators point good crops with BIOMSS +6%, CALF at 0.97 and VCIx at 0.85.

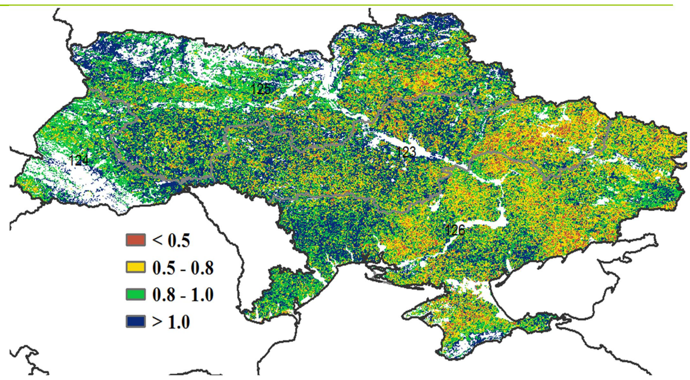
The Southern wheat and maize area (Mykolaiv, Kherson and Zaporizhia oblasts) recorded substantial rainfall (RAIN 226 mm, +20%), normal temperature (TEMP 2.4℃, +0.2℃) and radiation (RADPAR 586, -1%). Despite low CALF (0.68), VCIx (0.83) and BIOMSS (up 12%) indicate satisfactory output of winter wheat.

Figure 3.42. Ukraine's crop condition, January-April 2018



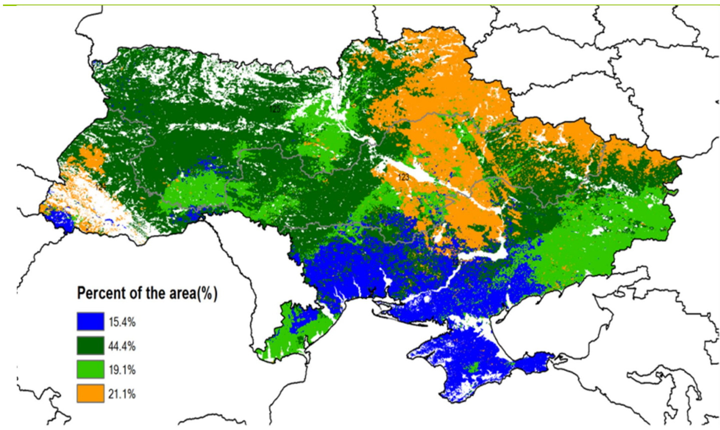
(a). Phenology of major crops

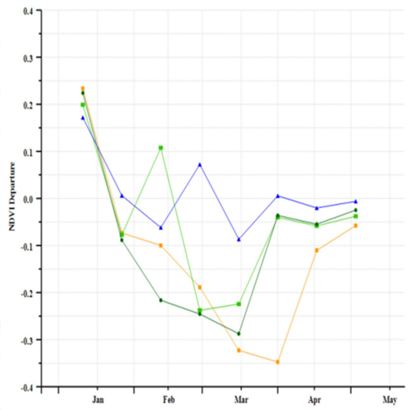




(b) Crop condition development graph based on NDVI

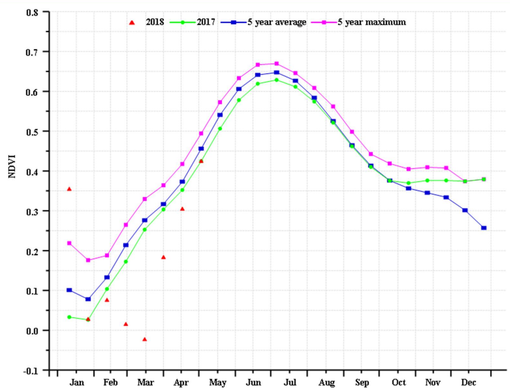
(c) Maximum VCI

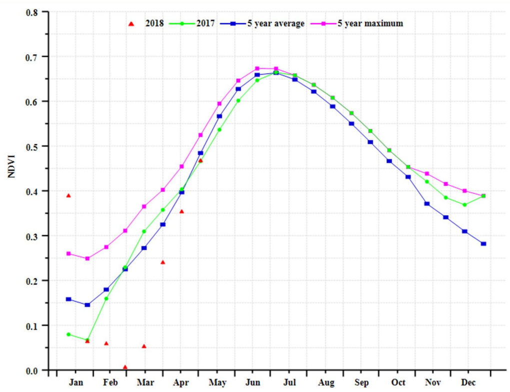




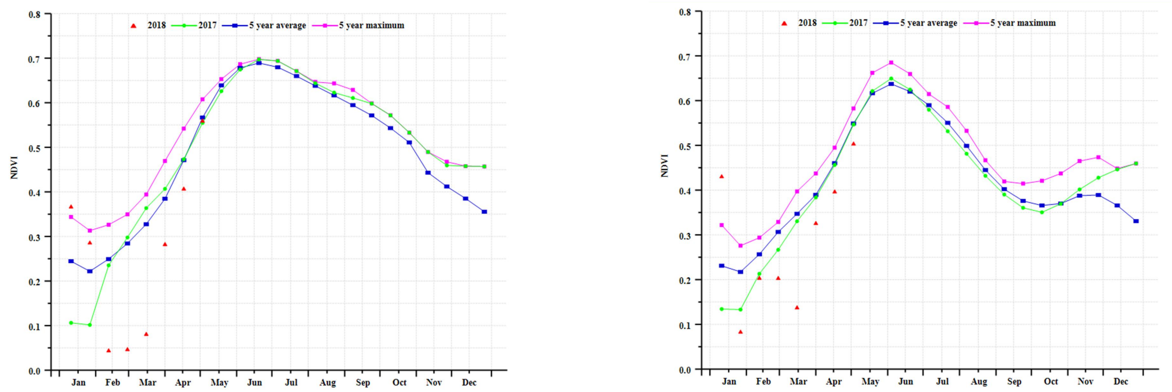
(d) Spatial NDVI patterns compared to 5YA

(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 3.89. Ukraine's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m^2)	Departure from 15YA (%)
Central wheat area (Ukraine)	227	33	0.9	-0.2	562	2
Northern wheat area (Ukraine)	180	6	0.8	-0.1	553	5
Eastern Carpathian hills (Ukraine)	204	-6	2.0	0.5	580	4
Southern wheat and maize area (Ukraine)	226	20	2.4	0.2	586	-1

Table 3.90. Ukraine's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Cebntral wheat area (Ukraine)	777	9	58	-21	0.87
Northern wheat area (Ukraine)	761	5	74	-11	0.89
Eastern Carpathian hills (Ukraine)	814	6	97	0	0.85
Southern wheat and maize area (Ukraine)	787	12	68	-20	0.83

Table 3.91. CropWatch-estimated Wheat production for Ukraine in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Wheat	22662	4.3%	-0.2%	23600	4.1%

[USA] United States

This monitoring period (January to April 2018) covers the overwintering stages of winter crops, and the sowing of summer crops: maize, rice, soybean, and spring wheat.

In general, crop condition described by the national NDVI profiles is below average. For the whole country, RAIN (315 mm) was 5% above average, while temperature (4.6°C) was below (-0.8°C), and radiation (RADPAR) significantly so (-6%). The biomass production potential was 9% below average.

Dry weather prevailed in the major winter wheat areas; in the Southern Plains and California RAIN was -12% and-19% below average, respectively, which in turn resulted in 22% and 6% below average biomass production potential. In other major winter wheat areas, RAIN in the Northwest was 1% above the average, temperature up 0.2°C and RADPAR below average by a significant 9%.

Almost all major winter wheat states suffered serious precipitation deficit problems. RAIN in Kansas, Oklahoma, Texas, California, Oregon and Nebraska was 58%, 15%, 14%, 19%, 22% and 27% below the average, respectively. Dry weather also prevailed in Iowa, Illinois and Missouri states, where RAIN was 17%, 6% and 10% below the average. Water stress caused the marked drop in BIOMASS of major winter wheat states, including Kansas (-49%), Texas (-17%), California (-6%), Oklahoma (-23%), and Nebraska (-17%).

Drought is also responsible for the significant CALF drop in major winter crops regions such as the Southern Plains (-24%) and the South-west (-34%). The performance of crop growth condition was also far below the average with maximum VCI (VCIx) reaching only 0.55 in the Southern Plains.

NDVI profiles indicated that the water deficit resulted in a significant decline of NDVI below average for the whole country after the middle of January. A negative NDVI trend was observed in the whole Southern Plains after the middle of February. Until the end of April, crop growth condition in almost regions was below the average.

Considering the drought and significant decline of CALF in the major winter crop regions, below average crop production is currently estimated by CropWatch for the USA.

Regional analysis

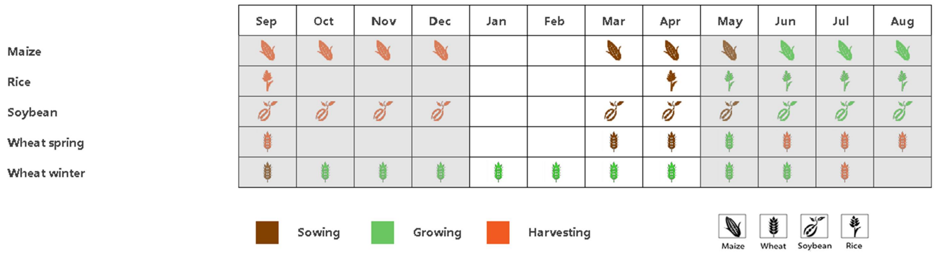
Based on cropping systems, climatic zones, and topographic conditions, 11 sub-national agricultural regions was distinguished for the USA. They are listed in the tables below. However, considering the timing of the season only three will be described in detail, namely the Southern Plains, Northwest and California.

The most important winter wheat region of United States, the Southern Plains suffered drought during this monitoring period. RAIN, temperature and RADPAR were 12%, 1.1°C, and 4% below the average. In Kansas, the most important winter wheat State, RAIN was 58% below the average, which has affected the growth of winter wheat. Unfavorable weather condition resulted in below average crop condition in the Southern Plains, with maximum VCI (VCIx) estimated by CropWatch not to exceed 0.55. In the north-western areas, VCIx was below 0.5, indicating bad crop growth condition.

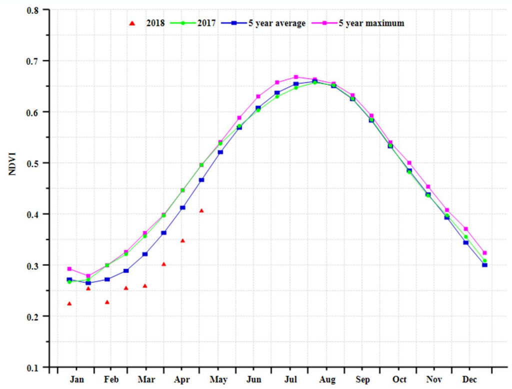
The weather condition in the Northwest was better than the Southern Plains: RAIN (237 mm) was average, and temperature was 0.2 °C above the average, while RADPAR was significant 9% below the average. In this region, Oregon State suffered serious drought with RAIN 22% below the average. The CALF was a marked 19% below the average which would entail reduced production. Below average crops and production are expected in this region.

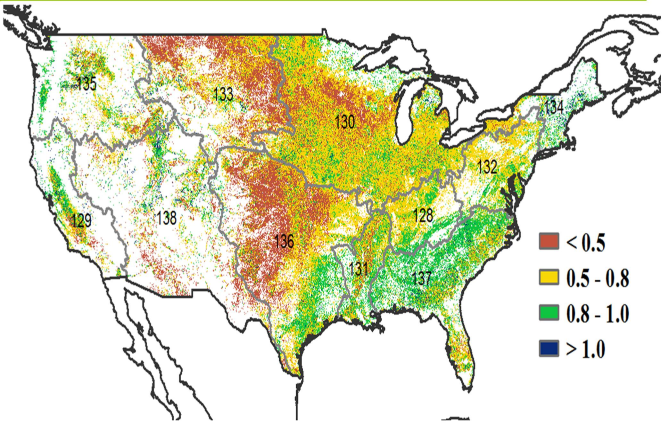
The crop condition in California was also below the average. This region was also dominated by dry weather: RAIN was 19% below the average, Temp was average, while the RADPAR was 5% below. The biomass accumulation potential was 6% below the average.

Figure 3.43. United States's crop condition, January-April 2018



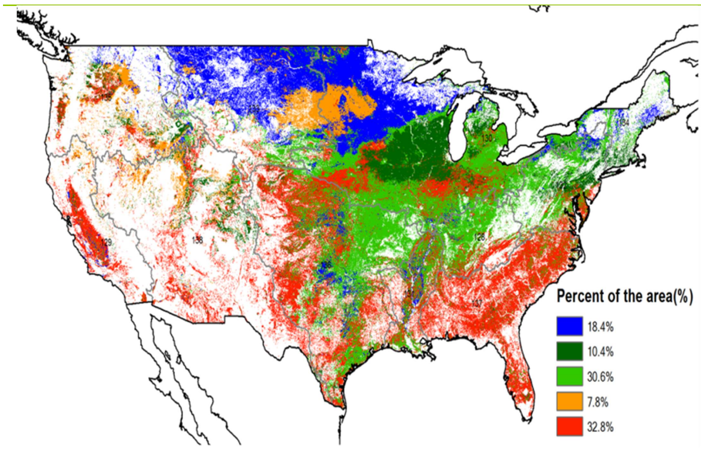
(a). Phenology of major crops

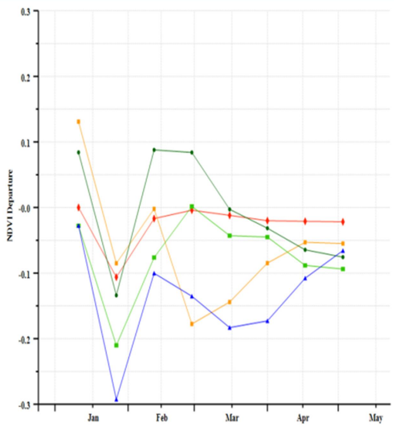




(b) Crop condition development graph based on NDVI

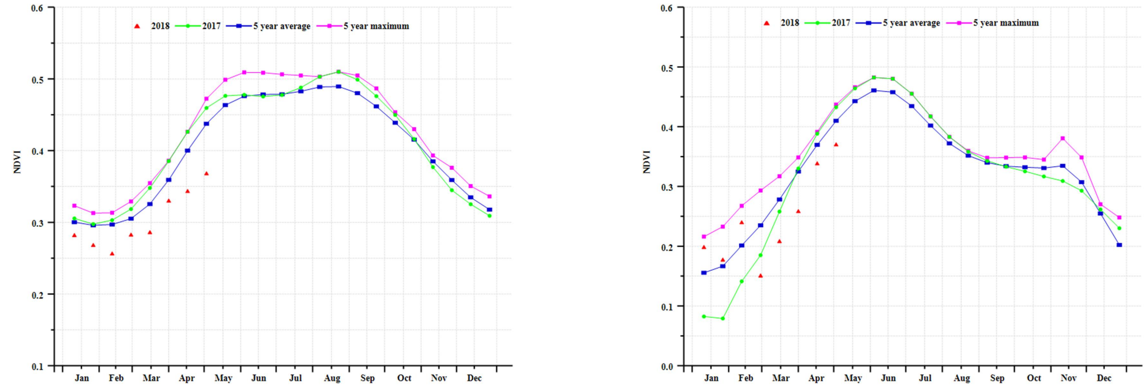
(c) Maximum VCI



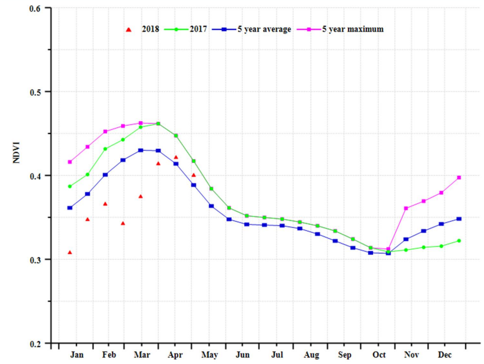


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



(f) Crop condition development graph based on NDVI (Southern Plains (left) and Northwest (right))



(g) Crop condition development graph based on NDVI (California)

Table 3.92. United States's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m^2)	Departure from 15YA (%)
Blue Grass region	590	18	6.5	-0.9	711	-10
California	190	-19	7.9	0.0	870	-5
Corn Belt	302	11	-1.3	-1.7	719of	-5
Lower Mississippi	583	13	11.4	-0.9	805	-6
Middle Atlantic	431	26	2.9	-0.7	666	-11
Northern Plains	198	50	-4.1	-2.8	762	-4
Northeast	426	27	-1.1	0.3	609	-13
Northwest	237	1	1.6	0.2	652	-9
Southern Plains	241	-12	9.0	-1.1	876	-4
Southeast	359	-16	12.6	-0.4	856	-4
Southwest	72	-23	5.7	1.4	1003	-4

Table 3.93. United States's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Blue Grass region	1143	-5	0.95	-3	0.76
California	598	-6	0.71	-3	0.73
Corn Belt	598	-16	0.15	-60	0.65
Lower Mississippi	1430	3	0.70	-9	0.73
Middle Atlantic	863	-3	0.84	-15	0.73
Northern Plains	483	-5	0.01	-86	0.50
Northeast	613	-1	0.67	-28	0.79
Northwest	681	9	0.47	-19	0.72
Southern Plains	601	-22	0.47	-24	0.55
Southeast	1194	-6	0.99	0	0.83
Southwest	303	-18	0.09	-34	0.61

Table 3.94. CropWatch-estimated Wheat production for United States in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Wheat	54812	-8.7	-5.3	47399	-13.5

[UZB] Uzbekistan

The monitoring period covers the growing stage of winter wheat and the sowing of maize. Crop condition was generally unfavorable. The national average VCIx was 0.63, and the cropped arable land fraction decreased by 26% compared with the 5YA. Among the CropWatch agroclimatic indicators, RAIN and RADPAR were below average (-11% and-8%), while TEMP increased by 0.7°C. The combination of factors resulted in decreased BIOMSS (-5%) compared to the recent five-year average. As shown by the NDVI development graph, crop condition was below average from late January to the end of March.

NDVI cluster graphs and profiles show that 16.6% of the agriculture area had above average conditions from late March to late April. This includes parts of the four eastern provinces (Namangan, Andijon, Quqon and Farghona) where most wheat is produced, and some patches in Kitab, Samarqand, Bukhoro and Guliston provinces. NDVI was below average in the western provinces and most parts of northern, central and southern provinces. Overall, CropWatch expects a decrease of 7.3% in wheat production compared with last year.

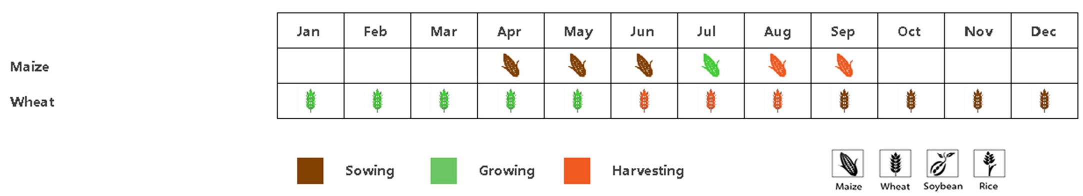
Regional analysis

For the regional analysis, additional detail is provided for two agro-ecological zones in the country: the maize and cereals zone and the cotton zone.

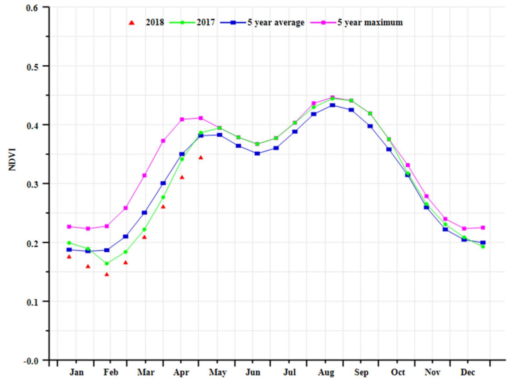
In the maize and cereals zone, NDVI was generally below the five-year average from January to April. The RAIN and RADPAR were 14% and 7% below average (respectively), but TEMP was slightly (0.8°C) above average. The agroclimatic indicators also include a decrease of the BIOMSS index by 11%.

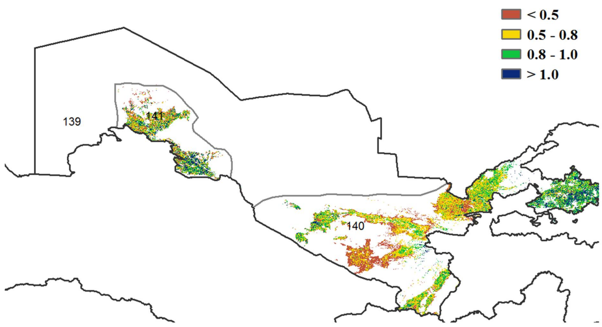
The western and northern areas of the country constitute the cotton zone. Crop condition was below the five-year average from late January to late April. Accumulated rainfall was above average during the monitoring period (RAIN +49%), radiation and temperature were below average (RADPAR -12% and TEMP -0.5°C). The BIOMSS index increased by 37% compared to the five-year average. The maximum VCI index was 0.69, while the cropped arable land decreased by 82%. Overall crop prospects for the region in this season are poor.

Figure 3.44. Uzbekistan's crop condition, January-April 2018

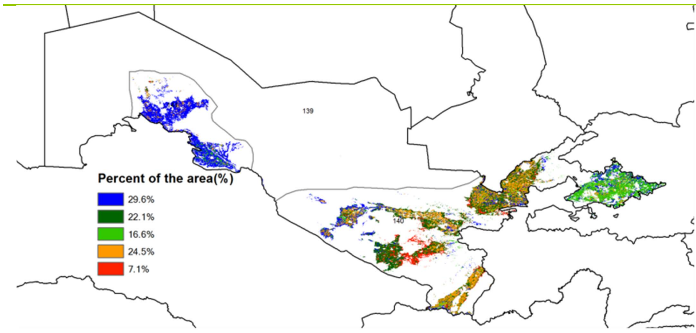


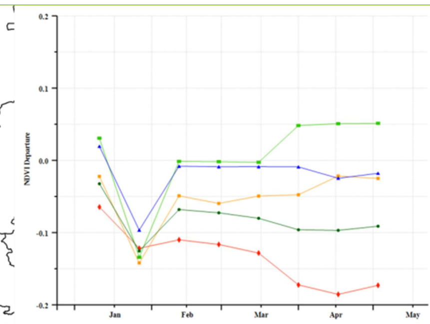
(a). Phenology of major crops



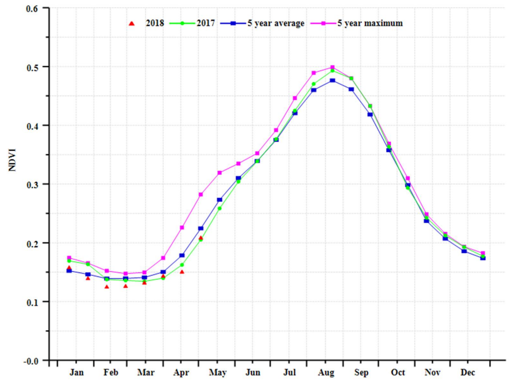


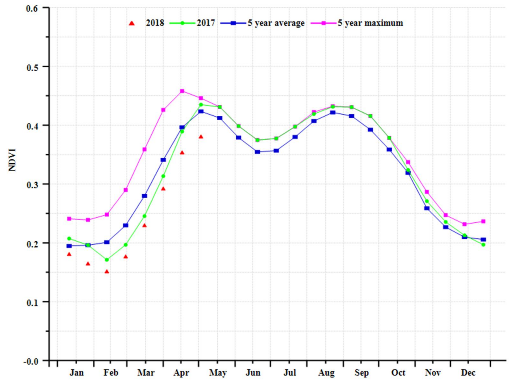
(b) Crop condition development graph based on NDVI (c) Maximum VCI





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





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

Table 3.95. Uzbekistan's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m^2)	Departure from 15YA (%)
Cotton zone (UZB)	139	49	3.4	-0.5	708	-12
Maize and Cereals zone (UZB)	184	-14	6.9	0.8	760	-7

Table 3.96. Uzbekistan's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Cotton zone (UZB)	550	37	33	-82	0.69
Maize and Cereals zone (UZB)	639	-11	-	-	0.61

Table 3.97. CropWatch-estimated Wheat production for Uzbekistan in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Wheat	6442	-8	1	5973	-7

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

[VNM] Vietnam

The period from January to April covers the sowing and growing periods of spring rice in both the north and south of the country, with differences due to altitude. Most of the rice cultivation regions are distributed in the northern Red River delta and in the Mekong Delta in the south.

Nationwide, rainfall was 134 mm, 37% above average. The temperature was about average but at 865 MJ/d/m2, RADPAR was 10% below. The biomass production potential fell 12% against the 5YA, with the cropped arable land fraction (CALF) at 0.96 (up 1% over the 5YA) and the maximum vegetation condition index at 0.84. CropWatch currently predicts rice production to decrease about 1.4% below 2017 output.

Regional analysis

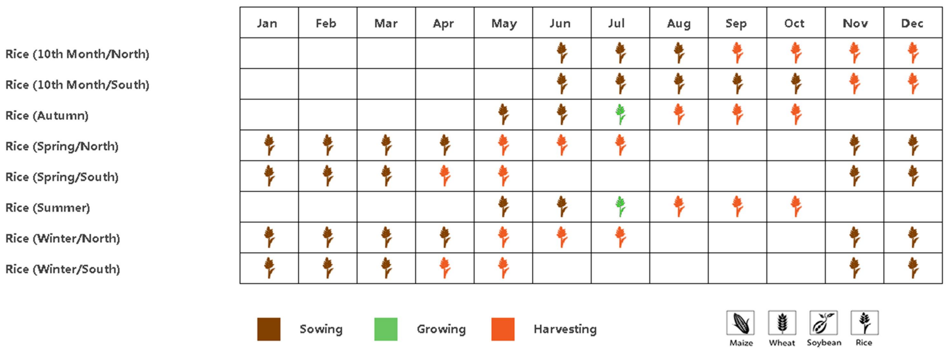
According to the cropping system, climatic zones, and topographic conditions, several agro-ecological zones (AEZ) could be distinguished. The Northern zone with the Red River Delta, the Central coastal areas from Thanh Hoa to Khanh Hoa and the Southern zone with the Mekong Delta.

The current biomass in the North Zone is lower than the last 5-years average by 19%, as a result of rain and RADPAR reductions of 35% and 18%, respectively. In the central zone, the biomass increased up to 13% as an effect of rain increasing 9% above average; RADPAR dropped 10%. The biomass in the southern zone decreased 20% below the 5YA in parallel with a 23% drop in RAIN; RADPAR was about average.

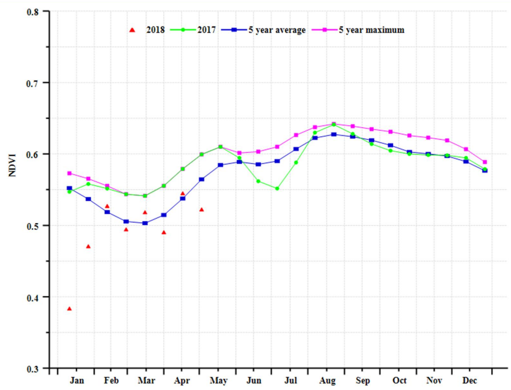
The central coastal zone did better than the other areas as over 80% of the croplands show average or better than average crop condition.

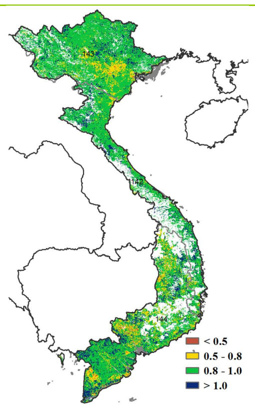
In general, crop prospects are expected to be satisfactory.

Figure 3.45. Vietnam's crop condition, January-April 2018



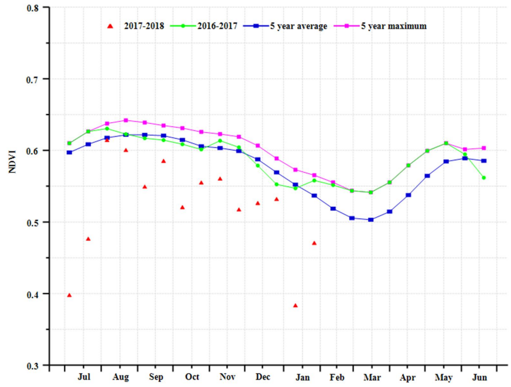
(a). Phenology of major crops





(b) Crop condition development graph based on NDVI

(c) Maximum VCI



(d) NDVI profiles

Table 3.98. Vietnam's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m^2)	Departure from 15YA (%)
Northern zone with Red river Delta	131	-35	18.3	-0.5	631	-18
Central coastal areas from Thanh Hoa to Khanh Hoa	169	9	22.3	-0.9	794	-10
Southern zone with Mekong Delta	113	-23	25.3	-0.8	1139	-4

Table 3.99. Vietnam's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Northern zone with Red river Delta	543	-19	1.0	0.2	0.8
Central coastal areas from Thanh Hoa to Khanh Hoa	635	13	1.0	-0.2	0.8
Southern zone with Mekong Delta	421	-20	0.9	2.8	0.9

Table 3.100. CropWatch-estimated rice production for Vietnam's in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Rice	45422	-1.50%	0.05%	44765	-1.45%

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

[ZAF] South Africa

The monitoring period corresponds to the main growing period for maize in South Africa. Favorable conditions prevailed in Free State, Kwa-Zulu Natal, Gauteng, Eastern Cape, North West and Mpumalanga provinces with VCIx between 0.5-0.8, while a large part of the Free State had VCIx above 0.8. Vegetation conditions reflect the agroclimatic conditions that prevailed during this period, essentially average rainfall nationwide (RAIN +2%). The major production regions in the country experienced a slight reduction in temperature not exceeding 1°C. The RADPAR was highest in the Mediterranean zone, where the growing season is just starting.

Agronomic indicators reveal a Biomass reduction in all the zones, with the Mediterranean recording a 12% departure from average. Correspondingly, its CALF dropped by 43% which is of little consequence at this time of the year. CALF in the Humid Cape Fold Mountains increased by 24%, which is far less relevant, in terms of production, than the 6% increment noted in the main rainfed summer maize production zone of the Dry Highveld and Bushveld.

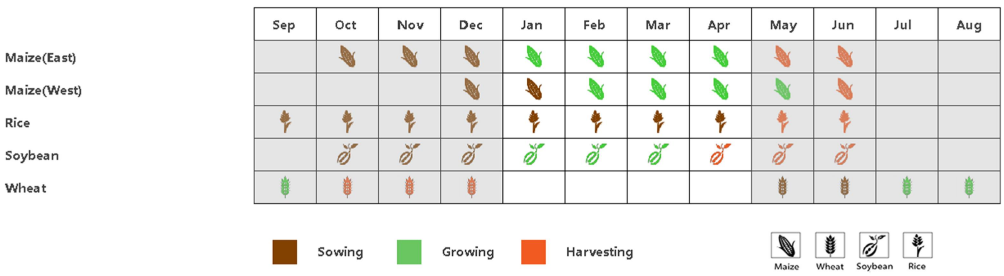
Overall compared to last years production, maize is expected to be quite comparable to last season's.

Regional analysis

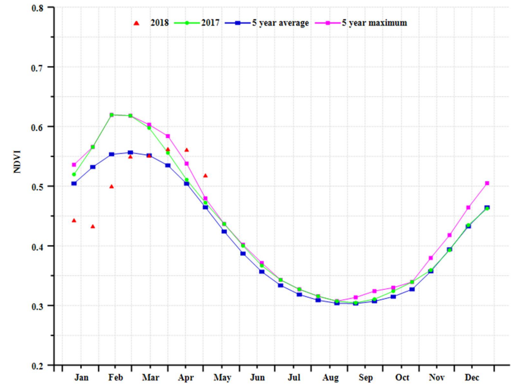
The Mediterranean, Humid Cape Fold Mountains, and Dry Highveld and Bushveld maize zones are the major crop producing agro-ecological zones (AEZs) covered in this analysis. In the HumidCape Fold Mountains zone, the crop conditions were poor and below average during the monitoring period compared to last season. However, the conditions showed a fairly healthy vegetation status as given by a VCIx of 0.64.

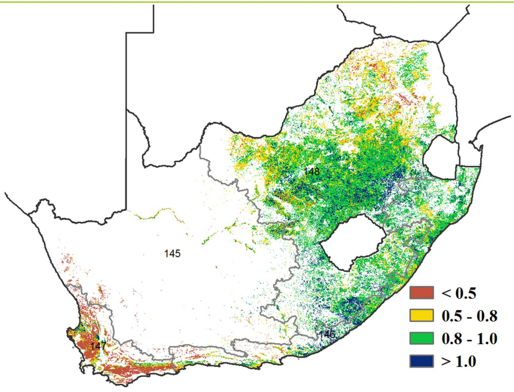
While the season is about to start in the Mediterranean zone, maize has reached the time of harvest in the Dry Highveld and Bushvelds. NDVI profiles were initially poor during initial growth stages but improved and were above average between starting in February, a period corresponding to the active vegetative stages and eventual flowering of most summer maize. This period enjoyed a notable increment in rainfall and temperature. About 18% of the cropped area experienced better conditions compared to the average, especially in Free State and parts of Gauteng Provinces. The VCIx in this zone was 0.70. While some concern may persist for parts of the Limpopo and Mpumalanga provinces, the overall situation for maize in South Africa is at least fair.

Figure 3.46. South Africa's crop condition, January-April 2018



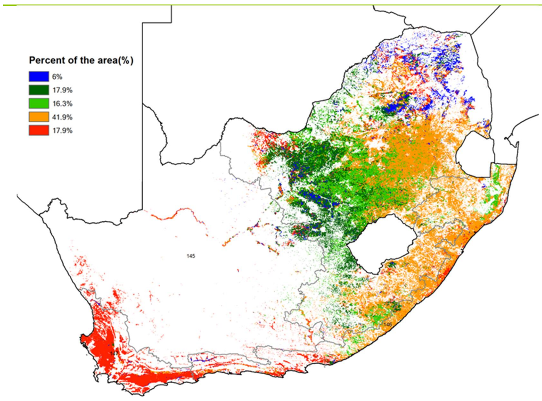
(a). Phenology of major crops

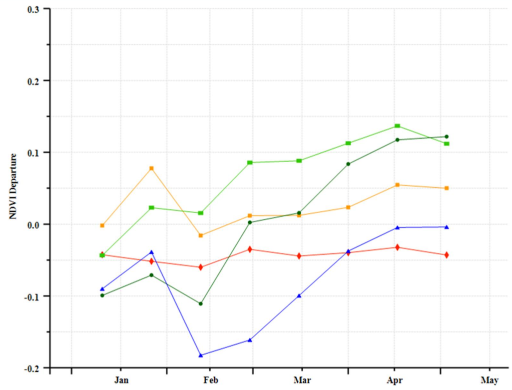




(b) Crop condition development graph based on NDVI

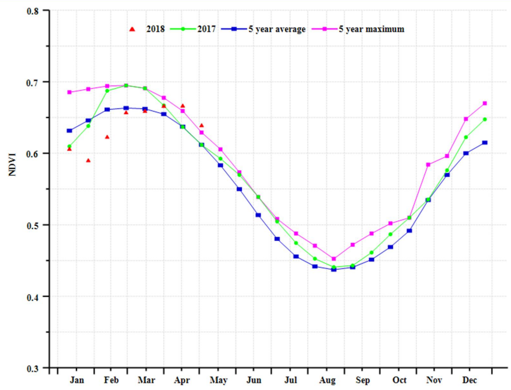
(c) Maximum VCI

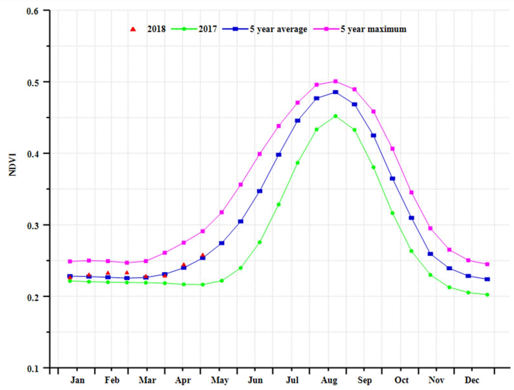




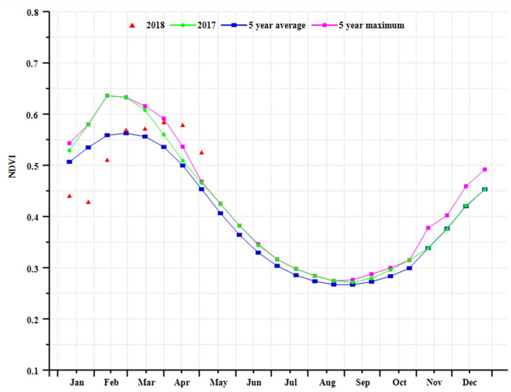
(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles





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



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

Table 3.101. South Africa's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m^2)	Departure from 15YA (%)
Humid Cape Fold Mountains	318	-2	21	-0.73	1098	-2
Mediterranean Zone	65	-22	19	-0.50	1285	-3
Dry Highveld and Bushveld	355	2	20	-0.37	1207	-1

Table 3.102. South Africa's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Humid Cape Fold Mountains	1035	-4	1	24	0.64
Mediterranean Zone	294	-12	0	-43	0.33
Dry Highveld and Bushveld	1180	-1	1	6	0.70

Table 3.103. CropWatch-estimated maize production for South Africa in 2018 (thousand tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Maize	14161	0	0	13197	0

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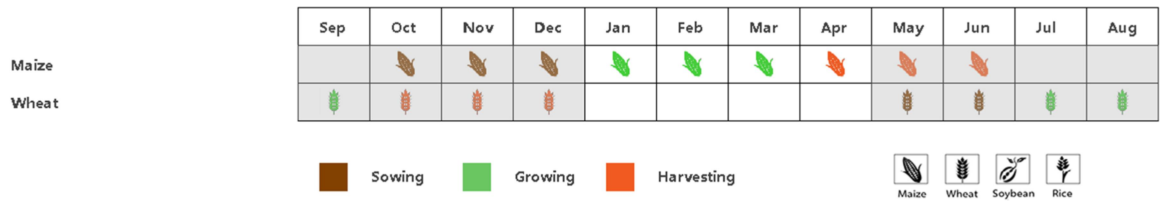
[ZMB] Zambia

The monitoring period cover the growing season of white maize, the main staple in Zambia. At the national scale, rainfall and temperature were slightly below average (RAIN -6%, TEMP -0.7℃) and sunshine measured by RADPAR was up 1%. Crop condition was slightly below average.

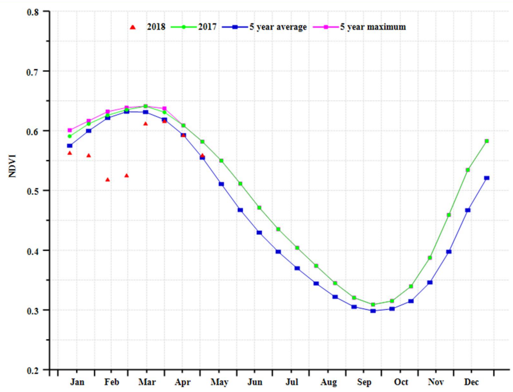
The spatial NDVI patterns show that Central, Southern and Eastern Provinces experienced a sharp decline in condition in the middle stages of growth. They represent about 20% of the cropped area and are the grain basket of the country. The observation is probably coupled with the agricultural drought that occurred in some of these areas. However, this was offset later when rains returned and even led to floods in certain areas. In the Southern and Western Provinces (representing about 15% of the cropped areas) severe conditions prevailed that could lead to poor yields and worsen local food insecurity.

Compared to the 5YA, CALF remained unchanged and accumulated biomass fell 2%. A drop in production is anticipated in most smallholder farms that were affected by the unfavourable rainfall patterns and armyworm attacks. Altogether, CropWatch estimates that the maize production will not vary significantly compared with 2017.

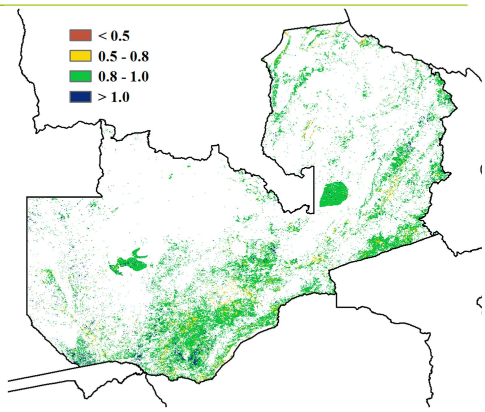
Figure 3.47. Zambia's crop condition, January-April 2018



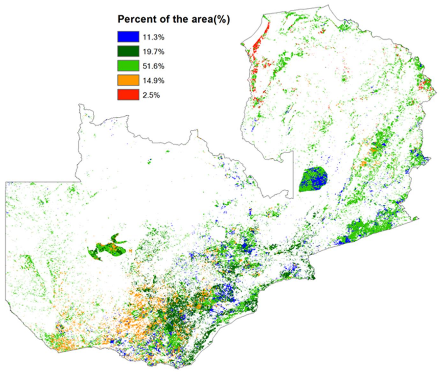
(a). Phenology of major crops

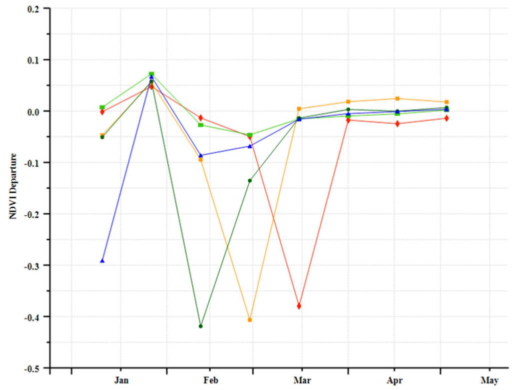


(b) Crop condition development graph based on NDVI



(c) Maximum VCI





(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles

Table 3.104. CropWatch-estimated maize production for Zambia in 2018 (thousands tons)

Crops	Production 2017	Yield variation	Area variation	Production 2018	Production variation
Maize	2394	-1.8%	0.7%	2367	-1.1%