# Chapter 3. Main producing and exporting countries

*Chapter 1 has focused on large climate anomalies that sometimes reach the size of continents and beyond. The present section offers a closer look at individual countries, including the 30 countries that together produce and commercialize 80 percent of maize, rice, wheat, and soybean. As evidenced by the data in this section, even countries of minor agricultural or geopolitical relevance are exposed to extreme conditions and deserve mentioning, particularly when they logically fit into larger patterns.*

## 3.1 Overview

The current reporting period recorded relatively few extreme conditions among the 41+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.

Several major cereal producers on all continents suffered from abnormally dry conditions over the reporting period, especially in Australia (RAIN 45% below average). In Europe, the reporting period (which corresponds with late dormancy and early vegetative growth of winter crops) was particularly dry in Germany (-33%), Poland and some Nordic and Baltic areas. In South Africa (-19%) the period corresponds to the final stages of late maize harvesting. In Canada (-18%) crop development is comparable to the European situation, but mostly less advanced. Finally, in Brazil (-16%), AMJJ corresponds to mid to late stages of summer crops and pre-planting of winter crops in the south, which are thus less likely to have been negatively affected. Rainfall was abundant for winter crops in Turkey (+37%) and possibly excessive in Argentina (+79%, with poor sunshine conditions) for the harvest of summer crops and the planting of winter wheat.

Cold “winter” temperatures affected Cambodia, Bangladesh and Thailand (around -1.4°C below average, with unfavorably low sunshine) where late stages of the second rice crop may have been affected. The coldest area among the major agricultural countries was Kazakhstan at 1.6°C; the planting of summer crops may have been delayed. Heat wave conditions affected much of Europe, with values in excess of 1.6°C above average in the United Kingdom, France, Germany, and Poland. All those areas, as well as Ukraine, experienced above average sunshine.

Figure 3.1 represents countries in the plane of the two first principal components computed based on RAIN, TEMP, BIOMSS, RADPAR, CALF, and VCIx. The two first component (PC1 and PC2) accounts for 68% of the variance. PC1 is positively correlated with RAIN (R =0.858) and BIOMSS (R =0.878) and negatively with RADPAR (R =-0.863). PC2 represents mainly CALF (R =0.751) and VCIx (R=0.706). PC3 covers 18% of the variance and correlates best with TEMP (R =-0.665).

Data outside the concentration ellipse are deemed anomalous and include essentially ARG (point 1) with high RAIN and BIOMSS and low RADPAR, as well as low agronomic indices. EGY (8) comes next with high PC1 values but closer to average CALF and VCIx, while, at the other end of the scale, the group of DEU (7) and POL (22) had low rainfall and high RADPAR and nevertheless better CALF and VCIx. High agroclimatic indices occur in ZAF (31) while three countries had closer to average agroclimatic indices but low agronomic index values: IND (13), PAK (20) and UZB (29).

**Rainfall and biomass accumulation potential anomalies**

As already mentioned in chapter 1, the two indicators tend to follow very similar patterns, except where very unusual temperatures occur. Therefore, BIOMSS will not be specifically mentioned below, except where values markedly depart from RAIN.

**1. Dry areas**

The following discussion focuses on countries that experienced rainfall deficits in excess of 25%. Some of them (e.g. Botswana and Zimbabwe in southern Africa) do not raise any specific concern as they have now reached the end of their summer crop season.

The driest countries occur in Oceania and eastern South-east Asia, in particular, Timor Leste (-75%: 75 mm when the average reaches 260 mm), Australia (-45%), New Caledonia (-40%) and New Zealand (-38%). All of them except New Zealand are also characterized by above average sunshine. In the Caribbean, Dominica (-58%), Trinidad and Tobago (-51%) and the Dominican Republic (-42%) low precipitation was accompanied by low temperature with departures in excess of 1°C. Paraguay (-41%) and Chile (-30%) had the lowest rainfall at the national level in Latin America.

One of most spectacular deficits affects an area that has rarely been prone to very abnormal weather in recent years, i.e. northern central Europe, centred around Germany (-33%) and including Denmark (-48%), Sweden (-45%), the Netherlands (-44%), Belgium (-30%) , Latvia (-29%) and Finland (-28%). The whole area also experienced above average temperature ranging from +1.5°C in Latvia and as much as +3.4°C in Sweden. Not only: the area experienced positive sunshine departures between 8% (Latvia) and 12% (Sweden and Denmark). The conditions triggered early growth after overwintering, but under unfavorable moisture supply and higher than usual water demand owing to the high temperatures and sunshine.

In Asia, both east and west had some rainfall deficit areas at the national level, including the Korean Peninsula (-34% in the Korean DPR and the Korean Republic); in the west Georgia and Turkmenistan recorded a deficit of -33%, Afghanistan was at -30% and Azerbaijan at -26%. Several of the countries also had abnormal values for other indicators. Georgia is singled out because it followed the same pattern as the above mention “German group” with warm weather (+1.5°C) and abundant sunshine.

**2. Wet areas**

Positive Rainfall anomalies in excess of 50% occurred in limited and spatially coherent areas that were mentioned repeatedly in CropWatch bulletins since the feature appeared several years ago. The anomaly, which is very climate-change compatible, affects the normally hyper-arid and semi-arid area from West Africa to central Asia. It was mentioned in Chapter 1. Excess rainfall occurred in the long list of countries in the Arabian Peninsula, the Horn of Africa and the western Mediterranean. The record occurred in Oman where the AMJJ average amounts to 25 mm, but the current reporting period recorded 161 mm, equivalent to 554% increase. Other countries include Kuwait (+217%), Israel (+113%), Jordan (+142%), Iraq (+95%), Syria (+90%), Lebanon (+88%), Somalia (+77%), Saudi Arabia (+64%), Macedonia (+64%), Qatar (+63%), Yemen (+56%), Greece (+53%) and Libya (+50%). The countries experience mild positive or negative temperature anomalies but all had below average sunshine in the range from of -6% (Iraq, Kuwait, and Qatar) to -2% (Libya and Yemen). In Israel, Jordan, Kuwait, and Oman the biomass potential (BIOMSS) increases are significantly lower than the corresponding rainfall anomaly because BIOMSS response to rainfall reaches saturation and because of low temperature. Many of the listed countries

practice ground-water irrigation but others, especially in the Mediterranean area, derive water from rivers, which benefited from the abundant moisture.

Eastern and Southern Africa also had some regions with abundant precipitation, although of a lesser magnitude. The countries include Mozambique (+61%), Namibia and Malawi (+53%), and Tanzania (+50%). While the three first have now reached the end of their summer maize season, rangeland will benefit from the late-season rainfall. Tanzania has more complex cropping patterns due to latitude and relief, and rainfall will benefit food production.

Two more, unrelated, countries need to be mentioned: (1) Mauritania, where the recorded amount of 335 mm exceeds the average by 71%, thereby providing an early start to the summer rainy season. Other Sahelian countries also benefited from an unusually early start of the season (Niger, +30%; North Sudan +23%); (2) Argentina, where the nationwide departure (+79%) hides a spatially complex situation described later in this chapter.

**Temperature anomalies**

**1. Cool areas**

Several of the countries that experienced negative temperature departures in excess of 1.5°C were already mentioned among the areas that recorded large rainfall amounts, in particular, Mauritania (-1.9°C), Somalia (-1.5°C) and Kazakhstan (-1.6°C). Note, however, that the precipitation excess in the last country was only 10%.

All the countries listed in this group has below average sunshine, but they do not follow any clear spatial pattern. The lowest temperature anomaly occurred in French Guyana (-2.6°C and -10% RADPAR), followed by Morocco (-2.3°C and -8% RADPAR), Eswatini in southern Africa (-1.6°C) and Nepal (-1.5°C).

**2. Warmer than average areas**

The countries to be mentioned almost exclusively confined to Western Europe. In fact, among 24 countries where the temperature anomaly exceeds 1.0°C, only one (Angola, +1.7°C) is not European. The highest values (between +2.0°C and +3.4°C) are those of Denmark, Belgium, Luxembourg, Finland, Norway, and Sweden.

**Radiation or sunshine**

The largest national sunshine deficits do not, again, follow any clear geographic pattern, although three of eight countries with very large deficits of 10% and more do occur in Africa: Sao Tome and Principe (-14%), Burkina Faso and Sierra Leone, both at -10%. Four countries of the group are located in central and South America (Guyana -13%, Uruguay -12%, French Guiana -10% and Suriname 10%). This leaves Portugal (-11%) in a somewhat isolated position as the country is characterized by average values of the other agroclimatic indicators.

The highest positive departures all belong in the already mentioned group of European countries with low rainfall and high temperature. The three largest departures are observed in the Netherlands (+10%), Denmark and Sweden (Both at +12%).

**Figure 3.1: Countries in the plane of the two first principal components. 1 ARG, 2 AUS, 7 DEU, 8 EGY, 13 IND, 20 PAK, 22 POL, 29 UZB, 31 ZAF. The green concentration ellipse includes 90% of data.**

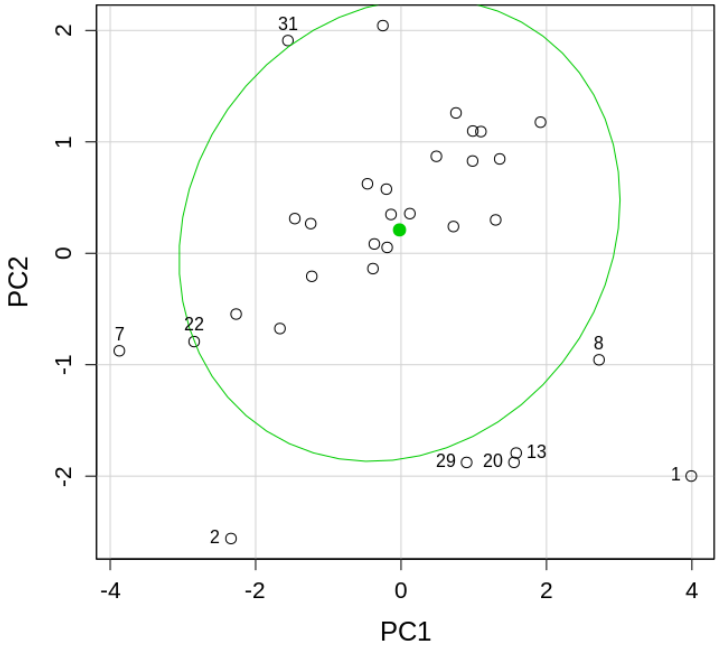



**Figure 3.2. Global map of April to July 2018 rainfall (RAIN) by country and sub-national areas, departure from 15YA (percentage)**

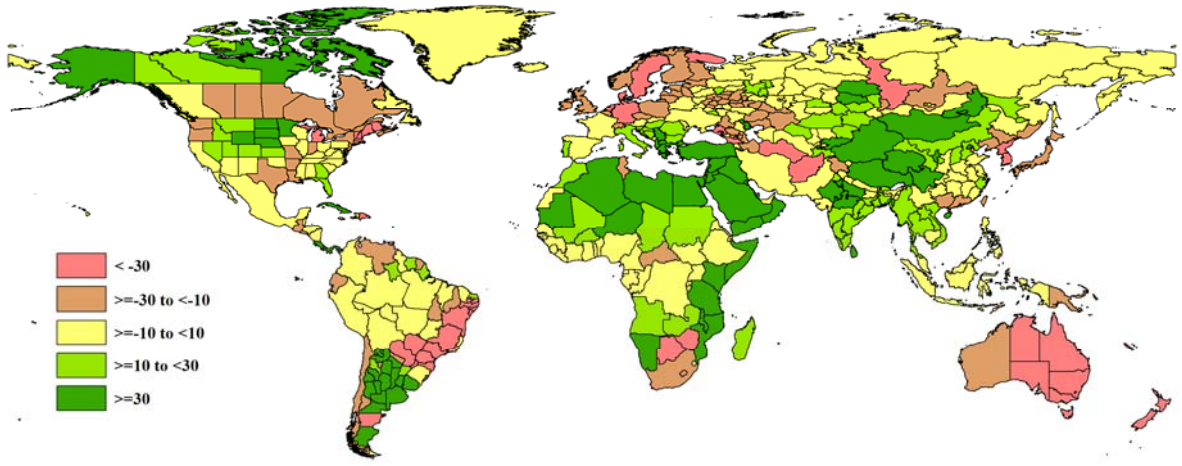



**Figure 3.3. Global map of April to July 2018 biomass (BIOMSS) by country and sub-national areas, departure from 15YA (percentage)**

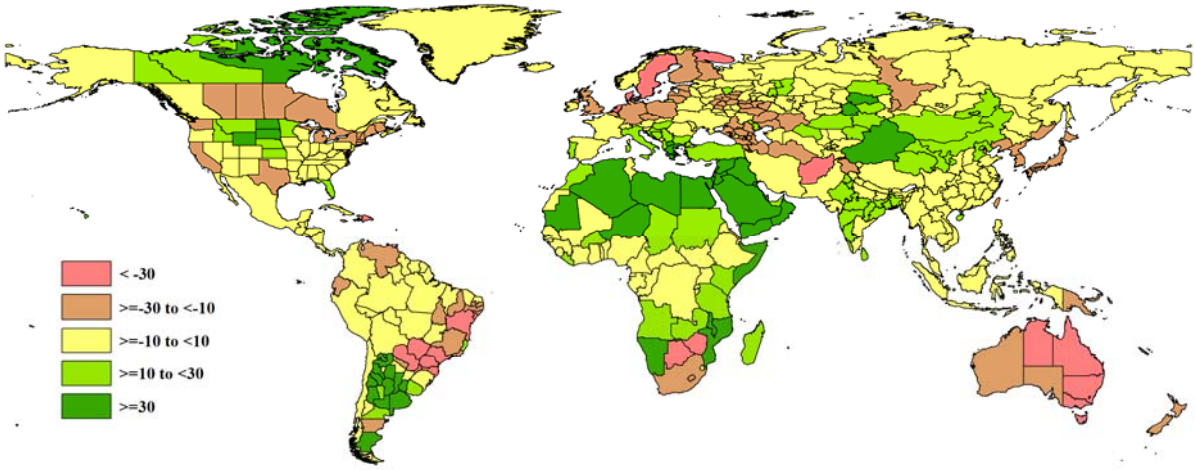


**Figure 3.4. Global map of April to July 2018 temperature (TEMP) by country and sub-national areas, departure from 15YA (degrees)**

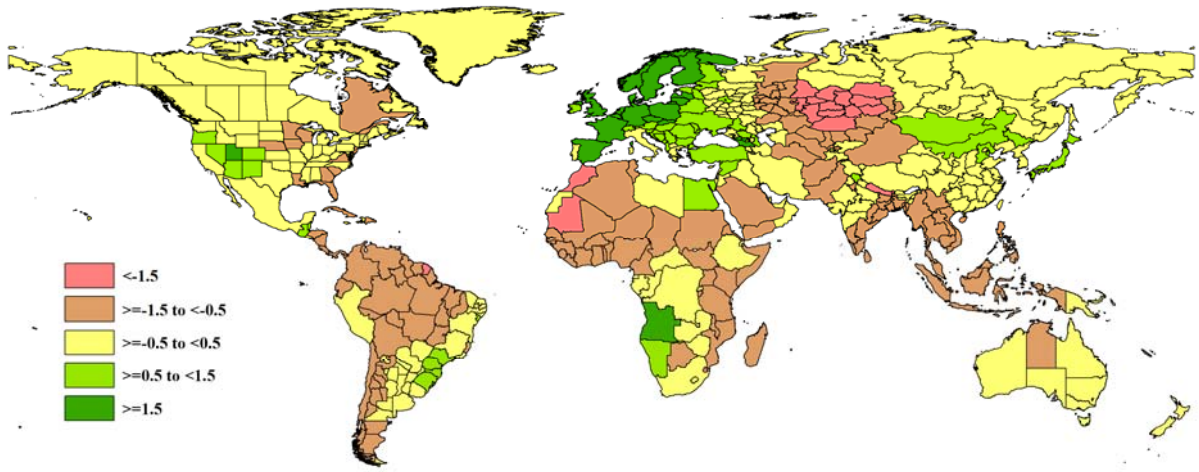
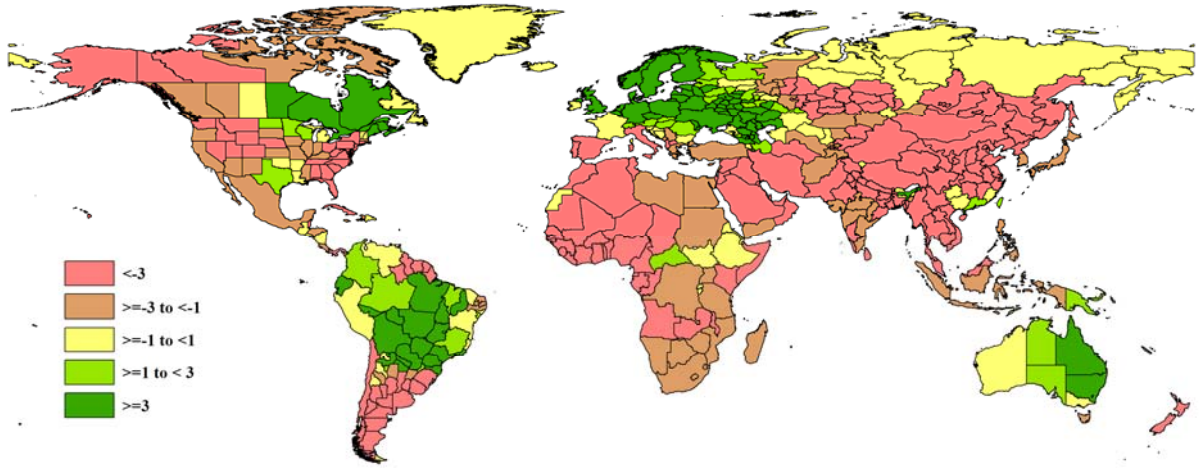



**Figure 3.5. Global map of October April to July 2018 PAR (RADPAR) by country and sub-national areas, departure from 15YA (percentage)**




## 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 April-July 2018 period to the previous season and the five-year average (5YA) and maximum; (c) Maximum VCI (over arable land mask) for April-July 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 April-July 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 3.6 - 3.46.; Crop condition for individual countries ([AFG] Afghanistan - [ZMB] Zambia) including sub-national regions during April – July 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

Wheat, barley, maize, and rice are the major cereals grown in semi-arid Afghanistan. The bulk of winter wheat is cultivated in the northern border provinces and was harvested in May. Spring wheat was planted from March to April. Maize and rice were planted in June and July, respectively.

On average, the country received 30% below average rainfall; compared to average, TEMP dropped -0.5°C and RADPAR -3%. The biomass production potential fell 32% while CALF reached 50 % below 5YA and VCIx did not exceed 0.4. As a result, CropWatch foresees a wheat production drop of 22% relative to 2017.

Nationwide crop condition based on NDVI graphs was low compared to the last 5 years average as well as to 2017. Four provinces recorded low NDVI in April; Badghis, Faryab, Jawzian, and samangan. The same and Hirat, Saripul, Balkh, and Kunduz recorded VCIx value below than 0.5. Remaing provinces, however, had VCIx values between 0.8 and 1.

Regional analysis

Afghanistan is divided into four AEZs: Central, Dry, Dry with irrigated cultivation, and Dry and grazing regions.

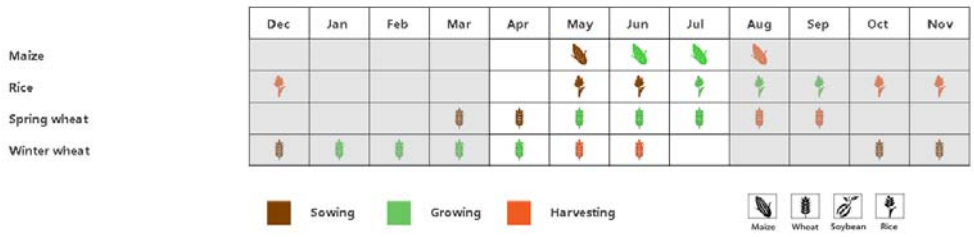
The Central region received low rainfall (50mm, -39% below average) and TEMP was 17.0°C (-0.4°C). RADPAR reached 1576 MJ/m2 (-3%). The reduction of rainfall resulted in 33% lower than 5YA BIOMSS accumulation potential. Low NDVI, CALF down -8 % and VCIx at 0.6 indicate unsatisfactory crop condition and output.

The Dry region received low rain (24mm, 56% below average) and TEMP was 0.4°C below average, while RADPAR was down 2.3 %. A drop in CALF (-22 %) associated with rather low VCIx (0.3) and a 51% BIOMSS loss compared with the 5YA) all indicate low production.

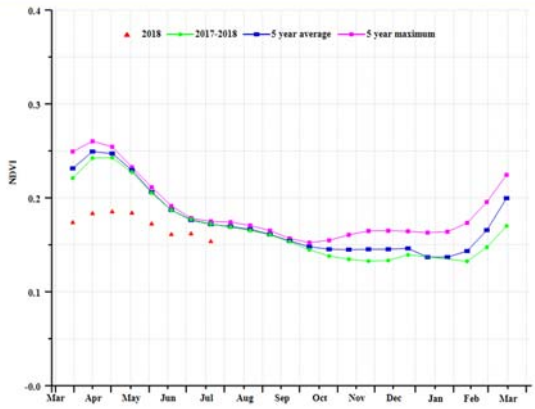
The Dry and irrigated cultivation region received the largest precipitation amount (96 mm) but it is still below the average by 19 %. TEMP was slightly cooler than average (-0.6°C) and RADPAR was 2 % below average. The BIOMSS reached 330 gDM/m2 (the highest regional value in the country) and it was 24 % under the 5YA. The CALF was -44% and VCIx scored 0.5.

The Dry and grazing region recorded 20 mm with reduction of 40% from the average, with below average TEMP at 20.0°C (-0.8°C) and a below average RADPAR of 154 was lower than the average by -31% and CALF reached -89% lower than the average, while crop condition was poor at 0.4 VCIx.

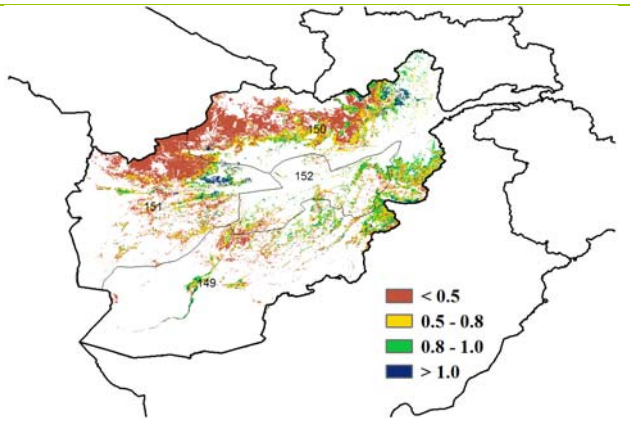
**Figure 3.6. Afghanistan's crop condition, April -July 2018**



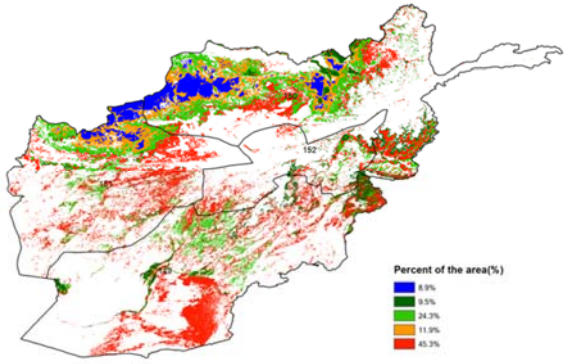

(a). Phenology of major crops



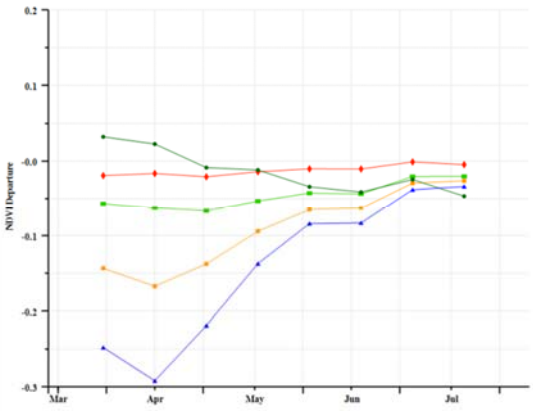

(b) Crop condition development graph based on NDVI



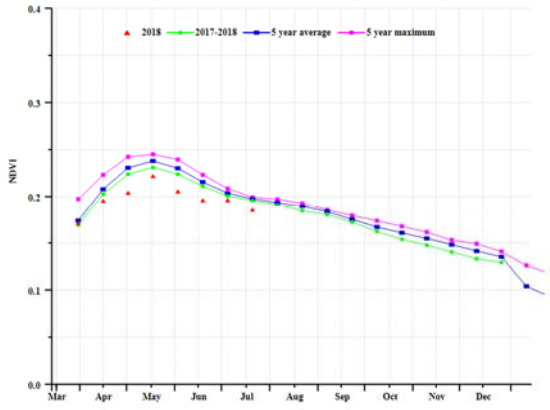

(c) Maximum VCI

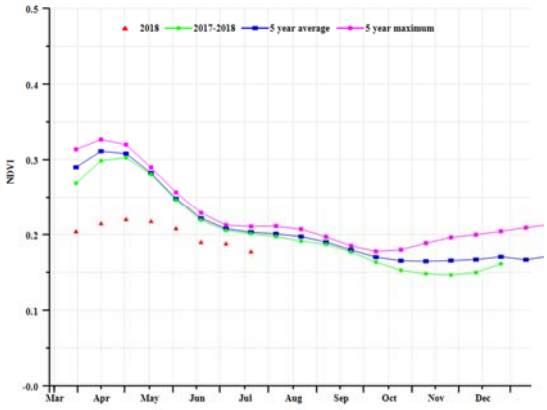



(d) Spatial NDVI patterns compared to 5YA

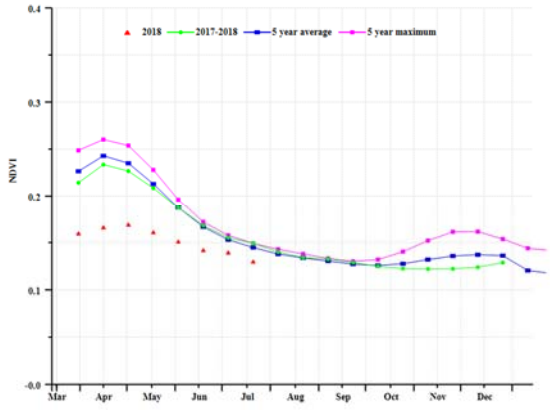


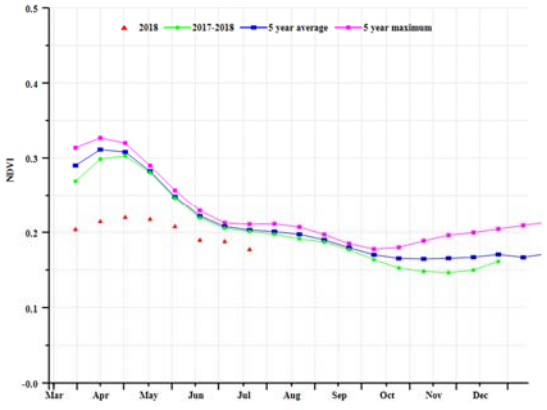

(e) NDVI profiles




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




(g) Crop condition development graph based on NDVI (Mixed_Dry_IrrigatedRegion (left) and Dry (right))

**Table 3.1. Afghanistan's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current ($MJ/m^2$) | Departure from 15YA (%) |
| Central region | 50 | -39 | 17 | -0.4 | 1576 | -2.6 |
| Dry region | 24 | -56 | 23 | -0.2 | 1576 | -2.3 |
| Dry and irrigated cultivation region | 96 | -19 | 19 | -0.6 | 1480 | -2.3 |
| Dry and grazing region | 20 | -40 | 20 | -0.8 | 1542 | -3.5 |

**Table 3.2. Afghanistan's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current ($gDM/m^2$) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Central region | 228 | -33 | 7 | -8 | 0.6 |
| Dry region | 90 | -51 | 3 | -22 | 0.3 |
| Dry and irrigated cultivation region | 330 | -24 | 12 | -44 | 0.5 |
| Dry and grazing region | 105 | -31 | 1 | -89 | 0.4 |

**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 | -24.60% | 3.90% | 3353 | -21.70% |

# [AGO] Angola

During the current monitoring period (April-July 2018), the country was harvesting Maize and Rice from April to May while Wheat was at sowing and early growth. The agroclimatic indicators for this period show an increase in rainfall and temperature (RAIN, +20.2% and TEMP, +1.7ºC) and a decrease of about 3.1% in RAPDAR. Contrary to the agroclimatic indicator, an increase was observed in all agro-ecological indicators (BIOMASS, +6.2% and CALF, +4.1%).

The crop condition was generally below reference values at the start of April but above from the end of April to July. During this period, Angola registered favourable maximum vegetation cover index (VCIx) all over the country with values varying between 0.8 to 1.0 and above. The maximum VCIx recorded was 0.91. Based on the NDVI clusters, favorable crop condition representing 36% of arable land where observed in Southwest of the country, especially in the provinces of Huila and Cunene. Unfavorable crop condition prevailed in the Province of Zaire, covering one area of about 4.7%. The 2018 maize area is expected to increase 4.1% over 2017.

**Regional analysis**

Considering the cropping systems, climatic zones and, and topographic conditions, Angola is divided into five agro-ecological zones (AEZ): Sub-humid zone, Humid zone, Arid zone, Semi-arid zone and Desert zone.

In the Sub-humid zone, the agronomic indicators show an increase in rainfall and temperature (RAIN, +11% and TEMP, +1.8ºC) while the radiation fell 4%. Both biomass and cropped arable land fraction increased by 21% and 0.2% respectively. The crop condition development graph based on NDVI shows that the region registered unfavorable crop condition from April to May; it improved between May and the end of July.

Similar to the Sub-humid zone, favorable crop condition was observed from mid-May to July in the Humid zone. Rainfall and radiation dropped by 11% and 4% respectively when compared to average, while the temperature increased 1.0ºC. With CALF was close to the average of past five year's departure. The maximum VCI for this region was 0.88.

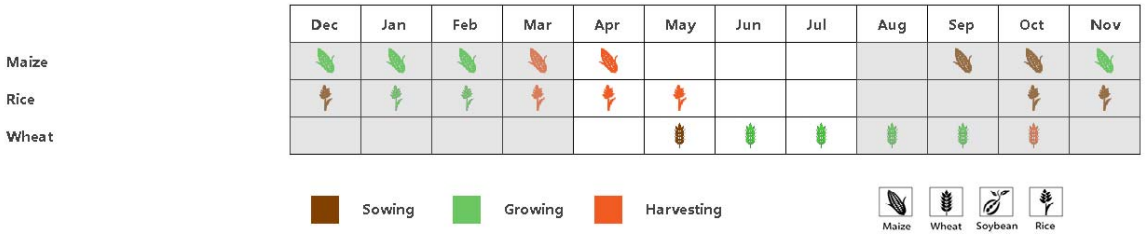
Increases in both rainfall and temperature (RAIN, +25% and TEMP, +0.5ºC) were recorded in the Arid zone, which was accompanied by a reduction in the sunshine by about 2%. Associated with CALF which increased by 20.6%, the agro-climatic conditions led to an increase in biomass (BIOMASS, +22%). With a VCIx of 0.90, the crop condition development graph for graph based on NDVI shows that during the monitoring period, crop conditions was generally satisfactory in the AEZ.

With a maximum VCI value of 0.94, favorable crop condition was observed in the Semi-arid zone. In this region, the rainfall and temperature increased by 44% and 1.5ºC, while the radiation decreased by 3%. An increase of 8.4% in cropped arable land faction and an increase in biomass (about 29%). indicate favorable crop prospects

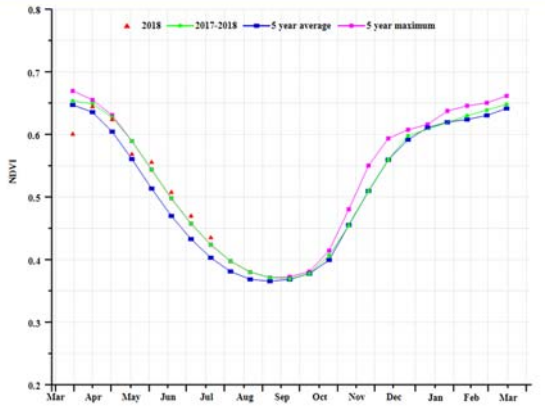
The Desert zone registered significant increases in both rainfall and temperature (RAIN, +76% and TEMP, +3.1º). The radiation during this period dropped by 3%. Concerning the agronomic indicators, the BIOMSS increased by 48% and CALF by 1.1%. The maximum VCI for the region was 0.91. The NDVI for this region, suggests better crop conditions from mid-May till the end of the monitoring period.

Based on the indicators observed for this monitoring period, in general, Angola registered favorable crop conditions.

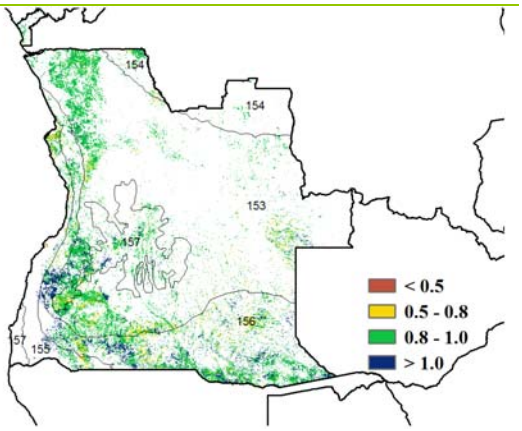
**Figure 3.7. Angola's crop condition, April – August 2018**



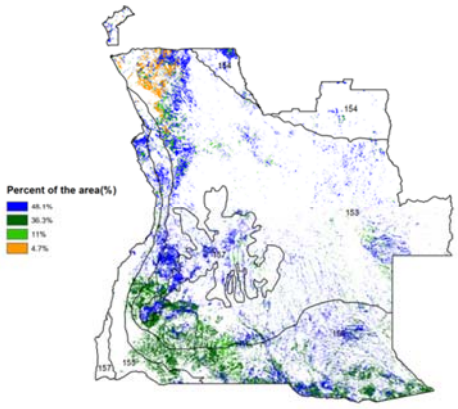

(a). Phenology of major crops



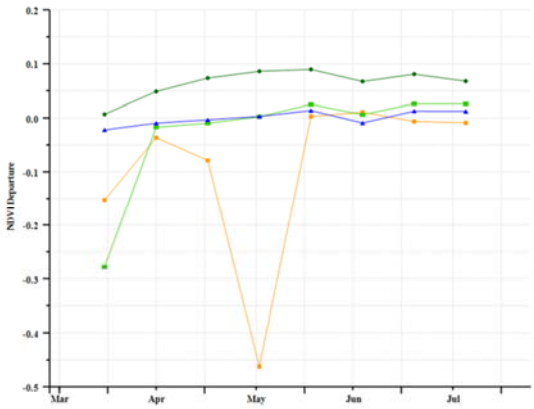

(b) Crop condition development graph based on NDVI



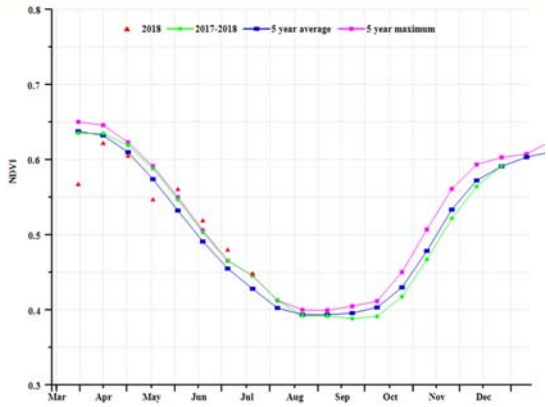

(c) Maximum VCI



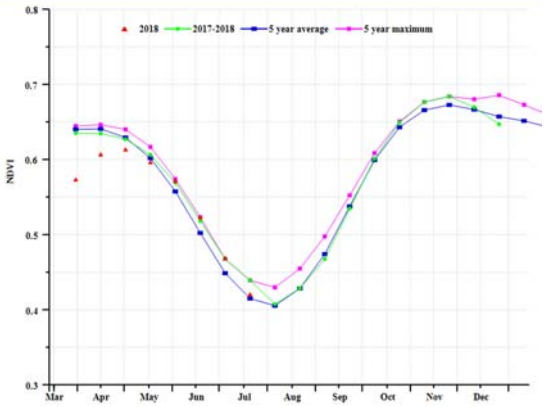

(d) Spatial NDVI patterns compared to 5YA



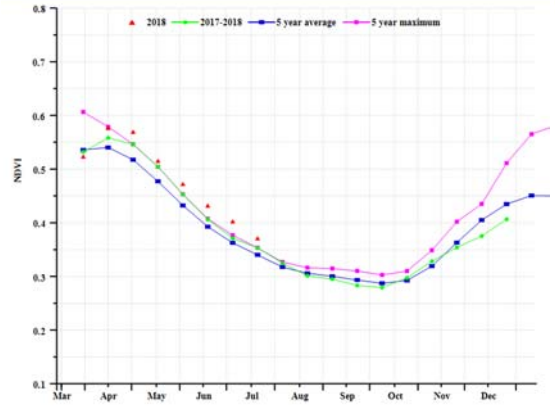

(e) NDVI profiles



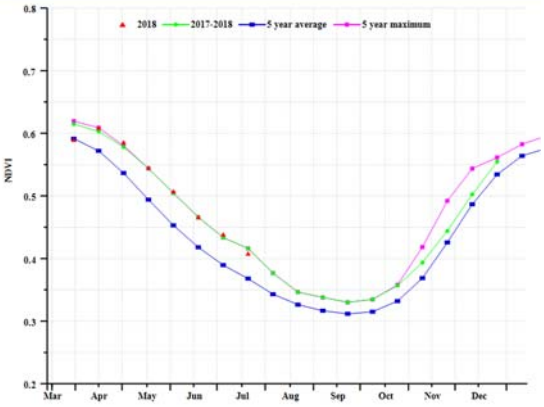

(f) Crop condition development graph based on NDVI - Sub-humid zone



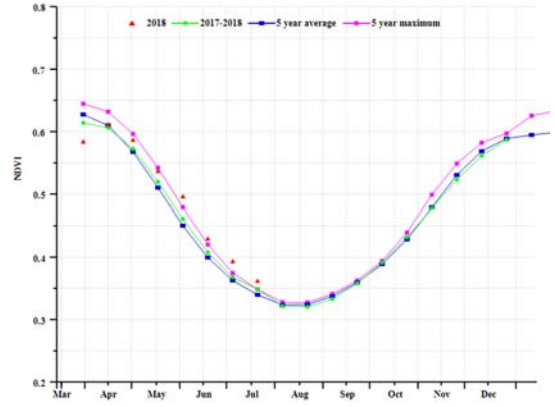

(g) Crop condition development graph based on NDVI - Humid zone




(h) Crop condition development graph based on NDVI - Arid zone




(i) Crop condition development graph based on NDVI - Semi-arid zone




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

**Table 3.4. Angola agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current ($MJ/m^2$) | Departure from 15YA (%) |
| Sub-humid zone | 185 | 11 | 23.4 | 1.8 | 1075 | -4 |
| Humid zone | 186 | -11 | 24.9 | 1.0 | 1085 | -4 |
| Arid Zone | 103 | 24 | 22.7 | 0.5 | 1099 | -2 |
| Semi-Arid Zone | 92 | 44 | 22.6 | 1.5 | 1090 | -3 |
| Desert zone | 158 | 76 | 20.8 | 3.1 | 1134 | -3 |

**Table 3.5. Angola agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current ($gDM/m^2$) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Sub-humid zone | 519 | 21 | 100 | 0.2 | 0.91 |
| Humid zone | 619 | -9 | 100 | 0.0 | 0.88 |
| Arid Zone | 313 | 22 | 93 | 20.6 | 0.90 |
| Semi-Arid Zone | 282 | 29 | 100 | 8.4 | 0.94 |

**Table 3.6. CropWatch-estimated maize production for Angola in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| Maize | 2680 | 2.10% | 2.00% | 2791 | 4.10% |

# [ARG] Argentina

Favorable conditions for crop growing were observed during the reporting period particularly when considering the severe drought that occurred during last reporting period. The crop calendar shows for this period the maturity of late summer crops (soybean, maize and rice), fallow for early planted summer crops and sowing of winter crops such as wheat.

Rainfall showed a marked positive anomaly of 79 %. Temperature was reduced by just 0.1° but radiation showed a more significant reduction of 7 % associated with rainy and cloudy weather. These conditions led to a significant increase in BIOMSS of 33%.

NDVI profiles show in general near averages values, with lower than average values at the beginning of the period and higher than average values at the end. Some regions (12.3% or arable land) showed a strong negative anomaly during May, probably associated to flooding conditions. Temporal behavior of NDVI for the whole region (Figure c) shows lower than average values during most of the period, probably associated to past drought conditions during growing stage of summer crops.

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.

All four regions showed very high increments in RAIN. Higher anomalies were observed for Tropical Highlands (158 %), followed by Chaco (131 %), Pampas (92 %) and Mesopotamia (27 %). TEMP showed negative anomalies for Tropical Highlands (-0.5°) and Chaco (-0.1°), positive anomalies for Pampas (+0.2), and no anomalies for Mesopotamia. Pampas and Mesopotamia showed reductions in RADPAR of 14.6 and 4.9 % respectively, while Tropical Highlands and Chaco showed increments of 1.7 and 1.3 % respectively. The four regions showed significant increments in BIOMSS in response to high amounts of RAIN observed. Estimated increments in BIOMSS are +83 % for Tropical Highlands, 47% for the Pampas, 14 % for Chaco and 10 % for Mesopotamia

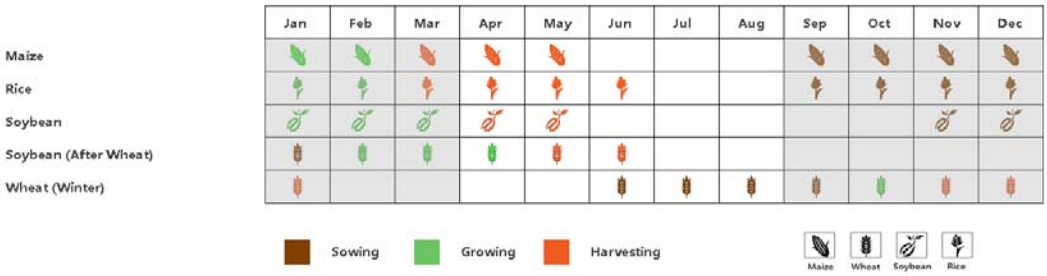
According to the cropped arable land fraction indicator (CALF), higher reductions were observed for Pampas (-6.7 %) and Chaco (-0.43 %), while Subtropical highlands and Mesopotamia showed increments of 1.6 and 0.7 % respectively.

Maximum VCI was characterized by near average values for most of the country (between 0.8 and 1) and low variation from average (among 0.5 and 0.8). Depressed Pampas region showed higher than average values and West Pampas very low values (less than 0.5). Considering sub regions, Maximum VCI was high for Tropical Highlands (0.87), Chaco (0.83) and Mesopotamia (0.83) and low for the Pampas (0.2). This low value can be associated to flooding conditions in part of this sub region.

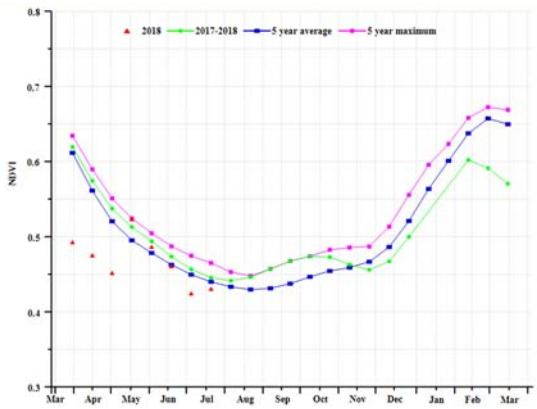
Crop condition development graph based on NDVI analysis for sub regions showed for Chaco, Mesopotamia and Pampas, a recovering pattern (NDVI anomalies at the beginning and more similar to average values during last months), probably due to drought conditions occurred during last reporting period and wetter conditions for this reporting period. For Subtropical highlands, a pattern more similar to average values was observed.

The CropWatch estimates for Soybean, Maize and Rice are 14.1%, 15.1% and 5.7% below previous year's production as a result of excess precipitation.

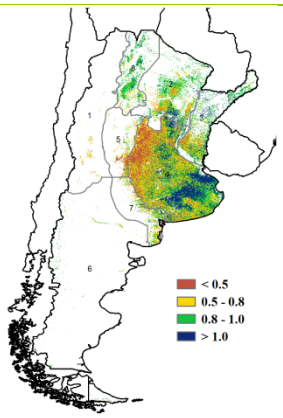
**Figure 3.8. Argentina's crop condition, April-July 2018**



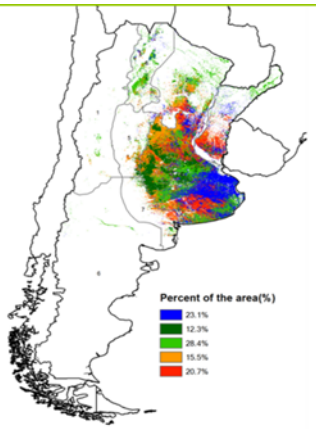

(a). Phenology of major crops



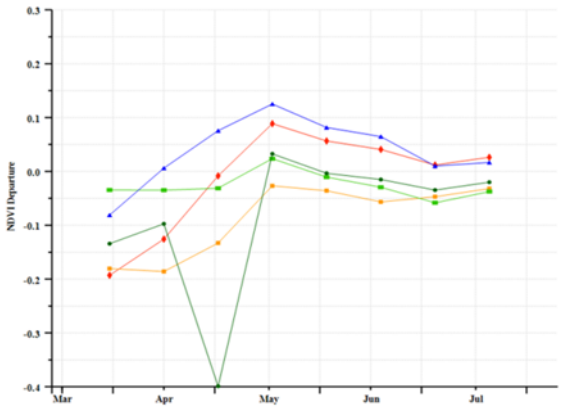

(b) Crop condition development graph based on NDVI



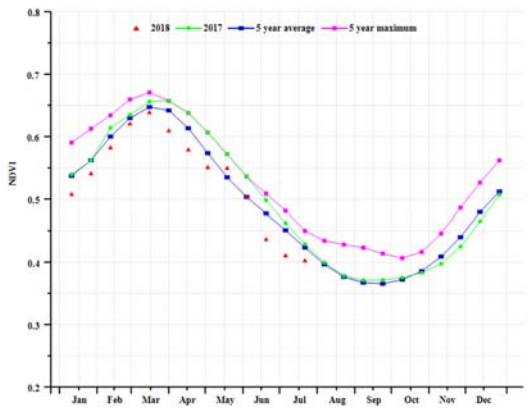

(c) Maximum VCI

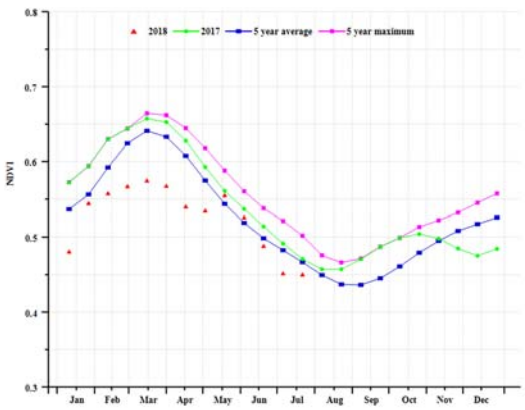



(d) Spatial NDVI patterns compared to 5YA

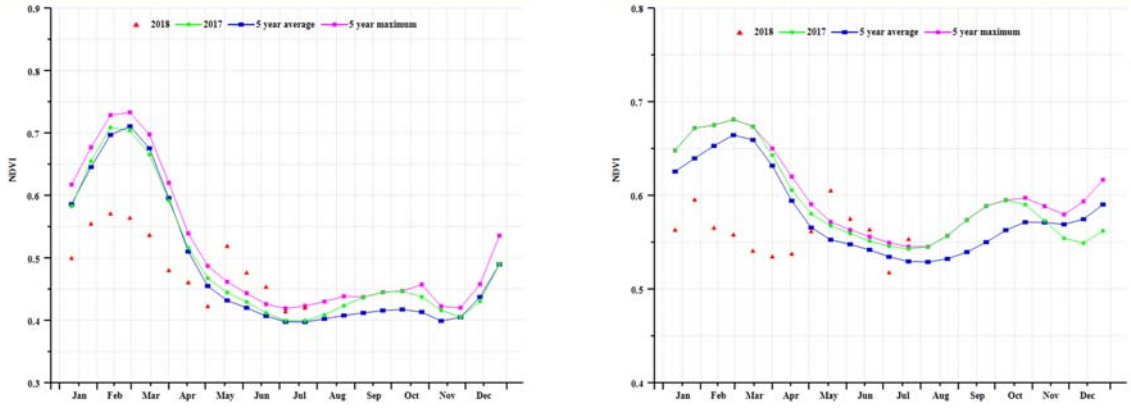



(e) NDVI profiles



(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 3.7. Argentina's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018.**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | 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 |

**Table 3.8. Argentina's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | 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 3.9. 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

The main crops of Australia are wheat and barley, which are normally planted from the end of April to July to be harvested from October to January. The crop condition during the currently monitored period was mixed. The national NDVI profile showed around one month delay of sowing due to rather late and insufficient rainfall (RAIN, -45%), although the temperature (TEMP, -0.4°C) and sunshine (RADPAR, +1%) were average. The VCIx was rather low at 0.27 during the planting season of wheat and barley. The Cropped Arable Land Fraction (CALF) attained 86%, 4% below the five-year average.

The spatial NDVI pattern further showed that the central and southern New South Wales and some parts of north-east Victoria experienced severely lagged behind average growing conditions of the last 5 years, with the VCIx below 0.5. The below average crop condition of New South Wales and Victoria was due to poor rainfall (RAIN, -56% and -41%), as the States recorded average temperature (TEMP, 0.5°C and 0.1°C) and radiation (RADPAR, 6% and 0%). The resulting BIOMSS drop is 48% and 32%, respectively.

Regional analysis

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

The Southeastern wheat zone experienced severely delayed growing conditions, starting with planting, which closely followed the national NDVI profile. The region recorded a severe 43% deficit in rainfall with rises in temperature (+0.3°C) and RADPAR (+3%), resulting in BIOMSS being 36% below the recent average. CALF nevertheless remained surprisingly high (95%) and the same as the five-year average.

The southwestern wheat zone showed below average condition but with no sowing delay according to the regional NDVI profile: below average from April to June and close to average in July. The region had the least severe rainfall deficit (-23%), with stable temperature and radiation. The weather based potential biomass was 20% below the five-year average. The region was the only one in the country where CALF increased (+4%). The situation is confirmed by the NDVI cluster maps in the Western Australia region.

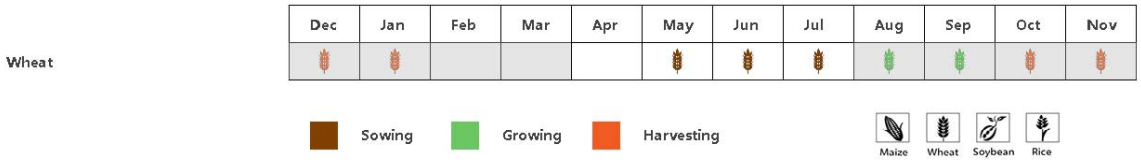
The crop condition in the country's arid and semi-arid zone displayed below average values. The regional NDVI profile was close to average in April but dropped below average thereafter, resulting from the insufficient rainfall (-49%), again combined with average TEMP and RADPAR. The potential biomass was 25% below average. CALF was 76%, and VCIx reached 0.73, indicating that lower rainfall has caused some adverse effect on the crops.

The crop condition in the wet temperate and subtropical zone appeared below average according to the regional NDVI profile during this period: below average from April to June but recovering to 5-year average in July. The region was 35% deficient in rainfall with marginally above average temperature (TEMP, +0.1°C) and stable radiation. BIOMSS was 37% below average. The area had high CALF (98%) with low VCIx (0.36), indicating a high cropped area but mediocre prospects.

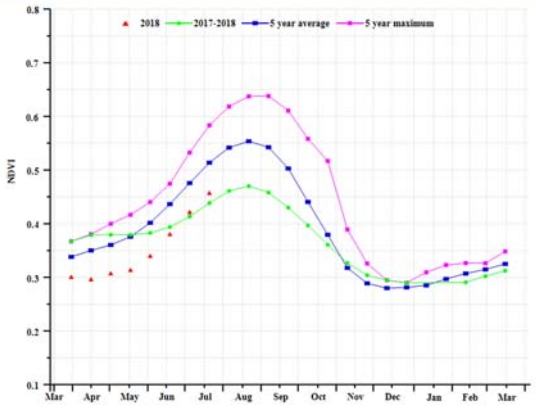
Crops in Australia's sub-humid subtropical zone showed generally below average condition during the whole monitored period, which was possibly related to the sowing delay caused by extreme drought mentioned above. Rainfall underwent a severe deficit of 63% with normal temperature and RADPAR, resulting in BIOMSS falling 55%. The area also experienced a low CALF (53%) as well as poor VCIx (0.3), indicating below average cropped area and unfavorable production prospects, which deserves close monitoring in the coming months.

On the whole, CropWatch estimates the wheat production of Australia will decrease by 19.7% in 2018 with a yield decrease of 9.7% and an area increase of 11.1%, compared with 2017.

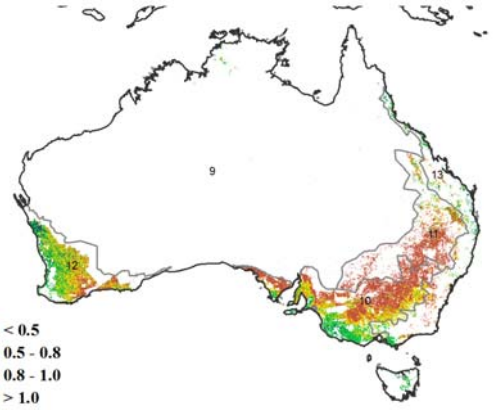
**Figure 3.9. Australia's crop condition, April -July 2018**



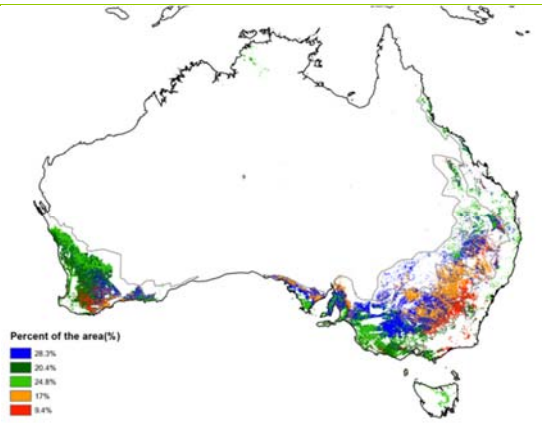

(a). Phenology of major crops



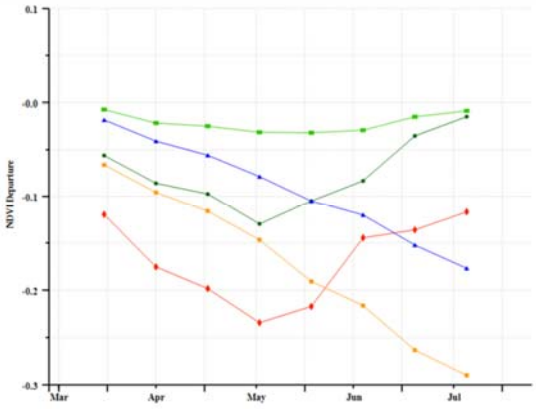

(b) Crop condition development graph based on NDVI



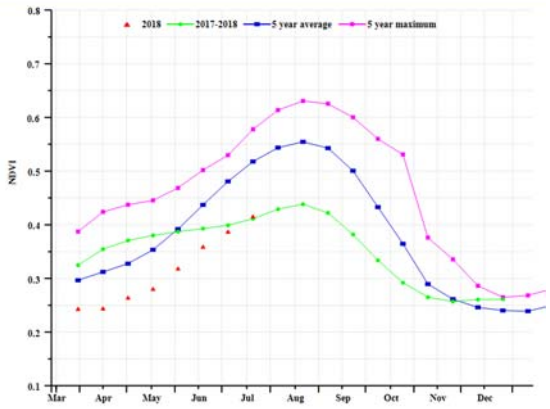

(c) Maximum VCI

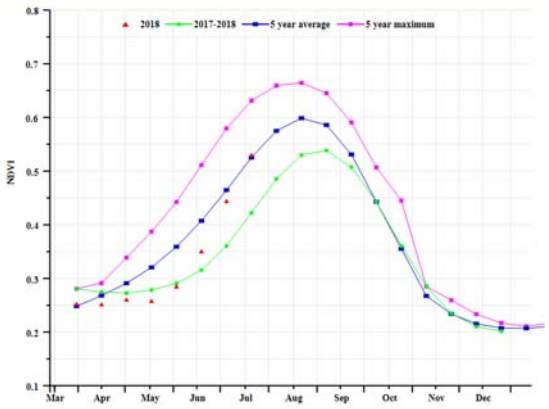



(d) Spatial NDVI patterns compared to 5YA

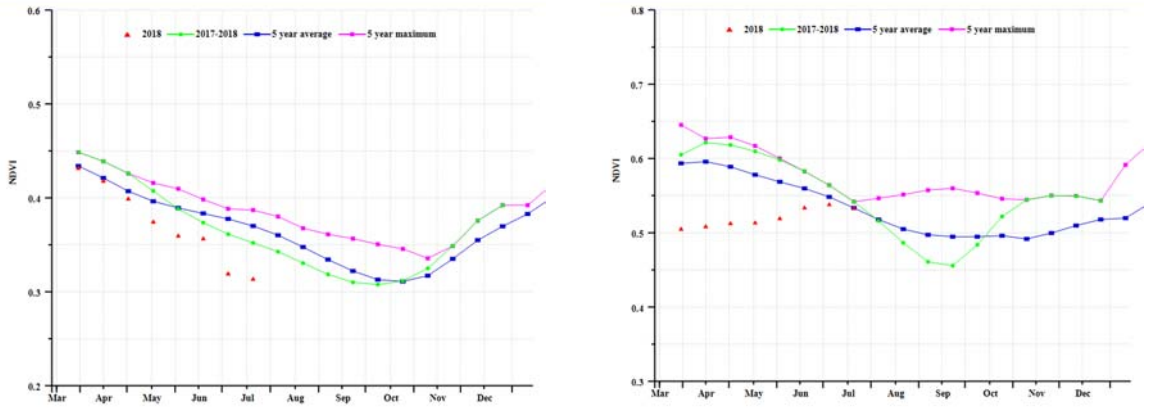



(e) NDVI profiles

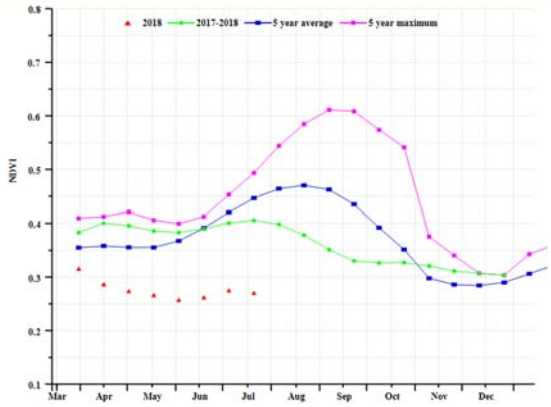



(f) Crop condition development graph based on NDVI (South-eastern wheat zone (left) and South-western wheat zone (right))




(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 3.10. Australia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| outheastern wheat zone | 94 | -43 | 12.2 | 0.3 | 630 | 3 |
| Southwestern wheat zone | 163 | -23 | 14.0 | 0.1 | 669 | 0 |
| Arid and semiarid zone | 50 | -49 | 23.3 | -0.3 | 1092 | 3 |
| Wet temperate and subtropical zone | 104 | -49 | 13.9 | 0.1 | 711 | 3 |
| Subhumid subtropical zone | 46 | -63 | 14.8 | 0.3 | 846 | 6 |

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

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current | Departure from 5YA (%) | Current |
| Southeastern wheat zone | 409 | -36 | 95 | 0 | 0.06 |
| Southwestern wheat zone | 580 | -20 | 89 | 4 | 0.58 |
| Arid and semiarid zone | 244 | -25 | 76 | -1 | 0.73 |
| Wet temperate and | 453 | -37 | 98 | -1 | 0.36 |

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current ($gDM/m^2$) | Departure from 5YA (%) | Current | Departure from 5YA (%) | Current |
| subtropical zone | | | | | |
| Subhumid subtropical zone | 221 | -55 | 53 | -20 | 0.30 |

**Table 3.12. CropWatch-estimated Wheat production for Australia in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| Wheat | 24606 | -9.7 | -11.1 | 19750 | -19.7 |

# [BGD] Bangladesh

Bangladesh is located in a humid climate region. Rice is by far the preferred cereal, followed by maize and wheat. Dry season irrigated Boro rice and wheat crops were harvested during the reporting period (April-July). The Field preparation and planting of monsoon rice (Aus and Aman) was done during the reporting period.

Nationwide crop condition based on NDVI graphs was slightly below the average of the last 5 years, the 5-year maximum as well as the previous season (2017). NDVI peaked in April and decrease from the middle of May till July.

The Spatial NDVI patterns compared to 5YA showed a reduction of the vegetation cover in the east and an improvement in the west, especially in June and July. VCIx varied between 0.8 and 1, indicating good production prospects.

Regional analysis

Bangladesh is divided into four Agro-ecological zones (AEZ) or regions: Coastal region, Gangetic plain, the Hills and the Sylhet basin.

The Coastal region received high rainfall (1539mm, 23% above average) and TEMP was 29°C (-1.1°C). RADPAR reached 968 MJ/m2 a very significant drop of -10.6% below average. The increase of rainfall resulted in 24% higher than 5YA BIOMASS accumulation potential. High NDVI, CALF at 0.8 % and VCIx at 0.9 indicated higher production in general.

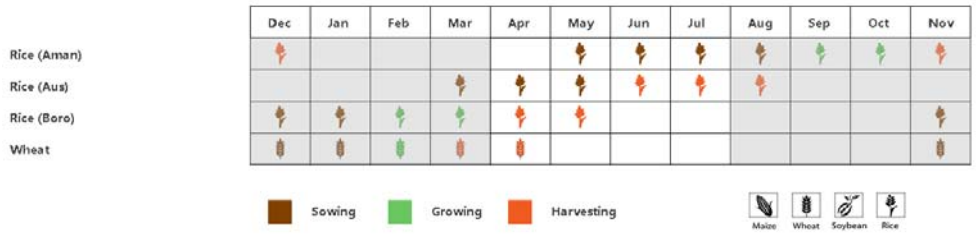
The Gangetic plain region received a high amount of rain (1424mm, 23% over average) and TEMP dropped 1.5 °C below average, while RADPAR was down 8 %. CALF (90 %) and VCIx at 0.9 with BIOMASS up to 17% (against 5YA) indicate good crops.

The Hills region precipitation amounted to 1985 mm (11% higher than average. TEMP was cooler by -1.4°C and RADPAR was 5 % below average. The BIOMASS reached 2355 gDM/m2 and was 3 % above the 5YA. The CALF did not change relative to the 5YA and VCIx was high at 0.9 which indicates good production.

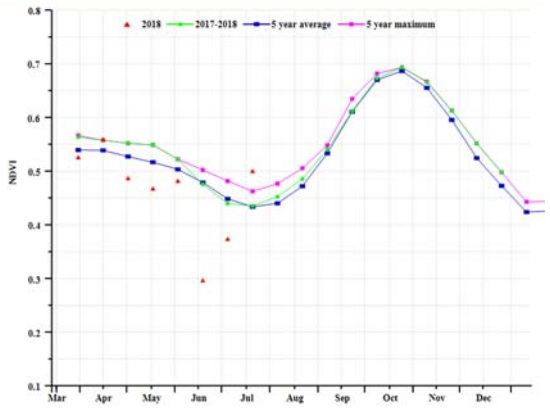
The Sylhet basin region recorded the highest precipitation in Bangladesh (2225 mm) up 29% above average, with below average TEMP at 27.7°C (-1.3°C) and a below average RADPAR (902 MJ/m2 or -5%). The BIOMASS was higher than the average (+10%) and CALF increased 2% higher than 5YA. Together with a VCIx value of 0.9, crop prospects are favorable.

CropWatch puts the production estimate of Maize and Rice 4% and 6% above the output of the 2017 season.

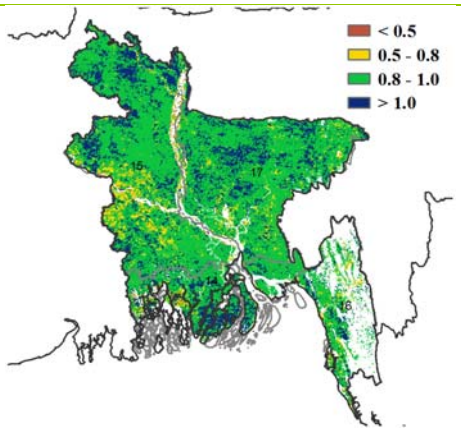
**Figure 3.10. Bangladesh's crop condition, April-July 2018.**



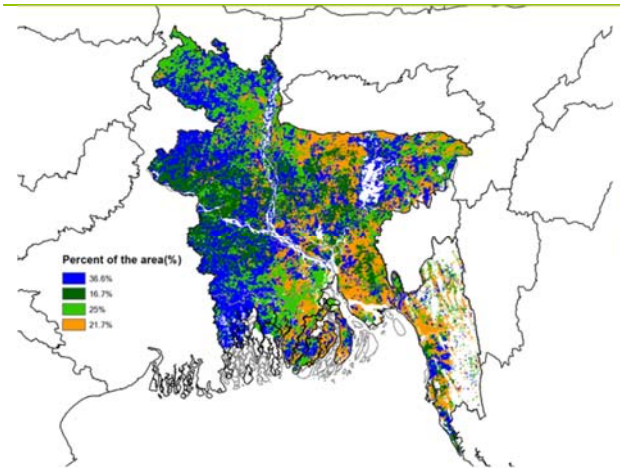

(a). Phenology of major crops



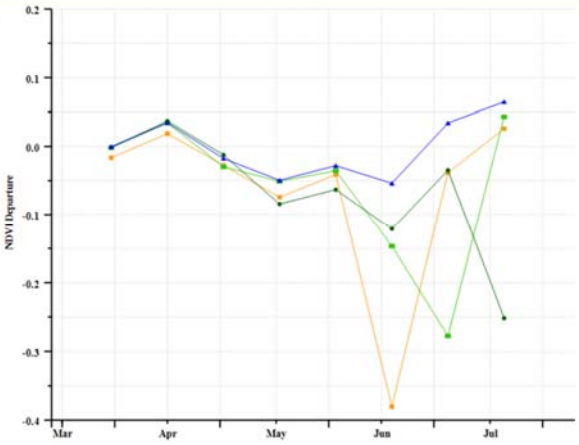

(b) Crop condition development graph based on NDVI



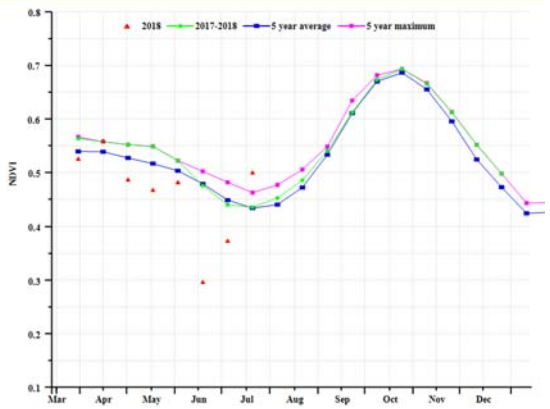

(c) Maximum VCI

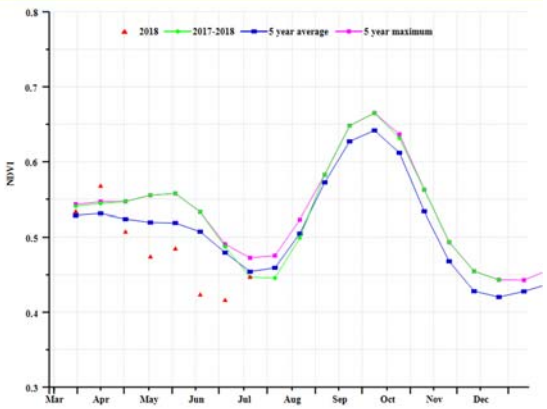



(d) Spatial NDVI patterns compared to 5YA

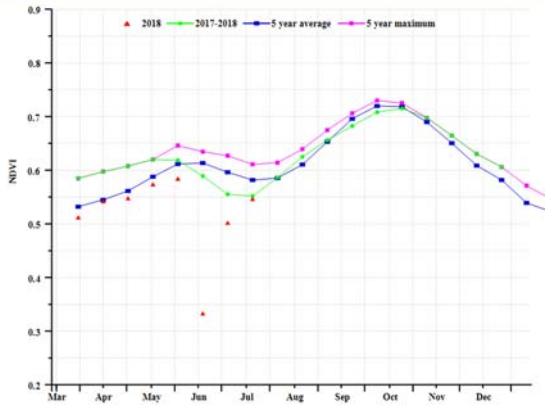


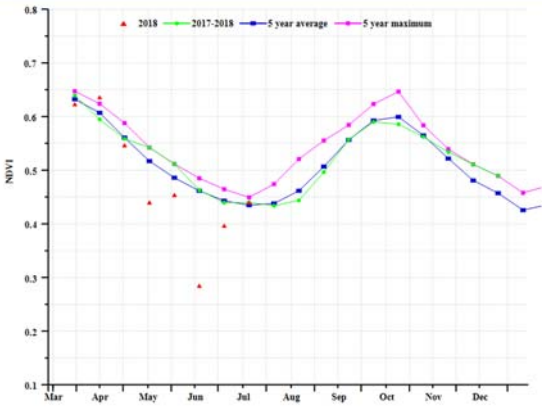

(e) NDVI profiles




(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 3.13. Bangladesh's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA April-July 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) | 1539 | 23 | 29 | -1.1 | 968 | -10.6 |
| Gangetic plain (Bangladesh) | 1424 | 23 | 28.7 | -1.5 | 970 | -7.9 |
| Hills (Bangladesh) | 1985 | 11 | 27.1 | -1.4 | 970 | -5.3 |
| Sylhet basin (Bangladesh) | 2225 | 29 | 27.7 | -1.3 | 902 | -4.9 |

**Table 3.14. Bangladesh's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2018.**

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current ($gDM/m^2$) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Coastal region (Bangladesh) | 2414 | 24 | 80 | 0.9 | 0.9 |
| Gangetic plain (Bangladesh) | 2361 | 17 | 100 | 0.2 | 0.9 |
| Hills (Bangladesh) | 2355 | 3 | 100 | -0.2 | 0.9 |
| Sylhet basin (Bangladesh) | 2585 | 10 | 100 | 2 | 0.9 |

**Table 3.15. CropWatch-estimated rice and Maize production for Bangladesh in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| Maize | 2245 | 4.10% | 0.00% | 2337 | 4.10% |
| **Rice** | 45274 | 6.50% | -0.30% | 48063 | 6.20% |

# [BLR] Belarus

Wheat, triticale and barley are three major cereal crops in Belarus, while during the current monitoring period Bielarussian farmers harvested winter wheat in July and planted spring wheat and other summer crops such as barley from April.

Agroclimatic conditions were satisfactory (RAIN 287 mm, +5%; TEMP 16.4℃, +1.4℃; RADPAR 1129 MJ/m², +4%). Agronomic indicators also showed a very good maximum vegetation condition index (VCIx, 0.93) and crop arable land fraction (CALF, 99%). At national level, the crop condition development graph was close to or above the 5YA average from middle April to middle May. After a temporary drop in June (in 18% of cropped areas), NDVI gradually recovered to normal levels. The drop is most likely due to premature harvest due to abnormally high temperature. According to the spatial distribution maps, VCIx was satisfactory in most areas of the country (above 0.8). Globally, BIOMSS is expected to decrease by 4%, while the winter wheat production will remain stable.

Regional analysis

Regional analyses are provided for three agroecological zones (AEZ) defined by their cropping systems, climatic zones and topographic conditions. They are referred to as Northern Belarus (159) with the Regions of Vitebsk, northern area of Grodno, Minsk and Mogilev; Central Belarus (158) with the southern part of Grodno, Minsk and Mogilev, the north of Brest and Gomel and Southern Belarus (160) with the southern halves of Brest and Gomel regions.

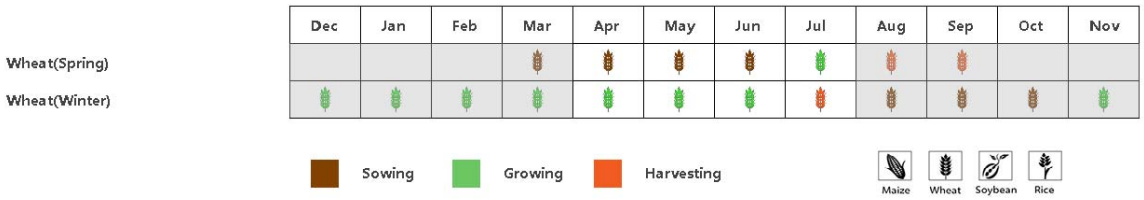
All three AEZs were exposed to abnormally high temperature with anomalies between 1.3℃ and 1.6℃, which is likely to have shifted phenology ahead by about one month, as shown in the NDVI-based crop development graphs, and caused water stress in summer crops.

Northern Belarus recorded average rainfall, 1.3% higher temperature, 4% higher radiation but satisfactory agronomic indicators: 99% of CALF and 0.94 for VCIx. However, NDVI profiles in this area dropped below 5 YA average since June, which agrees with projected biomass 5% lower than the 5 YA average level.

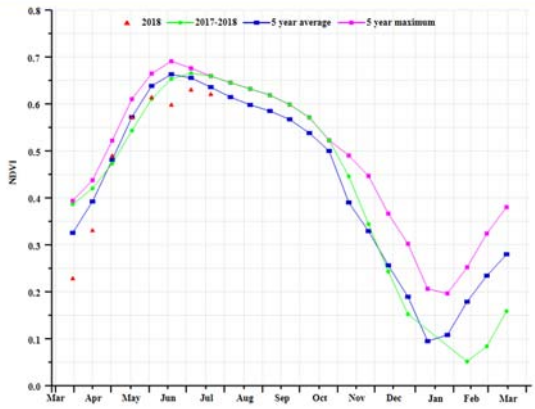
Central Belarus recorded above average rainfall (RAIN +8%), temperature (TEMP +1.6℃) and radiation (RADPAR +4%) with VCIx at 0.92 and high CALF (99%) indicating that nearly all arable land is cultivated. However, continuous near or below average NDVI until June restricted potential biomass (BIOMSS -3%).

The situation in Southern Belarus different little from the other area: 10% excess rainfall, +1.4℃ temperature anomaly and abundant radiation (+3%). CALF reached 100% and high VCIx (0.95) confirmed a good condition for crop growth. However, potential biomass seemed not benefit from above conditions (BIOMSS -2%).

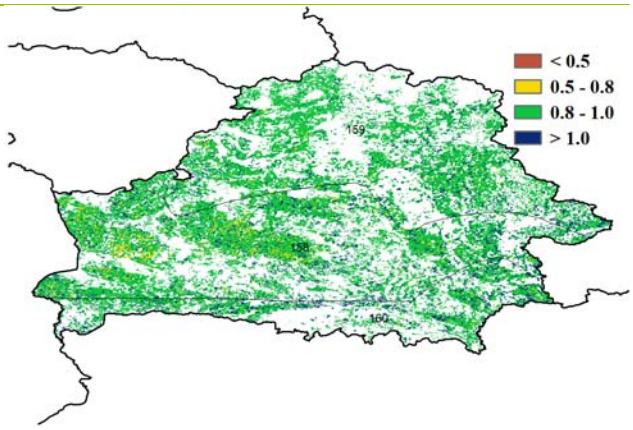
**Figure 3.12. Belarus's crop condition, April-July 2018**



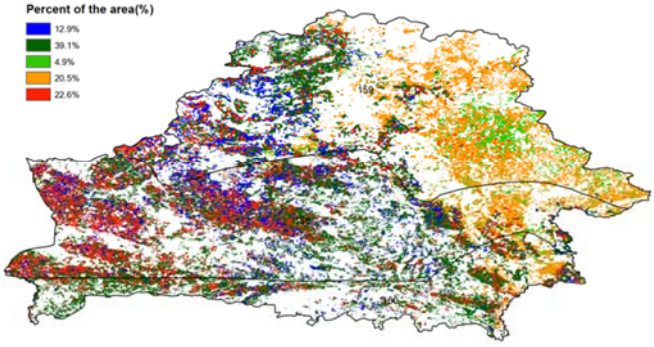

(a). Phenology of major crops



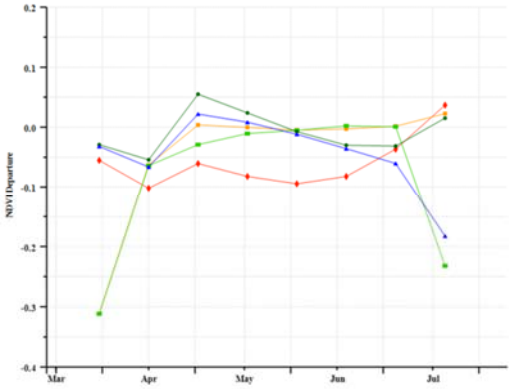

(b) Crop condition development graph based on NDVI



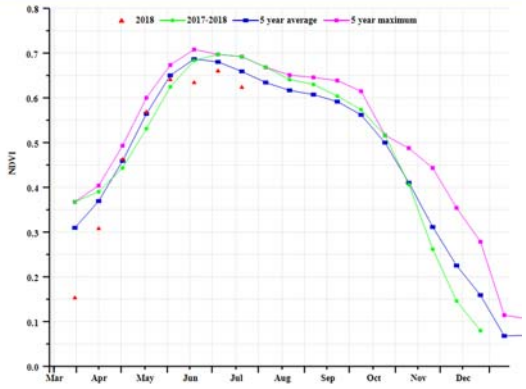

(c) Maximum VCI



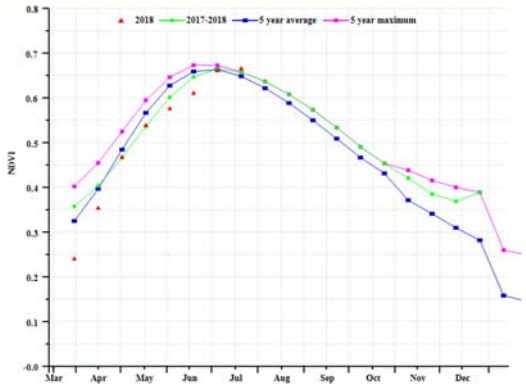

(d) Spatial NDVI patterns compared to 5YA



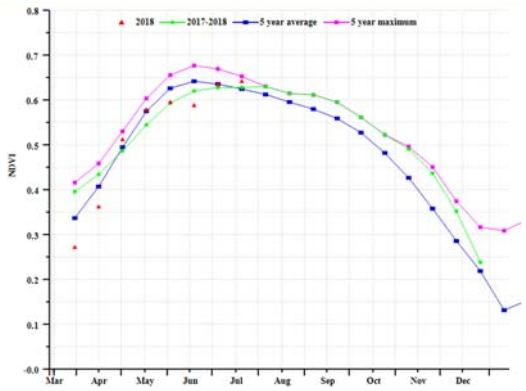

(e) NDVI profiles




(f) Crop condition development graph based on NDVI (Northern Belarus)




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




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

**Table 3.16. Belarus's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA April-July 2018.**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| Northern Belarus | 283 | 0 | 15.7 | 1.3 | 1112 | 3 |
| Central Belarus | 294 | 8 | 16.7 | 1.6 | 1138 | 4 |
| Southern Belarus | 285 | 10 | 17.4 | 1.4 | 1150 | 3 |

**Table 3.17. Belarus's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2018.**

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Northern Belarus | 1123 | -5 | 99 | 0 | 0.94 |
| Central Belarus | 1105 | -3 | 99 | 0 | 0.92 |
| Southern Belarus | 1080 | -2 | 100 | 0 | 0.95 |

**Table 3.18. CropWatch-estimated rice and Maize production for Belarus in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| Wheat | 2766 | -24.3% | 2.4% | 2768 | 0.1% |

# [BRA] Brazil

This bulletin covers the harvesting of summer crops (maize, soybean and rice) in most areas of Brazil except for north-east where maize is still at peak growing stage. After sowing from the end of April, wheat is currently at early to peak of growing season.

Generally, crop condition in Brazil was average compared to the same period in the previous five years. The CropWatch agroclimatic indicators show below average weather conditions compared with average (15YA) with 16% below average rainfall (308 mm) and 0.4 °C below average temperature (24.1 °C). Together with 2% above average radiation, BIOMSS was 18% lower than the previous five years average. Most states received below average rainfall except for Goias where rainfall was 8% above average. Five major states including Mato Grosso Do Sul, Minas Gerais, Parana, Santa Catarina, and Sao Paulo are suffering from drought with more than 30% rainfall deficit compared with 15YA. Shortage of rainfall in those states hampered the Biomass accumulation as indicated by the significant negative departure. However, since summer crops were at maturity and harvesting stage during the monitored period, the low rainfall does not have much impacts on the crop outputs.

Overall crop conditions in Brazil were slightly below average according to the national NDVI profile for Brazil from April to July 2018. NDVI departures cluster and the map show spatial and temporal diversity of crop condition during the monitoring period. Over more than half of croplands conditions were average with above average crops (16%) mostly distributed in coastal areas and Mato Grosso. Crops with below average condition concentrated in western Sao Paulo and neighboring regions. National maximum vegetation condition index (VCIx) presents same spatial pattern with lower value only in Parana River zone. Average VCIx value for Brazil was 0.90 during the monitoring period. Almost 99% of arable land was cultivated, 0.4% above 5YA.

Maize and soybean production for Brazil is revised down at 85482 ktons and 96311 ktons, 1 million tons down from the previous forecast but still slightly above previous year. Rice production is revised up at 3% above 2017 or 11666 ktons thanks to the favorable conditions in Rio Grande Do Sul. Wheat production is projected at 8205 ktons, 1% more than 2017 wheat outputs.

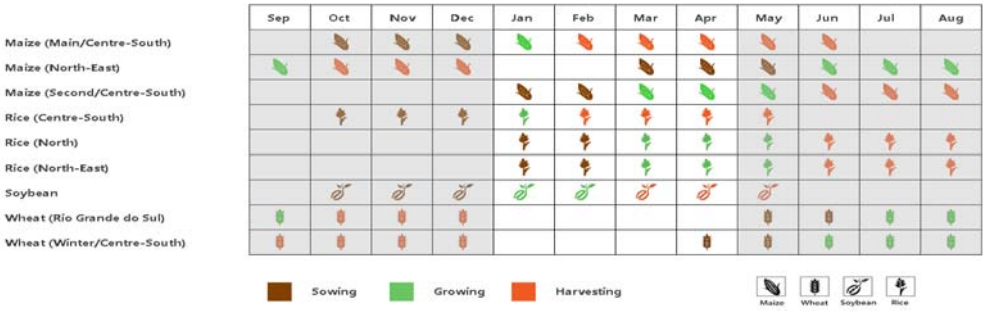
Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, eight agro-ecological zones are identified for Brazil. They include the Amazonas (18), Central Savanna (19), Eastern coastal zone (20), Northeastern mixed forest and farmland (21), Mato Grosso (22), Nordeste (23), Parana basin (24), and Southern subtropical rangelands (25).

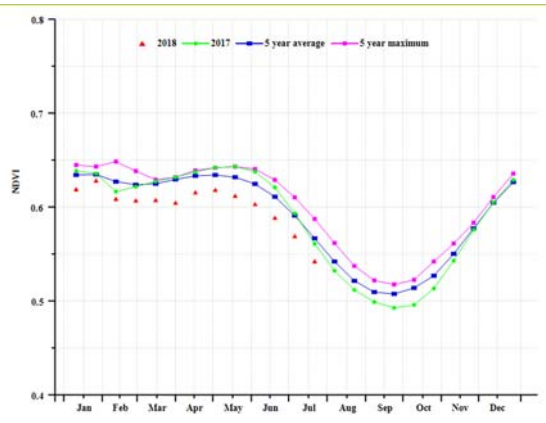
Over the recent reporting period, only one AEZ (Amazonas) received above average rainfall (+7%). RAIN in Central Savana, Northeastern mixed forest and farmland, Mato Grosso and Southern Subtropical rangelands was close to average while the remaining three AEZs suffered from water shortage, ranging from 17% to 49%. Three AEZs including Nordeste, Parana Basin, and Southern Subtropical rangelands experienced close to average temperature while other AEZs experienced lower temperature. Favorable temperature conditions were beneficial for crops because they lengthened the period for dry matter distribution to seeds.

The variation of weather conditions among AEZs distributes the crop condition into different categories: (1) well below average condition were observed in Amazonas, Northeastern mixed forest and farmland, Parana Basin, and Southern subtropical rangelands mainly due to the continous unfavorable conditions; Among those AEZs, Parana Basin presents the worst situation but VCIx was still at 0.87; (2) Central Savana and Mato Grosso presented average condition thanks to the average and stable weather conditions; (3) even the rainfall during the monitoring period is lower than average; crops in Nordeste and Eastern coastal zones were at above average condition as indicated by the above average NDVI peak resulting mainly from adequate rainfall during the previous monitoring period.

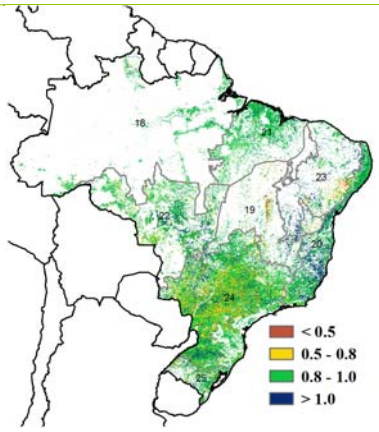
**Figure 3.13. Brazil's crop condition, April – July 2018**



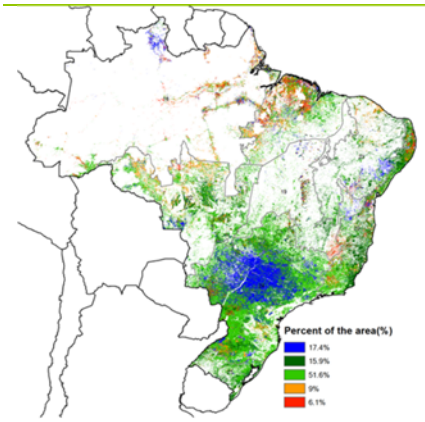

(a). Phenology of major crops



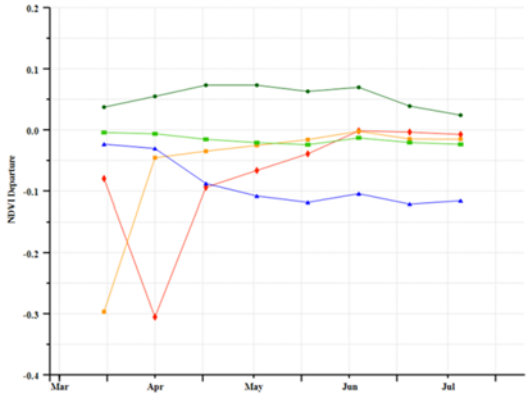

(b) Crop condition development graph based on NDVI



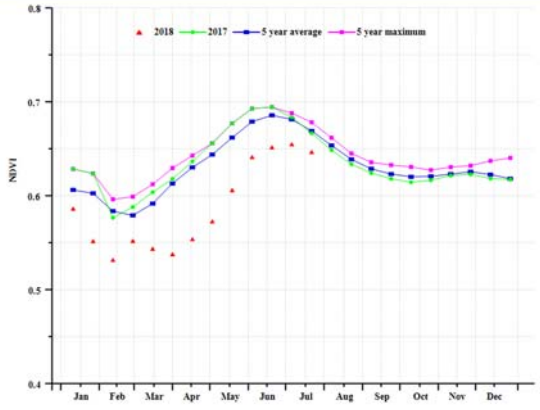

(c) Maximum VCI

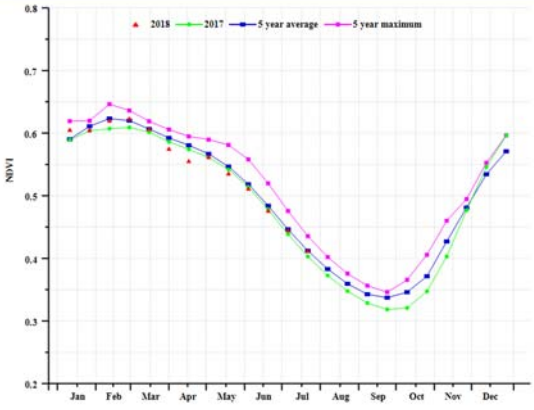



(d) Spatial NDVI patterns compared to 5YA

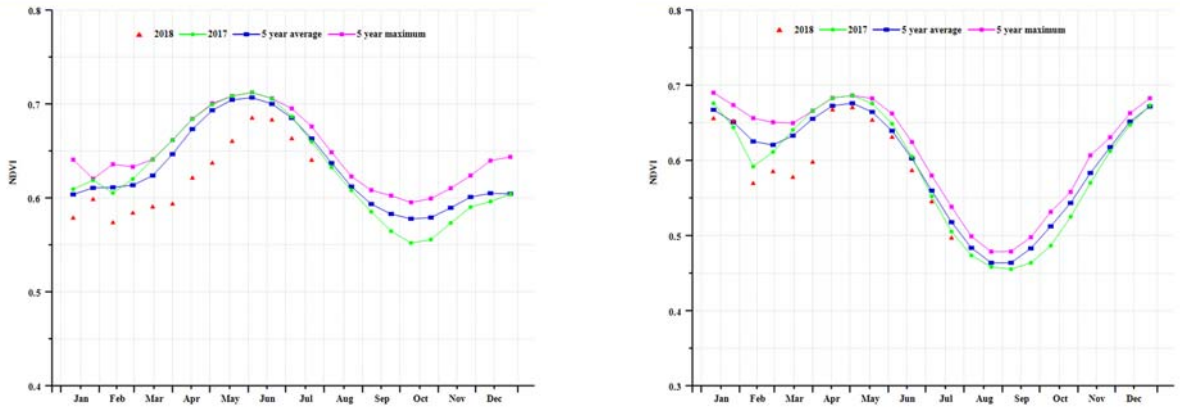



(e) NDVI profiles

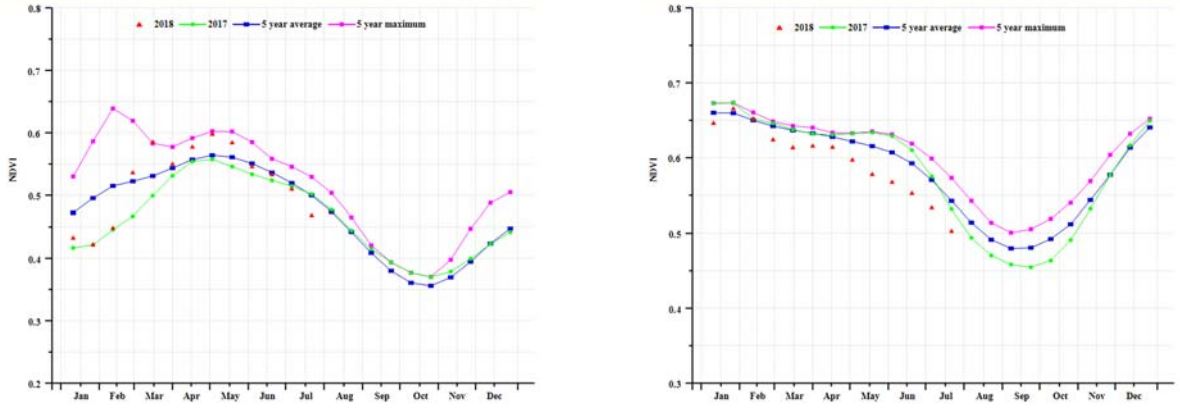


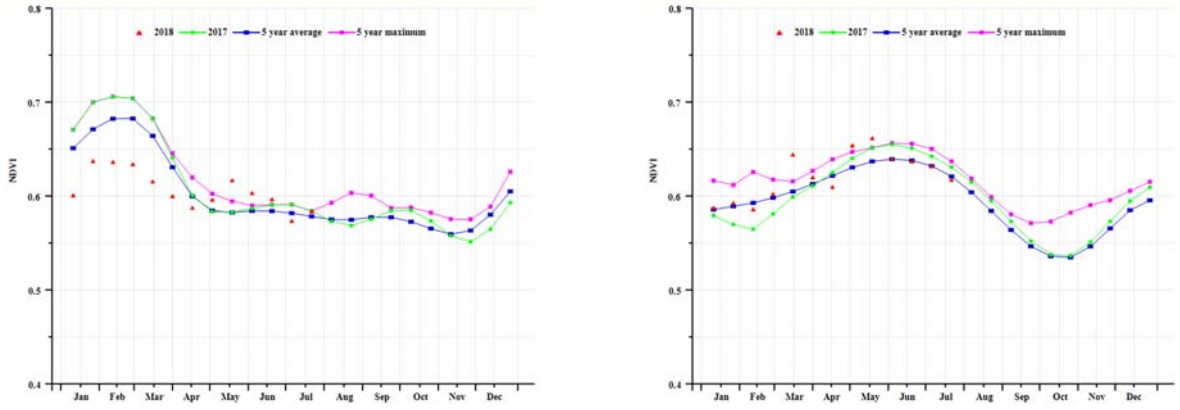

(e) Crop condition development graph based on NDVI ((Central Savanna) (left) and (East coast zone) (right))




(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 3.19. Brazil's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April – July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m2) | Departure from 15YA (%) |
| Amazonas | 809 | 7 | 26.9 | -0.8 | 933 | 0 |
| Central Savanna | 140 | 0 | 24.3 | -0.9 | 1066 | 3 |
| East coast | 142 | -33 | 22.9 | -0.6 | 844 | 0 |
| Northeastern mixed forest and farmland | 562 | -3 | 27.6 | -0.8 | 1034 | 3 |

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m2) | Departure from 15YA (%) |
| Mato Grosso | 222 | -4 | 25.8 | -1.1 | 1043 | 3 |
| Nordeste | 159 | -17 | 26.4 | 0.1 | 1027 | 0 |
| Parana basin | 183 | -49 | 21.1 | 0.3 | 895 | 4 |
| Southern subtropical rangelands | 519 | 1 | 16.9 | 0.1 | 611 | -7 |

**Table 3.20. Brazil's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April – July 2018**

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Amazonas | 1740 | -1 | 100 | 0 | 0.94 |
| Central Savanna | 406 | -10 | 95 | -1 | 0.89 |
| East coast | 545 | -19 | 100 | 0 | 0.97 |
| Northeastern mixed forest and farmland | 1220 | -10 | 100 | 0 | 0.94 |
| Mato Grosso | 676 | -9 | 100 | 0 | 0.91 |
| Nordeste | 474 | -21 | 96 | 7 | 0.95 |
| Parana basin | 597 | -41 | 100 | 0 | 0.87 |
| Southern subtropical rangelands | 1526 | 7 | 99 | 1 | 0.91 |

**Table 3.21. 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 | 0 | 2 | 85482 | 2 |
| **Rice** | 11344 | 1 | 2 | 11666 | 3 |
| **Wheat** | 8120 | 1 | 0 | 8205 | 1 |
| **Soybean** | 96726 | 0 | 0 | 96311 | 0 |

# [CAN] Canada

The current reporting period covers both the harvest of winter wheat and the early development of summer crops. Rainfall was below the recent 15-years average in most of Canada (RAIN, -18%). Both the temperature and radiation were almost average (TEMP, -0.1°C; RADPAR, +1%), and the maximum VCI value was 0.92. Because of the insufficient rainfall, the potential biomass was slightly below the recent 5-years average (BIOMSS, -10%).

Based on the NDVI profiles and crop condition clusters, crop growth conditions were below those of both the last year and recent 5-years average from April to June, and improved in July. This was mostly the result of poor growth conditions of winter wheat. Most of Canada had VCIx greater than 0.8, but values were below in the middle-southern Prairies.

Both agro-climatic and remote sensing indicators show crop condition that could be slightly below the average of the recent 5-years average. In particular, the conditions in three main production provinces of Canada were unsatisfactory, with below average rainfall and biomass production potential: Alberta -17% and -12 %, respectively; Manitoba -22% and -17% and Saskatchewan -24% and -19%.

As a result, the overall condition of winter wheat in Canada was poor, and the summer crops, except the spring wheat, also had worrying early stages. CropWatch predicts that the crop production of Canada is unlikely to reach 2017 levels.

**Regional analysis**

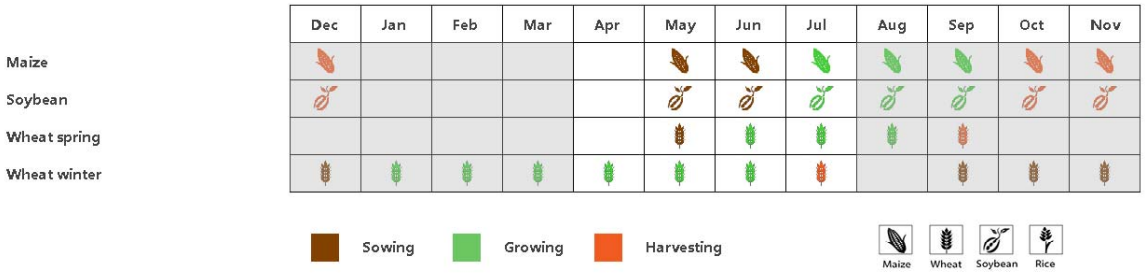
The Prairies (area identified as 30 in the maximum VCI map) and Saint Lawrence basin (26, covering Ontario and Quebec) are the major agricultural regions.

The rainfall in the Prairies, the main food production area in Canada, was below average (RAIN 215 mm, -22%), while both the temperature and radiation were almost normall (TEMP, 0.1°C; RADPAR, +1%). Due to the poor rainfall, the potential biomass was below the 5-years average (BIOMSS, -17%). According to the NDVI profiles, the growth condition of winter wheat was generally worse than the 5YA, which is likely to lead to a reduction of production. At the same time, the summer crops also experienced an unfavorable start.

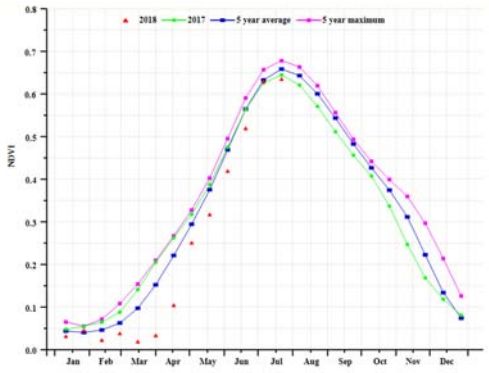
The rainfall of the Saint Lawrence basin was below average (RAIN 268 mm, -22%) as well, but temperature was almost average (-0.3°C), and the radiation was above average (+4%). The potential biomass was below the average (BIOMSS, -12%). The NDVI profiles also indicated that the crop conditions were poor from April to June, which was the end of the growth period of winter wheat. This was similar to the Prairies subregion, but the condition of summer crops in July was almost equal to the recent 5-years maximum.

Overall, the crop condition of Canada is mixed: the winter wheat was probably poor but spring wheat could be fine; other summer crops still have chance to improve if the weather becomes favorable. Current CropWatch estimates indicate a slightly increase in wheat production (30,741 ktons, 0.2% above 2017), and drops in maize (11,387 ktons, -4.2% below 2017) and soybean (5,183 ktons, -5.3% below 2017).

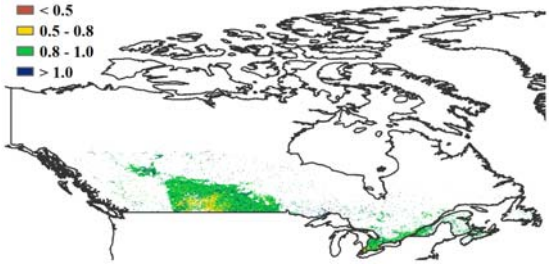
**Figure 3.14. Canada's crop condition, April – August 2018**



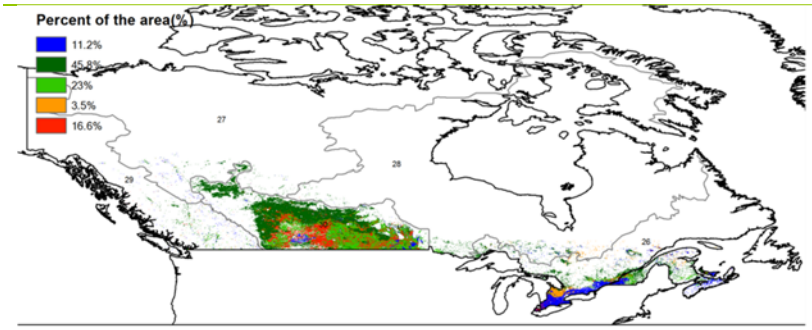
(a). Phenology of major crops



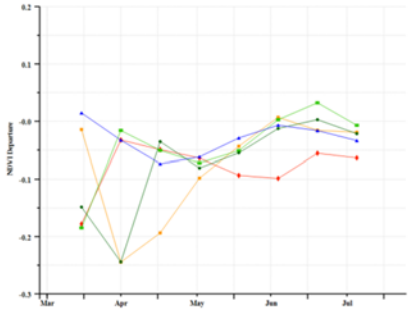

(b) Crop condition development graph based on NDVI



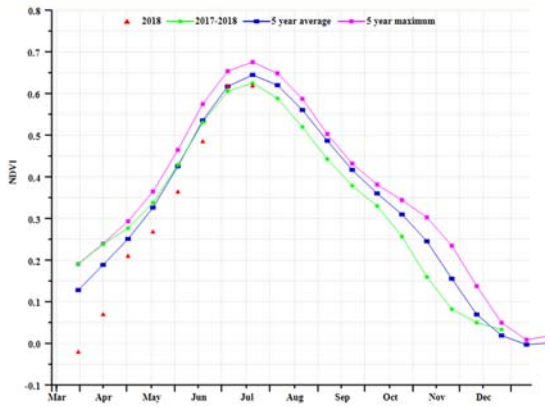

(c) Maximum VCI

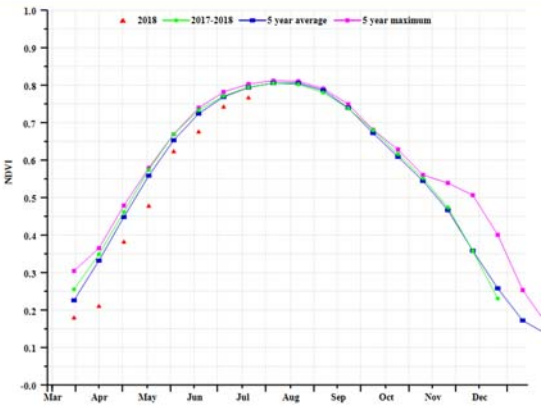



(d) Spatial NDVI patterns compared to 5YA




(e) NDVI profiles




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

**Table 3.22. Canada's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April – August 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| Prairies (Canada) | 215 | -22 | 11.8 | 0.1 | 1261 | 1 |
| Saint Lawrence basin (Canada) | 268 | -22 | 11.4 | -0.3 | 1196 | 4 |

**Table 3.23. Canada agronomic indicators by sub-national regions, current season's values and departure from 5YA, April – August 2018**

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Prairies (Canada) | 899 | -17 | 98 | 0 | 0.90 |
| Saint Lawrence basin (Canada) | 1088 | -12 | 100 | 0 | 0.93 |

**Table 3.24. CropWatch-estimated wheat production in Canada for 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| **Wheat** | 30679 | 2.5 | -2.2 | 30741 | 0.2 |
| **Maize** | 11881 | -3.6 | -0.6 | 11387 | -4.2 |
| **Soybean** | 5471 | -4.5 | -0.8 | 5183 | -5.3 |

# [DEU] Germany

Overall, the crops in Germany showed below average condition during the reporting period from April to July during which winter wheat, spring wheat, and maize are the main grain crops. Currently winter wheat has been harvested while the other two are nearing harvest. At the national level, CropWatch agroclimatic indicators show below average precipitation (Rain, -33%), temperature and radiation well above average (TEMP +1.8°C, RADPAR, +9%). Below average precipitation occurred throughout most parts of Germany during the reporting period, except in Rheinland-Pfalz and Baden-Wuertenberg from mid-May to mid-June. Above average temperatures were observed throughout Germany before mid-June, and warmer-than-usual weather conditions continued to prevail throughout Germany after early-July. Below average temperatures were only observed from late-June to early July. Warm temperatures coupled with a persistent rainfall deficit affected winter crops flowering and grain filling in large parts of Germany, and the biomass accumulation potential BIOMSS was 28% below the recent five-year average.

As shown by the crop condition development graph, national NDVI values were below average during the whole reporting period, except for one period in late-April with close to or above average values. These observations are confirmed by the NDVI profiles. Winter crops in the Schleswig-Holstein, Mecklenburg-Vorpommern, eastern Niedersachsen and Sachsen-Anhalt had generally unfavorable condition, with low VCIx areas and NDVI due to warmer-than-usual weather conditions. Summer crops were also below average in Schleswig-Holstein, Mecklenburg-Vorpommern, eastern Niedersachsen, Sachsen-Anhalt, Brandenburg, Thüringen and Sachsen according to the NDVI, as result of warm temperature coupled with a persistent rainfall deficit.

Generally, the values of agronomic indicators show unfavorable condition for most winter crops and the sowing of summer crops. In the wheat area, crop condition is slightly below the average of last year. The condition of maize is slightly above average that of last year's, and the production of wheat and maize is estimated at respectively 4.4% and 2.8% below 2017 values.

**Regional analysis**

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

The CropWatch agroclimatic indicator for Schleswig-Holstein and the Baltic coast show that RAIN was below average (-45%), radiation was above average (RADPAR +12%), and temperature was significantly above average (TEMP +2.0°C, which is the largest temperature departure in Germany). as a result, biomass (BIOMSS) in this zone fell by 36% compared to the five-year average. As shown in the crop condition development graph based on NDVI, the NDVI values were below average during the whole reporting period and with low VCIx areas. Warmer-than-usual weather conditions caused crops to mature early and yields were affected; NDVI clusters show the same pattern, indicating unfavorable crop prospects.

The CropWatch agroclimatic indicators for **Mixed wheat and sugar beet zone of the north-west** show that RAIN was below average (-42%), temperature was above (TEMP +1.9°C) and so was radiation, resulting in unfavorable crop condition for both crops. Biomass (BIOMSS) in this zone dropped by 35% compared to the five-year average. As shown in the crop condition development graph based on NDVI, the values were below average throughout. Crop condition for the region is unfavorable.

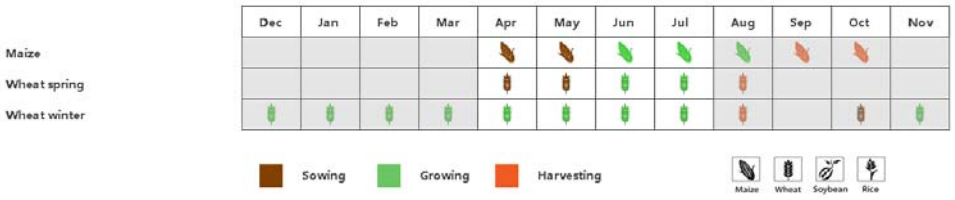
**For Central wheat zone of Saxony and Thuringia region,** it is the region with the most serious precipitation stress (RAIN -47%). Warm temperature (TEMP +1.8°C) and the precipitation deficit caused biomass potential (BIOMSS indicator) to fall 40% below average. As shown in the crop condition

development graph based on NDVI, the values were below average during the whole period, showing unfavorable crop prospects.

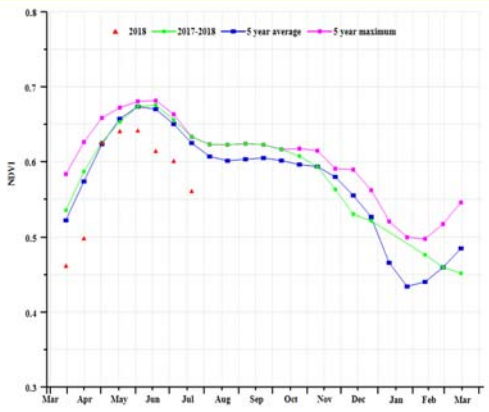
The cropland in **the sparse crop area of the east-German lake and Heathland** and **western sparse crop area of the Rhenish massif** are more marginal. Rainy weather was recorded (RAIN -46% and -24%, respectively), as well as above average temperatures (TEMP, +1.9°C in both areas) and radiation (RADPAR, +10% and +9%). Compared to the average of the last five years, BIOMSS was lower by 36% and 19% respectively, while the Cropped Arable Land Fraction was at 100% for both. As shown in the crop condition development graph based on NDVI, the values in the region of sparse crop area of the east-German lake and Heathland were below average during the reporting whole period, showing unfavorable crop prospects. In the western sparse crop area of the Rhenish massif, values were above average only from mid-April to mid-May; crop prospects are unfavorable as well.

Maize, wheat and potato major crops in the **Bavarian Plateau**. The CropWatch agroclimatic indicators show that abnormal weather was recorded for RAIN (-21%), TEMP (+1.6°C), and RADPAR (+7%). Compared to the five-year average, BIOMSS decreased 17% but the Cropped Arable Land Fraction stayed at 100%. Due to precipitation deficit and warm temperature, the crop condition was below average.

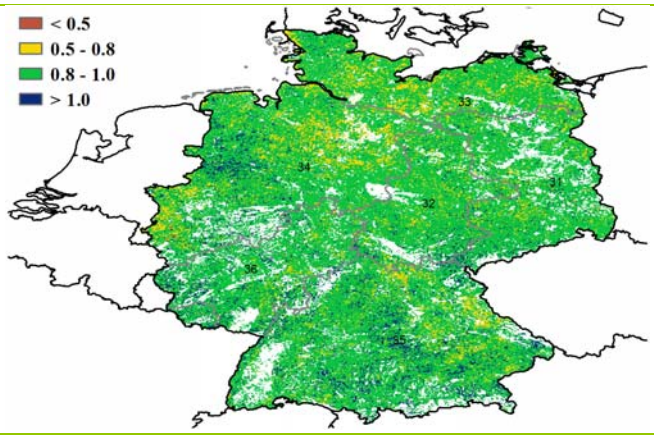
**Figure 3.15. Germany's crop condition, April -July 2018**



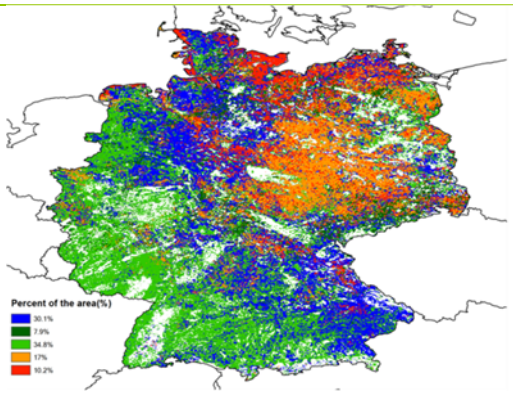

(a). Phenology of major crops



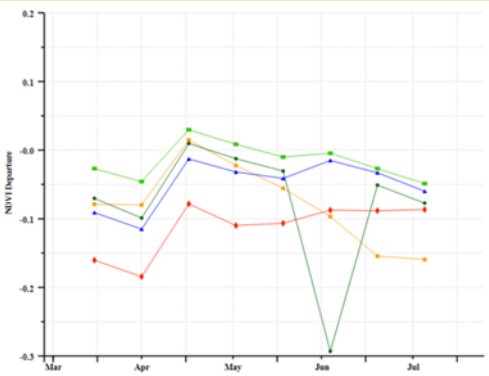

(b) Crop condition development graph based on NDVI



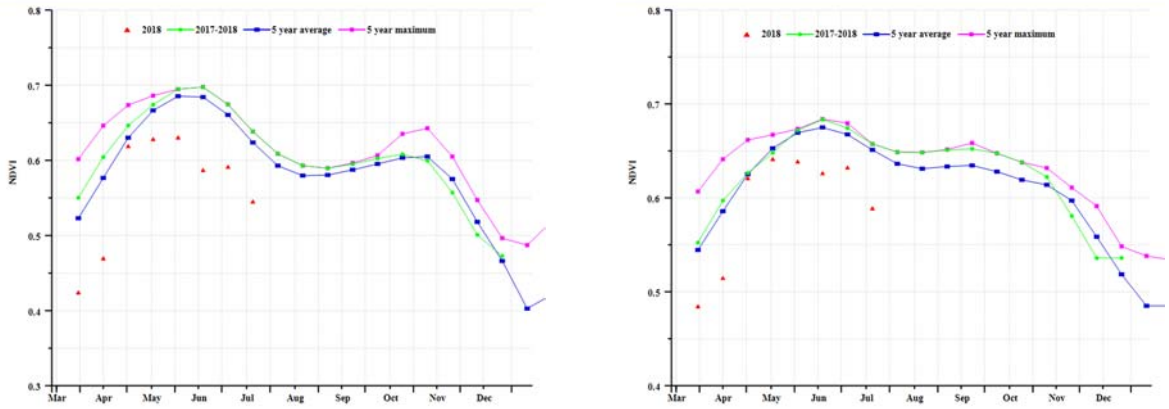

(c) Maximum VCI



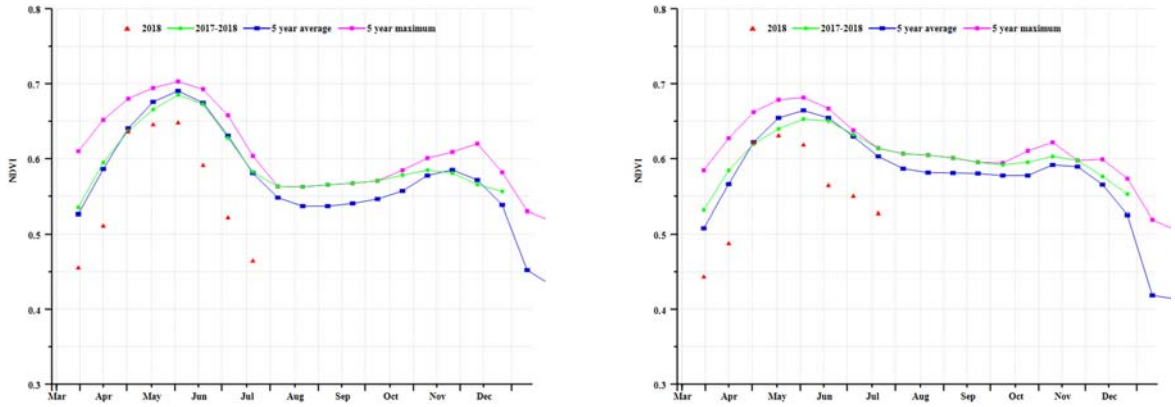

(d) Spatial NDVI patterns compared to 5YA



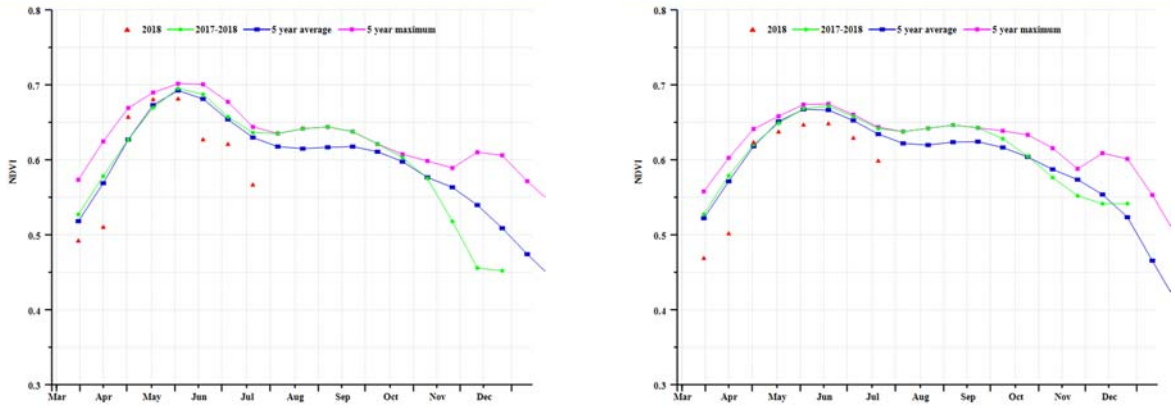

(e) NDVI profiles




(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 3.25. Germany's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 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 | 137 | -45 | 16.5 | 2.0 | 1230 | 12 |
| Mixed wheat and sugar beets zone of the north-west | 154 | -42 | 16.9 | 1.9 | 1178 | 10 |

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m2) | Departure from 15YA (%) |
| Central wheat zone of Saxony and Thuringia | 133 | -47 | 17.5 | 1.8 | 1207 | 11 |
| Sparse crop area of the east-German lake and Heathland | 133 | -46 | 17.4 | 1.9 | 1198 | 10 |
| Western sparse crop area of the Rhenish massif | 203 | -24 | 17.1 | 1.9 | 1202 | 9 |
| Bavarian Plateau | 283 | -21 | 16.6 | 1.6 | 1198 | 7 |

**Table 3.26. Germany's agronomic indicators by sub-national regions, current season's value and departure from 5YA, April -July 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 | 669 | -36 | 100 | 0 | 0.86 |
| Mixed wheat and sugarbeets zone of the north-west | 725 | -35 | 100 | 0 | 0.89 |
| Central wheat zone of Saxony and Thuringia | 636 | -40 | 100 | 0 | 0.90 |
| Sparse crop area of the east-German lake and Heathland | 660 | -36 | 100 | 0 | 0.91 |
| Western sparse crop area of the Rhenish massif | 913 | -19 | 100 | 0 | 0.93 |
| Bavarian Plateau | 1116 | -17 | 100 | 0 | 0.92 |

**Table 3.27. CropWatch-estimated wheat and Maize production for Germany in 2018 (thousands tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| **Wheat** | 2813.0 | -4.2% | -0.2% | 2688.5 | -4.4% |
| **Maize** | 475.5 | -2.9% | 0.1% | 462. | -2.8% |

# [EGY] Egypt

During the April to July 2018 period, winter wheat reached its final stage (pre-harvest or harvest), while the summer crops (e.g. maize and rice) were sown and were still growing. Nationwide agro-climatic indicators show that rainfall (RAIN) and TEMP were average (TEMP was 25°C, 0.5°C above the 15YA). The radiation (RADPAR) was 1553 MJ/m2, -3% below 15YA, while the estimated biomass (BIOMSS) was 57 gDM/m2, and 47 % above 5YA. Generally, crops being irrigated, RADPAR is the main limiting factor.

The spatial NDVI patterns show that the conditions of 71% of the total cropped area were below the 5 years average from April to mid-May, after which crop condition became either above or close the 5YA conditions. The maximum VCI map shows poor and fair crops (< 0.5 and 0.5 to 0.8) are mostly located in the Nile Delta, whereas the value of the maximum VCI for the whole country was 0.7. The Cropped arable land fraction (CALF) was only 2% less than the 5YA nationwide.

CropWatch estimates that crop conditions was moderate during the analysis period. The variation in CropWatch-estimated maize, rice, and wheat production was lower (-2.4%, -2.9% and -1.6%, respectively) compared to the previous season.

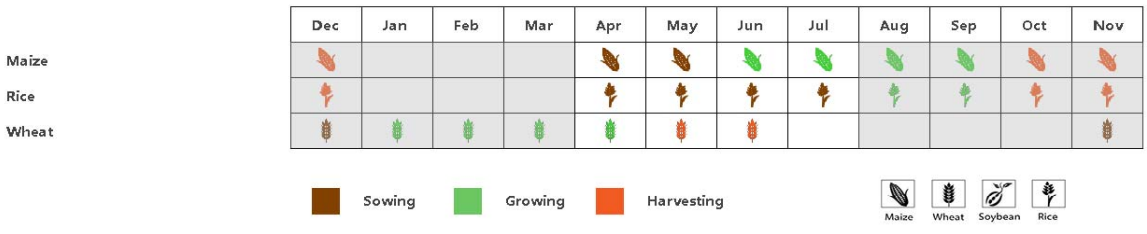
**Regional analysis**

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 first zone is the **Nile Delta and Mediterranean coastal strip**, while the second zone is the **Nile Valley**.

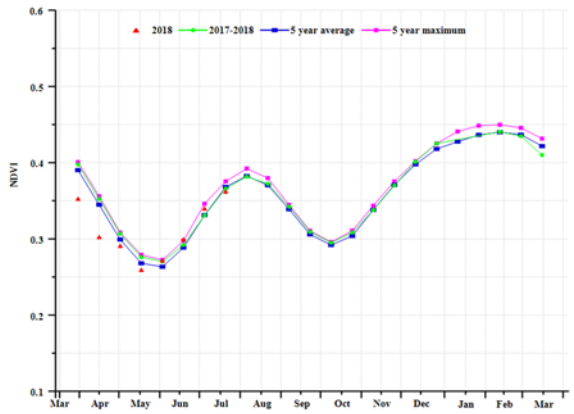
Rainfall was seasonally low in both AEZs (6 mm in the **Nile Delta and Mediterranean coastal strip** and 25 mm in the **Nile Valley**. Since virtually all Egyptian crop production is irrigated, rainfall makes little change in the outcome of the season, although additional water usually has a beneficial effect. RADPAR for both zones was (-3% and -4%, respectively) slightly below average; the BIOMSS index shows an increase (25% and 37% above the 5YA, respectively) for both zones.

The NDVI-based Crop condition development graphs indicate below average conditions in the period from April to mid-May for both zones after which crop condition for the two zones returned to be close to or above average, especially in Nile Valley zone where the crop condition even exceded the last 5 years maximum after mid-May, in agreement with the VCIx values (0.7 and 0.8, respectively).

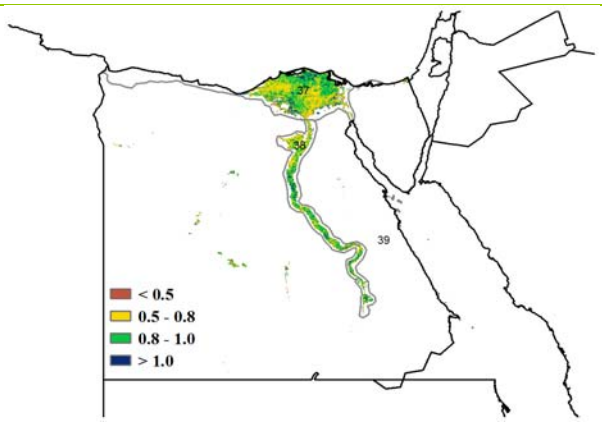
**Figure 3.16. Egypt's crop condition, April -July 2018**



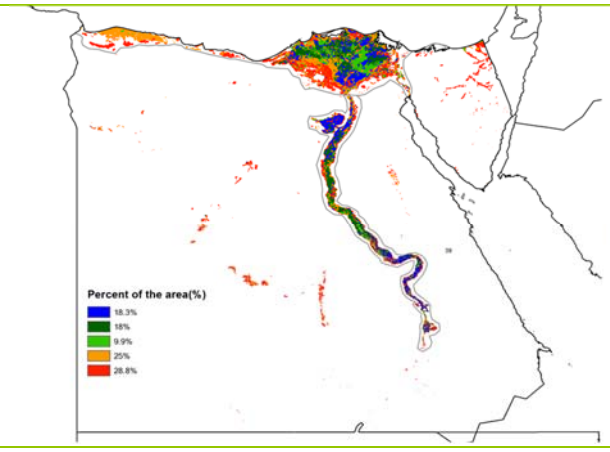

(a). Phenology of major crops



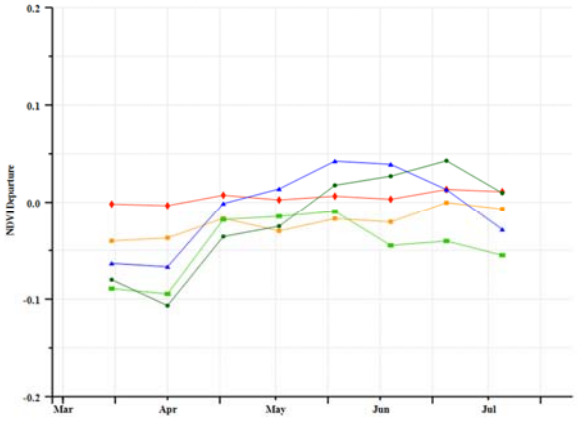

(b) Crop condition development graph based on NDVI



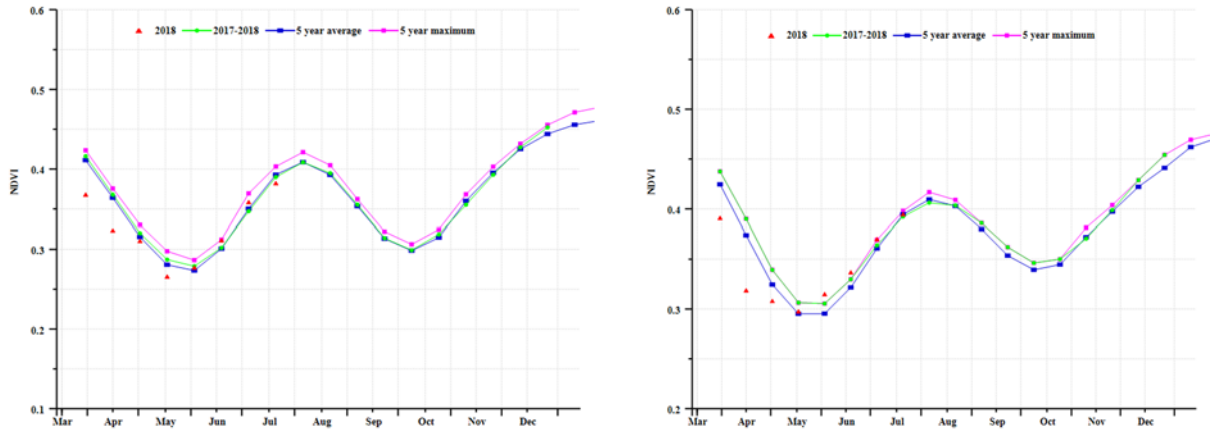

(c) Maximum VCI




(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 3.28. Egypt's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 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 | 6 | -5 | 24.7 | 0.5 | 1544 | -3 |
| Nile Valley | 25 | 64 | 27.4 | 0.3 | 1573 | -4 |

**Table 3.29. Egypt's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| Region | Current (gDM/m²) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Nile Delta and Mediterranean coastal strip | 48 | 25 | 1 | 0 | 0.7 |
| Nile Valley | 71 | 37 | 1 | -2 | 0.8 |

**Table 3.30. 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 | -6.9% | 4.8% | 5774 | -2.4% |
| **Rice** | 6545 | -6.5% | 3.9% | 6358 | -2.9% |
| **Wheat** | 10963 | -6.6% | 5.4% | 10790 | -1.6% |

# [ETH] Ethiopia

Ethiopia experiences two main agricultural seasons: Meher and Belg. Meher is the main crop season and farmers cultivate cereals like, wheat, teff, maize and barley. This reporting period corresponds to Belg harvesting time and Meher land preparation and planting (the season covers crops harvested from August to the end of December). Agroclimatic indicators were below average (RAIN - 9%, TEMP -0.4°C), and radiation (RADPAR) was stable, resulting in a minor BIOMSS potential drop of 2% compared to average. On average, VCIx was 0.87 with about half of cropped areas at values lower than 0.8. VCIx exceeding 1, indicating unusually favourable conditions was mostly distributed in small regions along eastern and central part Oromia and northern Tigray. National NDVI values were below average. According to spatial NDVI departure clusters areas with above average NDVI (about 24.5% of arable lands) are located in the central Oromia region, which is coincident with the high VCIx values. Generally, based on below average indicators the crop outlook was unfavorable. The production of wheat is estimated to decreased by 3.8 % and Maize decreased by 6.6% during the 2018 production year.

Regional analysis

Ethiopia can be subdivided into five agro-ecological zones: the semi-arid pastoral zone, southeastern highlands, southeastern mixed-maize zone, western mixed maize regions, and central-northern maize-teff highlands.

In the Western mixed maize zone, maize was the most cultivated crop during the Belg and early meher seasons. Agroclimatic variables were below average with RAIN -14%, TEMP -0.3°C and RADPAR -1%, which resulted in a BIOMSS drop of 7%. Overall,even though the maximum VCIx at 0.91% was good, the NDVI-based Crop condition development graphs was below average to that of past five years average.Base on the agreements of agronomic and Agro climatic indicators with addition to the NDVI based crop condition development over all the western maize zone there was no favorable condition. In general, during the reported period the crop Phenology of planting of Meher and harvest of Belg was Not conducive.

South-eastern Mendebo highlands

The southeastern Mendebo highlands are major maize and teff producing areas. It received 473 mm with slight above average of rainfall (RAIN, 1%). Hence the temperature was decreases by 0.6 oc from average. There was no reduction in RADPAR. Due to slight above average of rainfall The Cropped arable land fraction (CALF) dropped 3% below the recent five-year average. Even though during the reported period the AEZ had maximum VCIx at 0.97, the NDVI crop condition development graph still described the temporal difference: above average during April and May, and below average from Mid -May to end of July during the grain filing stage. Over all the NDVI crop condition graph was below the five years average. In this highland zone the crop condition was not favorable to harvest good yield and will not expect to get more yield than before during meher.

South-eastern mixed maize zone

The average rainfall was 497 mm (15% above average), the temperature was below average by 0.6. The RADPAR for both zones was about 1% below average and the BIOMSS index shows an increasing of 5% in central Oromia and eastern Amhara as The NDVI-based Crop condition development graphs indicate that from April it was rise up and drops in June as below average condition. In this zone there was also a maximum VCIx value at 0.92%. In general, based on the Agronomic and Agro Climatic indicators was Slightly increasing from average, but the NDVI profile was below average, therefore, the Crop condition was good based the agreement of the indicators

Semi-arid pastoral

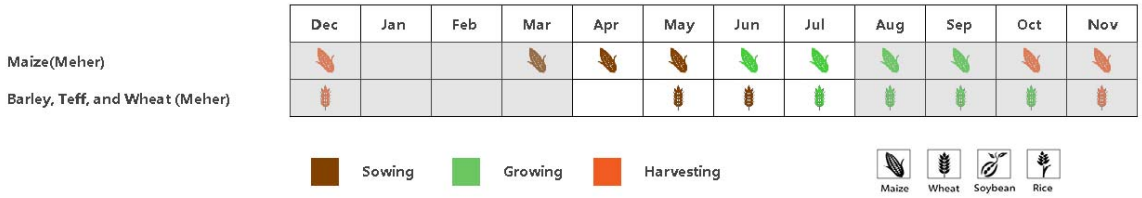
The semi-arid pastoral zone commonly known by livestock production. Small semi-arid pastoral region suffered a drop-in rainfall and sunshine (RAIN -2% and TEMP -0.7°C), while The RADPAR did not register any changes compared to the Recent five-year average. The biomass in this region was increased by 2% and cropped arable land fraction (CALF) dropped by 3% below the recent five-year average. The maximum VCIx reached From the NDVI-based Crop condition development graphs, In this zone indicate below average conditions during the reported period, especially in the grain filling stage during the belg

season. Over all The situation and the agreement of the agroclimatic, Agronomic indicators and the NDVI based crop condition development graph there was unfavorable condition.

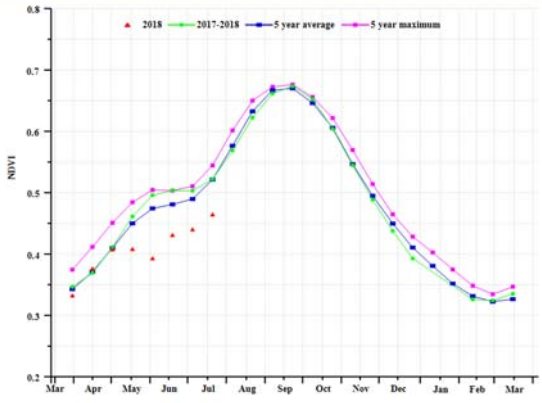
Central-northern maize-teff highlands

The main crops of this area in the central north highland as assigned as 40 in the VCIx map. In this zone the rainfall was below average by 10%. As a result of below average rainfall the BIOMSS production was dropped by 3%. And the Temperature was also below average (TEMP, -0.4oc) with remains constant of RADPAR. Crop condition was below average according to the NDVI development graph, an observation confirmed by the decrease of BIOMSS by -3% compared to average. Even though, this Central-northern maize-teff highlands was had maximum VCIx value at 0.84, based on the Agronomic and agro climatic indicators and the NDVI crop condition development graph over all the outlook was not conducive.

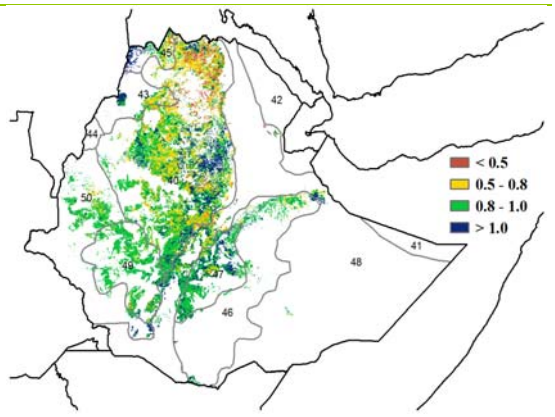
**Figure 3.17. Ethiopia's crop condition, April -July 2018**



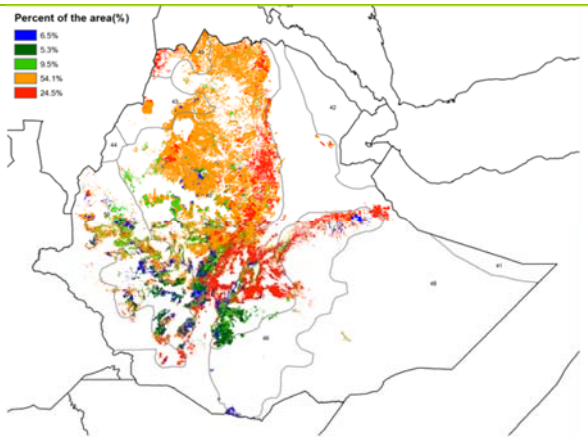

(a). Phenology of major crops



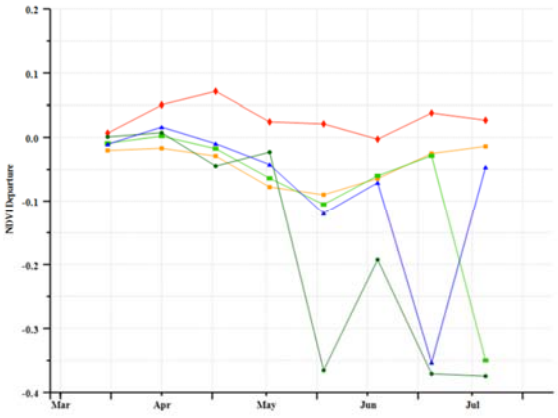

(b) Crop condition development graph based on NDVI



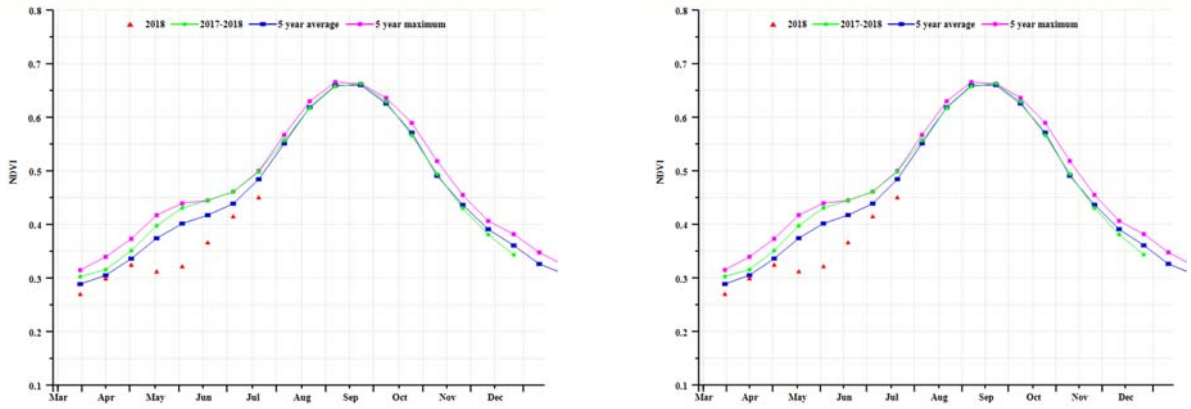

(c) Maximum VCI



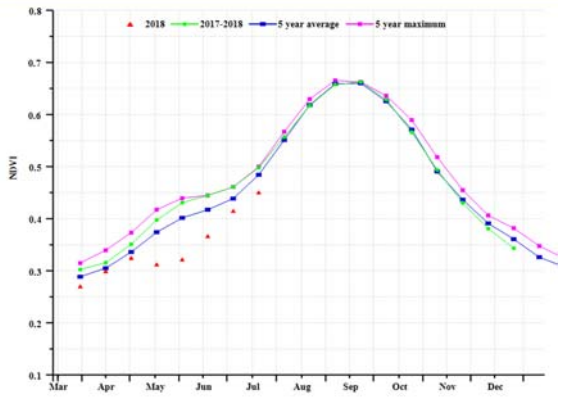

(d) Spatial NDVI patterns compared to 5YA




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

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m2) | Departure from 15YA (%) |
| Central-northern maize-teff highlands | 511 | -10 | 20.6 | -0.4 | 1203 | 0 |
| South-eastern mixed maize zone | 497 | 15 | 23.1 | -0.6 | 1132 | -1 |
| South-eastern Mendebo highlands | 473 | 1 | 17.9 | -0.6 | 1103 | -2 |
| Semi-arid pastoral | 416 | -2 | 23.0 | -0.7 | 1170 | 0 |
| Western mixed maize zone | 615 | -14 | 24.5 | -0.3 | 1113 | 0 |

**Table 3.32. Ethiopia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current ($gDM/m^2$) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Central-northern maize-teff | 1441 | -3 | 76 | -8 | 0.84 |

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m$^2$) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| highlands | | | | | |
| South-eastern mixed maize zone | 1455 | 5 | 96 | 6 | 0.92 |
| South-eastern Mendebo highlands | 1504 | 2 | 99 | 2 | 0.97 |
| Semi-arid pastoral | 1344 | 2 | 77 | -3 | 0.91 |
| Western mixed maize zone | 1739 | -7 | 99 | 0 | 0.91 |

**Table 3.33. CropWatch-estimated Wheat production for Ethiopia in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| **Maize** | 7154 | -7.6 | 1 | 6079 | -6.6 |
| **Wheat** | 4180 | -3.9 | 0.1 | 4021 | -3.8 |

# [FRA] France

Over the monitoring period, the planting of spring wheat and maize were started from April, while winter wheat was harvested from June. Compared to average, CropWatch agroclimatic indicators show that the conditions were below normal.This includes a 1% drop in RAIN, about average RADPAR, and an increase in temperature at the national level. Also at the national level, crop condition was slightly below average,which is confirmed by a marginal decrease for the BIOMSS indicator (-3%), and the main crop production estimates (Wheat -4.5%,Maize -1.5%).

National NDVI values were mostly below those for 2017, but close to the five-year average from April to May. And the national NDVI values began to drop slightly below average from May, which is consistent with the abundant of rainfall during this period. The spatial NDVI patterns compared to the five-year average indicate that NDVI is above average in 79.1% of arable land, with below average values in the other regions. This spatial pattern is reflected by the maximum VCI (VCIx) in the different areas, with a VCIx of 0.95 and average CALF for France overall. Generally, due to the suitable rainfall, the agronomic indicators mentioned above show that the crop growing conditions were close average during the monitoring period.

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: (54) Northern barley region; (58) Mixed maize/barley and rapeseed zone from the Center to the Atlantic Ocean; (55) Maize, barley and livestock zone along the English Channel, (56) Rapeseed zone of eastern France;(51) Dry Massif Central zone; (57) Southwestern maize zone; (52) Eastern Alpes region and (53), the Mediterranean zone.

In the Northern barley region both RAIN and TEMP were below average (9% and 2.1°C, respectively), while RADPAR was 6% above. As a result of the shortage of rain, the BIOMSS indicator is 13% below the five-year average. High VCIx values, however, are observed, reflecting overall satisfactory crop condition.

The Mixed maize/barley and rapeseed zone from the Center to the Atlantic Ocean average rainfall (RAIN, -1%), temperature and RADPAR. According to the NDVI profile 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 Maize_barley and livestock zone along the English Channel over the reporting period. Rainfall was 16% below average (166 mm over four months).Temperature and radiation (RADPAR) was normal. The dry conditions have hampered crop growth, indicated also by a BIOMSS indicator 16% below average for the period.

The Rapeseed zone of eastern France recorded 270 mm of rainfall over four months (RAIN -10%). Temperature was average (TEMP 1.4°C) but RADPAR was 6% above. The drop in BIOMSS was 12% compared to the five-year average. The NDVI profile confirms the conditions of crop were close average.

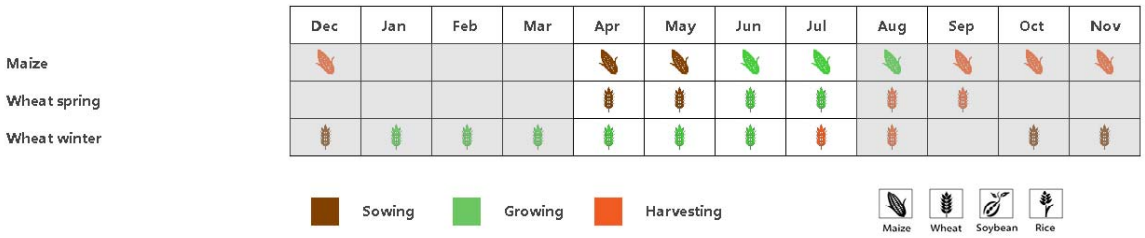
The Dry Massif Central zone a slight 10% rainfall deficit (RAIN -10%), with above average values for both RADPAR and TEMP. BIOMSS for the region is 6% below the five-year average, and a high VCIx value reflects the generally favorable crop condition. That overall crop condition is generally comparable with the previous five years, as confirmed by the crop condition development graph, in this minor agricultural region.

The Southwestern maize zone is one of the major irrigated maize regions in France. Rainfall dropped 12% below average, temperature was average, but radiation was below expectations (RADPAR -5%). Crop condition was below average according to the NDVI development graph, in spite of an observation confirmed by the increase of BIOMSS by 9% compared to average. The VCIx map, however, shows that the crop condition was unsatisfactory, in spite of a high VCIx value recorded for the region as a whole (0.95).

Generally, crop condition for the Eastern Alpes region is above average with the following agroclimatic indicator values: RAIN +14%, TEMP +1.5°C, and RADPAR, -1%. Almost all arable land in this region was cropped during the monitoring period, and the average VCIx is 0.95. The NDVI profile confirms the favorable conditions.

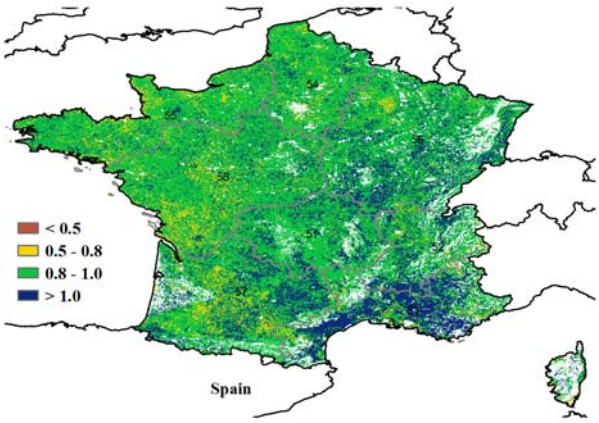
Finally, the best weather conditions were observed in the Mediterranean zone (RAIN +13%) even if other indicators remain close to average. According to the NDVI profiles, crop condition has been continuously deteriorating since June. BIOMSS is 18% above its five-year average, and the VCIx value of 1 for the region is the highest in the country.

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

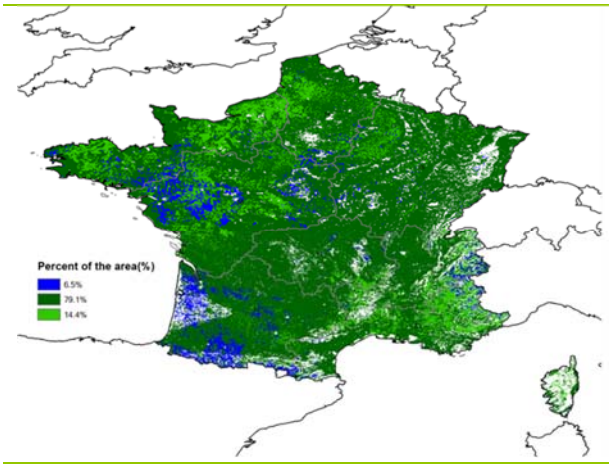



(a). Phenology of major crops

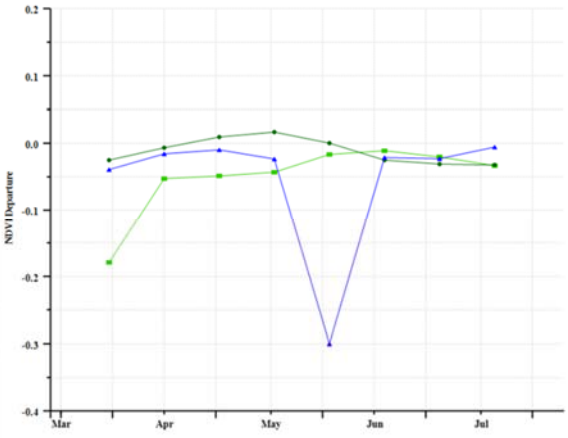

(b) Crop condition development graph based on NDVI



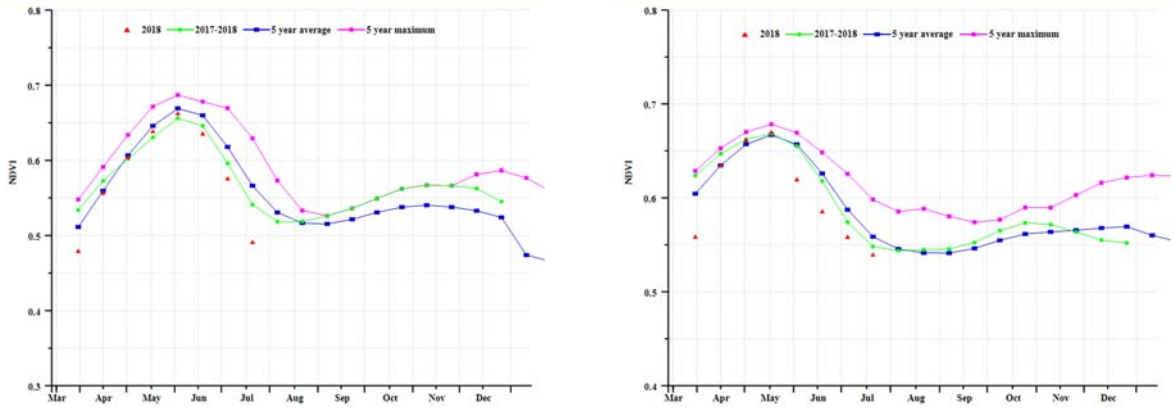

(c) Maximum VCI



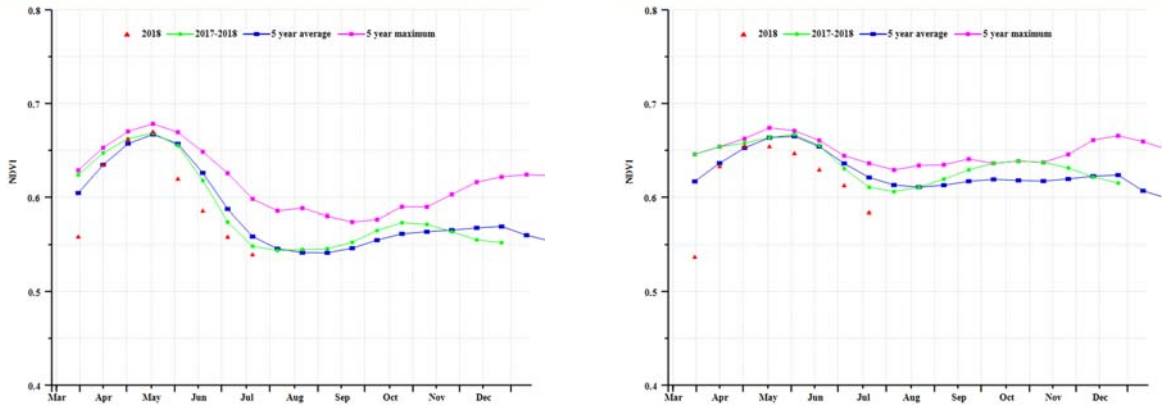

(d) Spatial NDVI patterns compared to 5YA



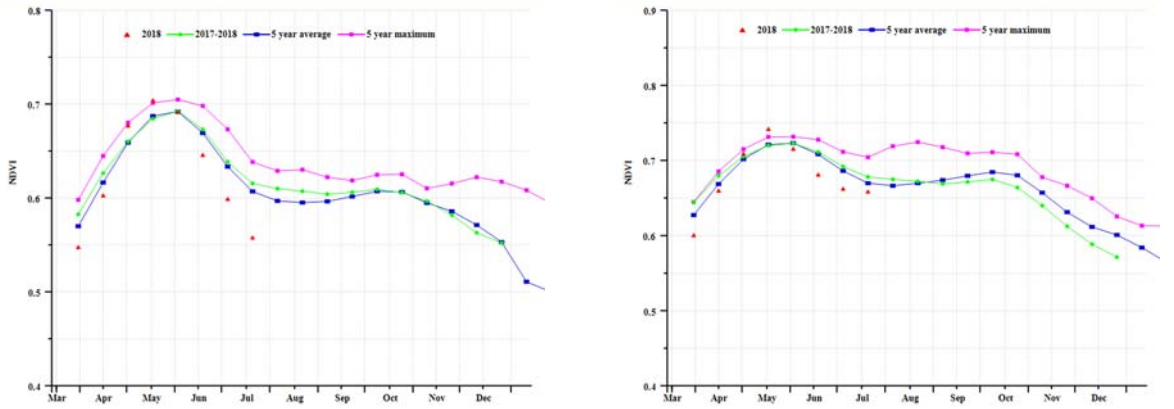

(e) NDVI profiles



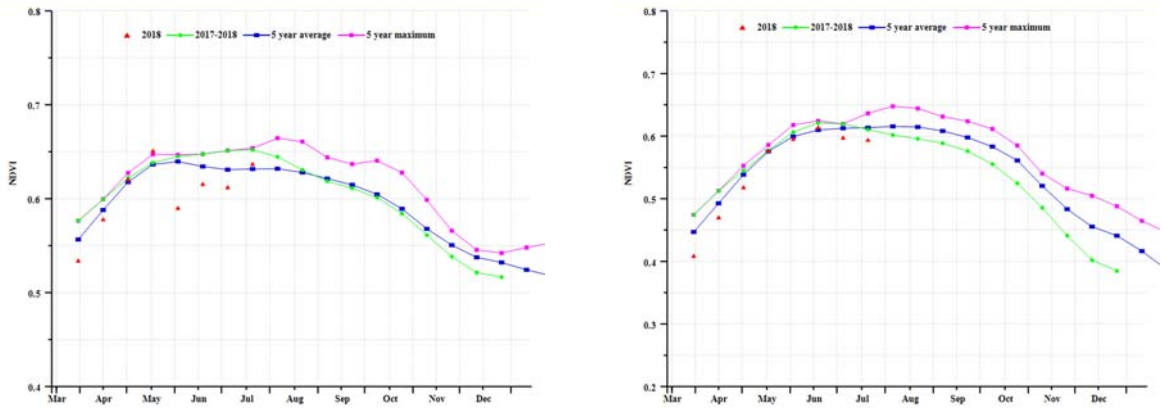

(f) Crop condition development graph based on NDVI (Northern barley region (left) and Mixed maize, Barley and Rapeseed zone (right))




(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 3.34. France's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 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) | 211 | -9 | 16 | 2.1 | 1187 | 6 |
| Mixed maize/barley and rapeseed zone(France) | 226 | -1 | 17 | 2.1 | 1181 | 0.5 |
| Maize, barley and livestock zone(France) | 169 | -16 | 15 | 1.6 | 1175 | 2 |
| Rapeseed zone (France) | 270 | -10 | 16 | 1.4 | 1215 | 6 |
| Dry Massif Central zone(France) | 290 | -10 | 15 | 2.0 | 1212 | 1 |
| Southwest maize zone (France) | 321 | 12 | 17 | 1.0 | 1179 | -5 |
| Eastern Alpes region (France) | 403 | 14 | 15 | 1.5 | 1267 | -1 |
| Mediterranean zone (France) | 260 | 13 | 16 | 1.3 | 1266 | -7 |

**Table 3.35. France's agronomic indicators by sub-national regions, current season's value and departure from 5YA, April -July 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) | 872 | -13 | 100 | 0 | 0.92 |
| Mixed maize/barley and rapeseed zone(France) | 900 | -3 | 100 | 0 | 0.91 |
| Maize, barley and livestock zone(France) | 741 | -16 | 100 | 0 | 0.90 |
| Rapeseed zone (France) | 1037 | -12 | 100 | 0 | 0.96 |
| Dry Massif Central zone (France) | 1126 | -6 | 100 | 0 | 0.97 |
| Southwest maize zone (France) | 1174 | 9 | 99 | 0 | 0.95 |
| Eastern Alpes region (France) | 1253 | 7 | 97 | 0 | 0.96 |
| Mediterranean zone (France) | 1012 | 18 | 97 | 3 | 1 |

**Table 3.36. CropWatch-estimated wheat and Maize production for France in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| **Wheat** | 38051 | -3.5 | -1.0 | 38333 | Wheat |
| **Maize** | 14577 | -4.0 | 2.6 | 14359 | Maize |

# [GBR] United Kingdom

Crops showed unfavorable condition over the reporting period in the United Kingdom. Currently, most of the winter wheat and oats and all the winter barley and winter rape have been harvested, while spring barley is in the vegetative stage. Compared to average, rainfall decreased (RAIN -15.4%) with below average biomass (BIOMSS -13%). Both radiation and temperature were above average (RADPAR +4% and TEMP +1.6°C). 73.2% of arable land had below average NDVI, while slightly higher than average NDVI occurred from April to June in Norfolk,Essex, southern Cambridgeshire, Huntingdonshire, Northamptonshire and Rutland, Leicestershire, Dorset, Somerset, Gloucestershire and Worcestershire. Due to reduced rainfall, the national NDVI values dropped to below average from June to July. The national average of VCIx (0.91) was above average, and cropped arable land fraction remained unchanged compared with five-year average. CropWatch estimates wheat production to decrease 1.7% below 2017 values (yield down 2.6%, area up 1.0%).

Regional analysis

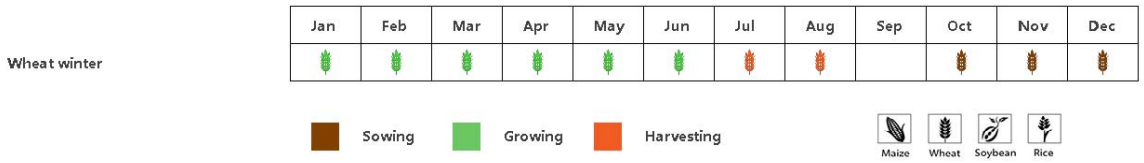
CropWatch has adopted three agro-ecological zones (AEZ) to provide a more detailed analysis for the country. They include the central sparse crop region (covering northern England, Wales, and northern Ireland), the northern barley region (Scotland and northern England), and the southern mixed wheat and barley region (southern England). All three regions are characterized by unchanged fractions of arable land (CALF) compared to average.

In the Main barley region, the NDVI was close to average from April to June, and below average from late June to July according to the crop condition graphs. Agroclimatic conditions include below average rainfall and biomass (RAIN -13% and BIOMSS -9%), and above average TEMP (+1.0°C) and radiation (+2.9%). The VCIx was generally good at 0.89.

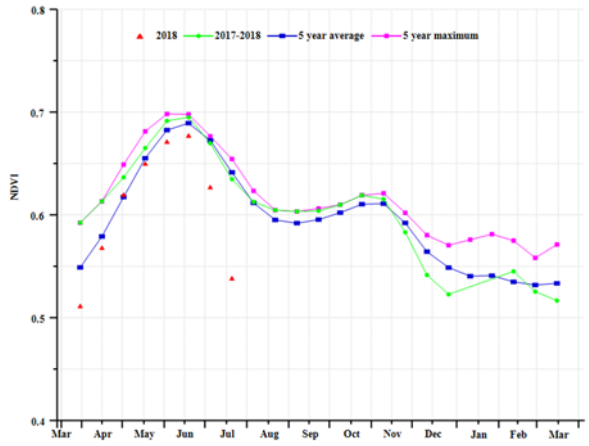
The Central sparse crop region is one of the country's major agricultural regions in terms production volume. NDVI values were close to average from April to May and below average between early June to July, according to the region's crop condition development graph. Agronomic conditions were below average for RAIN (-17%) and BIOMSS (-12%); TEMP and RADPAR were significantly above average (1.2°C and 3.5%). The VCIx (0.90) was well above average.

In the Southern mixed wheat and barley zone, NDVI was below average from late June to July and close to average April to June according to the crop condition graph. Rainfall and biomass fell by 17%, while temperature (TEMP, +2.2°C) and radiation (RADPAR +5%) were significantly above average. The region had above average VCIx (0.90).

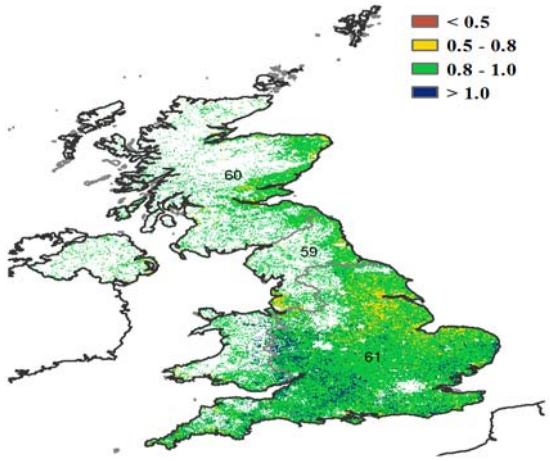
**Figure 3.19. United Kingdom crop condition, April -July 2018**



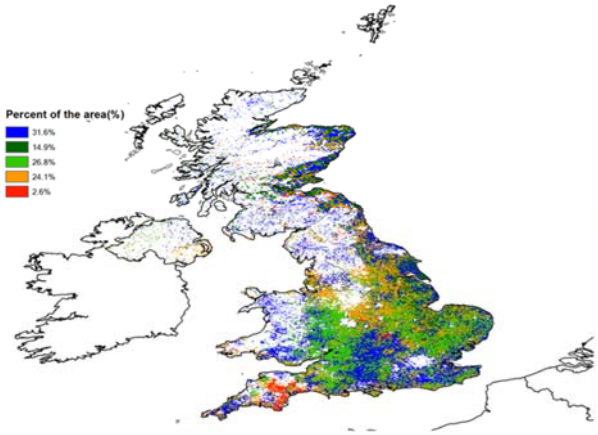

(a). Phenology of major crops



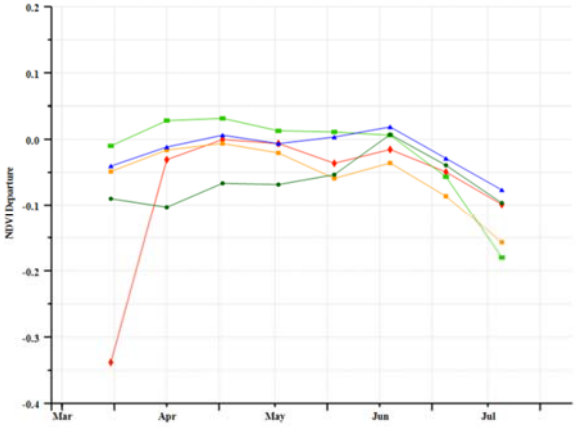

(b) Crop condition development graph based on NDVI



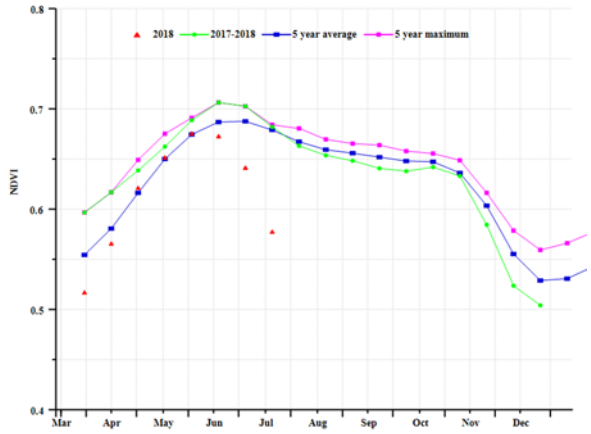

(c) Maximum VCI

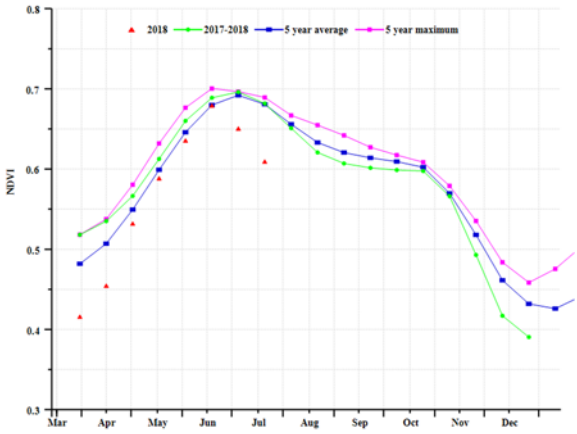



(d) Spatial NDVI patterns compared to 5YA

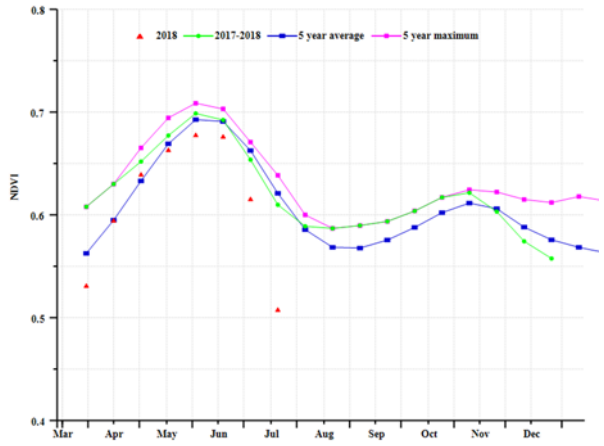



(e) NDVI profiles




(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 3.37. United Kingdom's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA,** April -July 2018

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| Northern Barley area (UK) | 304 | -13 | 11.2 | 1.0 | 981 | 2.9 |
| Southern mixed wheat and Barley zone (UK) | 207 | -17 | 14.6 | 2.2 | 1103 | 5.5 |
| Central sparse crop area (UK) | 264 | -17 | 12.7 | 1.2 | 1053 | 3.5 |

**Table 3.38. United Kingdom's agronomic indicators by sub-national regions, current season's values and departure from 5YA,** April -July 2018

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Northern Barley area (UK) | 1152 | -9 | 99 | 0 | 0.89 |
| Southern mixed wheat and Barley zone (UK) | 863 | -17 | 100 | 0 | 0.91 |
| Central sparse crop area (UK) | 1088 | -12 | 99 | 0 | 0.90 |

**Table 3.39. CropWatch-estimated wheat production for United Kingdom in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| **Wheat** | 14521 | -2.6% | 1.0% | 14279 | -1.7% |

# [HUN] Hungary

Crops in Hungary showed favorable conditions during this reporting period. Winter wheat has been harvested in June and July. All agroclimatic indicators were above average: RAIN +21.3%, TEMP +1.3°C and RADPAR +2.9%. The favorable agroclimatic conditions resulted in increase in the BIOMSS index by 12.2% compared to the five-year average. According to nationwide NDVI graphs, crop condition was close to average during this period, with the maximum VCI value on the national level reaching 0.93 and the cropped arable land fraction (CALF) unchanged compared to the recent five-year average. Crop condition was below average throughout the reporting period in 28.4% of arable land in the Grea tPlain, and 54.5% was above average from April to early June. About 45.3% of arable land was below average from early June to late July. CropWatch estimates that wheat production will decrease by 4.1% below 2017 values (yield down 4.2% and area down 1.4%).

Regional analysis

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

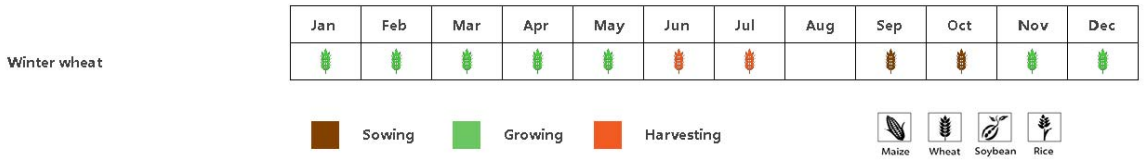
Central Hungary is one of its major agricultural regions in terms of crop production. About 5-8% of winter wheat, maize and sunflower are planted in this region. The NDVI was about average from April to May, lower than average from May to late June, and above average in July. Agroclimatic conditions were above average: rainfall was 343mm (+28% compared to average), TEMP 19.5°C (+1.3°C) and RADPAR of 1236 MJ/m2 was 2.5% above average. This resulted in above average BIOMASS (+17%).

The North Hungary region growth 5 to 8% of the national winter wheat, plus and sunflower and 1 to 4% of maize. NDVI values fluctuated compared to the 5YA: below average in April and May to June, above average late April and July. The accumulated rainfall (RAIN +1%), temperature (TEMP +1.3°C) and radiation (RADPAR +2.5%) were above average, resulting in the biomass production potential increase in this region (BIOMSS, +3%).

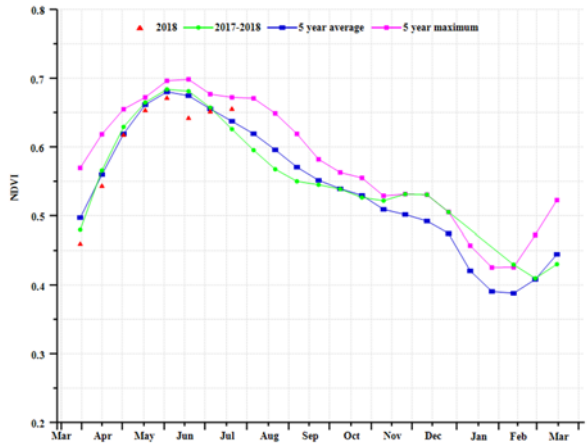
The Great Plain region grows mostly winter wheat, maize and sunflower especially in the counties of Jasz-Magykum-Szolnok and Bekes. According to crop condition graph, NDVI values were below average from April to late June, slightly higher than average in July. All agroclimatic indicators were above average in this period which is RAIN (+23%), TEMP (+1.3°C) and RADPAR (+3.0%), leading to a BIOMSS value of 1188 gDM/m2, up 11% above average. The maximum VCI did well (0.91).

Southern Transdanubia cultivated 4 to 8 % of winter wheat, maize and sunflower seed, mostly in Somogy and Tolna counties while only 1 to 4% of main crops are planted in the northern Transdanubia. NDVI was above average. Compared to average, rainfall was up by 16%, temperature by 1.3°C and radiation by 2.9%. The biomass production potential rose 16%. The Transdanubia region's VCIx was well above average (0.95).

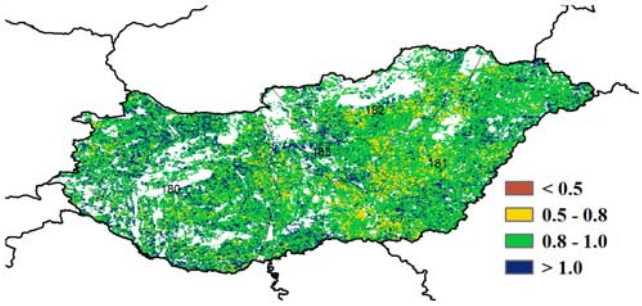
**Figure.3.20. Hungary's crop condition, April - July 2018**



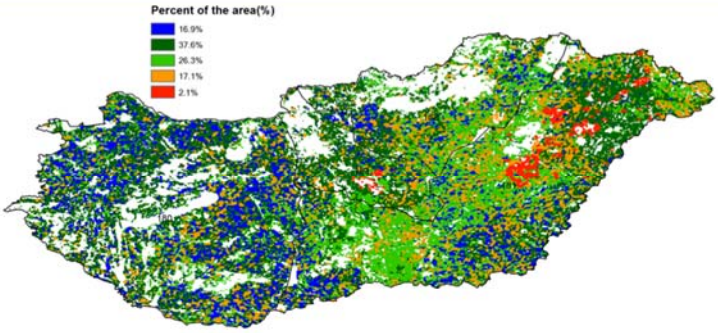

(a). Phenology of major crops



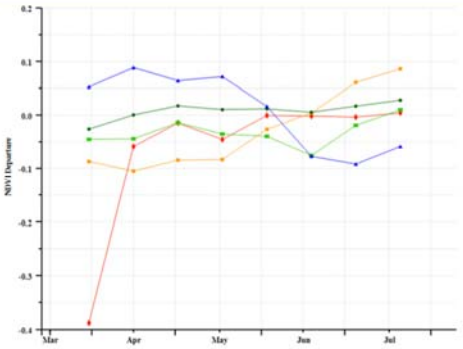

(b) Crop condition development graph based on NDVI



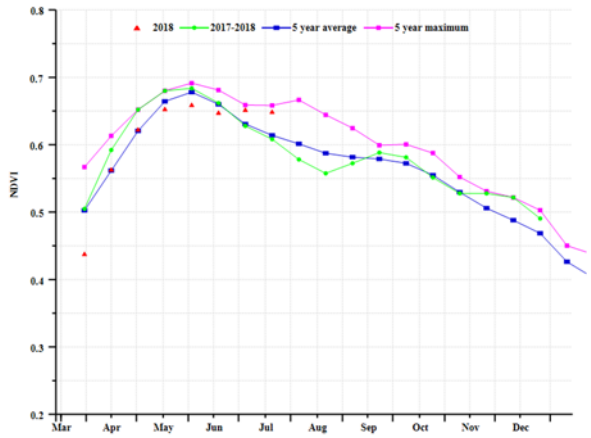

(c) Maximum VCI

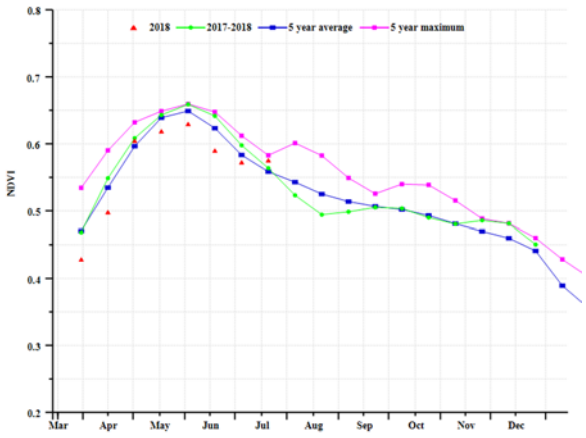



(d) Spatial NDVI patterns compared to 5YA

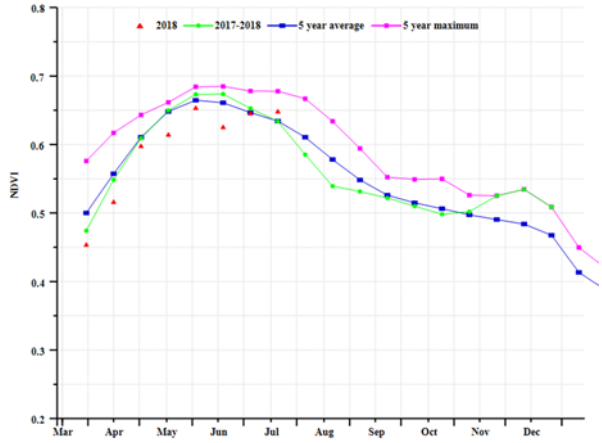


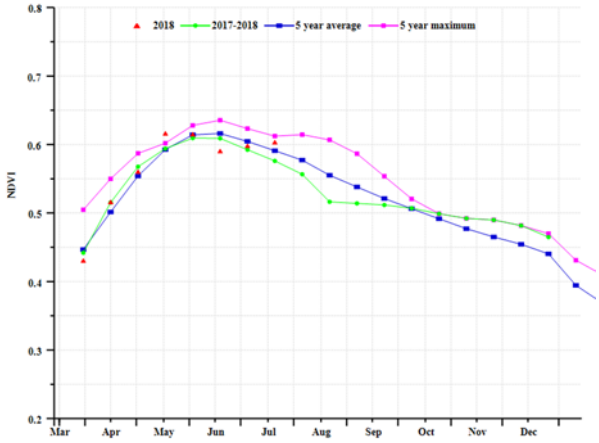
(e) NDVI profiles




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



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

**Table 3.40. Hungary's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| Northern Barley area (UK) | 304 | -13 | 11.2 | 1.0 | 981 | 2.9 |
| **Central Hungary** | 343 | 28 | 19.5 | 1.3 | 1236 | 2.5 |
| **North Hungary** | 287 | 1 | 18.9 | 1.4 | 1216 | 2.5 |
| **Great Plain** | 333 | 23 | 19.8 | 1.3 | 1244 | 3.0 |
| **Transdanubia** | 372 | 26 | 19.2 | 1.3 | 1235 | 2.9 |

**Table 3.41. Hungary's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| **Central Hungary** | 1234 | 17 | 100 | 0 | 0.94 |
| **North Hungary** | 1145 | 3 | 100 | 0 | 0.91 |
| **Great Plain** | 1188 | 11 | 100 | 0 | 0.91 |
| **Transdanubia** | 1313 | 16 | 100 | 0 | 0.95 |

**Table 3.42. CropWatch-estimated wheat production for Hungary in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| **Wheat** | 5237 | -2.8% | -1.4% | 5022 | -4.1% |

# [IDN] Indonesia

During the monitoring period, the harvest of the main rice and maize crops was completed, and the secondary rice is growing. The area of cropped arable land (CALF) in the country is comparable to the five-year average. All agroclimatic indicators were below average (RAIN - 10%, TEMP -0.6°C) and sunshine, expressed as RADPAR -2%, which brought about a decrease of crop production potential of 8%. This leads to unrealistically low values in the national NDVI development graph compared to the recent five-year average from April to July. According to NDVI profiles, crop condition in 54.5% of the arable land around the country was slightly below average. In 16.4% of the country (mostly in Sumatera Utara, Riau, Sumatera Barat and Jambi) NDVI deteriorated in the middle of this monitoring period and then slightly improved in July. In other areas, NDVI fluctuated over a large range, possibly due to cloudiness. Although the agroclimatic indicators showed somewhat unfavorable conditions, considering the favorable maximum VCIx value of 0.93, the national production is anticipated to be below but close to average in 2018.

Regional analysis

For more spatial detail, CropWatch also prepares a regional analysis for four agro-ecological zones within the country, namely Sumatra (64), Java (the main agricultural region in the country, 62), Kalimantan and Sulawesi (63) and West Papua (65), among which former three are relevant for crops cultivation. The numbers correspond to the labels in the VCIx and NDVI profile maps.

The weather of Java was exceptionally dry compared with average (RAIN, -58%), while, temperature (TEMP, -0.3℃) was slightly below average and radiation (RADPAR 5%) was well above average. Due to the deficit of rainfall, biomass production potential in this region suffered a significantly decreased of 47%. According to the NDVI development graph, crop condition was below the 5-year reference. Overall, the crop condition in Java was unfavorable.

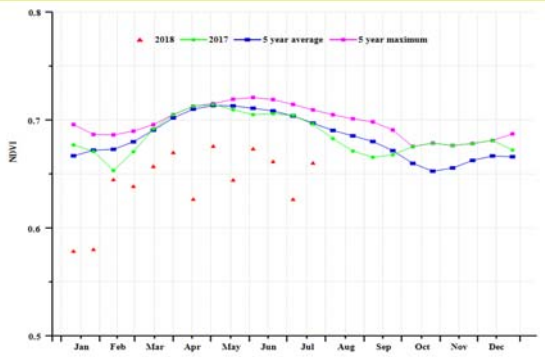
The agroclimatic conditions of Sumatra follow the same patterns as the country as a whole: accumulated rainfall (RAIN -10%), temperature (TEMP -0.8℃) and radiation (RADPAR -6%) were all nbelow average, resulting in the biomass production potential decrease in this region (BIOMSS -7%). Overall, the crop condition in Sumatra was unfavorable.

Kalimantan and Sulawesi experienced unfavorable agroclimatic conditions, with rainfall and radiation dropping 10% and 6%, repectively, which lead to a decrease of biomass production potential by 7% compared to the recent five-year average. Crop condition in Kalimantan and Sulawesi was unfavorable.

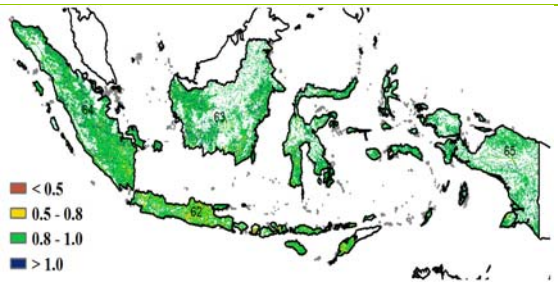
Considering that all the arable land was cultivated, CropWatch anticipates that the yield of maize and rice in Indonesia in 2018 will decrease by 0.1% and 2.5%, respectively.

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

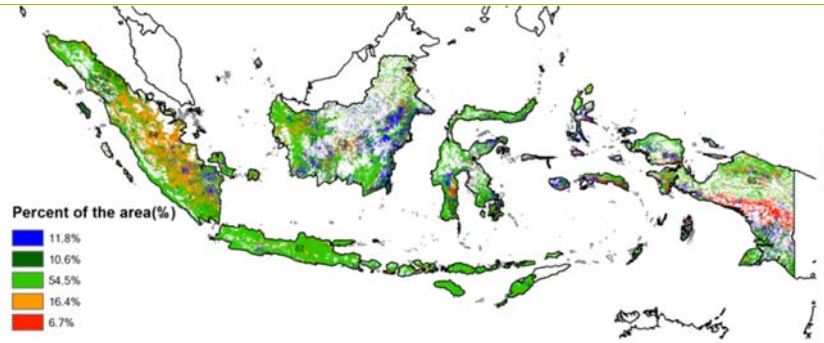

(a). Phenology of major crops



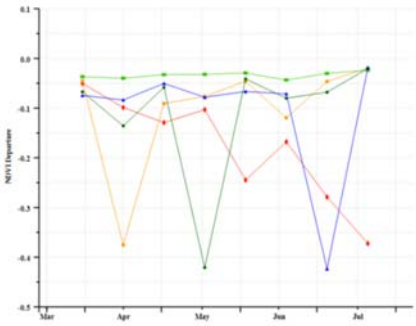

(b) Crop condition development graph based on NDVI



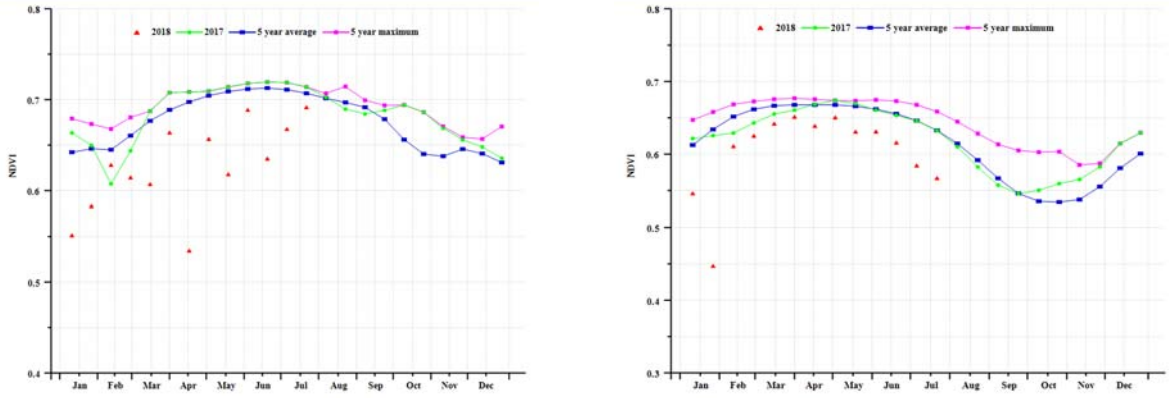

(c) Maximum VCI



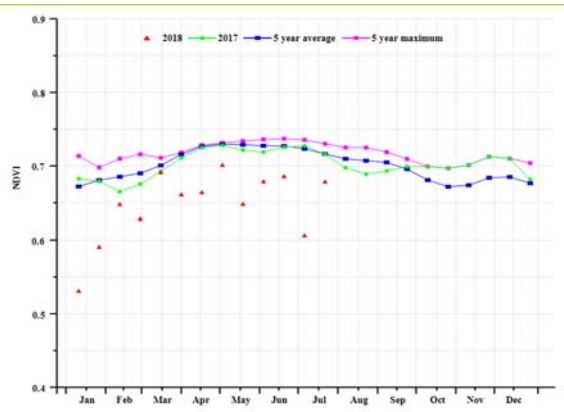

(d) Spatial NDVI patterns compared to 5YA



(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 3.43. Indonesia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure (%) | Current (°C) | Departure (%) | Current (MJ/m²) | Departure (%) |
| Java | 219 | -58 | 25.8 | -0.3 | 1103 | 5 |
| Kalimantan and Sulawesi | 892 | -10 | 26.1 | -0.5 | 960 | -1 |
| Sumatra | 724 | -10 | 25.8 | -0.8 | 968 | -6 |
| West Papua | 1215 | -2 | 24.7 | -0.5 | 840 | -1 |

**Table 3.44. Indonesia's agronomic indicators by sub-national regions, current season's value and departure from 5YA, April -July 2018**

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure (%) | Current (%) | Departure (%) | Current |
| Java | 650 | -47 | 99 | -1 | 0.85 |
| Kalimantan and Sulawesi | 2014 | -7 | 99 | 0 | 0.94 |
| Sumatra | 1838 | -7 | 100 | 0 | 0.93 |
| West Papua | 2132 | -1 | 100 | 0 | 0.95 |

**Table 3.45. 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 | -2.6% | 0.0% | 66675 | -2.5% |

# [IND] India

Rice, wheat and maize, are the major grain crops in India. The Rabi (winter) rice and wheat crops were harvested during the reporting period (April- July). The Field preparation and planting of Kharif (Summer) rice and maize were completed.

On average, the country received "good" monsoon rains (RAIN, +17%). The departure from average ranged between 5% and 31%. The country TEMP was 0.4°C below average and RADPAR was 4% below average. BIOMSS increased 10% but CALF was 21 % below the 5YA with an average VCIx of 0.7.

National NDVI profiles indicate that crop condition was slightly lower than the average of the last 5 years and the same period of 2017. The pattern generally repeats itself in all sub-regions in the country. Three States recorded a sudden drop in NDVI in July: Chhattisgarh, Madhya Pradesh, and Gujarat. The same States as well as Uttar Pradesh, Delhi, and Haryana recorded VCIx between 0.5 and 0.8. Other states mostly recorded values of VCIx between 0.8 and 1.

Overall, the production of maize, wheat, and soybean was lower than the last year by 0.6%, 2.3%, and 5.3% respectively. Rice production increased by as much as 6 % over 2017 output.

Regional analysis

India has been divided into seven zones: the Deccan plateau, the Eastern coastal region, the Gangetic plains, the Northeastern region, the Western coastal region, the Northwestern dry region and the Western Himalayan region.

The Deccan Plateau region recorded 819mm of RAIN (+31% relative to average), 31.6°C TEMP (-0.2°C) and 1176 MJ/m² RADPAR (-2%). BIOMASS increased 15% in the region which also recorded low NDVI. The CALF fell as much as 40 % below 5YA and VCIx was 0.7.

The Eastern coastal region received rainfall 17% higher than the average and TEMP was 0.8℃ lower. The RADPAR of 1140 MJ/m² (3 % lower than the average) and BIOMASS of was 10% above 5YA. The region recorded 6% lower than average cropped area and a VCIx of 0.8 indicating moderate crop condition.

In the Gangetic region precipitation amount was 774mm (21% higher than 15YA). TEMP was cooler with 0.8°C and RADPAR was 6 % below average. The BIOMASS reached 1475 gDM/m2 and it was 10 % above the 5YA. The CALF was lower than 5YA (-24 %) and VCIx was high as 0.7.

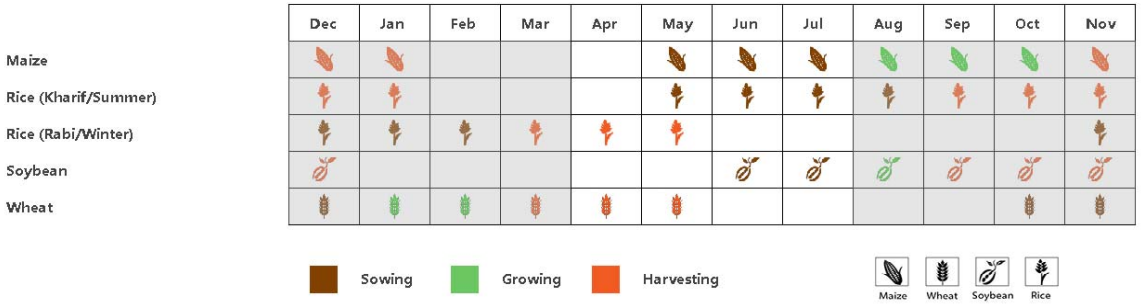
The Assam and Northeastern region recorded the highest precipitation in India (1749mm), an increase of 7% over the average, with slightly below average TEMP at 25.9°C (-0.3°C) and above average RADPAR of 966 MJ/m2 (1 %). The BIOMASS was slightly lower than the average (-2%) and CALF was the same as 5YA. Crop condition was good with VCIx at 0.9.

The Western coastal region received 6% higher than average rainfall, average TEMP (-0.5℃ compared to 5YA) and RADPAR of 1063 MJ/m² (-3%). This region had 12% higher than average BIOMASS. The CALF was 4% lower than 5YA but crop condition was satisfactory at 0.9 VCIx.

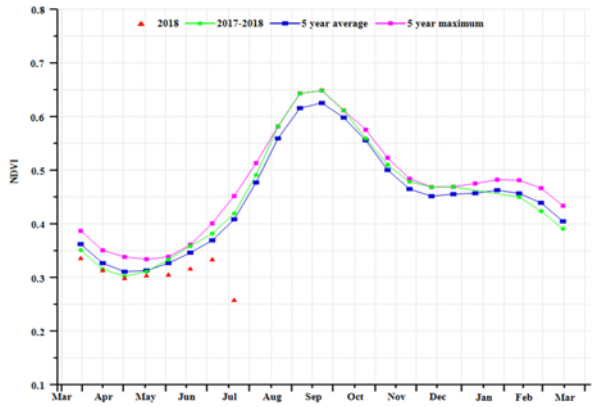
The Northwestern region recorded the lowest rainfall value in India (493mm, but higher than average by 30%) and near average TEMP and low RADPAR (-6%). The BIOMASS was higher than the average (11%). The CALF drop was very large (68% lower than 5YA) and crop condition with below average at 0.5 VCIx.

The Western Himalayan region received rainfall of 510mm (5% above average) and average TEMP was recorded. RADPAR reached 1249 MJ/m2 (-8.6%). The BIOMASS was higher than 5YA with 6%. The CALF at -2.5 % and VCIx at 0.8 indicate good production in general.

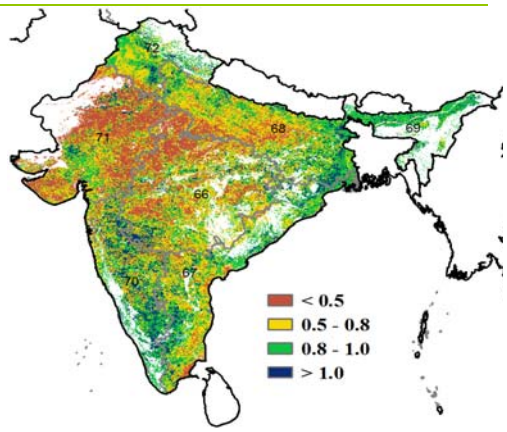
**Figure 3.22. India's crop condition, April -July 2018**



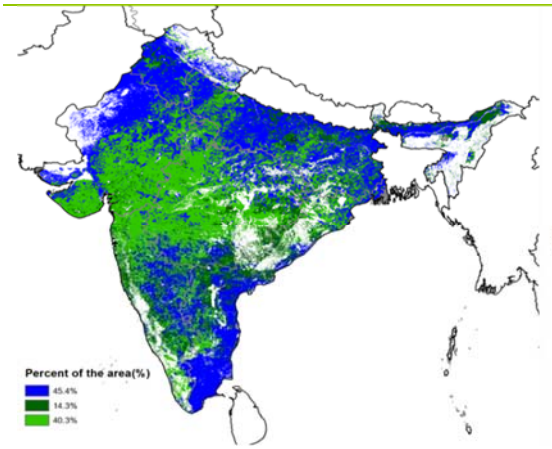

(a). Phenology of major crops



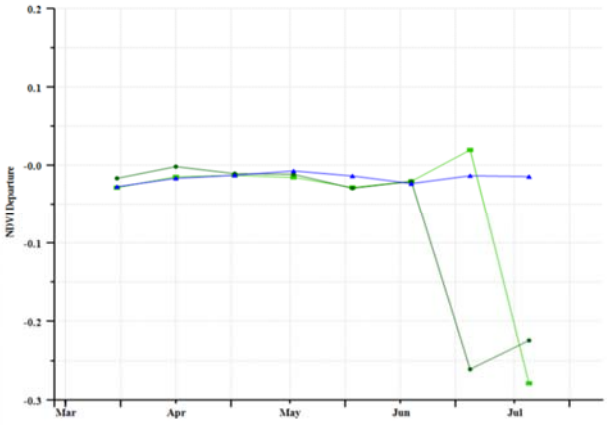

(b) Crop condition development graph based on NDVI



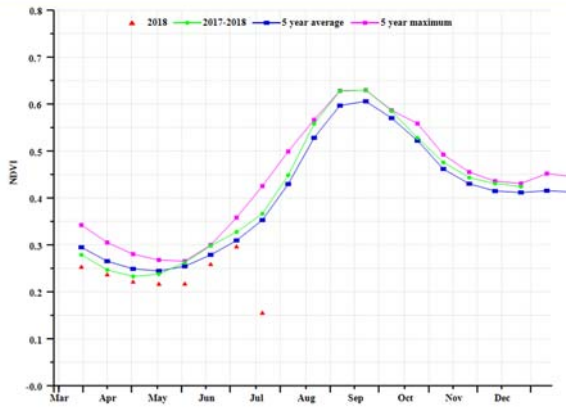

(c) Maximum VCI

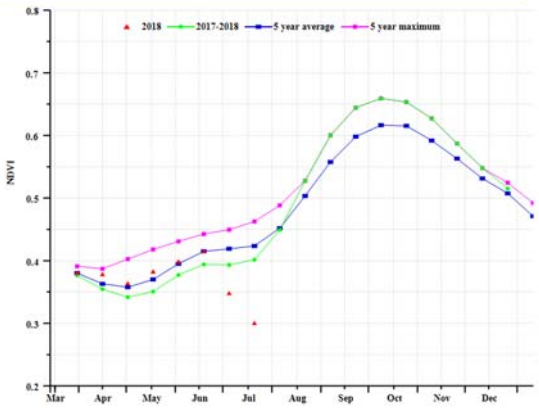



(d) Spatial NDVI patterns compared to 5YA

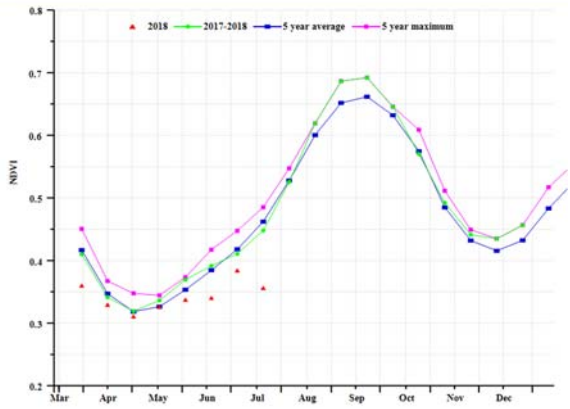


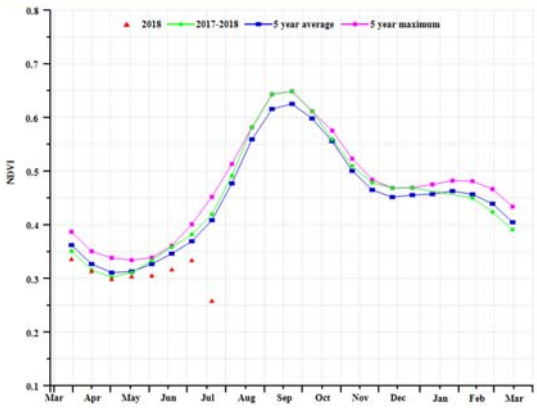

(e) NDVI profiles



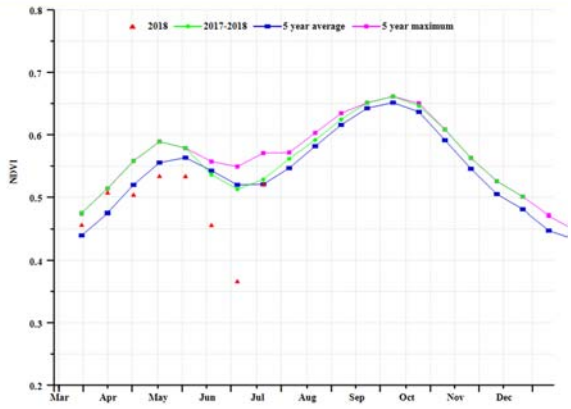



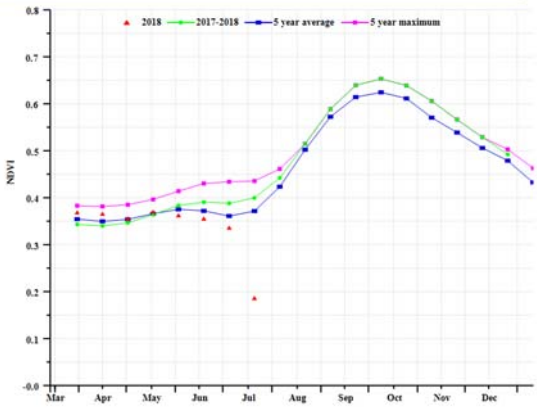

(f) Crop condition development graph based on NDVI (Deccan Plateau (left) and Eastern Coastal Region (right))



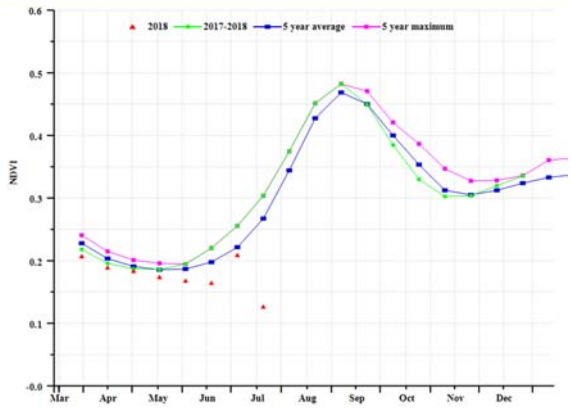




(g) Crop condition development graph based on NDVI (Gangatic Plains (left) and North Eastern Region (right))




(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 3.46. India's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 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) | 819 | 31 | 31.6 | -0.2 | 1177 | -2 |
| Eastern coastal region (India) | 608 | 17 | 30 | -0.8 | 1140 | -3 |
| Gangatic plain (India) | 774 | 21 | 31 | -0.8 | 1167 | -6 |
| Assam and north-eastern regions (India) | 1749 | 7 | 25.9 | -0.3 | 966 | 1 |

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m2) | Departure from 15YA (%) |
| Western coastal region (India) | 821 | 6 | 27.1 | -0.5 | 1063 | -3 |
| North-western dry region or Rajastan and Gujarat (India) | 493 | 30 | 32.5 | -0.1 | 1251 | -6 |
| Western Himalayan region (India) | 510 | 5 | 22.6 | 0 | 1249 | -9 |

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

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m$^2$) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Deccan Plateau (India) | 1402 | 15 | 40 | -40 | 0.7 |
| Eastern coastal region (India) | 1421 | 10 | 60 | -6 | 0.8 |
| Gangatic plain (India) | 1475 | 10 | 60 | -24 | 0.7 |
| Assam and north-eastern regions (India) | 2274 | -2 | 100 | -0.3 | 0.9 |
| Western coastal region (India) | 1536 | 12 | 50 | -4 | 0.9 |
| North-western dry region or Rajasthan and Gujarat (India) | 885 | 11 | 10 | -68 | 0.5 |
| Western Himalayan region (India) | 1158 | 6 | 90 | -2 | 0.8 |

**Table 3.48. CropWatch-estimated rice, Maize, Soybean and wheat production for India in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| **Maize** | 19034 | -2% | 1% | 18920 | -1% |
| **Rice** | 163146 | 1% | 5% | 173270 | 6% |
| **Wheat** | 93496 | -2% | -1% | 91374 | -2% |
| **Soybean** | 12159 | -4% | -1% | 11514 | -5% |

# [IRN] Iran

Crop condition from April to July 2018 was generally above average in Iran. During the report period, winter wheat was harvested from June to July, and the summer crops (potato and rice) were planted from April. Accumulated rainfall (RAIN, -10%), temperature (TEMP, -0.4°C) and radiation (RADPAR, -5%) were below average during the monitoring period. The unfavorable agro-climatic conditions resulted in a decrease in the BIOMSS index by 2% compared to the five-year average. The national average of maximum VCI index was 0.73, but the Cropped Arable Land Fraction (CALF) increased by 27% compared to the recent five-year average.

According to the national NDVI development graphs, crop condition was above or close to average throughout the monitoring period in about 31.4% of croplands, mainly in Kurdistan, Zanjan, East and West Azerbaijan provinces of the north-western region. Crop condition in about 17.1% of arable land, particularly in Ardabil and Golestan provinces, was above average from March to May and then dropped to below average. About 51.5% of arable land experienced unfavorable crop condition from April to July.

Overall, crop condition was fair in Iran during the monitoring season. The increase of both wheat area (+1.3%) and yield (+7.4%) resulted in an increase production by 8.8% compared to last year. The rice production in 2018 was forecast to increase slightly by 2.9% than 2017 due to the increase of rice area (+5.0%).

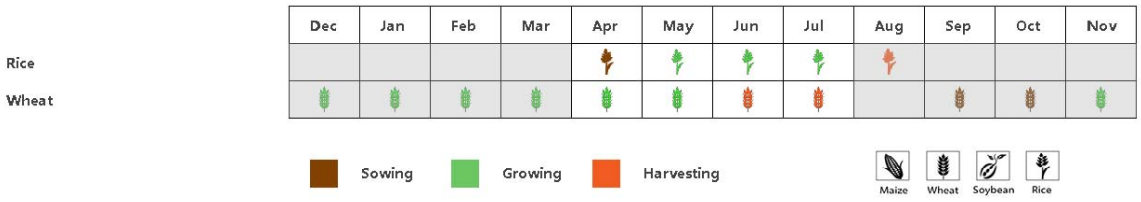
Regional analysis

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.

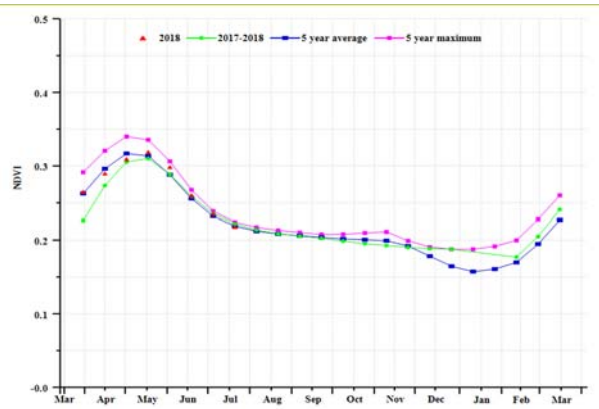
In the Semi-arid to sub-tropical hills of the west and north region, the accumulated rainfall was 85mm, which is 17% below average. Temperature (TEMP -0.3°C) and radiation (RADPAR -5%) were below average as well. The unfavorable weather conditions resulted in a decrease of BIOMSS by 5% compared to the recent five years average. The CALF increased by 30%. According to the NDVI profiles, the crop condition was close to or above average during the monitoring period. The national maximum VCI (VCIx) with 0.83 also indicates favorable crop condition. The outcome for winter and summer crops of this season was favorable in this region.

Crop condition in the Arid Red Sea coastal low hills and plains region was far below average. The region received only 62 mm rainfall during this report period. The CALF was 5% and decreased by 35% compared to five-year average, and the national VCIx (0.37) was lower. Therefore, the outcome for winter and summer crops of this region was very poor.

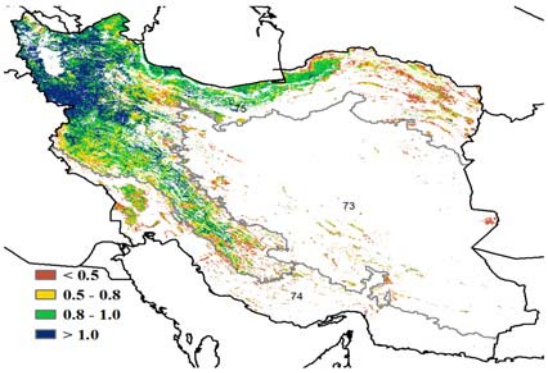
**Figure 3.23. Iran's crop condition, April -July 2018**



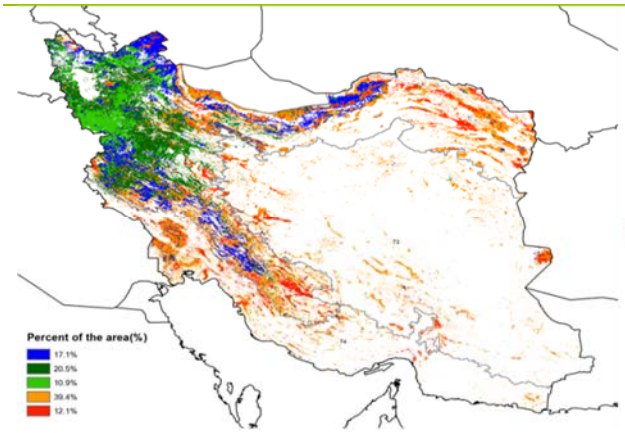

(a) Phenology of major crops



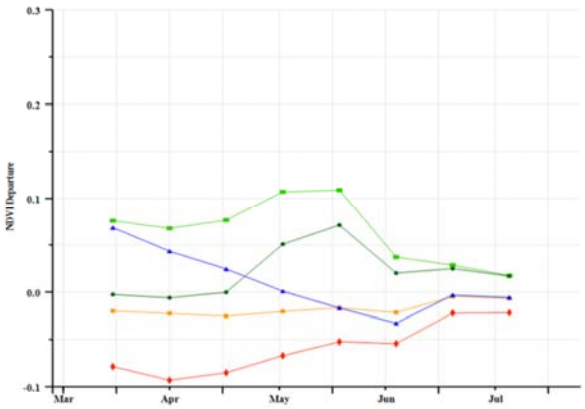

(b) Crop condition development graph based on NDVI



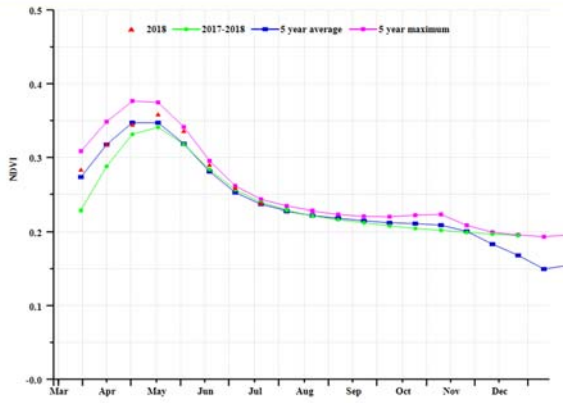

(c) Maximum VCI

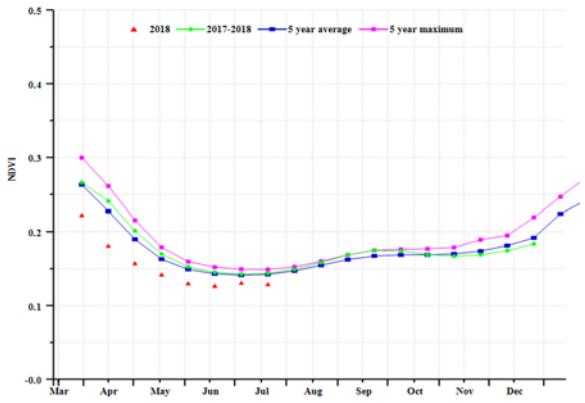



(d) Spatial NDVI patterns compared to 5YA




(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 3.49. Iran's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| Semi-arid to sub-tropical hills of the west and north | 85 | -17 | 19.5 | -0.3 | 1398 | -5 |
| Arid Red Sea coastal low hills and plains | 62 | 99 | 29.8 | -0.3 | 1490 | -4 |

**Table 3.50. Iran's agronomic indicators by sub-national regions, current season's value and departure from 5YA, April -July 2018**

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Semi-arid to sub-tropical hills of the west and north | 367 | -11 | 36 | 30 | 0.83 |
| Arid Red Sea coastal low hills and plains | 261 | 95 | 5 | -35 | 0.37 |

**Table 3.51. CropWatch-estimated wheat production for Iran in 2018 (thousands tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| **Rice** | 2272 | -2.0 | 5.0 | 2338 | 2.9 |
| **Wheat** | 12735 | 7.4 | 1.3 | 13851 | 8.8 |

# [ITA] Italy

Winter wheat is growing during the early summer months and is harvested in June and July. Generally, according to the crop condition development graphs, the NDVI values were above the average of the past five years and especially over the maximum of the past five years in May. After May, NDVI values first increased and thereafter gradually decreased. CropWatch agroclimatic indicators show that Rainfall (287 mm) was above the average (16%), the temperature (19°C) was about the average (+0.5°C); RADPAR (1269 MJ/m²) was 4% below the 5YA as a result, with the CALF of 0.99. BIOMSS increased 11% and VCIx was high (0.94). Overall crop condition in the country is satisfactory.

Regional analysis

Based on cropping systems, climatic zones, and topography, four sub-national regions can be distinguished for Italy, among which three are relevant for crops cultivation. These four regions are Eastern Italy, Northern Italy, Southern Italy and Western Italy.

In spite of high RAIN (+20%), TEMP (+0.6°C above average) and a somewhat low RADPAR (-3%), the overall condition of wheat in Eastern Italy was above; BIOMSS increased by 14.7% compared with the averages (5YA). VCIx was 0.93 with a high CALF of 0.99. The crop condition development graph of NDVI exceeded the 5 years average except in April. According to agroclimatic indicators, above average output is expected.

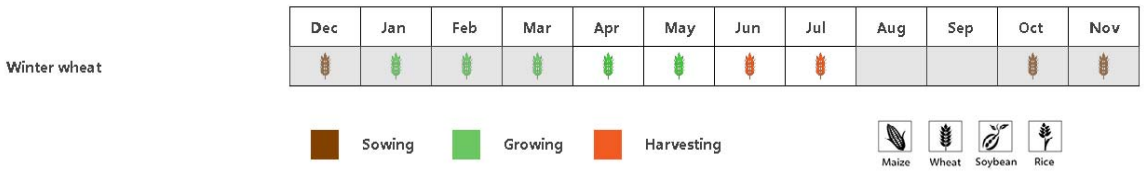
In Northern Italy, the situation and expected impact on crop production is almost identical with Eastern Italy with the exception of more rainfall, temperature and a low RADPAR, resulting high biomass production potential: RAIN +20% relative to average, TEMP -0.6°C, RADPAR -6%, BIOMSS +18%, VCIx 0.97 and CALF 0.99. The NDVI development graph exceeded the 5 years maximum in May. Based on agroclimatic indicators, above average output is expected.

Overall condition of wheat in Southern Italy was above the average as the expected BIOMSS increased by 20.9% compared with the averages (5YA), while VCIx was 0.91 and CALF reached 0.98. The situation results from abundant RAIN (20% above average), average TEMP (0.3°C below average) and lower RADPAR (-2%), The NDVI curves reached the average of 5 years except in May and June. Generally, above average output is expected.

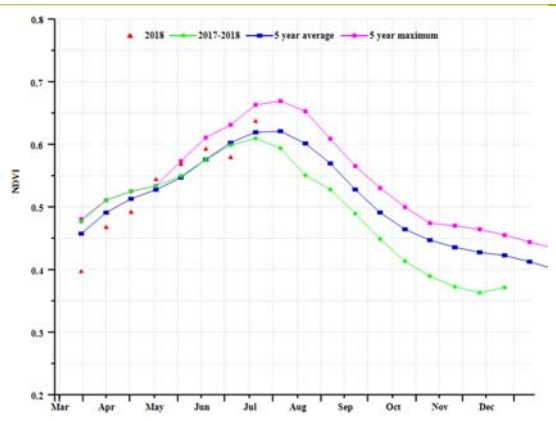
Compared to average, the situation in Western Italy does not differ much from the North of the country: RADPAR (-4%), TEMP (+0.4°C), VCIx (0.94) and CALF (0.99) while a small increase in RAIN (+9.6%) led to a minor BIOMSS increase of 4%. NDVI values were close to the maximum of 5 years. CropWatch expects above average production.

With the mentioned situations, crop prospects are generally excellent due to favorable rainfall. Production of winter wheat is likely above the average.

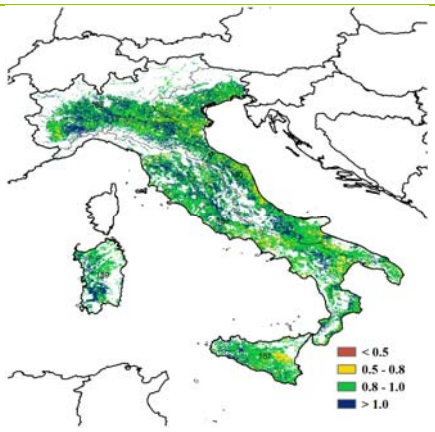
**Figure 3.24. Italy's crop condition, April - July 2018.**



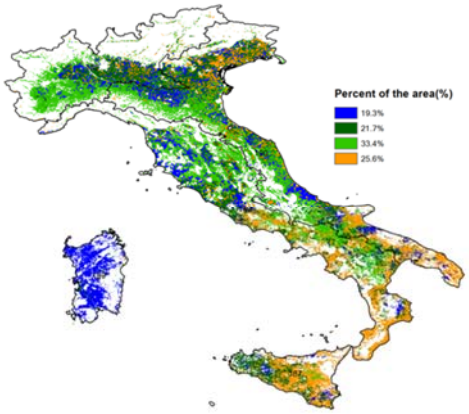

(a). Phenology of major crops



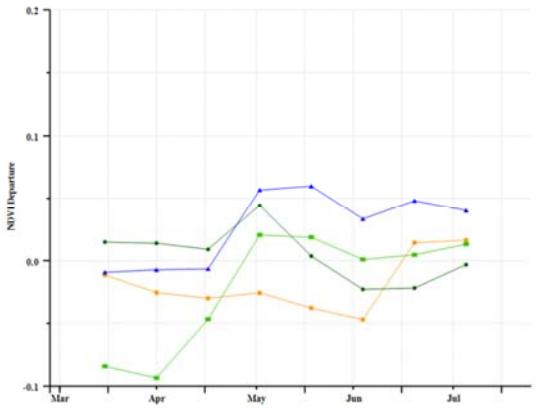

(b) Crop condition development graph based on NDVI



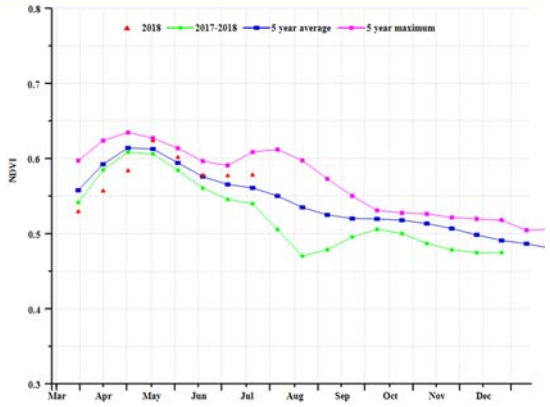

(c) Maximum VCI



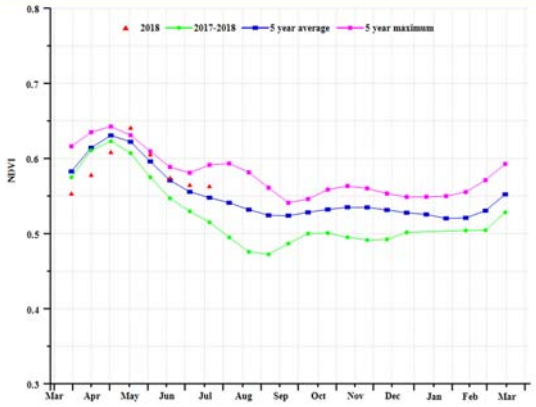

(d) Spatial NDVI patterns compared to 5YA



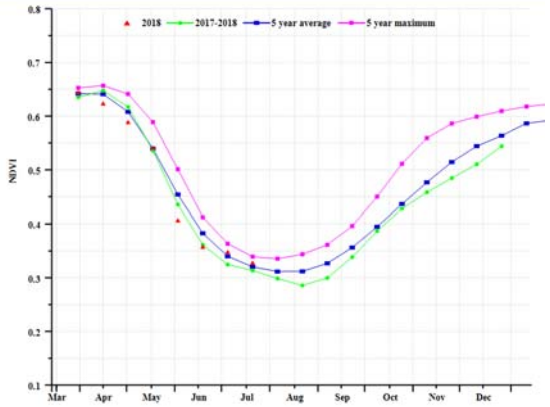

(e) NDVI profiles

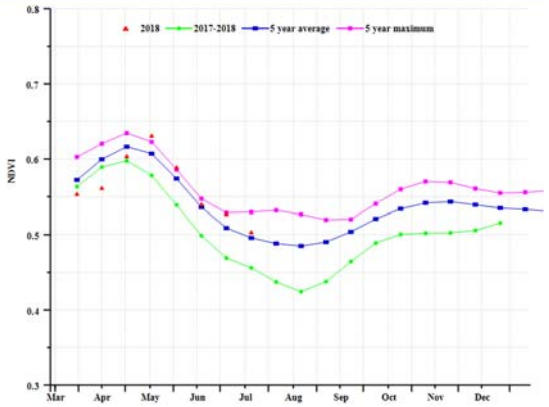



(f) Eastern Italy (Italy) crop condition development graph based on NDVI




(g) Northern Italy (Italy) crop condition development graph based on NDVI



| (h) Southern Italy (Italy) crop condition development graph based on NDVI | (i). Western Italy (Italy) crop condition development graph based on NDVI |
|---|---|

**Table 3.52. Italy's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| **Eastern Italy** | 313 | 20 | 20.5 | 0.6 | 1257 | -3 |
| **Northern Italy** | 435 | 20 | 17.9 | 0.6 | 1181 | -6 |
| **Southern Italy** | 108 | 11 | 19.8 | -0.3 | 1437 | -2 |
| **Western Italy** | 212 | 10 | 19.2 | 0.4 | 1302 | -4 |

**Table 3.53. Italy's agronomic indicators by sub-national regions, current season's value and departure from 5YA, April -July 2018**

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| **Eastern Italy** | 1108 | 15 | 99 | | 0.94 |
| **Northern Italy** | 1423 | 18 | 99 | | 0.97 |
| **Southern Italy** | 508 | 21 | 98 | | 0.91 |
| **Western Italy** | 804 | 4 | 99 | | 0.94 |

**Table 3.54. CropWatch-estimated wheat production for** Italy **in 2018 (thousands tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| **Wheat** | 7200 | 6.0% | -4.4% | 7295 | 1.3% |

# [KAZ] Kazakhstan

The monitoring period covers spring wheat, barley, and other cereals, which were sowed before June in Kazakhstan. During the reporting period, crop condition in the country was generally favorable. The national average VCIx was 0.87 and the Cropped Arable Land Fraction decreased by 4% compared to the five-year average. Among the CropWatch agroclimatic indicators, RAIN and BIOMSS were above average (+10% and +8%), while TEMP and RADPAR were below average (-1.6°C and -3%). As shown by the NDVI development graph, crop condition was below average from April to June and above from the beginning of July. The spatial NDVI pattern and profile show that the crop condition in 57.5% of the cropped areas was above average in the north part of West Kazakhstan, Aktobe and Pavlodar, most parts of Qostanay, North Kazakhstan, Akmola, Kostanay, East Kazakhstan, Almaty provinces and some parts of South Kazakhstan, Zhambyl, and Qyzylorda provinces from late June to July. CropWatch wheat production estimates are 1.9% below last year's output because of the decrease of a wheat area by 5.3%.

Regional analysis

For the regional analysis, additional details are provided for four agro-ecological zones in the country: Northern region, Eastern plateau and southeastern region, South region and Central and non-agriculture region. The following are crop condition analyses for these regions.

In the Northern region crop condition was below the five-year average from April to June and above from July. RAIN was above average (+7%), and TEMP and RADPAR were below average (-1.9°C and -4%, respectively). BIOMSS increased by 7% in this zone. The maximum VCI index was 0.87, and the Cropped Arable Land Fraction increased by 5% compared to the recent five-year average. Overall, the outcome for the crops will be favorable in this region.

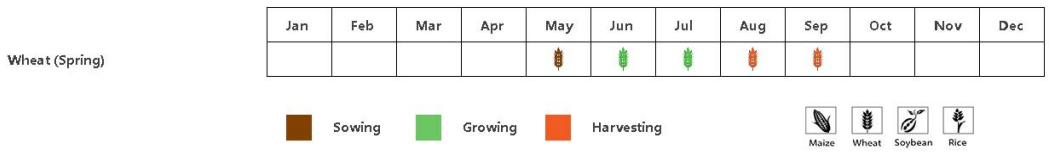
NDVI was generally below the five-year average from April to July in the Eastern plateau and southeastern region. RAIN was 15% above average, but TEMP and RADPAR were below average (-1.0°C and -2%). The agroclimatic indicators also resulted in an increase of the BIOMSS index by 10%. The maximum VCI index was 0.89, while the cropped area increased by 2% compared to the five-year average. Overall crop prospects are fair.

In the Southern region, NDVI was generally below the five-year average from April to June but close to average from late June to July. RAIN was above average (+13%), while TEMP and RADPAR were below (-1.1°C and -1%). The agroclimatic conditions resulted in a BIOMSS increase of 14%. VCIx reached 0.80, and the fraction of cropped arable land (CALF) decreased by 1% compared to the five-year average. Overall crop prospects for this region are normal and below 2017.

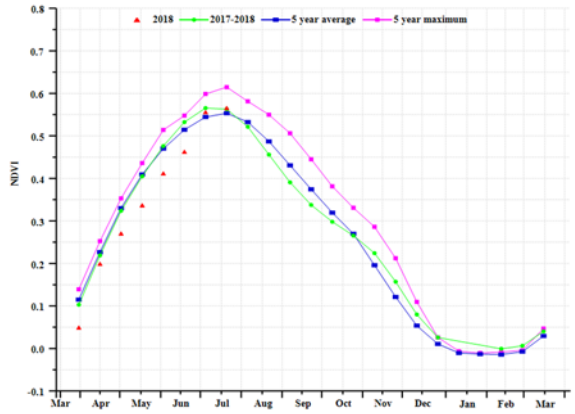
Central non-agriculture region

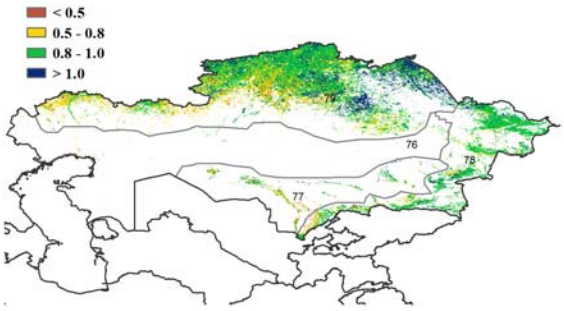
In this region, NDVI was below the five-year average during a reporting period. RAIN and TEMP were below average (-2% and -0.9°C) and RADPAR was above (+2%); BIOMSS decreased by 1%. The maximum VCI index was 0.67, and the Cropped Arable Land Fraction decreased by 16% compared to the recent five-year average. Overall, the outcome for the crops will be unfavorable in this region of limited agricultural importance.

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

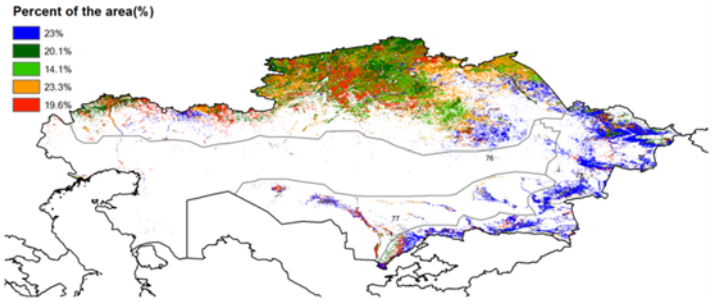


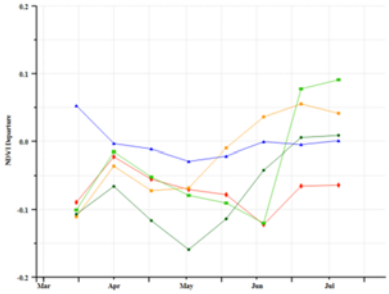

(a). Phenology of major crops



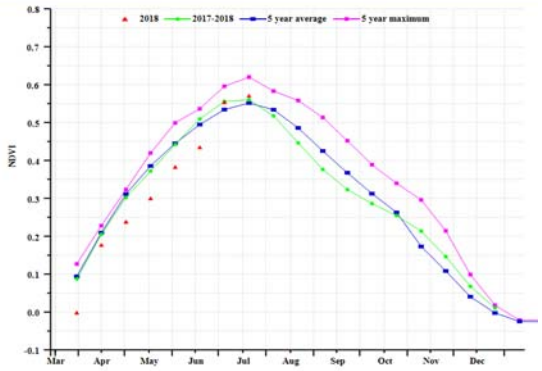



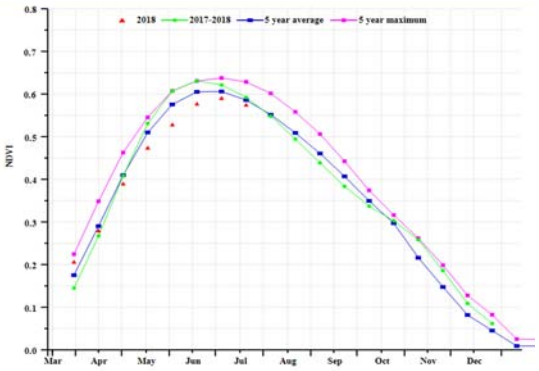

(b) Crop condition development graph based on NDVI (c) Maximum VCI



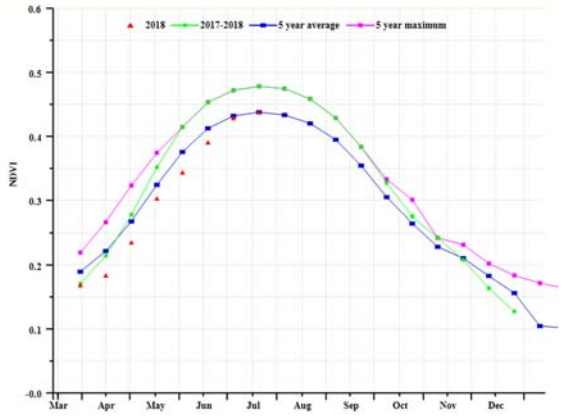



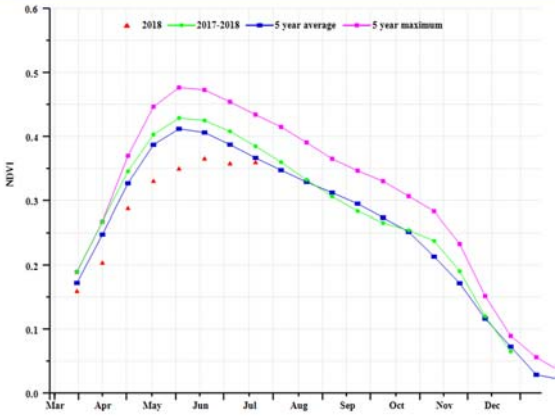
(d) Spatial NDVI patterns compared to 5YA (e) NDVI profiles




(f) Crop condition development graph based on NDVI in Northern region (left) Eastern plateau and southeastern region (right))




(g)Crop condition development graph based on NDVI in South region(left) and Central non-agricultural region (right)

**Table 3.55. Kazakhstan's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | TEMP | RADPAR |
|---|---|---|---|

| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
|---|---|---|---|---|---|---|
| **Northern region** | 175 | 7 | 14.0 | -1.9 | 1172 | -4 |
| **Eastern plateau and southeastern region** | 257 | 15 | 14.9 | -1.0 | 1317 | -2 |
| **South region** | 113 | 13 | 20.9 | -1.1 | 1395 | -1 |
| **Central non-agriculture region** | 115 | -2 | 17.1 | -0.9 | 1311 | 2 |

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

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| **Northern region** | 785 | 7 | 93 | 5 | 0.87 |
| **Eastern plateau and southeastern region** | 972 | 10 | 94 | 2 | 0.89 |
| **South region** | 488 | 14 | 56 | -1 | 0.80 |
| **Central non-agriculture region** | 540 | -1 | 47 | -16 | 0.67 |

**Table 3.57. CropWatch-estimated Wheat production for Kazakhstan in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| **Wheat** | 16595 | 3.6 | -5.3 | 16287 | -1.9 |

# [KEN] Kenya

The country has a "short rains" and a "long rains" season. The long grain crops (mostly maize and wheat) are planted from March to April (late sowing windows) to be harvested in October and November. For the short rains, crops are planted in December and harvested in February and March.

The current analysis covers early stages of long grain crops. RAINS increased 48% above average and BIOMSS is up 20% over the 5YA. Temperature and RADPAR dropped significantly by 1.2℃ and by 5 %, respectively.

Based on NDVI curves, crop condition was better than during 2017 and the five-year average in 88.9% of cropland. This pattern is reflected by the maximum VCIx in the different areas, with the maximum value of VCIx at 1.03, indicating exceptionally good crops. The production of maize is estimated to increase by 16.1 % during the 2018 production year.

Regional analysis

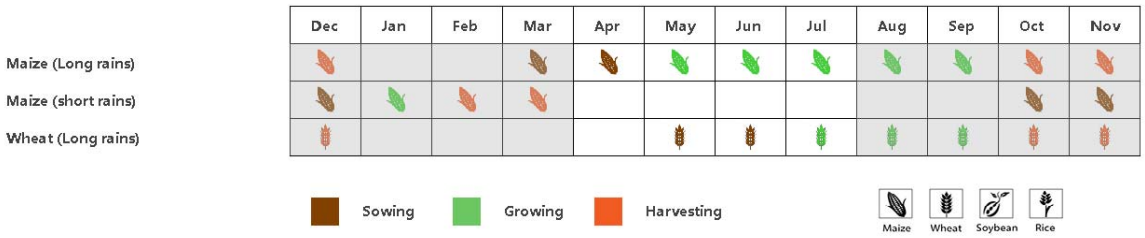
Based on the cropping systems, climatic zones and topographic conditions we divided this country into three Agroecological regions: the Eastern Coastal Area, the Northern region with sparse vegetation and Southwest Kenya.

The northern region with sparse vegetation is a mostly pastoral region; it recorded low rainfall compared to the other two regions: 377mm fell on average over Turkana, Samburu, West Pokot and Baringo, a 93 % increase over average. BIOMASS surged by 47%. Temperature and radiation were both below average (TEMP -1.1℃, RADPAR -3%). The NDVI-based Crop condition development shows that the NDVI profile was above the five years average with the maximum VCI value at 0.92. Moreover, large parts of the arable land in this region have high VCIx values (0.92 for the region), indicating good crop condition. Overall the outlook in the region indicates that there was a favorable condition for rangeland production in the Northern region with sparse vegetation.

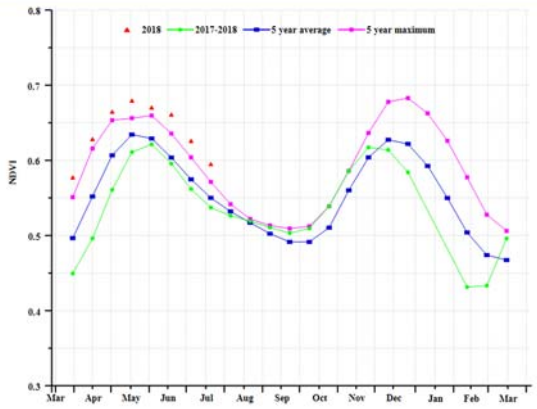
The Eastern Coastal Area include Mandera, Wajir and Isiolo. The counties are areas of low production compared to the southwest of Kenya. Rainfall and BIOMSS in the Eastern coastal areas rose 67% and 49%, respectively, compared to average. RADPAR dropped 3% and TEMP was 0.8℃ average. NDVI profiles were above their five-year average throughout the reporting period and maximum VCIx was 0.99, indicating very favorable crop condition. Production is expected to exceed 2017 values.

The counties of Narok, Kajiado, Kisumu, Nakuru and Embu make up the Southwest Kenyan AEZ. They include many high elevation areas and constitute major producers of wheat and maize. The AEZ recorded 532 mm of RAIN, 44% above average. However, due to low sunshine (RADPAR -6%) and cool temperature (TEMP, -1.3℃), BIOMSS is up only 15%. NDVI profiles above their reference values and VCIx at 1.03agree in depicting crop prospects as was very favorable.

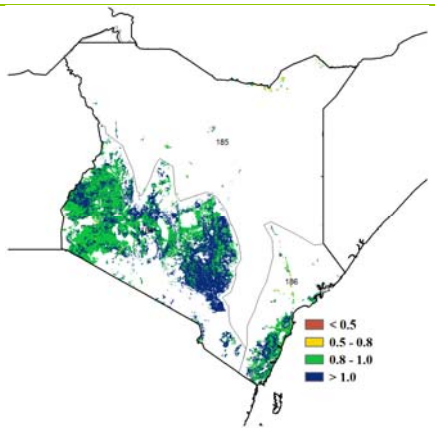
**Figure 3.26. Kenya's crop condition, April - July 2018.**



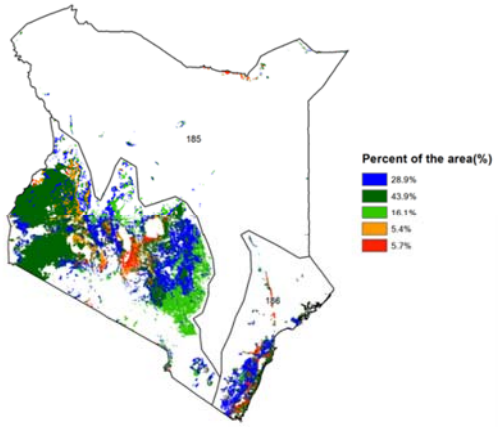

(a). Phenology of major crops



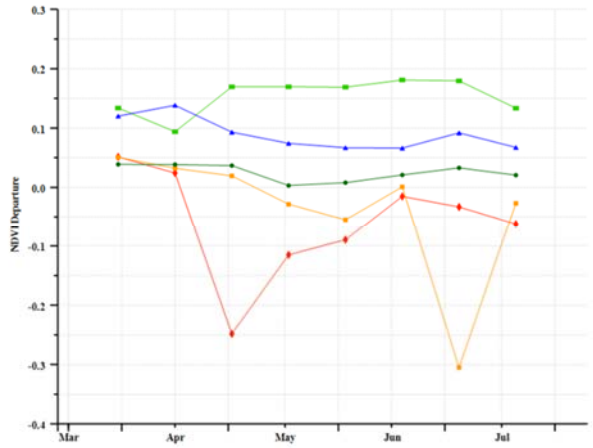

(b) Crop condition development graph based on NDVI



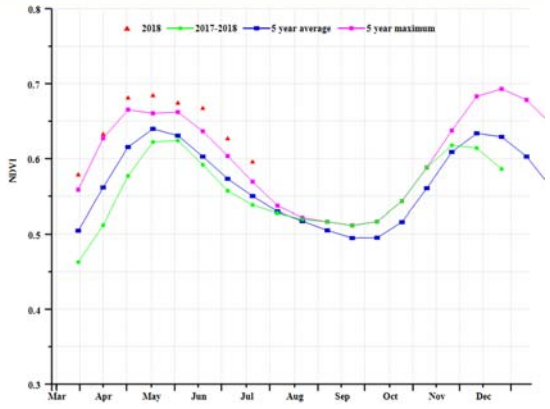

(c) Maximum VCI

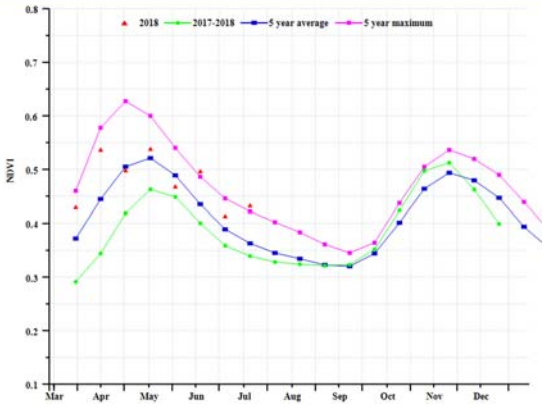



(d) Spatial NDVI patterns compared to 5YA

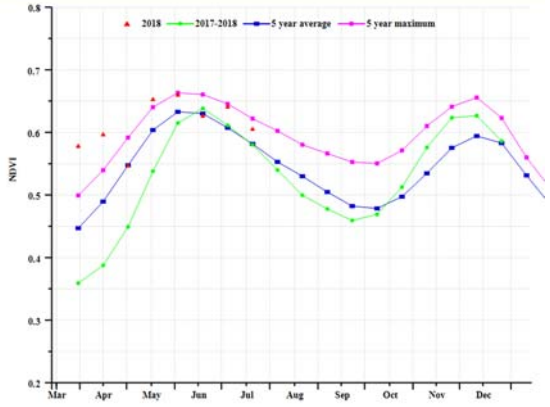



(e) NDVI profiles




(f) Crop condition development graph based on NDVI ( Southwest of kenya, and (g) Northern region with sparse vegetation



(g) Crop condition development graph based on NDVI, Eastern Coastal area

**Table 3.58. Kenya's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current ($MJ/m^2$) | Departure from 15YA (%) |
| Eastern Coastal Area | 412 | 67 | 26.9 | -0.8 | 1004 | -3 |
| Northern region with sparse vegetation | 377 | 93 | 25.3 | -1.1 | 1092 | -3 |
| Southwest of Kenya | 532 | 44 | 19.5 | -1.3 | 1060 | -6 |

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

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current ($gDM/m^2$) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Eastern Coastal Area | 1093 | 49 | 98 | 2 | 0.99 |
| Northern region with sparse vegetation | 965 | 47 | 91 | 23 | 0.92 |
| Southwest of Kenya | 1236 | 15 | 99 | 4 | 1.03 |

**Table 3.60. CropWatch-estimated Maize production for** Kenya **in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| Maize | 3000 | 11.4 | 4.2 | 3483 | 16.1 |

# [KHM] Cambodia

The Current monitoring period covers the planting of maize and the main rice crop as well as the end of harvest of the dry season rice. CropWatch agro-climatic indicators show the air temperature was significantly below average (-1.4℃), which is consistent with low solar radiation (-5.5%). Precipitation decreased below average (-8.5%), which caused a -1.5% drop in BIOMSS. Nation-wide VCIx (0.89) is fair, indicating that propects remain favorable for the crops currently in the field.

Most regions in the country experienced favourable VCIx values above 0.8, except some provinces near Tonle Sap, such as Siem Reap, Kampong Thom, Kampong Chhnang, Pursat and Battambang. NDVI clusters shows that most areas had slightly above average crop condition, with the exception of 18% of arable lands in the south of the country. The abnormal NDVI signal in late July is presumably caused by cloud contamination of remote sensing images. The cool and drier than average weather did not significantly influence crop condition.

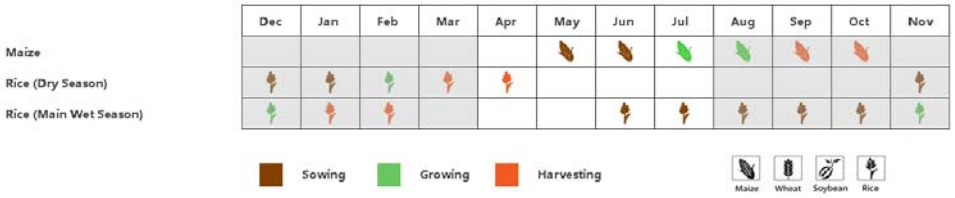
Based mostly on climate differences, two agro-ecological regions can be distinguished. Weather in the Tonle Sap lake area (especially rainfall and temperature) is mainly influenced by the lake itself. The second area, referred to as the "main crop area" covers areas outside the Tonle Sap basin along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

Most of the Tonle Sap plain region recorded above average rainfall (+6%). Mild drought occurred in some areas along the plain, causing a drop in BIOMSS (-2%), However, the maximum VCIx in this area is satisfied (0.89).

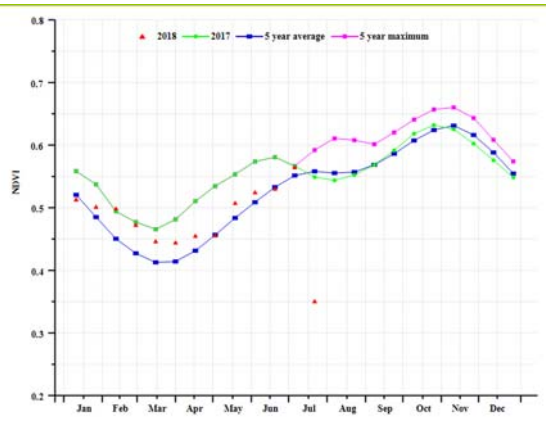
In the Main Crop Area weather was cold (-1.3℃) and drier (-11%), which causes a -1% decreasing in BIOMSS.

Both regions experienced a CALF slightly above average (+3%). According to the analysis given above and CropWatch yield forecast, rice yield is expected to exceed 2017 output by 3.4%.

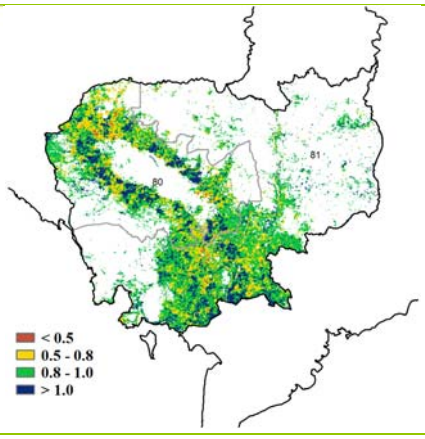
**Figure 3.27. Cambodia's crop condition, April -July 2018**



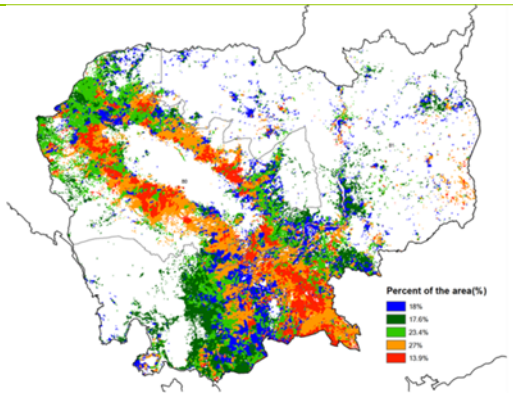

(a). Phenology of major crops

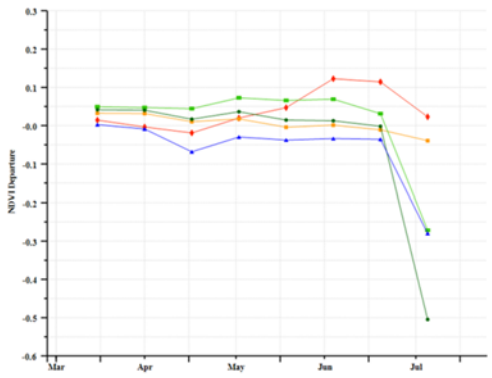



(b) Crop condition development graph based on NDVI

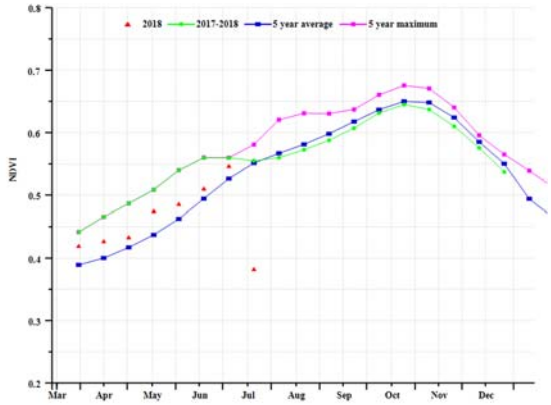


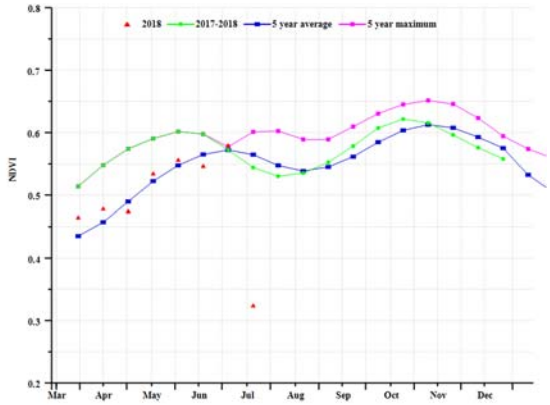

(c) Maximum VCI




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




(f) Crop condition development graph based on NDVI_Central Tonle-Sap plain (left) a and Upland areas (right))

**Table 3.61. Cambodia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m2) | Departure from 15YA (%) |
| **Main cropping area (Cambodia)** | 949 | -11 | 28.4 | -1.3 | 1042 | -6 |
| **Lake plains (Cambodia)** | 727 | 6 | 28.4 | -1.6 | 1069 | -5 |

**Table 3.62. Cambodia's agronomic indicators by sub-national regions, current season's value and departure from 5YA, April -July 2018**

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m$^2$) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| **Main cropping area (Cambodia)** | 2103 | -1 | 92 | 3 | 0.90 |
| **Lake plains (Cambodia)** | 2002 | -2 | 91 | 3 | 0.89 |

**Table 3.63. CropWatch-estimated wheat production for Cambodia in 2018 (thousands tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| **Rice** | 8792 | 0.5 | 2.9 | 9093 | 3.4 |

# [LKA] Sri Lanka

Sri Lanka cultivates maize and rice as its two main crops and two growing periods are rotated in one year for every kind of crop. The main Maha season lasts from October to March while the remaining months belong to the second Yala season. The reporting period covers the entire sowing and growing season of Yala rice and maize. According to the CropWatch indicators, crop condition is assessed as roughly up to May, it dropped sharply bas as much as 0.2 NDVI units after mid-June.

The interpretation which assigns the NDVI drop to persistent cloudiness is not incompatible with the prevailing below average RADPAR (4% below average, nationwide), abundant rainfall (+45% compared with average) and relatively cool weather (TEMP 0.9℃ below average). The fraction of cropped arable land (CALF) remained stable compared with the five-year average. Except for the effects of cloud in late monitoring period, crop production performed well under the abundant precipitation, with BIOMASS increasing 18% compared to the five-year average.

There were some spatial differences according to NDVI profile clusters and map. The whole country suffered a minor departure from average in April. Thereafter, crop condition fluctuated around the average in northern and eastern Sri Lanka while all other regions experienced departures from average to different extent. The North-western Province suffered bad conditions since May, especially in mid-May and mid-June. In the south-east of the country, the crops did unsatisfactorily since May and recovered to average in July in the Western Province. VCIx patterns tend to disagree with NDVI profiles, with low values distributed over the eastern and northern coast, and high values occurring throughout the country. The average VCIx value for Sri Lanka is rather high at 0.93.

Regional analysis

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

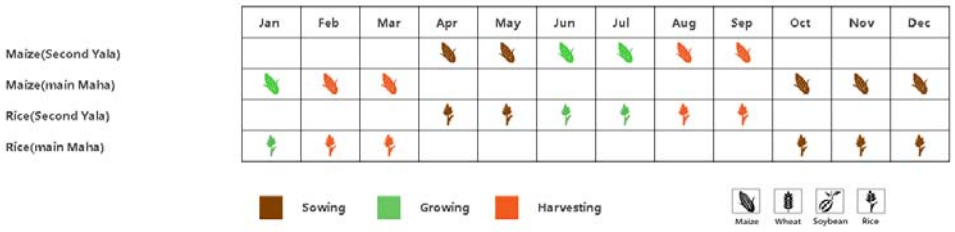
The Dry zone shows the most favorable agroclimatic and crop conditions for the country. The crop condition was slightly below average in April and above average after that. The agroclimatic indices show that rainfall was markedly over average (RAIN +51%) while temperature and radiation was poor (TEMP -0.9℃, RADPAR -4%).

The Wet zone (the northeast of the country) shows the least favorable values among the three sub-national regions discussed here. The crop condition was below average all the time and reached its lowest value in May and June. Less precipitation excess (RAIN +34%) compared with other two sub-national regions and constant cloud cover may substantially impacted the second maize and rice.

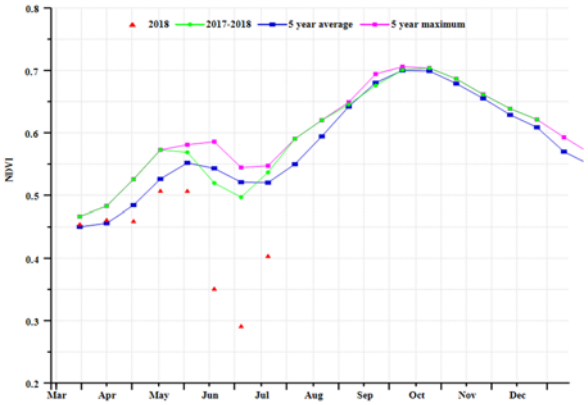
The Intermediate zone is located between the Dry and Wet zones, and therefore has the most comfortable weather condition over Sri Lanka. Temperature and radiation anomalies were close to those in the Dry zone (TEMP -0.9℃, RADPAR -4%) but rainfall was relatively more abundant (RAIN +57%). According to the NDVI development graphs, this region suffered below average crop condition but recovered to above average in July.

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

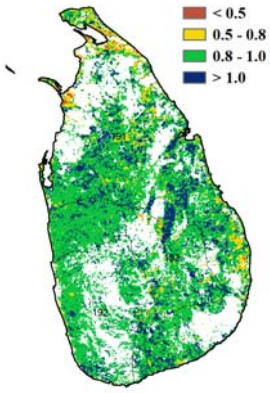
**Figure 3.28. Sri Lanka's crop condition, April - July 2018**



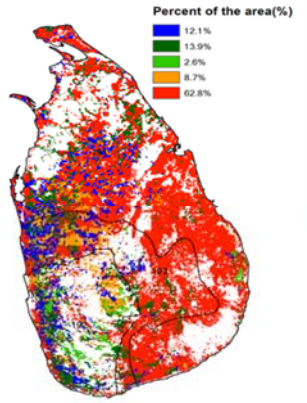
(a). Phenology of major crops



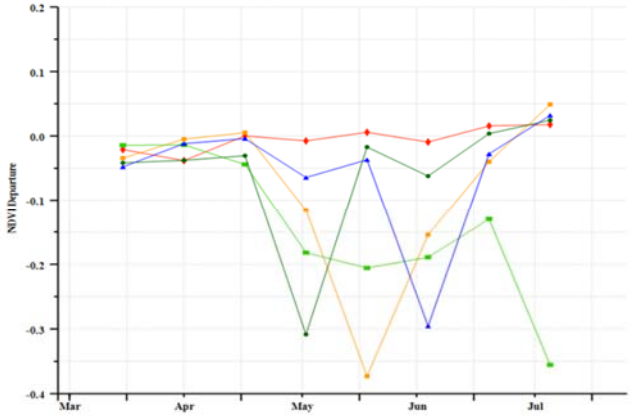

(b) Crop condition development graph based on NDVI



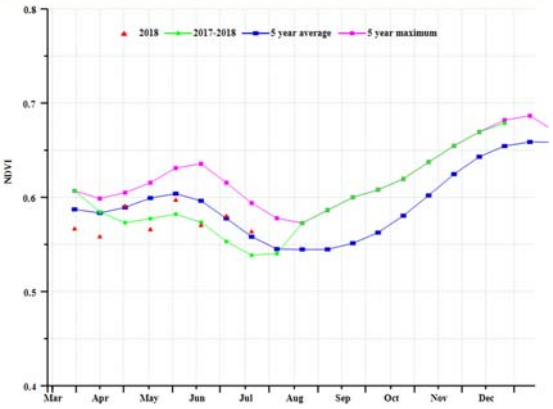

(c) Maximum VCI

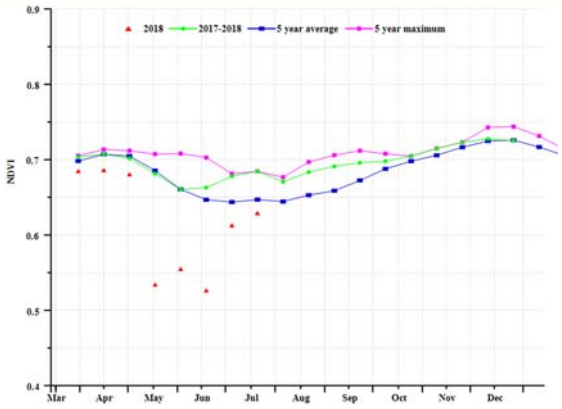



(d) Spatial NDVI patterns compared to 5YA

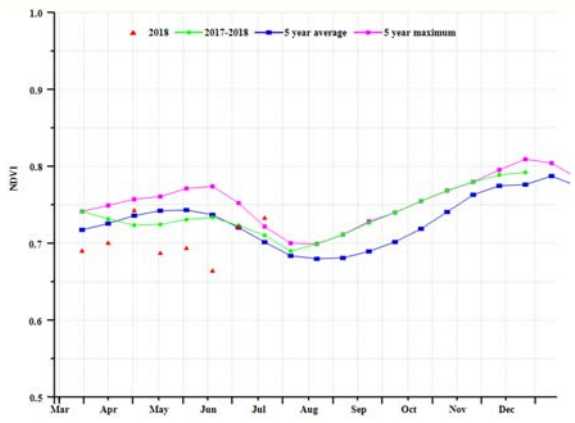



(e) NDVI profiles




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




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

**Table 3.64. Sri Lanka's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| **Dry zone** | 484 | 51 | 29.0 | -0.9 | 1161 | -4 |
| **Wet zone** | 1119 | 34 | 24.7 | -1.0 | 949 | -3 |
| **Intermediate zone** | 817 | 57 | 27.6 | -0.9 | 1103 | -4 |

**Table 3.65. Sri Lanka's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| **Dry zone** | 1113 | 24 | 98 | 0 | 0.92 |
| **Wet zone** | 2039 | 10 | 100 | 0 | 0.95 |
| **Intermediate zone** | 1653 | 19 | 100 | 0 | 0.95 |

**Table 3.66. CropWatch-estimated Rice production for Sri Lanka in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| **Rice** | 2499 | -0.3 | 0.1 | 2494 | -0.2 |

# [MAR] Morocco

During the AMJJ period, Morocco produces mostly maize and wheat. Farmers planted wheat during November and December so as to harvest May and June. Maize was planted in February and harvested in June and July.

As shown by the Crop Watch agroclimatic indices, compared to average, rainfall increased by 22%, and the average temperature was as much as 2.3℃ below average. Nationwide, the fraction of cropped arable land (CALF) showed an increase of 34%. The biomass production potential is 11% above the average of the previous 5 years.

Based on the VCIx indicator, favorable crop condition prevailed as the value mostly exceeded 0.92. NDVI-based crop condition development graphs show that there the situation was above the five-year average. The spatial NDVI patterns indicate that NDVI was above average by 64.2% of cropland. Altogether, CropWatch estimates that 2018 wheat production will remain below the output of 2017.

Regional analysis

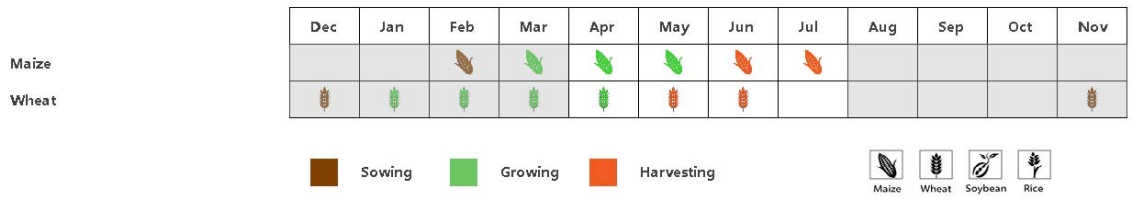
The reported period covers mainly cereal, wheat producing areas of warm semi-arid zones, warm subhumid and cool sub-humid of Morocco

The warm semiarid zone recorded 60 mm of rainfall over four months, which is an increase over average of 11%. Temperature and RADPAR were below average by 2.3°C and 7%, respectively, two rather significant values! Even though the rainfall increased BIOMSS dropped 4 % below the five-year average. In addition, the NDVI profile was above the five years average, and the maximum VCIx value was at 0.98. Overall the outlook was favorable for crop production.

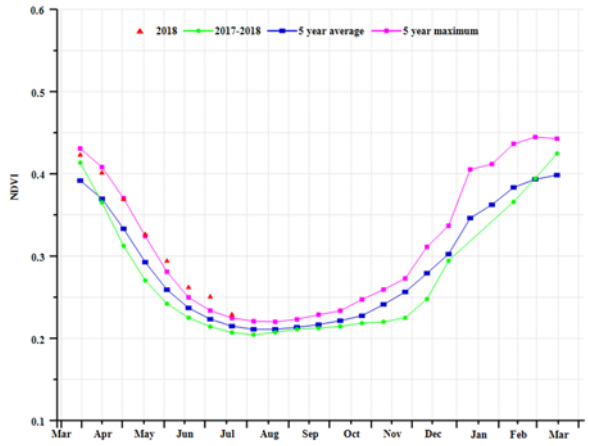
In the Warm sub-humid zone, rainfall increased by 32% above average with a decreased temperature of 2.4℃ and RADPAR 9% below reference values. VCIx reached 0.89. In general, based on the NDVI crop condition development graphs and the indicators, crop condition was favorable.

The Cool subhumid zone is very suitable for wheat cultivation. Rainfall increased over the fifteen years average (RAIN +21%) and BIOMSS followed with +19% output potential compared with the last five years. Similar to the other AEZs, RADPAR fell 9% and cool weather prevailed (TEMP -2.3°C). NDVI profiles stayed above the five-year average. VCIx reached 0.83). The available indicators generally concur to assess the situation as favorable.

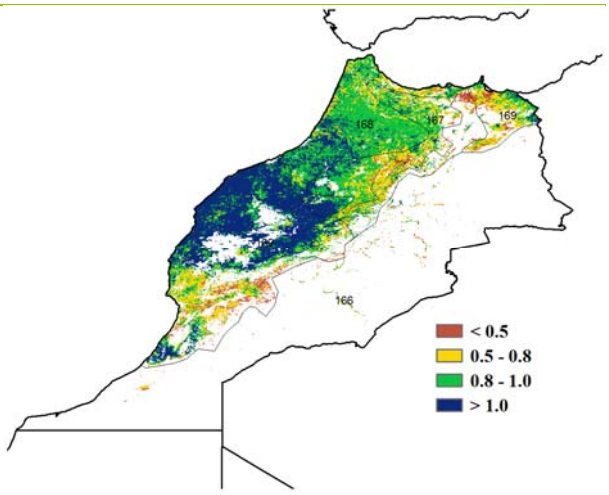
**Figure 3.29. Morocco's crop condition, April-July 2018**



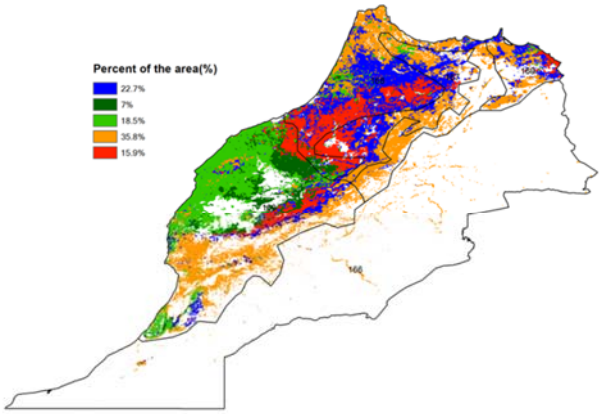

(a). Phenology of major crops



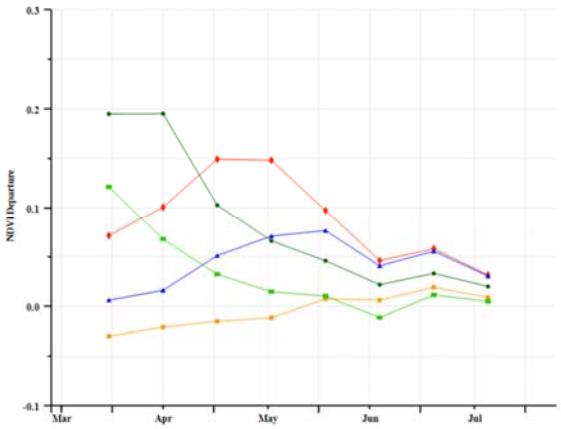

(b) Crop condition development graph based on NDVI



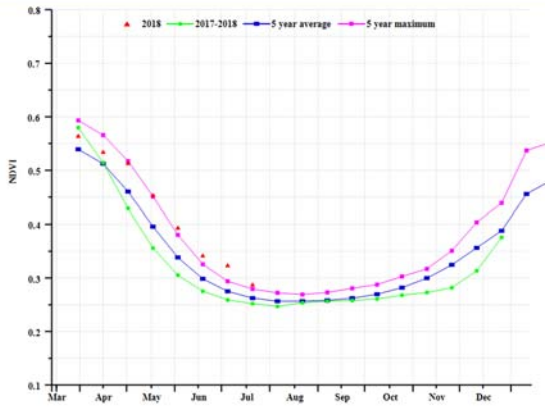

(c) Maximum VCI

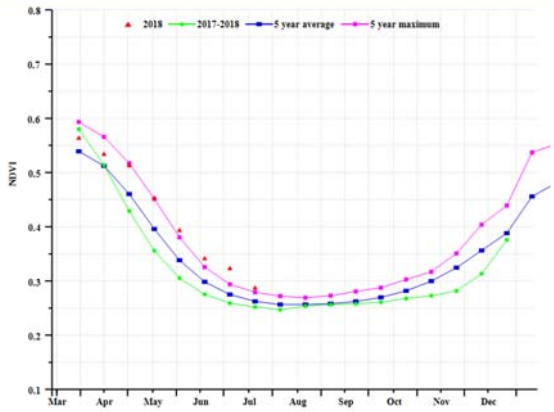



(d) Spatial NDVI patterns compared to 5YA

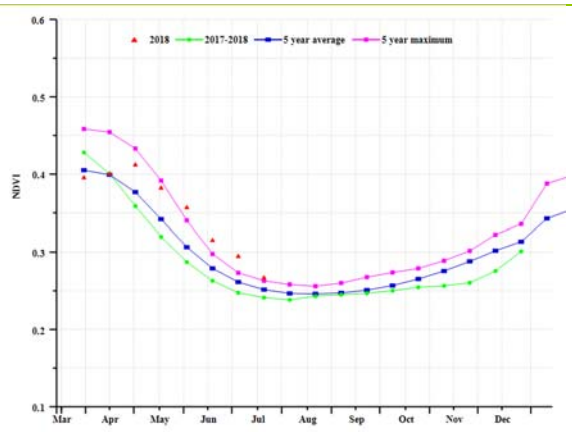



€ NDVI profiles




(f). Crop condition development graph based on NDVI (warm semiarid zones).and (g). warm sub humid zones )




(h) . crop condition development graph based on NDVI, Cool subhumid zone.

**Table 3.67. Morocco's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| **Warm semiarid zones** | 60 | 11 | 17.7 | -2.3 | 1455 | -7 |
| **Warm sub-humid zones** | 114 | 32 | 18.7 | -2.4 | 1381 | -9 |
| **Cool sub-humid zones** | 119 | 21 | 16.9 | -2.3 | 1390 | -9 |

**Table 3.68. Morocco's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| **Warm semiarid zones** | 228 | -4 | 45 | 91 | 0.98 |
| **Warm sub-humid zones** | 456 | 26 | 81 | 13 | 0.89 |
| **Cool sub-humid zones** | 489 | 19 | 69 | 14 | 0.82 |

**Table 3.69. CropWatch-estimated Wheat production for Morocco in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| **wheat** | 7100 | 2.8 | -3.5 | 7043 | -0.8 |

# [MEX] Mexico

During this monitoring period (April through July), maize in northwest Mexico was out of season while in other regions the crop was between sowing and growing time. Wheat was at the harvesting stage. Rice and soybean were at sowing period. Overall, crop condition was slightly below average but equal to the last year's level (Figure 3.30a).

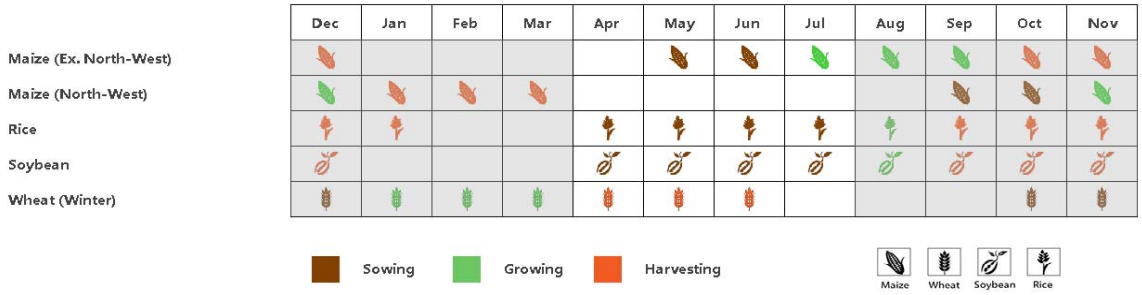
All CropWatch agrolimatic indicators were slightly below average: rainfall -9%, temperature -0.4°C and RADPAR -2% indicating moderately unfavorable weather. The biomass production potential BIOMSS and CALF were 3% and 1% below average, respectively. The maximum VCI was 0.81, with low values occurring in Sonora, Chihuahua and Coahuila and more favorable ones in Nayarit, Jalisco, Colima and Michoacan (Figure 3.30c). As shown by the spatial NDVI pattern and corresponding NDVI profiles, about 15.4% of cropped areas were continuously below average condition, mostly in Baja California, Sinaloa, and Tamaulipas. In contrast, 15.1% of crops were continuously above average in Oaxaca, Chiapas, Veracruz, Yucatan and Quintana Roo. This pattern is consistent with spatial VCIx variations. CropWatch estimates that the yield of maize will decrease by 0.5% compared with the previous season while wheat yield is up 0.6%.

Regional analysis

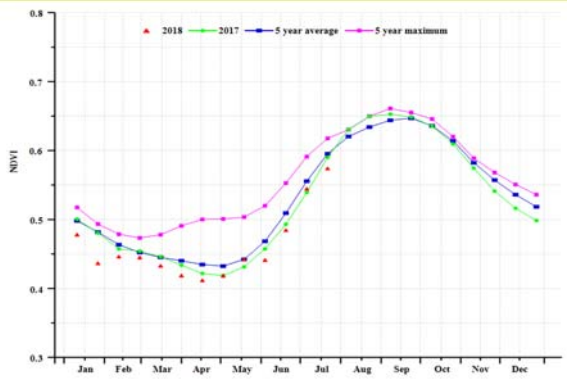
During April through July, crop condition in the Arid and semi-arid region was below average up to late June but got better to be above average from early July. Crop condition in the Humid tropics with summer rainfall was below average in early April but above average from late April to early May, and below average again since late June. Crop condition in the Sub-humid temperate region with summer rains and Sub-humid hot tropics with summer rains was generally below average but equal to last year's level during April through July.

The CropWatch agrolimatic indicators show that rainfall and RADPAR for all the four regions decreased compared to average with the departures between 4% and 14% (for rainfall), and 1% and 3% (for RADPAR). Temperature dropped slightly (around 0.5°C) in the the Humid tropics with summer rainfall, Sub-humid temperate region with summer rains and Sub-humid hot tropics with summer rains while it was just average in the Arid and semi-arid regions. BIOMSS were near average or average in Arid and semi-arid regions and Humid tropics with summer rainfall but below average in Sub-humid temperate region with summer rains (-7%) and Sub-humid hot tropics with summer rains (-5%). CALF were average in Humid tropics with summer rainfall and Sub-humid temperate region with summer rains but below average in Arid and semi-arid regions and Sub-humid hot tropics with summer rains, decreased by 5% and 1% respectively. Maximum VCI in Arid and semi-arid regions, Humid tropics with summer rainfall, Sub-humid temperate region with summer rains and Sub-humid hot tropics with summer rains were between 0.73 and 0.87.

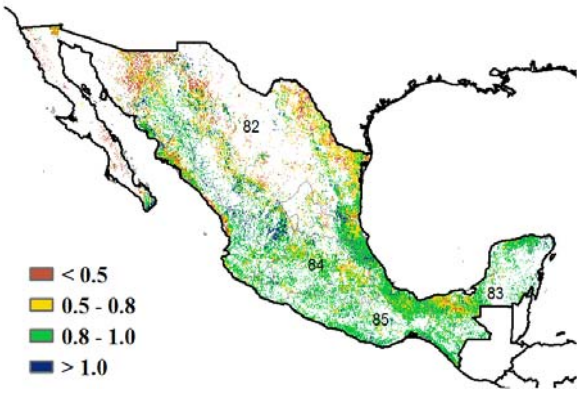
**Figure 3.30. Mexico's crop condition, April -July 2018**



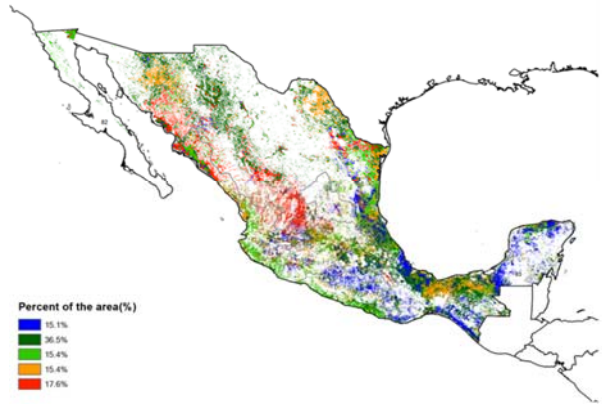

(a). Phenology of major crops



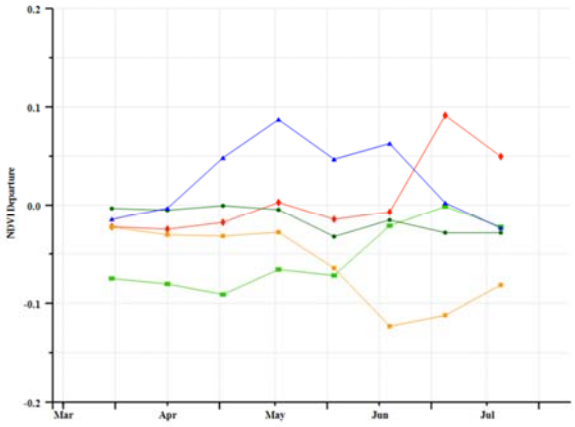

(b) Crop condition development graph based on NDVI



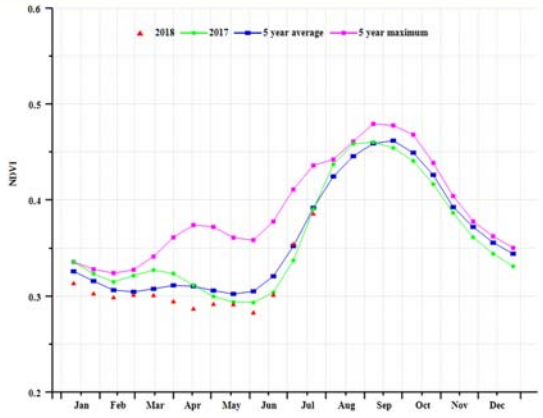

(c) Maximum VCI

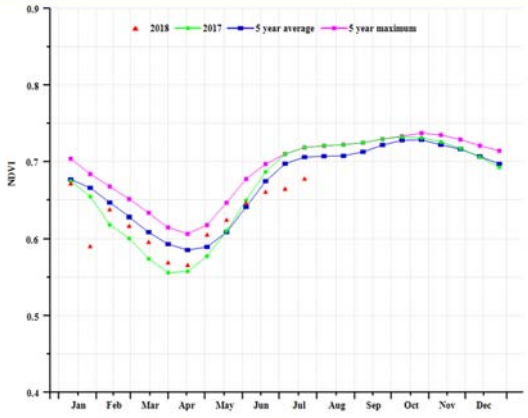



(d) Spatial NDVI patterns compared to 5YA

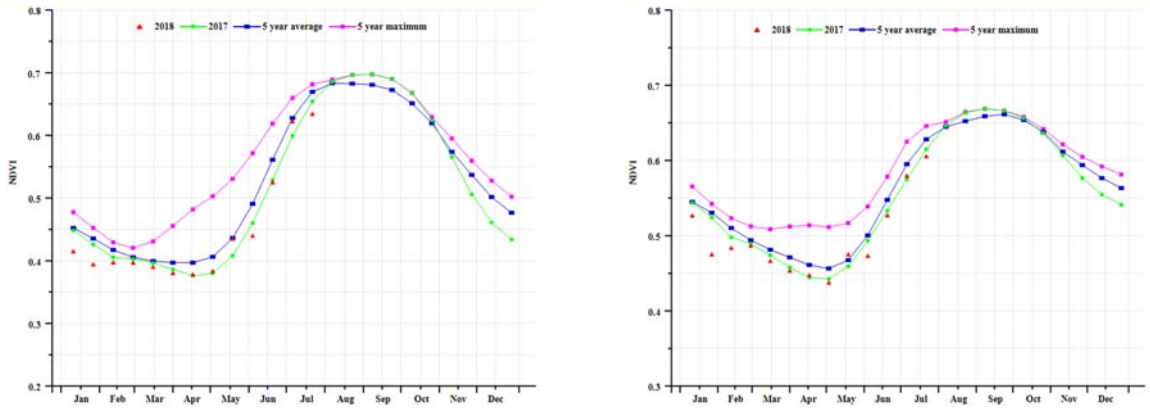



(e) NDVI profiles




(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 3.70. Mexico's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| **Arid and semi-arid regions** | 231 | -4 | 24.4 | 0.0 | 1482 | -2 |
| **Humid tropics with summer** | | | | | | |
| **rainfall** | 658 | -5 | 27.3 | -0.6 | 1258 | -1 |
| **Sub-humid temperate region** | | | | | | |

**Table 3.71. Mexico's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Arid and semi-arid regions | 697 | -1 | 1 | -5 | 0.73 |
| Humid tropics with summer rainfall | 1614 | 0 | 1 | 0 | 0.87 |
| Sub-humid temperate region with summer rains | 1139 | -7 | 1 | 0 | 0.86 |
| Sub-humid hot tropics with summer rains | 1208 | -5 | 1 | -1 | 0.87 |

**Table 3.72. CropWatch-estimated maize and wheat production for Mexico in 2018 (thousands tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| **Maize** | 23858 | -0.5% | 2.4% | 24315 | 1.9% |
| **Wheat** | 3283 | 0.6% | 8.7% | 3589 | 9.3% |

# [MMR] Myanmar

Maize is distributed mainly in the Hills region of Muyanmar, while wheat and rice are planted across the country. The reporting period covers the harvest of maize in the Hills region (completed in early April), of wheat (completed early May) and the second rice crop (completed mid-June). The main rice crop started growing in early July. According to the CropWatch monitoring results, crop condition is considered to have been generally average from April to May, after which it dropped sharply starting in early June and remained far below average thereafter.

CropWatch agroclimatic indices show a marked increase in rainfall above average (RAIN +20%), but a drop in temperature (TEMP -0.8°C) and radiation (RADPAR, -5%). The fraction of cropped arable land (CALF) underwent a slight decrease of 2%. Sufficient precipitation offset the influence of temperature and radiation, resulting a favorable behavior for biomass (+5%) compared to 5YA. The crop condition development graph based on NDVI shows an average situation in April and May but fell markedly below average in June and July. The abnormally low values since June over the whole country may be related to the poor condition of main rice and cloud cover over Myanmar during this period.

Regarding spatial variations, cropland across the country displayed unfavorable condition for almost the whole country during the monitoring period. All areas of Mandalay and Magwe and south of Sagaing remained average during April and May but deteriorated after June. Ayeyarwady,Yangon, Bago, Kayin and Mon displayed the lowest NDVI departures, a behavior similar to Mandalay, but reached very low values in mid-June. The spatial distribution of crop condition shows that the central plain experienced better climatic condition than the Hills and Coastal regions, which is consistent with the agroclimatic condition of sub-national regions. The maximum VCI map also displays this pattern: high values in central part of the central plain and low value in other regions. Country-wide, the maximum VCI value was 0.83.

Regional analysis

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

Agroclimatic and crop conditions in the Coastal region follow the same pattern as the whole country, with crop condition was above average before June and deteriorating thereafter. The unfavorable crop condition of this sub-national region may reflect the situation of main rice. Rainfall was above average (RAIN 21%) while temperature and radiation dropped by 0.6°C and 6% respectively.

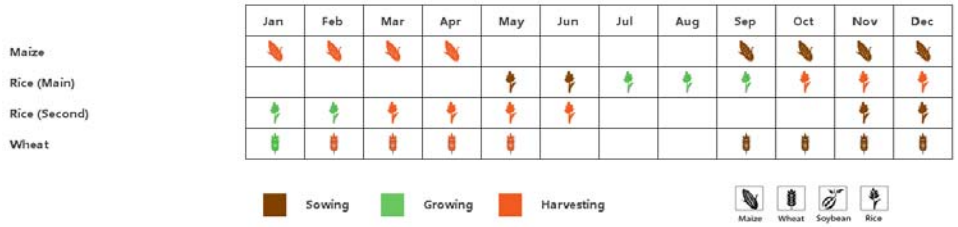
The Central plain is the main agricultural region of the country and includes most of Mandalay and Magwe, which both show satisfactory values for the CropWatch indicators, as mentioned above. More rainfall (RAIN, +22%) than the other two regions resulted in good crop growth, confirmed by a high VCIx value (0.84).

The Hills region is the major maize producing area of the country but also includes some rice. Agroclimatic indicators were close to the national values and other two sub-national regions. As NDVI development graphs show, crop condition was mostly below average except for mid-April.

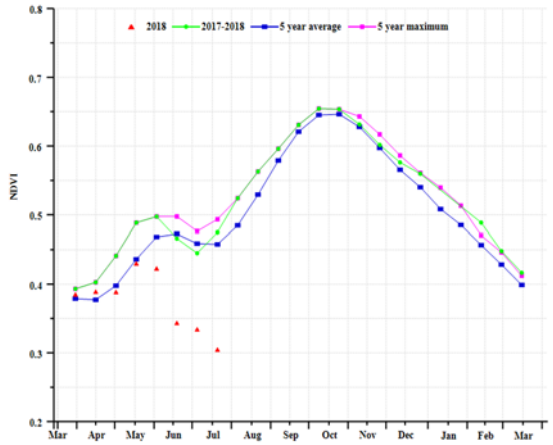
Overall for Myanmar, crop condition is generally below average due to the lower temperature and poor radiation. The NDVI values during April and May are average, meaning that there is no influence for the harvesting of maize, wheat and second rice, but the crop condition and production of main rice may have suffered adverse conditions in June and July. The Cropped Arable Land Fraction (CALF) for the country and the three regions also shows a slight decrease compared to average, which may contribute to reduce

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

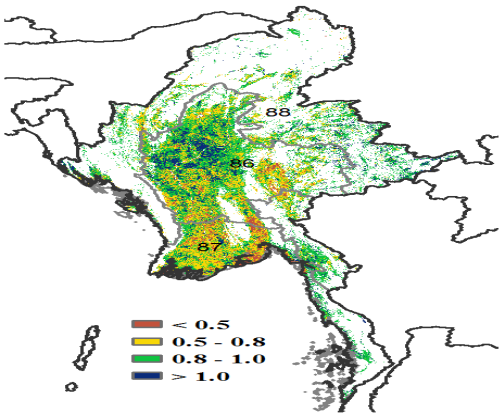
**Figure 3.31. Myanmar's crop condition, April -July 2018**



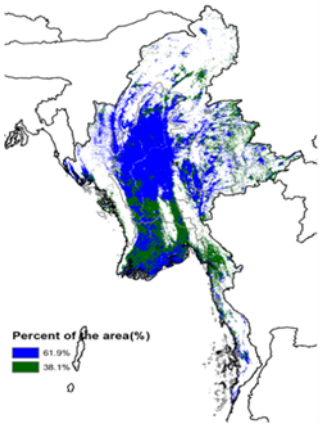

(a). Phenology of major crops



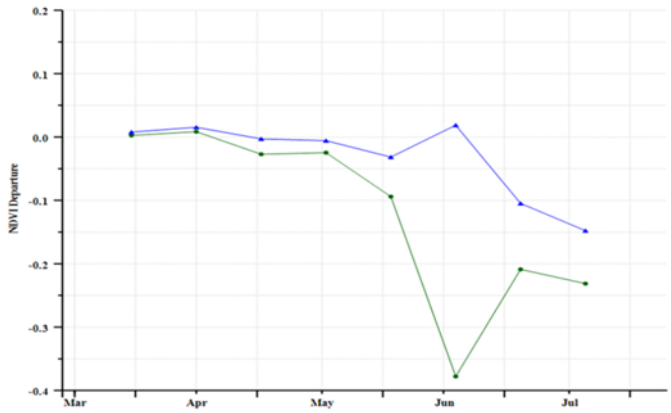

(b) Crop condition development graph based on NDVI



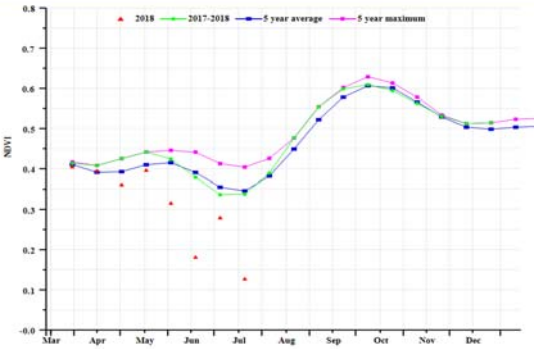

(c) Maximum VCI

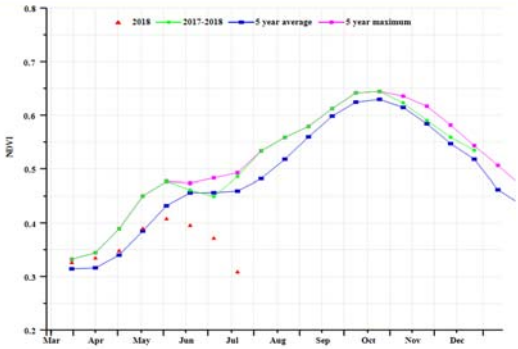



(d) Spatial NDVI patterns compared to 5YA

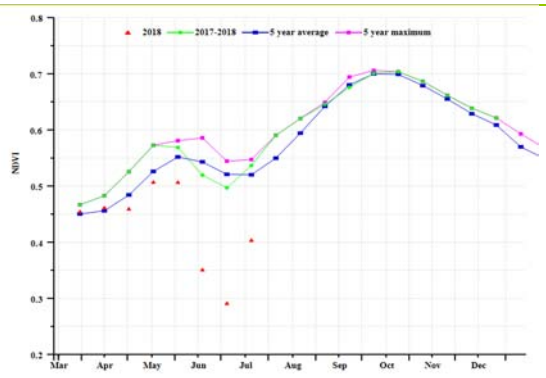



(e) NDVI profiles




(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 3.73. Myanmar's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| Coastal region | 1807 | 21 | 28.5 | -0.6 | 937 | -6 |
| Central plain | 853 | 22 | 27.8 | -0.9 | 1048 | -5 |
| Hill region | 1268 | 18 | 24.9 | -0.9 | 950 | -5 |

**Table 3.74. Myanmar's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Coastal region | 2161 | 2 | 64 | -20 | 0.76 |
| Central plain | 1813 | 8 | 82 | 2 | 0.84 |
| Hill region | 2030 | 3 | 94 | -1 | 0.86 |

**Table 3.75. CropWatch-estimated rice and Maize production for Myanmar in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| **Rice** | 25407 | -2.0 | 0.3 | 24987 | -1.7 |
| **Maize** | 1702 | -2.4 | 0.0 | 1661 | -2.4 |

# [MNG] Mongolia

The monitoring period covers spring wheat and other cereals currently in the field; they were sowed before June. During the reporting period, the crop condition in the country was favorable. The national average VCIx was 0.90 and the Cropped Arable Land Fraction increased by 2% compared to the five-year average. Among the CropWatch agroclimatic indicators, RAIN was above average (+40%), TEMP was about average (+0.5°C departure), while RADPAR was below 5%. The combination of factors resulted in high BIOMSS (+18%) compared to average. As shown by the NDVI development graph, crop condition was generally close to average from April to June and above average in July. NDVI cluster graphs and profiles show that 42.7% of arable lands were consistently above average since June, mostly in Khentii, Bulgan, Selenge and east Hovsgol provinces; 16% were consistently below average, mainly in Tov and patches in Arkhangai and south Bulgan, and south-west Hovsgol provinces. Variable NDVI with low values around May (23, 5%) occurred in east Dornod, Uvs, Bulgan and patches in Hovsgol and Khentii provinces. CropWatch expects an increase of 11.6% in wheat production compared with last year, while the production area of wheat is estimated to increase by 1.3%. Overall, the agroclimatic variables indicate favorable conditions for crops.

Regional analysis

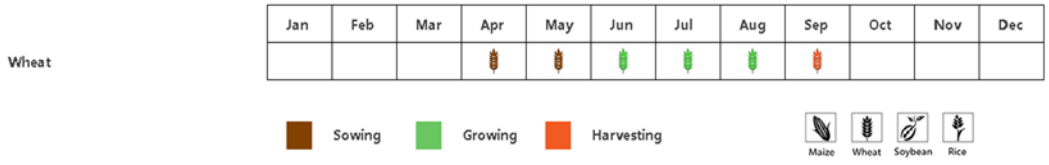
In the Khangai Khuvsgul region, NDVI was slightly below the five-year average from late April to late June and about average in July. The RAIN and TEMP were above average (+32% and +0.5°C) and RADPAR was below average (-2%). The combination of the factors resulted in high BIOMSS (+12%) compared to the five-year average. The maximum VCI index was 0.89, while the cropped area decreased by 1% compared to the five-year average. Overall crop prospects are favorable.

The Selenge-Onon region, Crop condition was above the five years average from May to July. Accumulated rainfall was above average during the monitoring period (RAIN 43%), BIOMSS and TEMP were above average (21% and 0.5°C). The RADPAR index decreased by 6% compared to the five-year average. The maximum VCI index was 0.91, while the cropped arable land increased by 4%. Overall crop prospects are favorable.

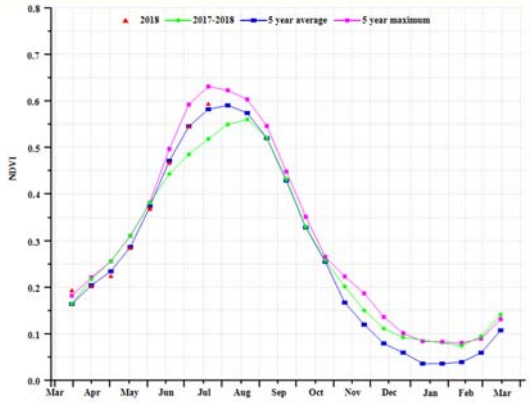
The Central and Eastern Steppe Region, According to the NDVI development graph, crop condition in this region was below average from April to June and close to average from late June to July. RAIN and TEMP were above average (+53% and +0.8°C, respectively), while RADPAR was below average (-6%). BIOMSS was up 38%, while the Cropped Arable Land Fraction increased by 5% compared to the five-year average. The maximum VCI index was 0.87. In general, the region experienced favorable weather conditions for crop growth during the current season.

Remaining regions (Altai and Gobi) play a minor role in crop production. Conditions were nevertheless favourable to rangeland development.

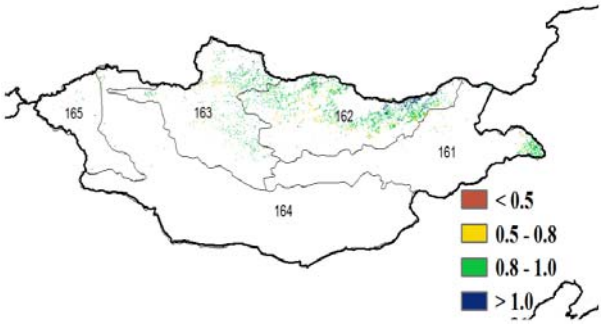
**Figure 3.32. Mongolia's crop condition, April -July 2018**



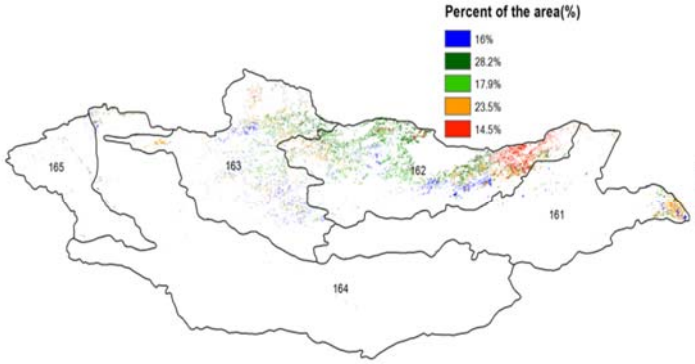

(a). Phenology of major crops



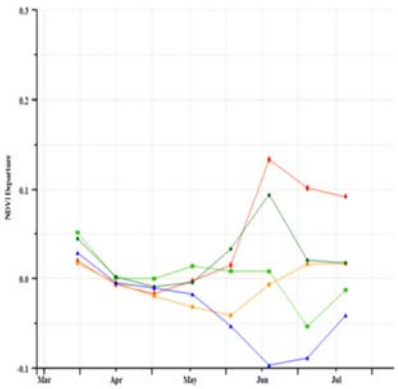

(b) Crop condition development graph based on NDVI



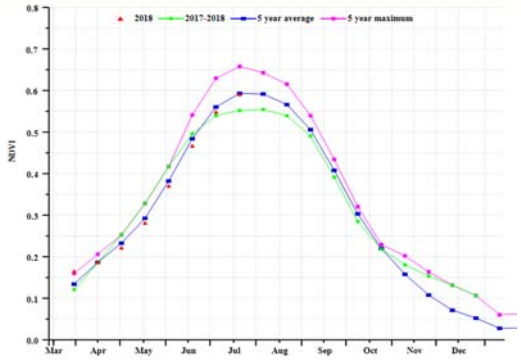

(c) Maximum VCI

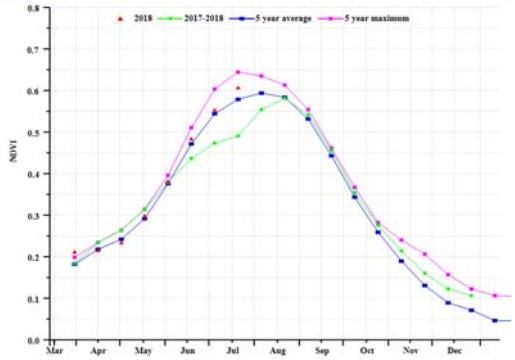



(d) Spatial NDVI patterns compared to 5YA




(e) NDVI profiles




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

**Table 3.76. Mongolia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| Coastal region | 1807 | 21 | 28.5 | -0.6 | 937 | -6 |
| Central plain | 853 | 22 | 27.8 | -0.9 | 1048 | -5 |
| Hill region | 1268 | 18 | 24.9 | -0.9 | 950 | -5 |

**Table 3.77. Mongolia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current ($gDM/m^2$) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Coastal region | 2161 | 2 | 64 | -20 | 0.76 |
| Central plain | 1813 | 8 | 82 | 2 | 0.84 |
| Hill region | 2030 | 3 | 94 | -1 | 0.86 |

**Table 3.78. CropWatch-estimated rice and Maize production for** Mongolia **in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| **Rice** | 25407 | -2.0 | 0.3 | 24987 | -1.7 |
| **Maize** | 1702 | -2.4 | 0.0 | 1661 | -2.4 |

# [MOZ] Mozambique

Considered to be the wet season in Mozambique, the April-July the monitoring period covers the final stage of growing season of Maize and Rice as well as harvesting season in the North region, while in the central area, Rice and Maize were harvesting in early April. The growing and harvesting stage characterised the wheat during this period. The agroclimatic indicators for Mozambique show an increase in rainfall (RAIN=+61%) and a decrease in both temperature and radiation (TEMP = -0.6ºC and RADPAR=-2.1%). The behaviours verified on agroclimatic indicators led to favourable condition on all agronomic indicators, where the biomass rose by 31%over the past five years average. The recorded cropped arable land fraction (CALF) and maximum vegetation condition index (VCIx) was 0.06% and 0.91respectively. An increase in Maize production of about 2.2% is expected.

The crop condition development graph based on NDVI for the entire country, indicate crop conditions above the average of past five years during almost the whole monitoring period, but below the values of the of the same monitoring period of 2017 as well as five years maximum. At the same time, the maximum VCIx map shows that poor crop conditions were observed in south part of Gaza Province with VCIx values below 0.5, while the coastal areas of Inhambane and Nampula and part of the central region of Zambezia Province registered better crop conditions with values of VCIx higher than 1. NDVI departure was above the average throughout the reporting period in most parts of the country representing 50.2% of the cropped area.

With few exceptions, crop conditions can be deemed favourable in Mozeambique.

Regional Analysis

Taking consideration of the climate, vegetation, altitude, soil and farming systems, Mozambique is divided into ten (10) agro-ecological zones (AEZ): Inland of Maputo and Southern Gaza,Coastal areas and South of Save, North and Central Gaza and Western Inhambane,Central medium altitude areas, Low altitude areas of Sofala and Zambezia, Dry areas of Zambezia and Southern Tete, North Coastal areas, High altitude areas,Mid-altitude areas and Northern hinterland of Cabo Delgado.

Inland of Maputo and southern Gaza region RAIN was 17% below average but TEMP and RADPAR were about average. BIOMSS rose 4% and cropped arable land fraction was up 3.3%. The maximum VCIx for this region was 0.90. Crop condition for this region was above the past five years' average.

Crop conditions above the average of past five years were recorded in Coastal areas and South of Save. Rain and temperature decreased by 26% and 0.3ºC respectively below average. BIOMSS registered a decrease of 5% while the cropped arable land fraction remained stable and VCIx of about 0.90 was observed.

RAIN in the North and Central Gaza and Western Inhambane region marginally increased by 5% while the temperature and radiation were average. Although BIOMASS increased by 22%, VCIx (0.77) was just average and CALF was reduced by 6.4%. All these elements combined, surprisingly resulted in crop conditions above the average of past five years, above the same monitoring period of 2017 as well but below the five years maximum.

With crop condition above the average of the past 5YA during almost all the monitoring period, the Central medium altitude areas registered a maximum vegetation condition index (VCIx) of 0.95. In this region the rainfall increased by 22%, the temperature dropped by 1.0ºC, and the radiation decreased by 2%. These elements led to a slight increase in Biomass while the CALF was about average.

In the Low altitude areas of Sofala and Zambezia, the agroclimatic indicators show an increase in rainfall (+47%) and a slight drop in temperature and sunshine (TEMP -0.6, RADPAR-2%). CALF was stable and BIOMSS increased by 23%. The maximum VCIx for this region was 0.92 and crop conditions were above the average of past 5YA.

About average crop conditions were observed in the Dry areas of Zambezia and Southern Tete. This region verified an increase in rainfall (+24%), a reduction in temperature (-0.8ºC) and a decrease in radiation (-3%). CALF increased by 0.9%, BIOMSS was average and regional VCIx 0.90.

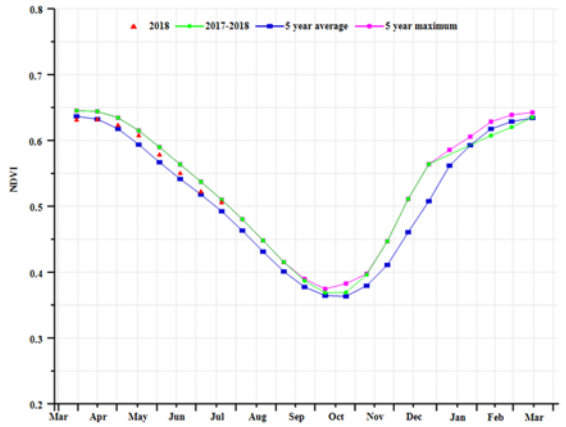
The Northen coastal areas was characterised mainly by a large increase in rainfall (RAIN+70%) and BIOMSS (+43 %.) Other variables, including crop condition, were favourable as well.

Better crop conditions were also verified in High-altitude and mid-altitude areas where the rainfall more than doubled compared with average. Excellent agronomic indicators (VCIx 0.91 and 0.93, respectively and CALF unchanged) confirm goo crop prospects.

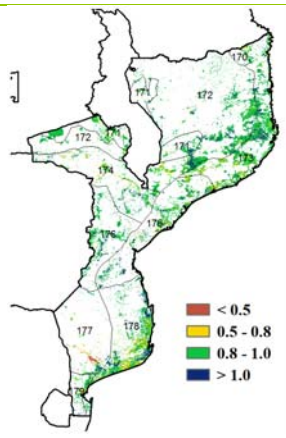
In the Northern hinterland of Cabo Delgado, below average crop condition were observed from the beginning of the monitoring period up to mid-June; Rain was average but temperature was unusually cool (1.1ºC below average). CALF was about average, BIOMSS dropped 7% and VCIx nevertheless reached 0.92.

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

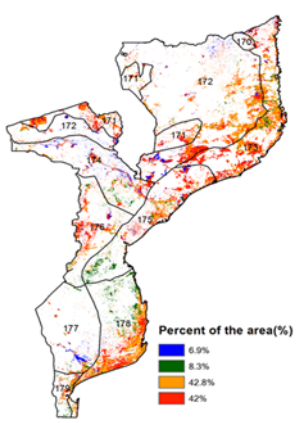

(a). Phenology of major crops

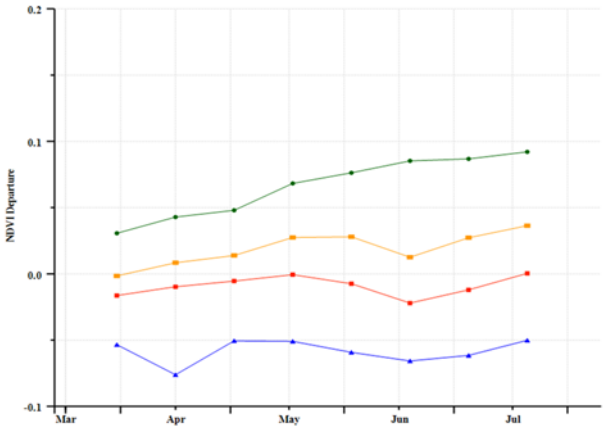



(b) Crop condition development graph based on NDVI

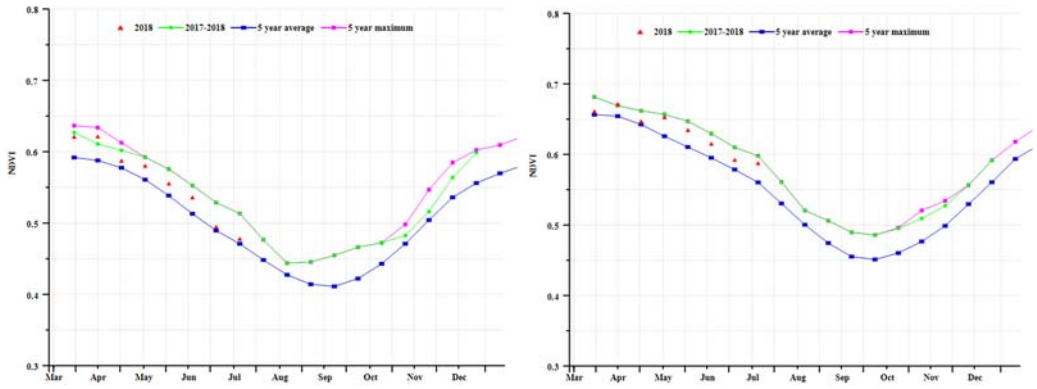



(c) Maximum VCI

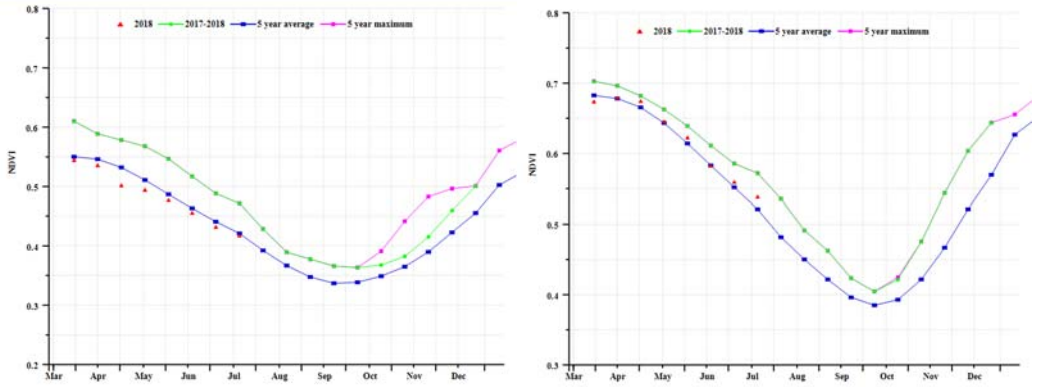


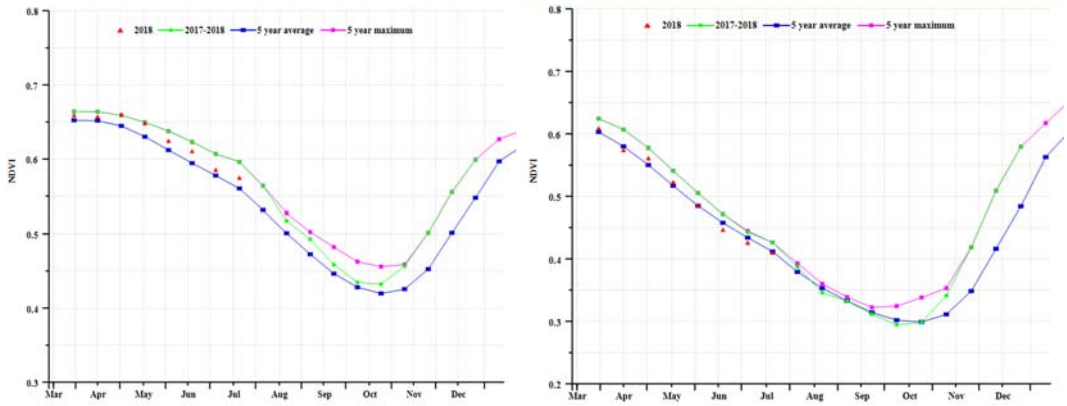

(d) Spatial NDVI patterns compared to 5YA (e) NDVI profiles




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

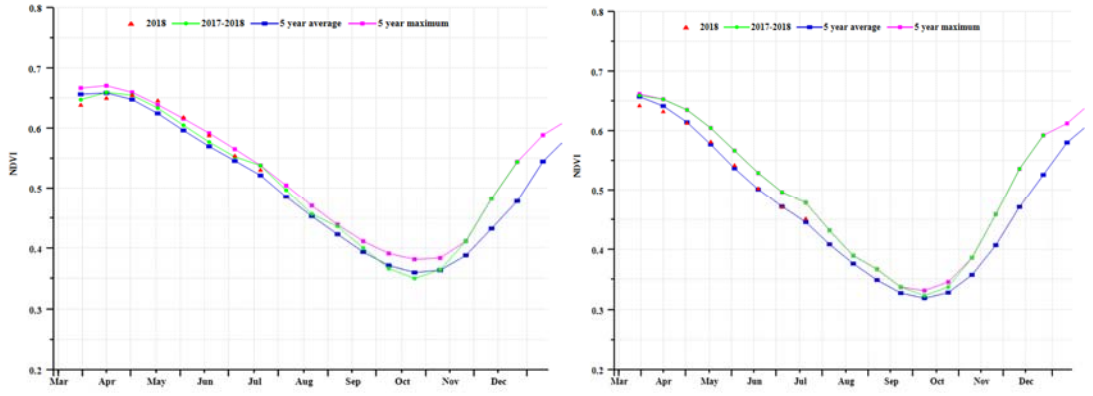



(g) Crop condition development graph based on NDVI (left) North and Central Gaza and Western Inhambane (right) Central medium altitude areas.

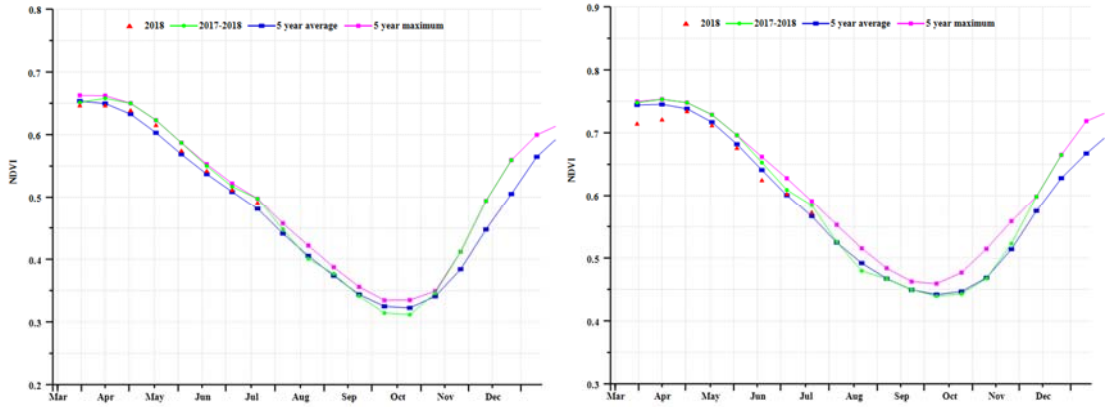



(h) Crop condition development graph based on NDVI (left) Low altitude areas of Sofala and Zambezia (right) Dry areas of Zambezia and

Southern Tete.




(i) Crop condition development graph based on NDVI (left) Northern coastal areas (right) High-altitude areas.




(j) Crop condition development graph based on NDVI (left) Mid-altitude areas (right) Northern hinterland of Cabo Delgado.

**Table 3.79. Mozambique's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current ($MJ/m^2$) | Departure from 15YA (%) |
| **Maputo** | 85 | -17 | 21.5 | -0.2 | 809 | -1 |
| **Gaza** | 83 | -26 | 22.8 | -0.3 | 854 | 0 |
| **Inhambane** | 84 | 5 | 22.0 | -0.2 | 835 | -2 |
| **Sofala** | 112 | 22 | 21.5 | -1.0 | 929 | -2 |
| **Manica** | 169 | 47 | 23.6 | -0.6 | 868 | -2 |
| **Tete** | 63 | 15 | 23.9 | -0.8 | 941 | -3 |
| **Zambézia** | 230 | 70 | 24.6 | -0.9 | 936 | -2 |
| **Nampula** | 171 | 104 | 19.7 | -0.6 | 989 | -4 |
| **Cabo Delegado** | 213 | 119 | 22.8 | -0.6 | 966 | -3 |
| **Niassa** | 151 | -2 | 22.7 | -1.1 | 1029 | -2 |

**Table 3.80. Mozambique's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current ($gDM/m^2$) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |

| 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** | 409 | 4 | 99 | 3.37 | 0.90 |
| **Inhambane** | 379 | -5 | 99 | 0.51 | 0.91 |
| **Sofala** | 369 | 22 | 88 | -6.44 | 0.78 |
| **Manica** | 336 | 3 | 100 | 0.02 | 0.95 |
| **Tete** | 490 | 23 | 99 | -0.05 | 0.92 |
| **Zambézia** | 215 | 0 | 96 | 0.88 | 0.90 |
| **Nampula** | 582 | 43 | 99 | 0.01 | 0.90 |
| **Cabo Delegado** | 498 | 64 | 700 | 0.00 | 0.91 |
| **Niassa** | 495 | 53 | 100 | 0.08 | 0.93 |

**Table 3.81. CropWatch-estimated Maize production for Mozambique in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| **Maize** | 2040 | 0.00% | 2.30% | 2085 | 2.2% |

# [NGA] Nigeria

The monitoring period covers the sowing and growing season of main Maize in the South and in the North as well as the planting of irrigated and non-irrigated rice. Compared with average, the agroclimatic indicators show an increase in rainfall (RAIN +10%) and a drop in both temperature and radiation (TEMP -0.8ºC and RADPAR -8%). With a maximum vegetation condition index of 0.90 and a reduction on the cropped arable land fraction by 1%, the biomass production potential registered an increase of 6%. The country recorded below average crop conditions during the entire monitoring period. The NDVI profiles over the nation reveal below average crop conditions from April to June. Thereafter, however, about 35% of the country registered crop conditions above the average, especially in Borno, Katsina, Zamfana and Sokoto states. Altogether, CropWatch expects a decrease in the production of maize and rice by 3.8% and 3.2% respectively.

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, Guinean savanna, Derived savanna and Humid forest zone.

Seasonally dry weather prevailed in the Sudano Sahelian until the beginning of the rainy season in July, when this region experienced favourable crop conditions. VCIx reached 0.91. An increase in rainfall of about 26% above average and a decrease in both temperature and sunshine (TEMP -0.9ºC and RADPAR -6%), led to an increase in biomass index by 18%. CALF dropped 5% compared with the five previous seasons.

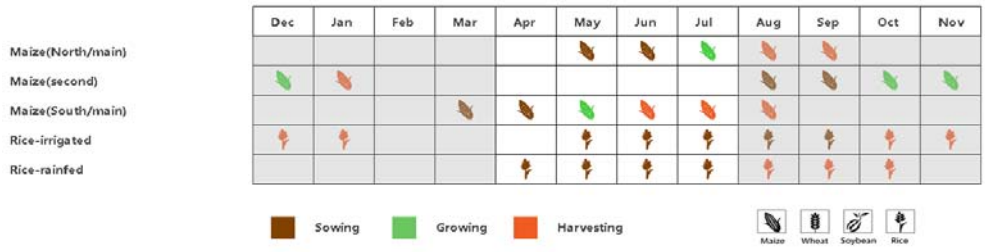
Contrary to Derived Savanna, the Guinean Savanna region, registered a reduction in all agroclimatic indicators (RAIN -1%, TEMP -0.8ºC and RADPAR -9%). With CALF reduced by 5.43%, the biomass registered a slight increase of 1%. The NDVI graph indicates crop condition about the average in early April, and unfavourable crop conditions from May to the end of the monitoring period. The maximum VCI for this region was 0.85, and a proportion of about 50% showed VCI values below 0.8.

The average VCI for the Derived Savanna (0.94) results from values between 0.8 and 1 and above, athough the crop condition development graph based on NDVI shows that the situation was unfavourable during the entire monitoring period. Relative to average, a slight increase in rainfall (RAIN +9%) was accompanied by a drop in temperature and radiation (-0.9ºC and -7%, respectively). Both CALF (+0.18%) and BIOMSS (+4%) were close to average.

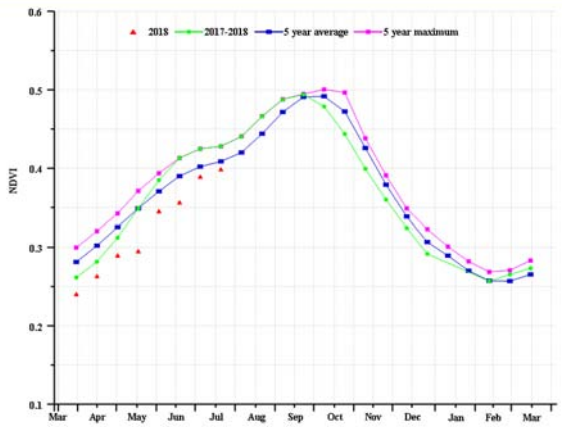
The maximum VCI of 0.91 suggests favourable crop conditions in the Humid Forest zone. However, the NDVI graph indicates poor crop conditions during the entire monitoring period. Similar to the Guinean Savanna, this region also registered a slight decrease in CALF (-0.5%). The Biomass increased by 3% when compared to past 5YA. The agroclimatic indicators show an increase in rainfall by 12% but both temperature and radiation decrease by 9ºC and 6% respectively.

In general, the crop conditions reported during this period indicates that in nationwide, the crop conditions were unfavourable, which can justify the decrease in the production of maize and rice registered.

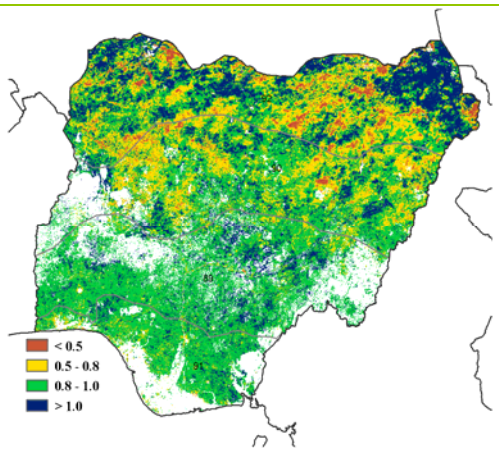
**Figure 3.34. Nigeria's crop condition, April -July 2018**



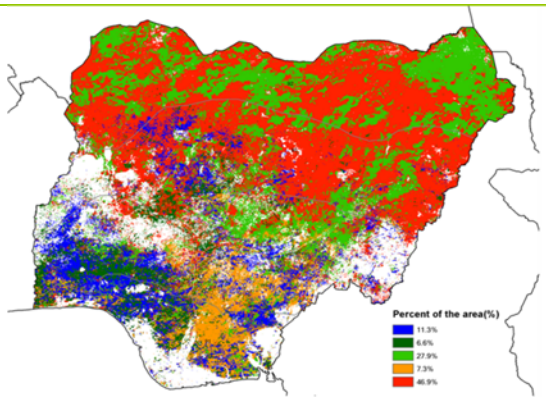

(a) Phenology of major crops



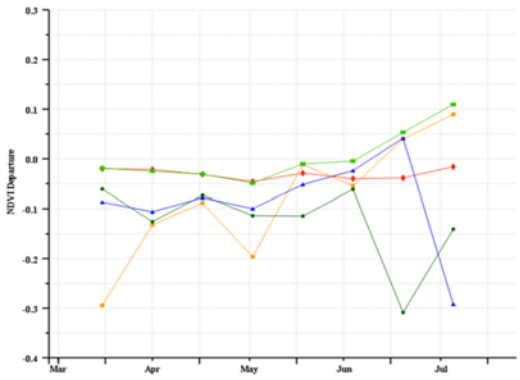

(b) Crop condition development graph based on NDVI



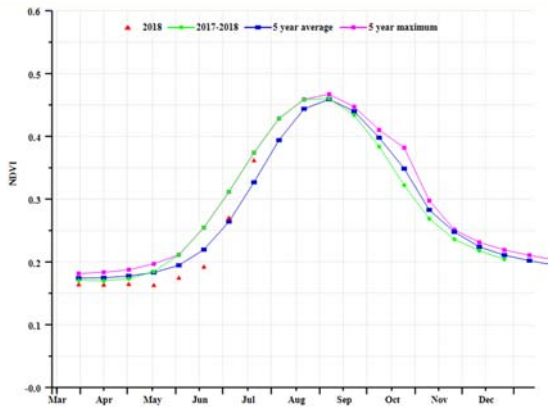

(c) Maximum VCI

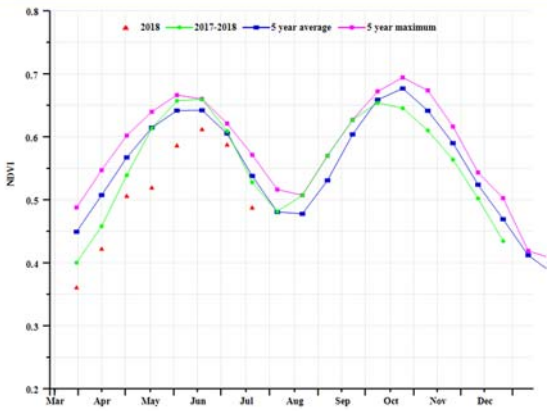



(d) Spatial NDVI patterns compared to 5YA

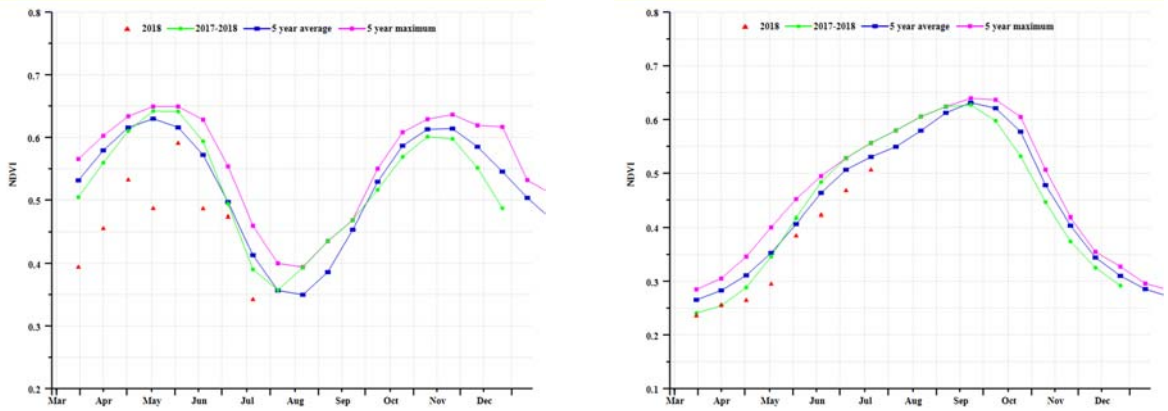



(e) NDVI profiles




(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 3.82. Nigeria's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA,** April -July 2018

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| Sudano Sahelian | 721 | 9 | 27.5 | -0.9 | 988 | -7 |
| Derived Savana | 524 | -1 | 28.5 | -0.8 | 1132 | -9 |
| Humid Forest Zone | 1113 | 12 | 27.1 | -0.9 | 864 | -6 |
| Guinean Savanna | 456 | 26 | 31.1 | -0.7 | 1270 | -9 |

**Table 3.83. Nigeria's agronomic indicators by sub-national regions, current season's values and departure from 5YA,** April -July 2018

| Region | BIOMASS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current | Departure from 5YA (%) | Current |
| Sudano Sahelian | 1909 | 4 | 99 | 0.18 | 0.94 |
| Derived Savana | 1605 | 1 | 87 | -5.43 | 0.85 |
| Humid Forest Zone | 2319 | 3 | 98 | -0.51 | 0.91 |
| Guinean Savanna | 1332 | 18 | 50 | -4.96 | 0.91 |

**Table 3.84. CropWatch-estimated maize and Rice production for Nigeria in 2018 (thousands tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| **Maize** | 11165 | -3.60% | -0.30% | 10736 | -3.80% |
| **Rice** | 4684 | -3.20% | -0.10% | 4532 | -3.20% |

# [PAK] Pakistan

The reporting period corresponds to the sowing of summer maize and the planting of rice crops in the country, as well as to the harvesting of winter wheat. Rainfall (RAIN, 240mm) was 5% above average. TEMP at 27.9°C was -0.6°C lower than average and RADPAR was near average. BIOMASS accumulation was expected to be 593 gDM/m2, 2% higher than average. NDVI was lower than average throughout the reporting period in most of the country. The Cropped Arable Land Fraction decreased to 0.3, 16.4% lower than average. The VCIx is average.

Regional analysis

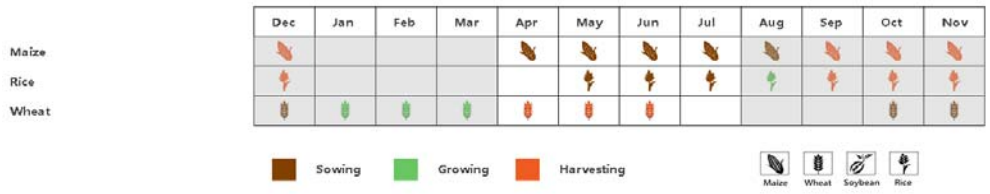
Due to the country's large diversity of natural environmental conditions (topography, soil and weather etc.), Pakistan can be divided into four agro-ecological regions (AEZ), namely Balochistan, Lower Indus river basin, Northern Highlands, and Northern Punjab. Only a small proportion of land is cultivated in Balochistan, and only the other three AEZs are described below.

All the regions received more rainfall than average while temperature marginally decreased (-0.6% ~ -1.1%). The proportion of rainfall increased most in the Lower Indus river basin (20% above average, against 5% in other areas) and the highest rainfall among the regions was recorded in the Northern Highlands (339 mm). The three regions received less RADPAR than expected: between 7 and 10%, which is significant.

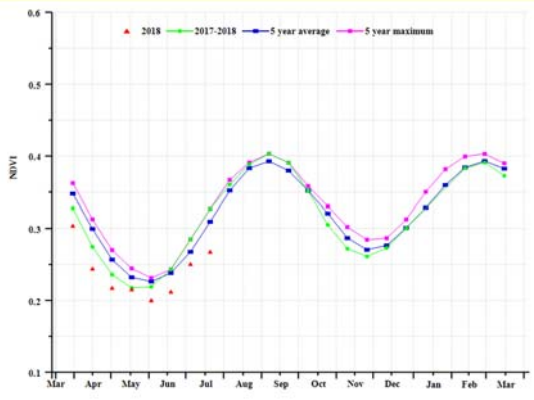
BIOMASS accumulation in the Northern highlands slightly reduced (-5%) while other regions increased (the Lower Indus river basin 23%, the Northern Punjab 10%). All the regions had persistently lower than average NDVI, with patches of low as well as high VCIx for an average around 0.64.

Cropped arable and ranged between 33% (the Lower Indus river basin) and 59% (Northern Punjab), and the CALF was off average between -20% (the Lower Indus river basin) to -15% (the northern highlands).

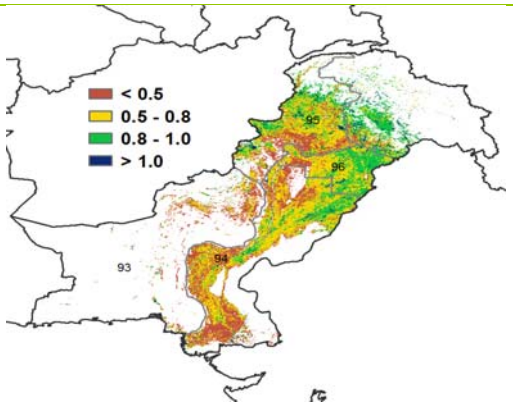
**Figure 3.35. Pakistan's crop condition, April -July 2018**



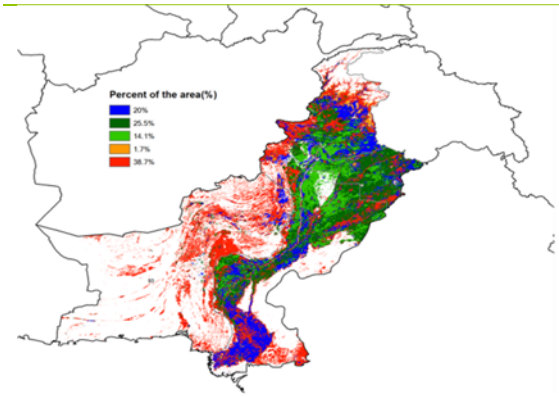

(a). Phenology of major crops



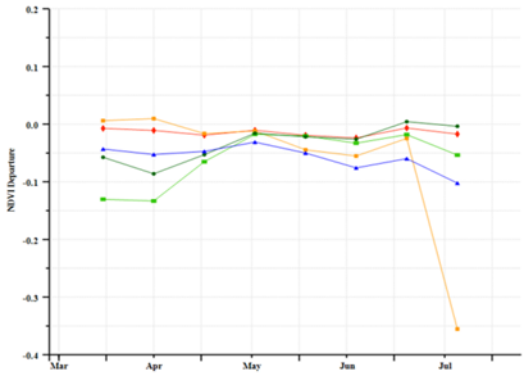

(b) Crop condition development graph based on NDVI



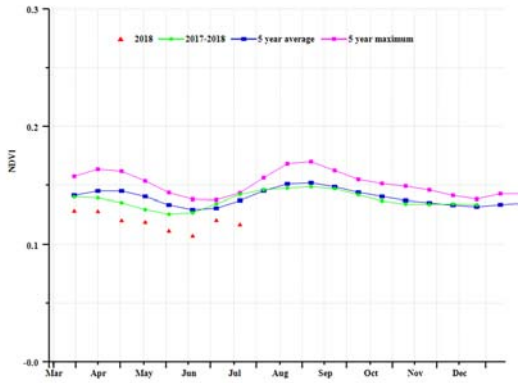

(c) Maximum VCI

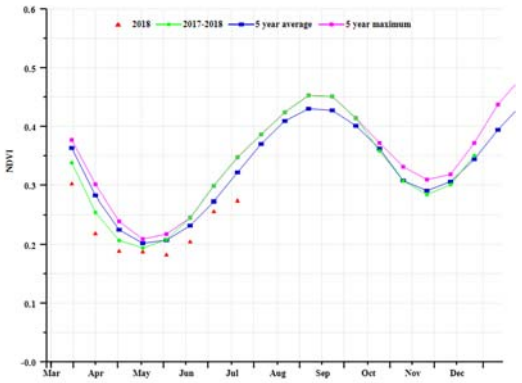



(d) Spatial NDVI patterns compared to 5YA

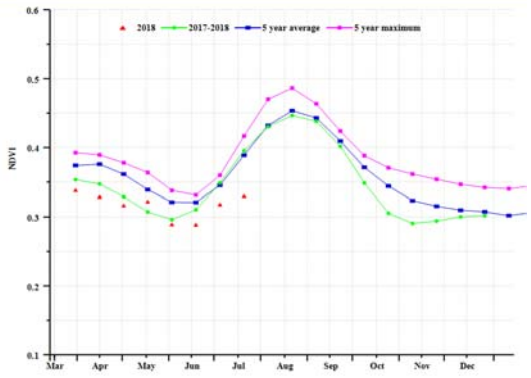


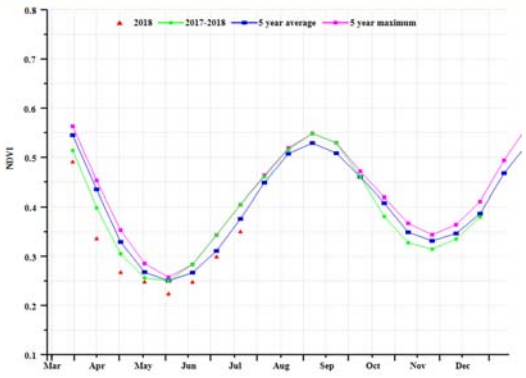

(e) NDVI profiles




(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 3.85. Pakistan's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| Balochistan | 177 | 20 | 33.1 | -0.6 | 1338 | -7 |
| Lower Indus river basin in south Punjab and Sind | 339 | 5 | 23.2 | -0.7 | 1323 | -8 |
| Northern highlands | 310 | 3 | 30.6 | -1.1 | 1235 | -10 |

**Table 3.86. Pakistan's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | CALF | | Maximum VCI |
|---|---|---|---|---|---|
| | Current ($gDM/m^2$) | Departure from 5YA (%) | Current (%) | Departure from 5YA (%) | Current |
| Balochistan | 562 | 23 | 33 | -20 | 0.54 |
| Lower Indus river basin in south Punjab and Sind | 953 | -5 | 44 | -15 | 0.64 |
| Northern highlands | 1022 | 10 | 59 | -19 | 0.73 |

**Table 3.87. CropWatch-estimated wheat, Rice and Maize production for Pakistan in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| **Maize** | 4904 | -3.1% | -7.2% | 4410 | -10.1% |
| **Rice** | 9904 | -0.2% | 2.3% | 10119 | 2.2% |
| **Wheat** | 24283 | -0.6% | -0.5% | 24004 | -1.2% |

# [PHL] The Philippines

In the Philippines, the main rice crop is currently growing, maize has reached the stage of maturity and is about to be harvested, while the harvesting stage of the secondary rice and maize is over. According to the NDVI profiles for the country, crop condition was below the five-year average. Nationwide, precipitation (RAIN) presents a negative departure of 5% compared with average, accompanied by below average radiation (-2%) and temperature (-0.5°C), which resulted in a decrease of BIOMSS 3% below average.

Based on the VCIx indicator, which mostly exceeded 0.80, favorable crop condition prevailed. The cropped arable land fraction (CALF) nation-wide was almost 100%. Considering the spatial patterns of NDVI profiles, 56% of the cropped area experienced average conditions, but other areas display different profiles including: （1）21.2% of the cropped area experienced average conditions from April to June, after which (in July) conditions suddenly dropped below average; （2）16.7% of the cropped area experienced average conditions from April to early May, below average conditions in the middle of May, but returned to average conditions in June and July; （3） 6.1% of the cropped area experienced average conditions from April to the middle of May, and fluctuations (average-below average) from the middle of May to July.

The behavior of NDVI can be explained mainly by the cloud and low radiation, partially by several typhoons of minor magnitude that affected the Philippines, including Henry, Inday and Josie, etc..Storms brought some heavy and short duration rain, causing flash floods. However, the rain anomaly is negative comparing to the 15-year average (RAIN, -5%). Altogether, the outputs for maize and rice in the country are expected to be below 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 (northern islands) experienced average rainfall, low radiation (RADPAR -4%) and mildly below average temperature (TEMP -0.7°C). According to the NDVI profiles for the region, crop condition was below the five-year average. BIOMSS was 3% below the average. Altogether, the outputs for maize and rice are expected to be below average.

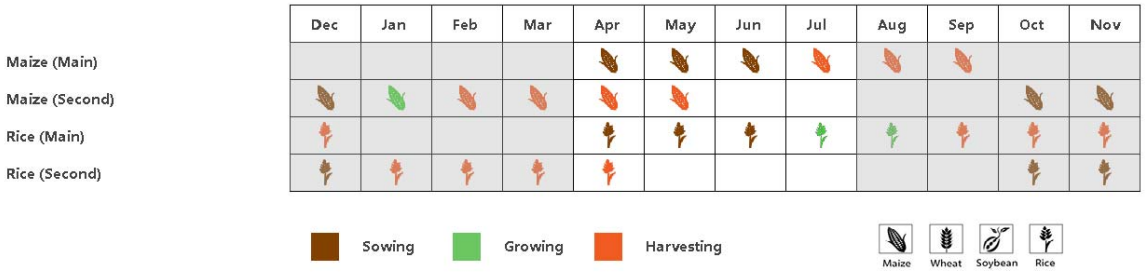
The Forest region (mostly southern and western islands) experienced a rainfall deficit (RAIN -7%), mildly below average temperature (TEMP -0.4°C) and marginally above average radiation (RADPAR +1%). According to the NDVI profiles for the region, crop condition was below the five-year average from the middle of May to July. BIOMSS was 1% below compared to the average for the period and region. Altogether, the outputs for maize and rice are expected to be slightly below average as well.

The hills region (Islands of Bohol, Sebu and Negros) recorded the largest negative rainfall departure (RAIN, -40%), average temperature and below average radiation (RADPAR -1%). According to the NDVI profiles for the region, crop condition was below the five-year average from the middle of June to July. BIOMSS is 24% below the five-year average. Altogether, the outputs for maize and rice are expected to be below average.

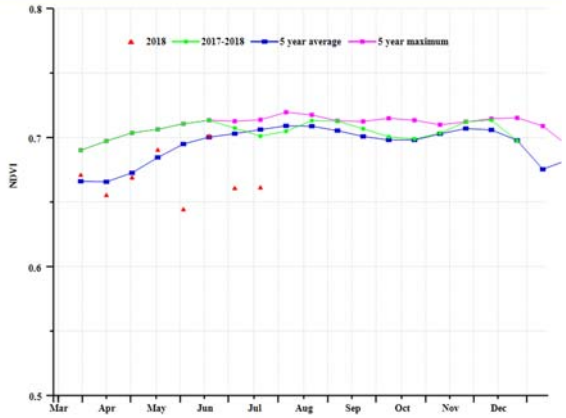
The NDVI-based Crop condition development graphs indicate below average conditions over the monitoring period or the last 2-3 months. Crop prospects are generally below average due to rainfall

deficit or low radiation, especially rainfall deficit. Current CropWatch estimates indicate drops in maize (7,236 ktons, -5.1% below 2017) and rice (20,033 ktons, -0.8% below 2017).

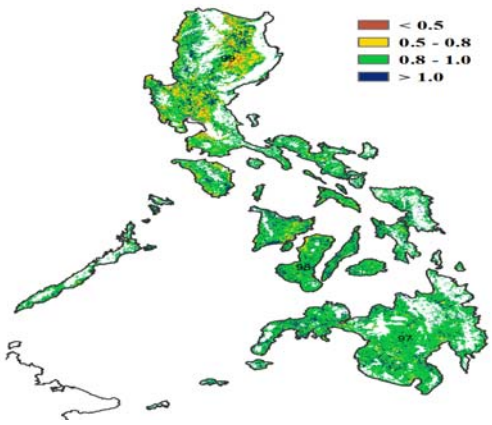
**Figure 3.36. Philippines's crop condition, April -July 2018**



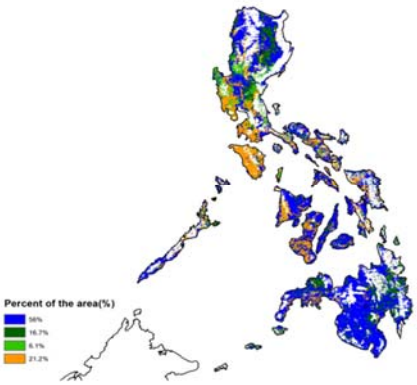

(a). Phenology of major crops



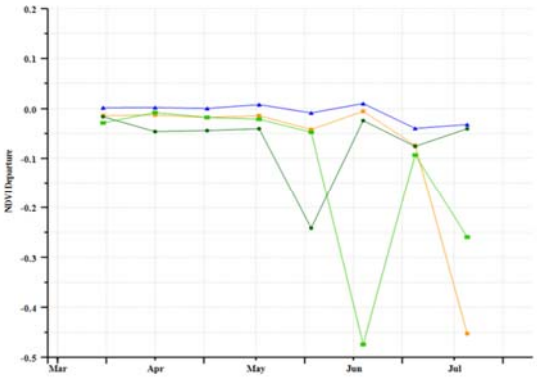

(b) Crop condition development graph based on NDVI



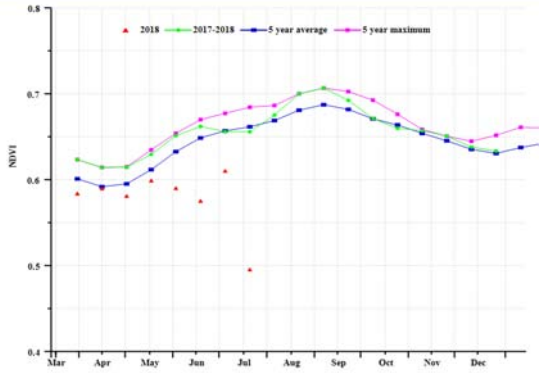

(c) Maximum VCI

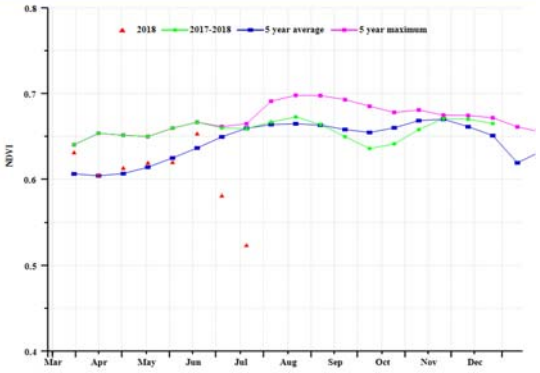



(d) Spatial NDVI patterns compared to 5YA

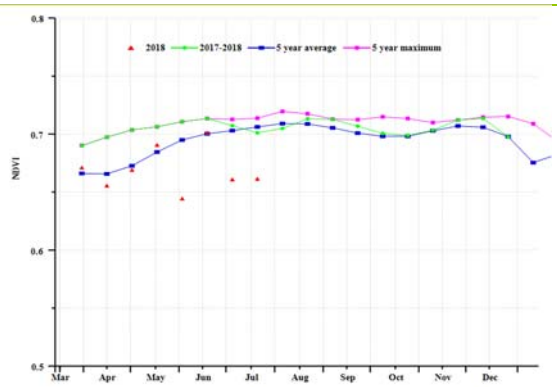



(e) NDVI profiles




(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 3.88. Philippines's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA,** April -July 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 | 993 | 0 | 26.6 | -0.7 | 1124 | -4 |
| Hills region | 473 | -40 | 27.5 | 0 | 1131 | -1 |
| Forest region | 790 | -7 | 26.6 | -0.4 | 1121 | 1 |

**Table 3.89. Philippines's agronomic indicators by sub-national regions, current season's values and departure from 5YA,** April -July 2018

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current ($gDM/m^2$) | Departure from 5YA (%) | Current | Departure from 5YA (%) | Current |
| Lowlands region | 1865 | -3 | 100 | 0 | 0.89 |
| Hills region | 1416 | -24 | 99 | 0 | 0.94 |
| Forest region | 1997 | -1 | 100 | 0 | 0.95 |

**Table 3.90. 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 | -5.1% | 0.0% | 7236 | -5.1% |
| **Rice** | 20188 | -0.8% | 0.0% | 20033 | -0.8% |

# [POL] Poland

The reporting period covers the sowing and growing of maize and spring wheat, and final winter wheat stages before harvest in July. For the whole country, the cropped arable land fraction (CALF) was very close to 100%, comparable to the average of the last five years. During the monitoring period, RAIN was 12% below average and both of temperature (16.8°C) and radiation were significantly above average (TEMP +1.8°C, RADPAR +8%). Resulting from dry-hot weather, crops were water-stressed and the potential biomass (BIOMSS) decreased 17% due to water stress.

As shown in the NDVI crop condition development graphs, the NDVI in Poland was below average when compared to the previous 2016-17 season and the last five years, especially from June to July. As NDVI was close to average in May, VCIx was 0.92 for Poland overall.

Crop condition was below average in Poland as a result of dry weather in the period.

**Regional analysis**

Three Agro-Ecological areas examined more closely for CropWatch include the Central rye and potatoes area, Northern oats and potatoes area, and the Northern-central wheat and sugarbeet area. The fourth area (Southern wheat and sugarbeet area) was wetter and the crop condition was slightly better than in the other three areas.

In the Central rye and potatoes area, the crop condition was below the average of last 5 years due to lower rainfall (RAIN -16%) and higher temperature (TEMP +1.8°C), which accounts for the decrease of biomass (BIOMSS -21%) compared to the five-year average. RADPAR was above average (+8%). The area has high CALF (100%) and VCIx (0.92).

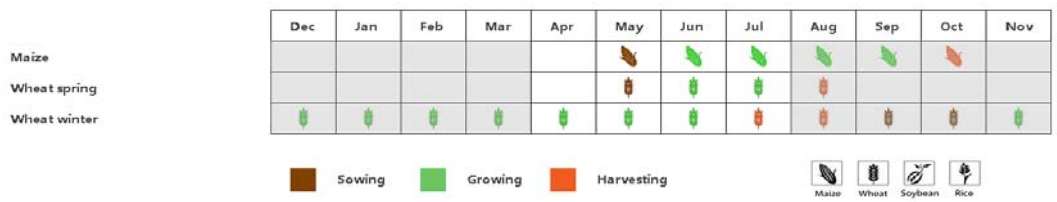
The Northern oats and potatoes area experienced the relatively driest weather condition in four areas, with RAIN down 20% and both of TEMP and RADPAR above average (+1.8°C and +9%), resulting in the decreased biomass (BIOMSS -24%). The area also has high CALF (100%) and VCIx (0.91).

The Northern-central wheat and sugarbeet area recorded a decrease in rainfall (RAIN -12%) and a temperature increment (TEMP +1.8°C), leading to decreased biomass (BIOMSS -15%) compared to the five-year average. The area has high CALF (100%) as well as VCIx (0.87).

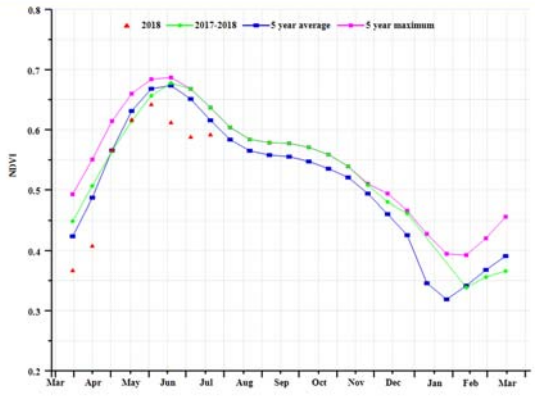
Crop conditions in the Southern wheat and sugarbeet area were slightly below the average of the last five years, with 6% below average RAIN, and warmer (TEMP +1.7°C) weather, resulting in the decreased biomass (BIOMSS -10%). The area has a high CALF (100%) and VCIx (0.94).

In conclusion, both crop condition and BIOMSS were below average across the four areas due to drier weather in the growing period of plants, pointing to an estimated yield and production in 2018 that both slightly decrease over 2017.

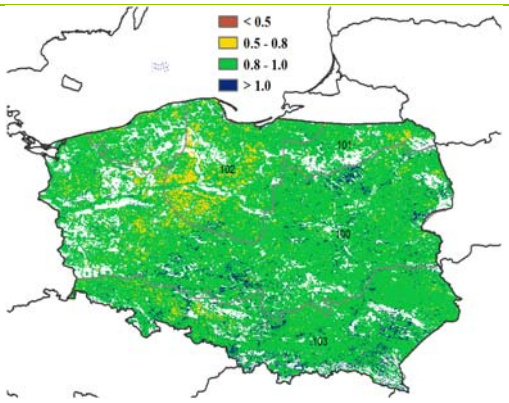
**Figure 3.37. Poland's crop condition, April -July 2018**



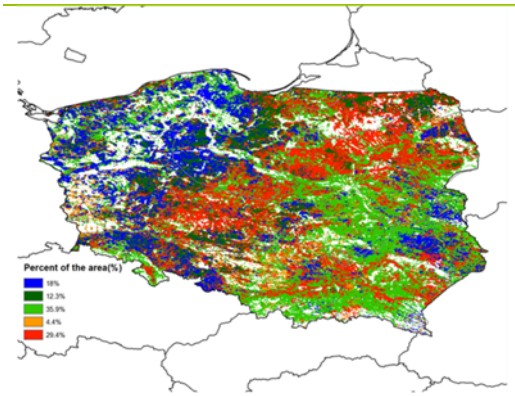

(a). Phenology of major crops



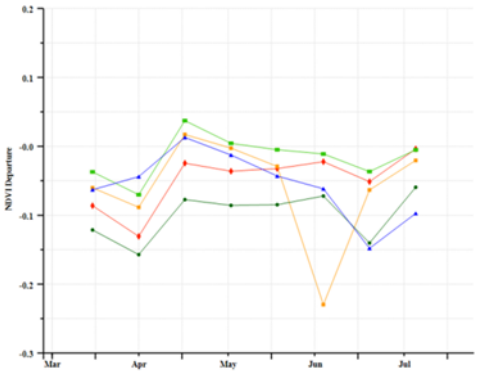

(b) Crop condition development graph based on NDVI



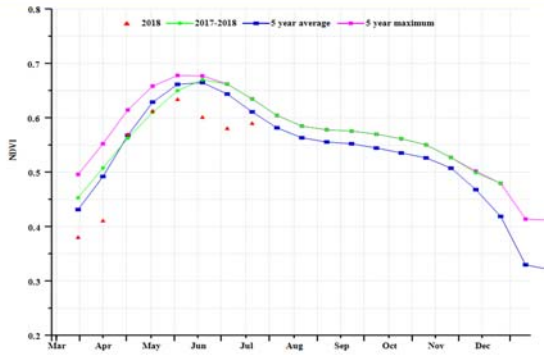

(c) Maximum VCI

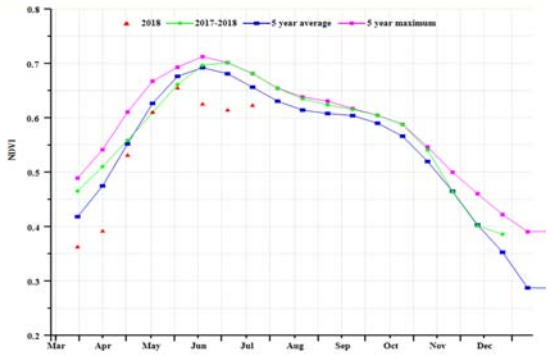



(d) Spatial NDVI patterns compared to 5YA

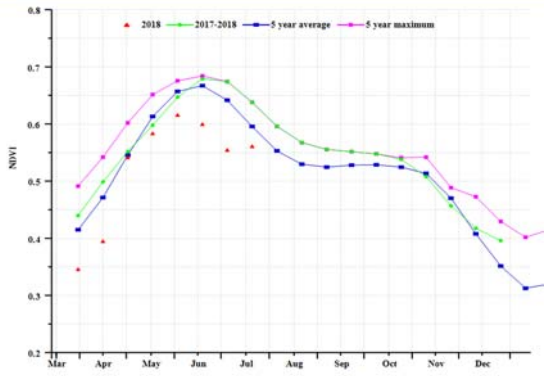


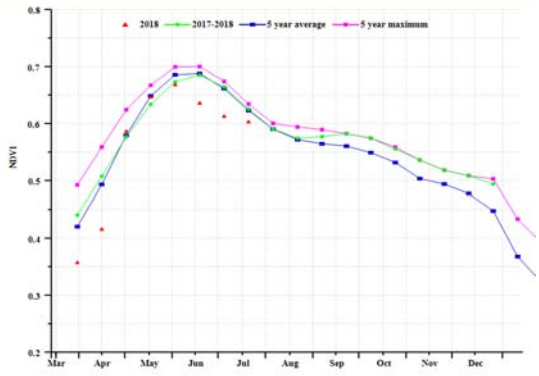

(e) NDVI profiles




(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 3.91. Poland's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 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 | 215 | -16 | 17.1 | 1.8 | 1176 | 8 |
| Northern oats and potatoes areas | 213 | -20 | 15.8 | 1.8 | 1192 | 9 |
| Northern-central wheat and sugarbeet area | 217 | -12 | 16.4 | 1.8 | 1181 | 8 |
| Southern wheat and sugarbeet area | 296 | -6 | 16.9 | 1.7 | 1153 | 6 |

**Table 3.92. Poland's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 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 | 852 | -21 | 100 | -2 | 0.92 |
| Northern oats and potatoes areas | 848 | -24 | 100 | -1 | 0.91 |
| Northern-central wheat and sugarbeet area | 888 | -15 | 100 | -2 | 0.87 |
| Southern wheat and sugarbeet area | 1124 | -10 | 100 | -1 | 0.94 |

**Table 3.93. CropWatch-estimated Wheat production for Poland in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| **Wheat** | 10931 | -8.21 | 0.83 | 10117 | -7.45 |

# [ROU] Romania

The reporting period includes the harvest of winter wheat, which started in July, and the growth of spring wheat and maize, sown in April. Overall crop conditions in Romania was good. The maximum VCI was 0.93 and the current cropped arable land fraction was 1.00, 0.01 higher than average. At 369 mm, rainfall was marginally higher than average; TEMP exceeded average by 0.9° C and radiation was high by 1%. This led to an increase of 5% of the biomass production potential. According to the crop condition development graph based on NDVI, conditions were close to average in April and May, but below average in June and July.

Regional analysis

More spatial detail is provided below for three main agro-ecological zones in the country: the Central mixed farming and pasture Carpathian hills; the Eastern and southern maize, wheat and sugar beet plains and the Western and central maize, wheat and sugar beet plateau.

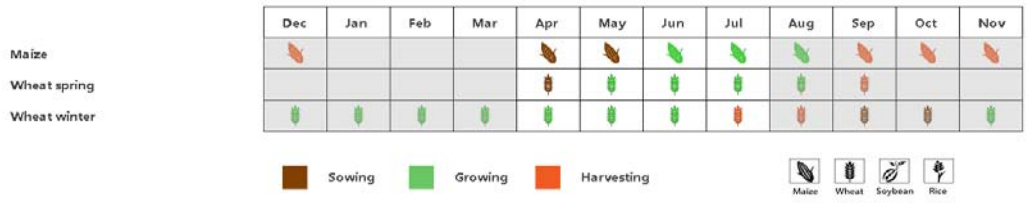
Climate conditions were fair in all three regions. Conditions were alike and differed little from average in the Central mixed farming and pasture Carpathian hills and the Western and central maize, wheat and sugar beet plateau. For the listed three regions, rain was 8%, 14% and 20% higher than average, respectively, while temperature anomalies were significant at +1.0℃, +0.7℃ and +1.1℃. Radiation was slightly higher than average.

According to NDVI development profiles, crop condition differed in the three regions. For the central maize, wheat and sugar beet plateau, crop condition remained stable for most part of the reporting period except for a slight decrease in May. In the eastern and southern maize, wheat and sugar beet plains, a sharp decrease occurred in May, followed by an increase in June. For western Romania, the influence of crop phenology, especially the starting of maize and spring wheat growing season resulted in an increase in May and June.

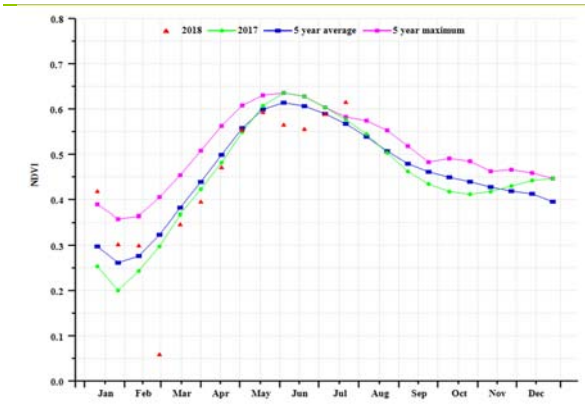
VCIx values were close to 1.0 in all three regions; VCIx was below 0.8 in some parts of the southern maize, wheat and sugar beet plains and higher than 1.0 in the central area. CALF of the three regions was close to average.

Overall, satisfactory crop condition prevailed in Romania. CropWatch predicts that the 2018 maize production will be up by 15.8% while wheat will drop by 2.1% below last season's values

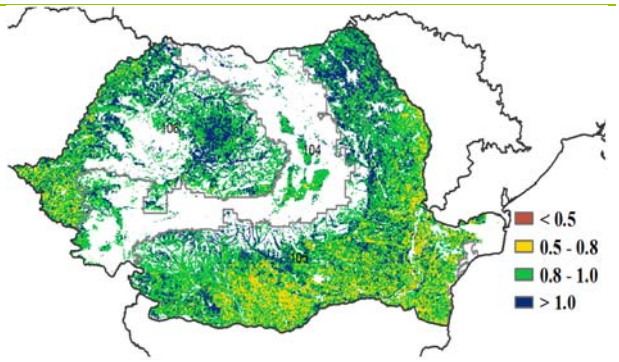
**Figure 3.38. Romania's crop condition, April -July 2018**



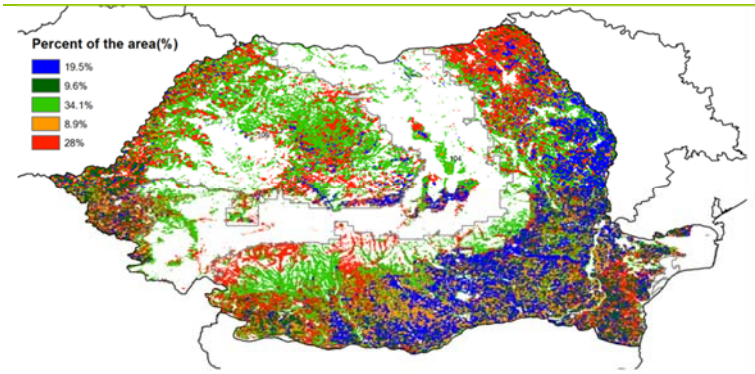

(a). Phenology of major crops



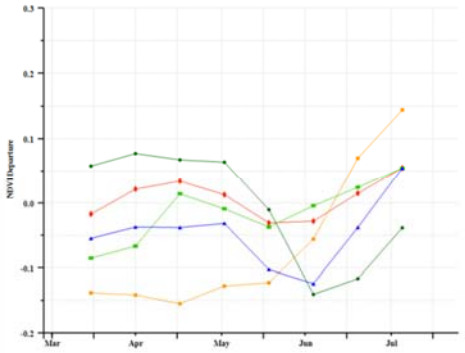

(b) Crop condition development graph based on NDVI



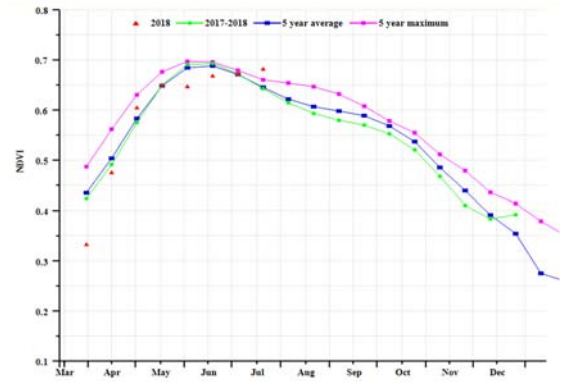

(c) Maximum VCI

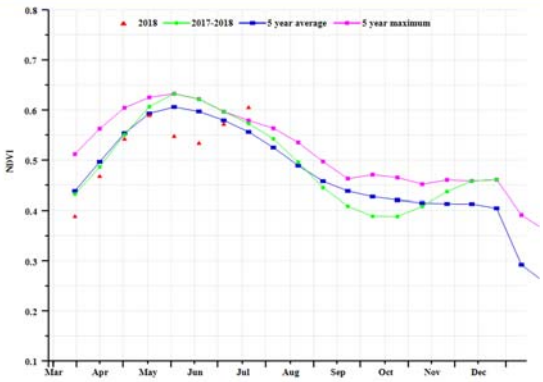



(d) Spatial NDVI patterns compared to 5YA

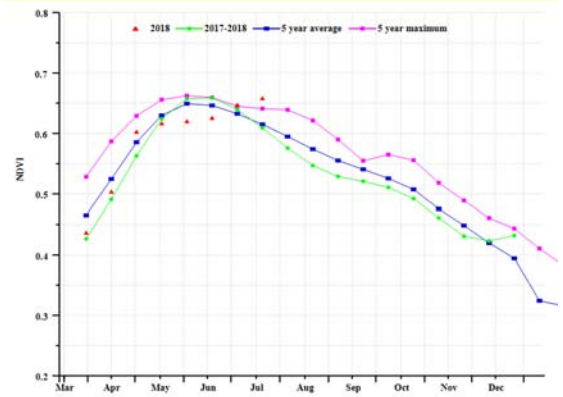



(e) NDVI profiles




(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 3.94. Romania's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 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 | 409 | 8 | 14.8 | 1.0 | 1191 | 0 |
| Eastern and southern maize, wheat and sugar beet plains | 325 | 14 | 19.0 | 0.7 | 1249 | 1 |
| Western and central maize, wheat and sugar beet plateau | 417 | 20 | 17.6 | 1.1 | 1230 | 2 |

**Table 3.95. Romania's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 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 | 1370 | 3 | 1 | 0 | 0.97 |
| Eastern and southern maize, wheat and sugar beet plains | 1132 | 4 | 1 | 0 | 0.91 |
| Western and central maize, wheat and sugar beet plateau | 1411 | 10 | 1 | 0 | 0.97 |

**Table 3.96. CropWatch-estimated Wheat and Maize production for Romania in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| **Maize** | 11986 | -0.20% | 16.10% | 13878 | 15.80% |
| **Wheat** | 7670 | -0.40% | -1.70% | 7512 | -2.10% |

# [RUS] Russia

Russia experienced locally unsatisfactory climate conditions during this monitoring period although the national VCIx reached 0.90 on average. The winter wheat harvest began in July, while the planting of maize and spring wheat started in April and May. The Cropped Arable Land Fraction was just below the last five-year average (-1%). Nationwide weather was average with a 1% drop in RAIN and slightly cool TEMP 0.4°C below average. The BIOMSS indicator recorded a marginal drop of 1% below its five-year average.

As shown in the NDVI crop condition development graph for the country as a whole, the NDVI was lower than during 2017 and the average of the previous year from May to July. In the Caucasus and north Volga area the NDVI was initially close to the average but significantly decreased from May (10.2% or cropland). In the Central Economic Region (20.8% of arable land), the NDVI was lower than average before June but close to average thereafter. More details are provided in the regional analysis. Due to poor winter climate condition wheat yield is expected to drop 6.8%, with a 10.3% drop on production below 2017 values, while summer crops, especially maize are doing relatively well so far (0.9% on yield).

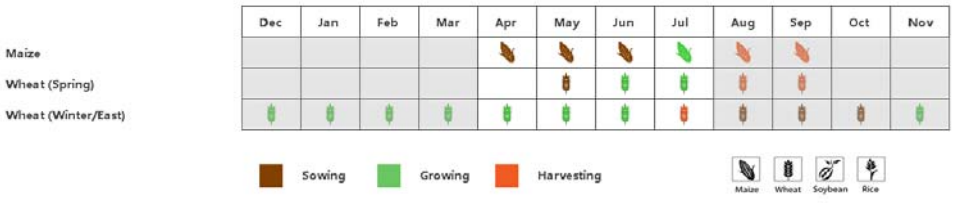
Regional analysis

Additional spatial detail is provided below for seven regions, namely the Kaliningrad Oblast, Caucasus, Volga Basin, Central Economic Region, Southern Urals, South Siberia, and Northwest region including Novgorod.

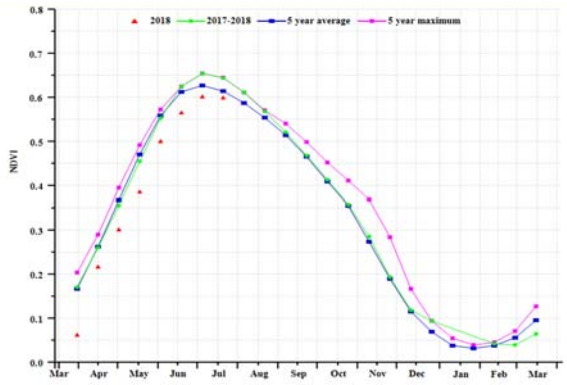
In the Kaliningrad Oblast, Caucasus, Volga region, Central Economic Region and Northwest region including Novgorod biomass expectations are below to averge by -16%, -4%, -7%,-3% and -2% respectively due to the precipitation deficits in the range from 9 to 17%. NDVI in these areas were lower than both last year and the average. Especially in Kaliningrad Oblast, the precipitation deficit was -17%, the Cropped arable land fraction was only 93% and VCIx was 0.78, which was the most affected area by climate condition in whole Russia.

In the Southern Urals and South Siberia, the BIOMASS was above average by 7% and 2% due to the satisfactory supply. The rainfall increased 13% in Southern Urals and the BIOMASS increase 7%. Unlike most of the rest of croplands in Russia, the NDVI in these two areas are close or above the previous year and average.

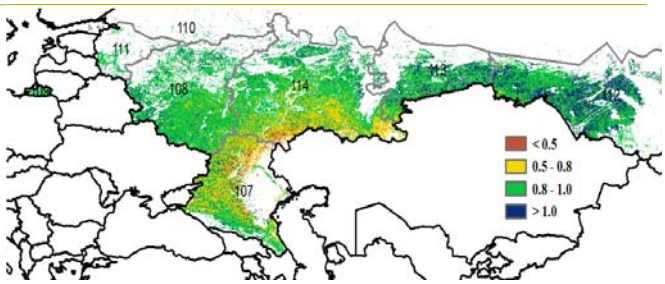
**Figure 3.39. Russia's crop condition, April -July 2018**



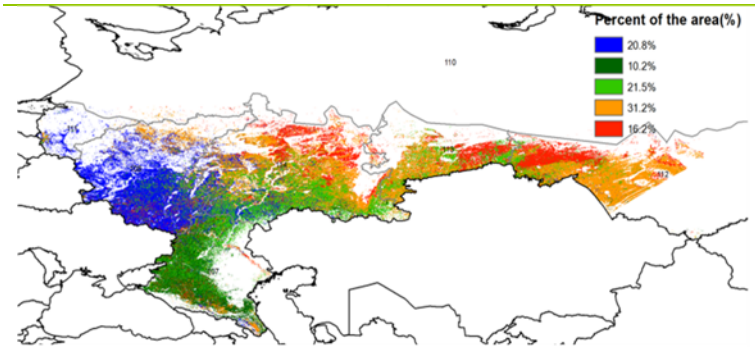

(a). Phenology of major crops



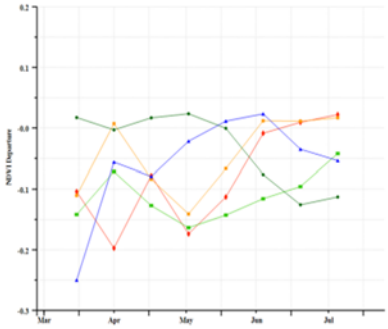

(b) Crop condition development graph based on NDVI



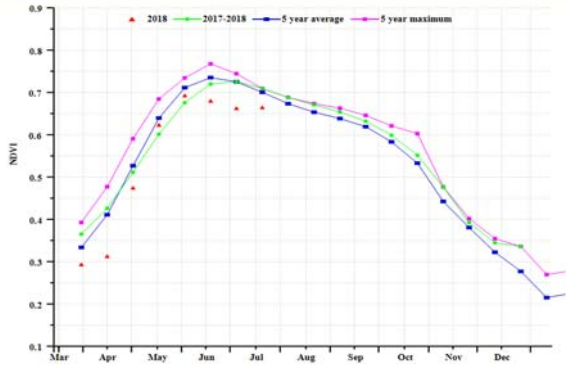

(c) Maximum VCI

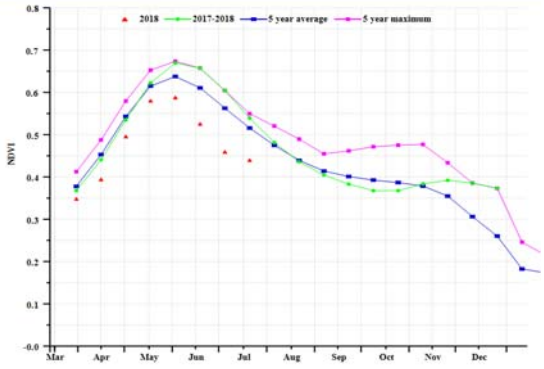



(d) Spatial NDVI patterns compared to 5YA

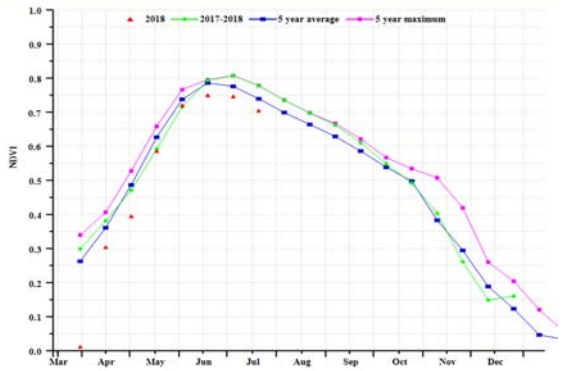


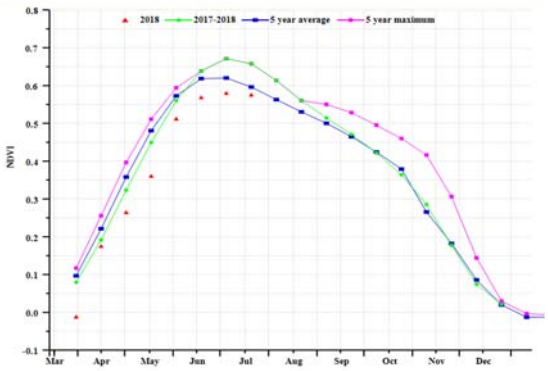
(e) NDVI profiles



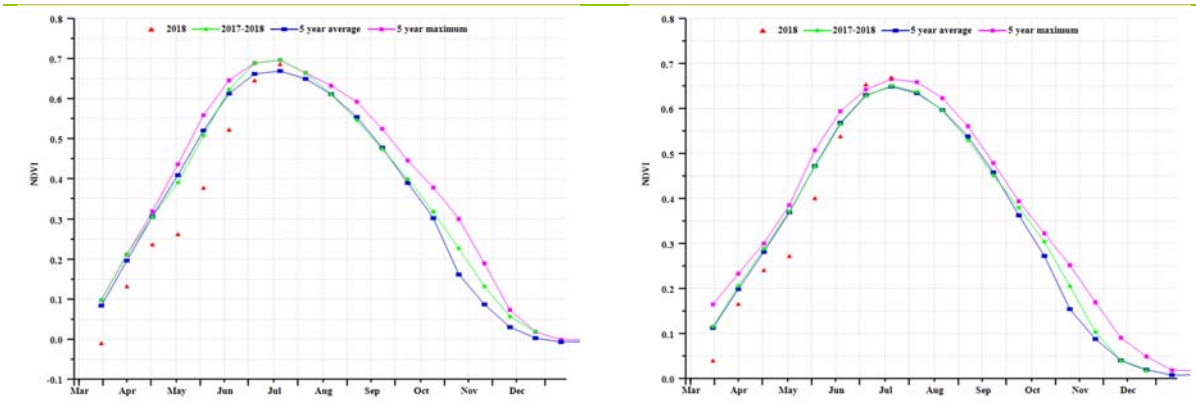




(f) Crop condition development graph based on NDVI (The Caucasus (left) and Central Economic Region (right))

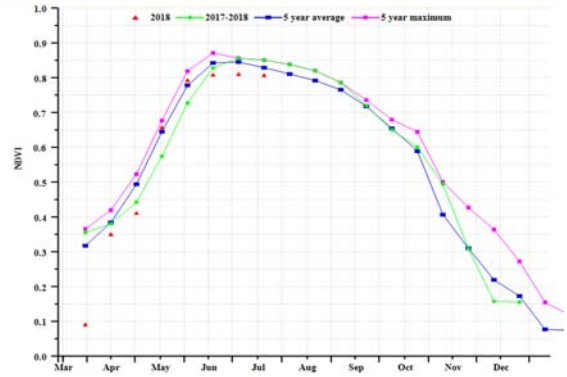



(g) Crop condition development graph based on NDVI (Kaliningrad oblast (left) and Northwest region (right))




(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 3.97. Russia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m2) | Departure from 15YA (%) |
| The Caucasus | 201 | -17 | 19.2 | 0.7 | 1306 | 7 |
| Central Economic Region | 246 | -4 | 15.0 | 0.3 | 1145 | 4 |
| Kaliningrad oblast | 234 | -11 | 16.0 | 1.9 | 1193 | 8 |
| Northwest region including Novgorod | 251 | -9 | 13.9 | 0.6 | 1094 | 4 |
| Southern Siberian area | 267 | 13 | 11.2 | -1.0 | 1103 | -8 |
| Southern Urals | 228 | -3 | 11.9 | -2.0 | 1074 | -5 |
| Volga Basin | 212 | -3 | 14.1 | -0.9 | 1155 | 1 |

**Table 3.98. Russia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m$^2$) | Departure from 5YA (%) | Current | Departure from 5YA (%) | Current |
| The Caucasus | 787 | -16 | 93% | -3 | 0.78 |
| Central Economic Region | 1043 | -4 | 100% | 0 | 0.93 |
| Kaliningrad oblast | 1029 | -7 | 100% | 0 | 0.91 |

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current | Departure from 5YA (%) | Current |
| Northwest region including Novgorod | 1116 | -3 | 100% | 0 | 0.96 |
| Southern Siberian area | 1061 | 7 | 98% | 1 | 0.98 |
| Southern Urals | 1012 | 2 | 100% | 0 | 0.95 |
| Volga Basin | 919 | -2 | 97% | -2 | 0.85 |

**Table 3.99. CropWatch-estimated Wheat and Maize production for Russia in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| **Maize** | 12817 | -0.9% | -17.5% | 10476 | -18.3% |
| **Wheat** | 58912 | -6.8% | -3.8% | 52815 | -10.3% |

# [THA] Thailand

The main rice crop was sown in Thailand during the current April to July monitoring period, while the harvest of the second rice crop was completed in June. According to the agroclimatic indices, temperature (TEMP, -1.2°C) and radiation (RADPAR, -5%) were below average for the country. Due to satisfactory rainfall (RAIN, +11%), the biomass production potential (BIOMSS) is up 4%. The NDVI development graph shows that crop condition was between average and the 5-year maximum condition before it deteriorated in July. According to the NDVI departure clustering map, 59.2% of cropland throughout the country was above average up to July, except in the southern region and Udon Thani, Nong Khai, Khon Kaen and Roi Et. 28.1% of cropland was consistently above average including Chumphon, Ranong, Surat Thani, Phangnga, Krabi, Nakhon Si Thammarat, Trang, Narathiwat, Phatthalung and Songkhla. Altogether, the crop output is anticipated to be above average.

Regional analysis

The regional analysis below focuses on some agro-ecological zones of Thailand, of which some are mostly defined by the rice cultivation typology. They include the 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.

According to agro-climatic indicators for the Central double and triple-cropped rice lowlands, temperature (TEMP -1.3ºC), radiation (RADPAR -4%) and accumulated rainfall (RAIN -4%) were below average, resulting in an average biomass production potential in Thailand (BIOMSS +1%). According to the NDVI development graph, crop condition fluctuated around the 5-year maximum before July but deteriorated in July. Considering the favorable maximum VCIx value of 0.96, the situation is assessed as average.

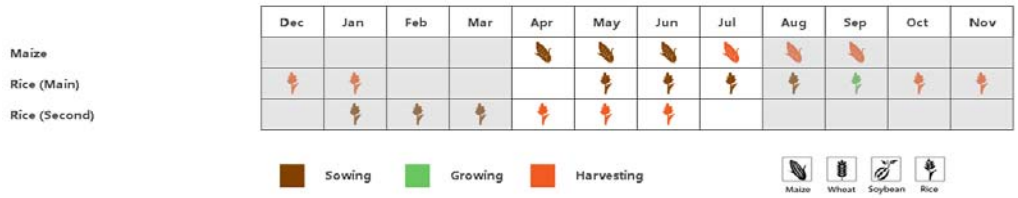
The South-eastern horticulture area suffered cool weather with low sunshine during this monitoring period (TEMP down 1.3℃ compared with average and RADPAR at -9%, which is significant). RAIN, however was close to average (-4%) and so was the biomass production potential. NDVI development graphs show a fluctuation around the 5-year maximum before July, and a subsequent drop. Considering that Cropped arable land fraction (CALF) increased 1% compared to 5-year average and the maximum VCIx value was around 0.95, the situation in South-eastern horticulture area was average or slightly above.

Crop condition in the Western and southern hill areas was usually below average according to the Agroclimatic indicators: TEMP -1.1°C, RADPAR -7%, and BIOMSS -4% when compared to their respective averages. RAIN was above average (+7%) but the positive effect was canceled out by low temperature and poor sunshine. The CALF was close to average compared to 5-year average, and the maximum VCIx was about 0.95. According to the NDVI development graph, crop condition was nevertheless close to 5-year average.

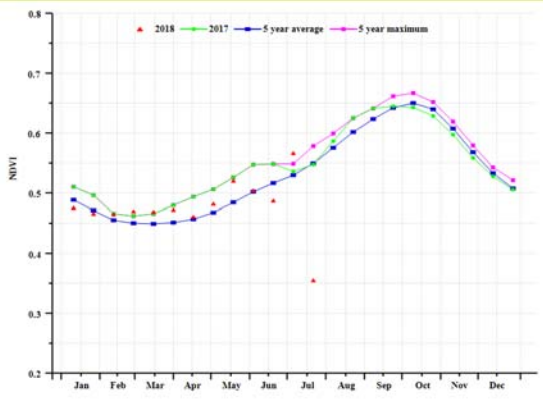
Finally, the situation in the Single-cropped rice north-eastern region follow the same patterns as those for the country as a whole: temperature (TEMP -1.5ºC) and radiation (RADPAR -5%) were below average, and accumulated rainfall was significantly above (RAIN +26%), resulting in slight biomass production potential increase (BIOMSS +5%). According to an average CALF (+1% change) and favorable VCIx value of 0.92, the crop condition was close to average, which is confirmed by the NDVI profiles and development graph.

At the national level, most arable land was cropped during the season and had favorable VCIx values around 0.94. CropWatch projects that yield of maize and rice in Thailand in 2018 will increase by 9.2% and 7.7%, respectively.

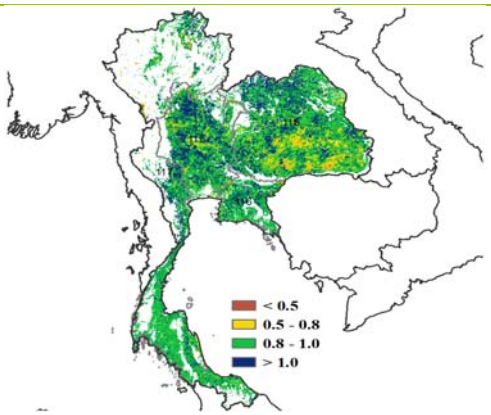
**Figure 3.40. Thailand's crop condition, April -July 2018**



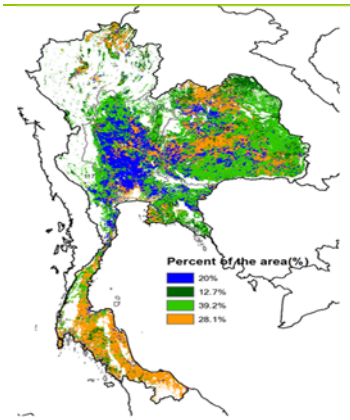

(a). Phenology of major crops



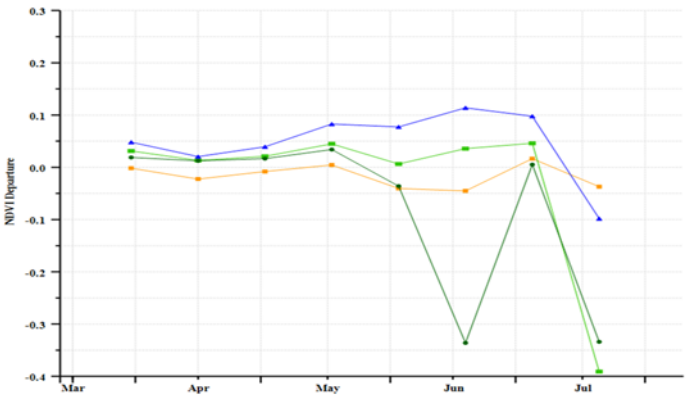

(b) Crop condition development graph based on NDVI



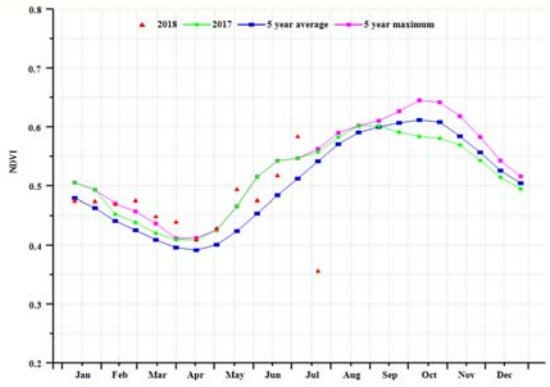

(c) Maximum VCI

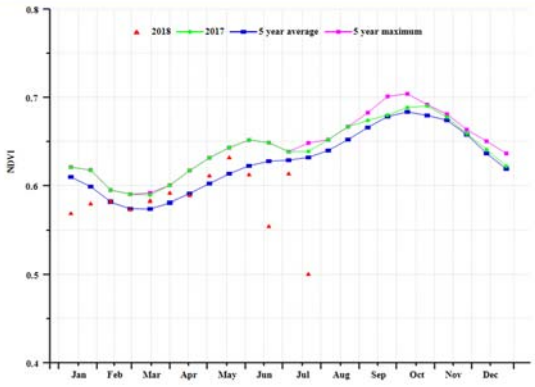



(d) Spatial NDVI patterns compared to 5YA

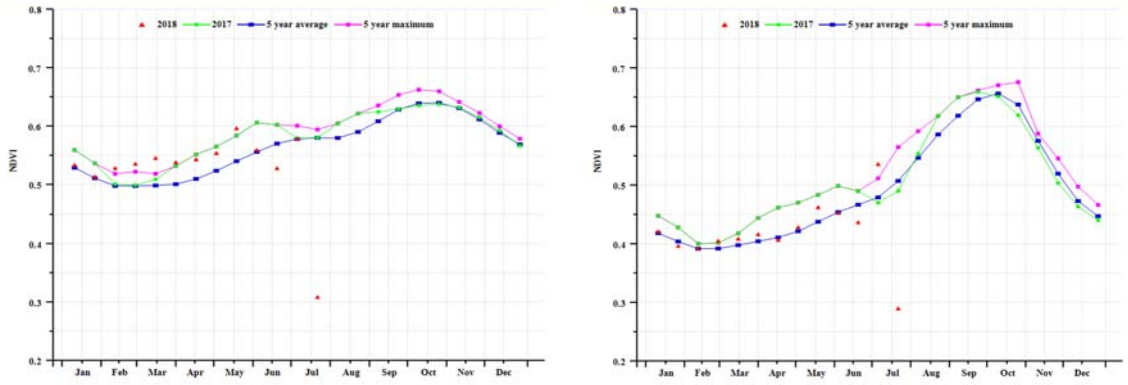



(e) NDVI profiles




(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 3.100. Thailand's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| Central double and triple-cropped rice lowlands | 582 | -4 | 28.2 | -1.3 | 1072 | -4 |
| South-eastern horticulture area | 774 | -9 | 27.7 | -1.3 | 1034 | -5 |
| Western and southern hill areas | 807 | 7 | 26.9 | -1.1 | 1028 | -4 |
| Single-cropped rice north-eastern region | 1025 | 26 | 28.1 | -1.4 | 1069 | -5 |

**Table 3.101. Thailand's agronomic indicators by sub-national regions, current season's values and departure from 5YA,** April -July 2018

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current | Departure from 5YA (%) | Current |
| Central double and triple-cropped rice lowlands | 1784 | 1 | 99 | 2 | 0.96 |
| South-eastern horticulture area | 2127 | 3 | 99 | 1 | 0.95 |
| Western and southern hill areas | 1986 | 4 | 99 | 0 | 0.95 |
| Single-cropped rice north-eastern region | 2087 | 5 | 99 | 1 | 0.92 |

**Table 3.102. CropWatch-estimated Rice and Maize production for Thailand in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| **maize** | 4999 | 9.3% | 0.0% | 5461 | 9.2% |
| **Rice** | 38495 | 8.3% | 0.5% | 41450 | 7.7% |

# [TUR] Turkey

Maize and rice were planted and growing, while wheat was growing and harvested during the monitoring period. In the whole country, rainfall and temperature were above average (RAIN +37%, TEMP +1.0℃), which led to an increase of biomass (BIOMSS +17%). The NDVI profiles indicate average crop condition in the whole country. The national average VCIx was 0.89. From the spatial NDVI patterns map, the NDVI was below average in Southeast Anatolia and the Marmara sea region, which mainly covers four provinces (Edirne, Kerklerelli, Tekirda and Shangle Urfa). Above average NDVI occurred in Eastern Anatolia, Mush, Ararat and Erzurum indicating good crop condition.

CropWatch estimates the wheat production in 2018 to be 2.0% below 2017. The wheat yield decreased by 2.3%, while the area increased by 0.3%. For maize, CropWatch puts the yield and area 0.3% and 2.5% above the 2017 value, respectively. The maize production is, therefore, estimated to be 2.8% above 2017.

**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.

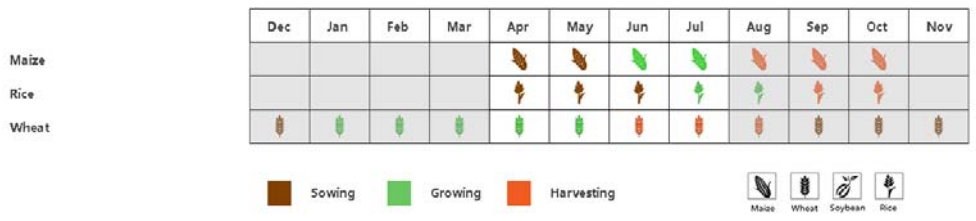
In the Black Sea zone, crop condition was generally above or close to average. In this region, the temperature was above average (TEMP +1.5℃), and the radiation (RADPAR) increased by 2%. The cropped arable land fraction was 98%. The average value of VCIx was high at 0.91. The output of summer crops was favorable.

During this reporting period, the crop condition was above or close average from April to May, and below average from June to July in the Central Anatolian zone. The abundant rainfall （RAIN+55%） resulted in a significant increase of BIOMSS index (+26%).The average VCIx for this region was 0.87. The CALF increased by 12%. The output of winter crops in this region was favorable.

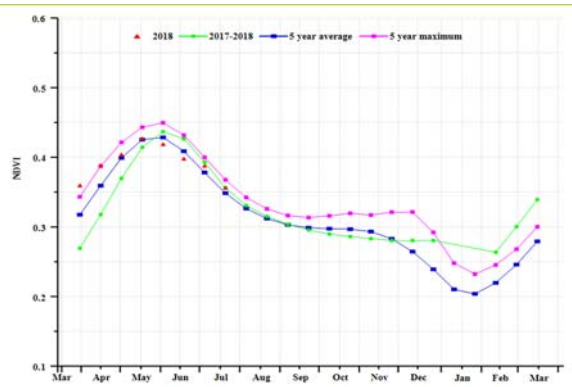
In the Eastern Anatolia zone, crop condition was above average. The VCIx map showed that most of this region enjoyed higher VCIx than 1.0. The excellent crop condition is also confirmed by the spatial NDVI patterns map. The rainfall and temperature were both above average (RAIN +14%, TEMP +1.0℃). The favorable climate condition resulted increases of biomass and cropped arable land fraction (BIOMSS, +2%; CALF, +9%). The output of summer crops is expected to be favorable.

As indicated by the NDVI profile in the Marmara Agean Mediterranean lowland zone, the crop condition was below average during the monitoring period. The temperature was close to average (TEMP +0.7℃), while the radiation was below average (RADPAR -3%). In this whole region, the VCIx was 0.86. The output of winter crops in this region is just fair.

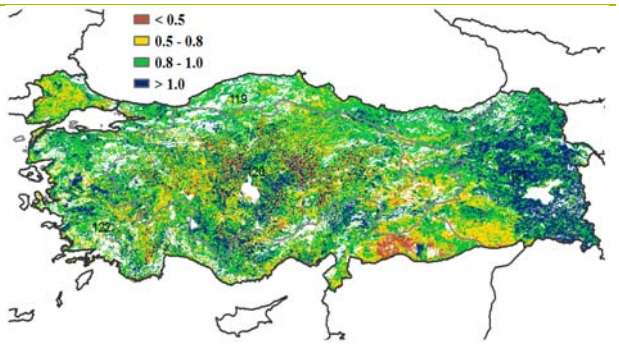
**Figure 3.41. Turkey's crop condition, April -July 2018**



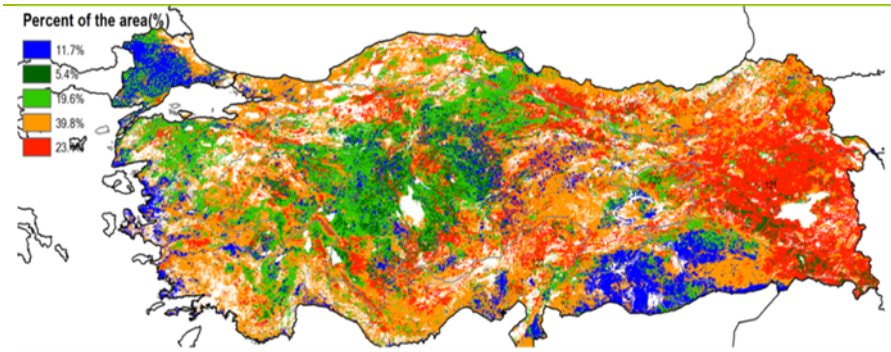

(a). Phenology of major crops



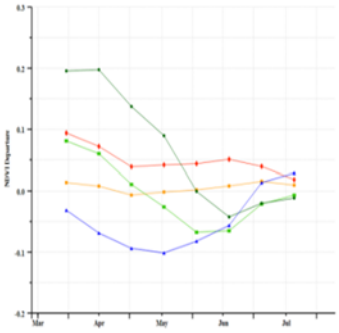

(b) Crop condition development graph based on NDVI



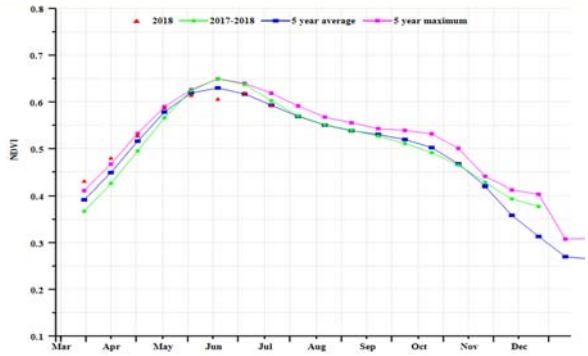

(c) Maximum VCI

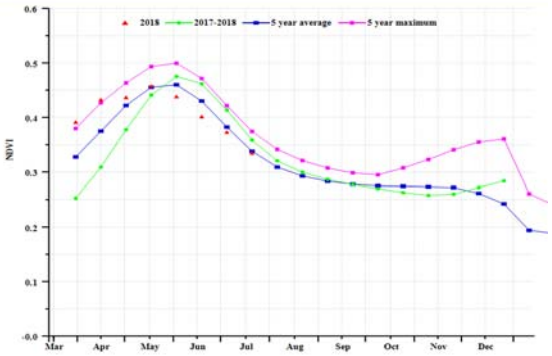



(d) Spatial NDVI patterns compared to 5YA

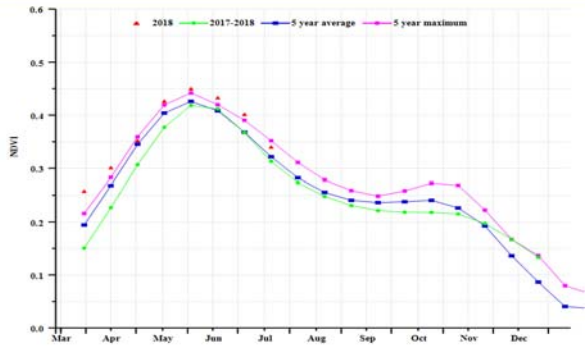


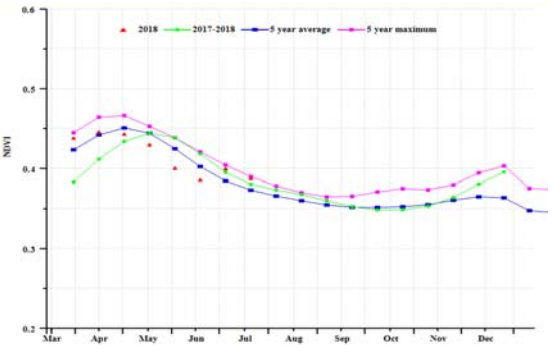
(e) NDVI profiles




(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 3.103. Turkey's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| Black Sea region | 220 | -10 | 16.6 | 1.5 | 1302 | 2 |
| Central Anatolia region | 287 | 55 | 17.6 | 1.0 | 1423 | 0 |
| Eastern Anatolia region | 266 | 14 | 16.1 | 1.0 | 1402 | -3 |
| Marmara Agean Mediterranean lowland region | 236 | 61 | 20.4 | 0.7 | 1413 | -3 |

**Table 3.104. Turkey's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current | Departure from 5YA (%) | Current |
| Black Sea region | 861 | -11 | 98 | 0 | 0.91 |
| Central Anatolia region | 951 | 26 | 70 | 12 | 0.87 |
| Eastern Anatolia region | 945 | 2 | 86 | 9 | 0.96 |
| Marmara Agean Mediterranean lowland region | 803 | 32 | 80 | 2 | 0.86 |

**Table 3.105. CropWatch-estimated Wheat and Maize production for Turkey in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| **Wheat** | 19174 | -2.3 | 0.3 | 18794 | -2.0 |
| **Maize** | 6294 | 0.3 | 2.5 | 6469 | 2.8 |

# [UKR] Ukraine

During this monitoring period, maize and other summer crops were planted in May, while winter wheat, another main crop in Ukraine, was harvested in July.

At the national level, precipitation was close to average (RAIN 246 mm, -0.3% compared with average), but temperature and radiation exceeded average significantly (TEMP, 18.2℃, +1.1℃; RADPAR, 1240 MJ/m², +6%). Nearly all cropland was cultivated (CALF, 99%) and the maximum vegetation condition index reached 0.87. Agroclimatic and agronomic indicators provide a mostly optimistic assessment of crop growth, even if the potential biomass (BIOMSS, 946 DM/m²) is down 6% below the average of the last five years.

Based on national NDVI curves, the crop condition was persistently below the 5-year average, especially from May to July, which suggests some growth restrictions. According to spatial NDVI patterns, NDVI was relatively below the 5-year average level everywhere. In 21% area (concentrated in southern areas), NDVI dropped dramatically in June and July, in this area, maximum VCI just reached 50-80% while other area usually reached above 80%. The mentioned area for Kherson to Luhansk (Oblasts) is a minor summer-crop production area except for sunflower.

CropWatch provisionally predicts 2018 maize production to decrease by 8.8% below 2017. Wheat (essentially winter grown) is put at -7.1%.

Regional analysis

Based on cropping systems, climatic zones and topographic conditions, reports covering four agroecological zones are provided: Central wheat area (118), Northern wheat area (119), Eastern Carpathian hills (120), and Southern wheat and maize area (121).

The Central wheat area (Poltava, Cherkasy, Dnipropetrovsk and Kirovohrad Oblasts) showed mostly normal spring and early summer weather (RAIN 232 mm, +3%; TEMP 18.3℃, +0.9℃; RADPAR 1252 gDM/m², +6%) and favourable agronomic conditions (CALF 99%; VCIx 0.91). The resulting biomass was normal (-2%). Attention should pay to the NDVI development profile, the NDVI was always below the average level, possibly due to increased water consumption linked to warm and sunnier than average weather.

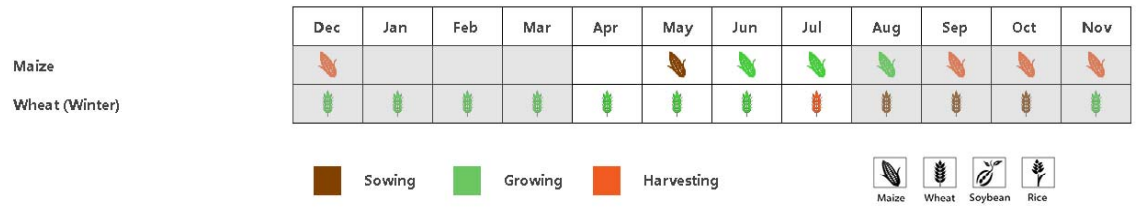
The Northern wheat area (Rivne, Zhytomyr and Kiev oblasts) also experienced a basically average agroclimatic and agronomic situation, akin to that in the Central wheat area. Rainfall, temperature and sunshine was marginally higher than average, by 7%, 1.2℃ and 4%, respectively. Region had good CALF (0.94) as well as VCI (0.96), which ensured BIOMSS was closed to 5-year average. Average summer crops can be expected.

The Eastern Carpathian hills (Lviv, Zakarpattia and Ivano-Frankivsk oblasts) received 2% higher than average rainfall, 3% higher radiation and 1.3℃ higher temperature; Stable agroclimatic conditions led BIOMSS stay at 5-year average level (-2%). Agronomic indicators showed a very good CALF (100%) and VCIx (0.97), the NDVI in this area recovered to 5-year average since July. all of these indicated the condition for crop was improving at the time of reporting.

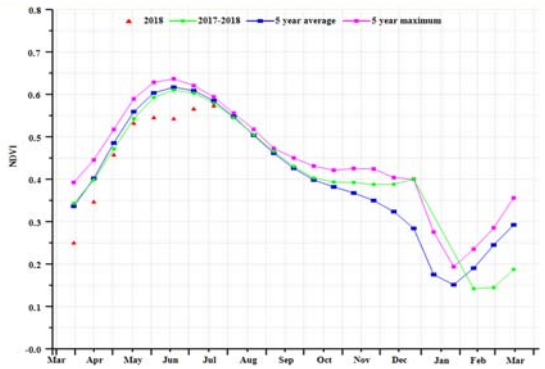
The Southern wheat and maize area (Mykolaiv, Kherson and Zaporizhia oblasts) was 16% deficient in rainfall, while the higher temperature (+1.0℃) and radiation (+8%) aggravated the water shortage. Such condition was unfavourable for crop growth, confirmed by NDVI profiles significantlybelow the 5-year average since May and a rather poor VCIx (0.77). This area will need close monitoring during the next

reporting period but average crops are unlikely

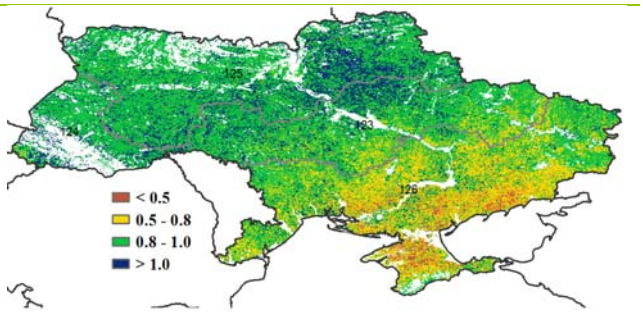
**Figure 3.42. Ukraine's crop condition, April -July 2018**



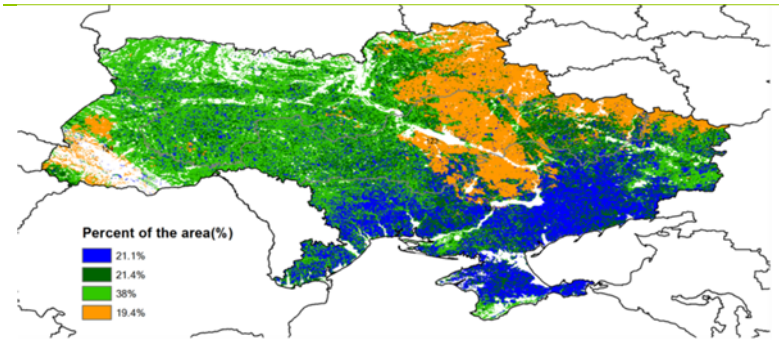

(a). Phenology of major crops



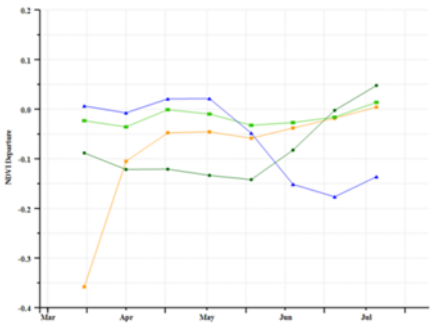

(b) Crop condition development graph based on NDVI



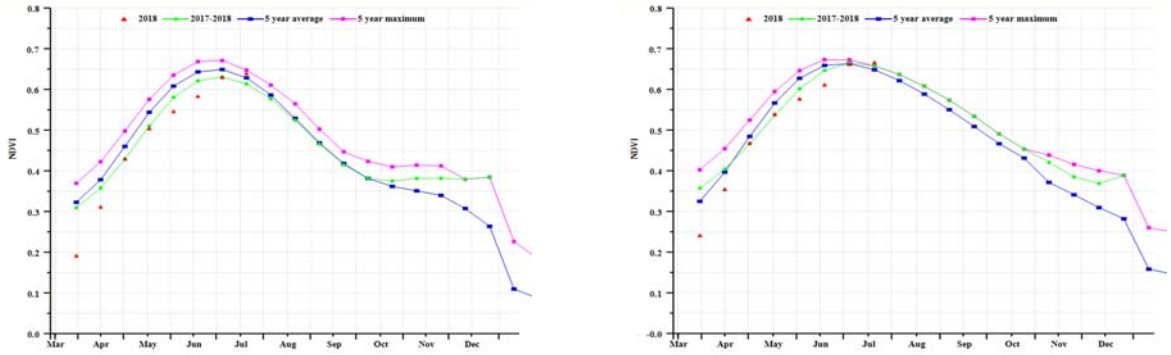

(c) Maximum VCI



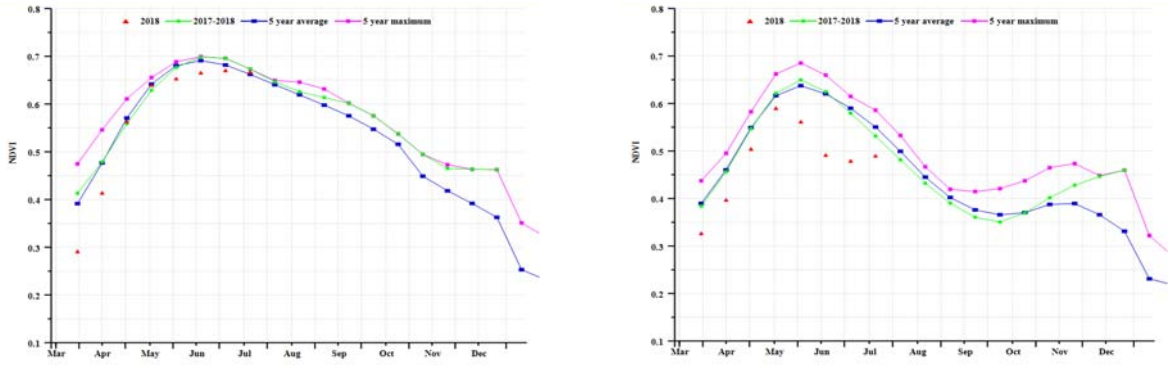

(d) Spatial NDVI patterns compared to 5YA



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

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| Central wheat area (Ukraine) | 232 | 3 | 18.3 | 0.9 | 1252 | 6 |
| Northern wheat area (Ukraine) | 277 | 7 | 17.6 | 1.2 | 1191 | 4 |
| Eastern Carpathian hills (Ukraine) | 382 | 2 | 16.6 | 1.3 | 1148 | 3 |
| Southern wheat and maize area (Ukraine) | 178 | -14 | 19.3 | 1 | 1316 | 8 |

**Table 3.107. Ukraine's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current (gDM/m²) | Departure from 5YA (%) | Current | Departure from 5YA (%) | Current |
| Cebntral wheat area (Ukraine) | 940 | -2 | 99 | 0 | 0.91 |
| Northern wheat area (Ukraine) | 1082 | -1 | 99 | 0 | 0.96 |
| Eastern Carpathian hills (Ukraine) | 1371 | -2 | 100 | 0 | 0.97 |
| Southern wheat and maize area (Ukraine) | 723 | -16 | 98 | -2 | 0.77 |

**Table 3.108. CropWatch-estimated Wheat and Maize production for Ukraine in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| **Maize** | 31398 | -2.6% | -6.4% | 28630 | -8.8% |
| **Wheat** | 22662 | -4.2% | -3% | 21043 | -7.1% |

# [USA] United States

This current reporting period includes the sowing and early growth of maize, soybean and rice, the full cycle of spring wheat, and the final growth stages and harvest of winter wheat.

NDVI profiles indicated the crop condition was slightly above the average at the end of July. The agro-climatic indicators were normal and RAIN was 396 mm (+1% compared to average), TEMP was 19.0 ℃ (-0.2℃), RADPAR was 1301 MJ/㎡ (-2%), and caused an increase of 2% in BIOMSS. Some Sates in the Southern Plains, Corn Belt and Lower Mississippi River suffered from a rainfall deficit, including Texas (-22% compared to average), Washington (-23%), and California(-7%), Indiana (-18%) , Michigan (-33%), Missouri(-20%), Ohio(-10%) and Illinois (-7%) and Arkansas (-14%). The Northern Plains and western part of the Corn Belt received abundant rainfall, including North Dakota (up 53% above average), South Dakota (49%), Nebraska (47%) and Minnesota (33%). Almost all states experienced normal temperature in the range of -0.6℃ to 0.6℃ compared to average.

The precipitation distribution caused directly resulted in crop condition patterns. Spatial distribution of NDVI profiles indicates the good performance expected for the Southern Plains. Favorable crop condition was recorded in the Northern Plain (North Dakota, South Dakota, and Montana) due to abundant rainfall over the monitoring period. Poor crop condition was already reported for the previous (JFMA) reporting period in the Southern Plains (Texas and Oklahoma) due to rainfall deficit. Slightly below average crop condition occurred in some parts of the Northern Corn Belt resulting from drought, for instance in Michigan. Favorable crop condition in the Northern Plains and the southern Corn Belt (Illinois and Indiana) was also confirmed by the maximum vegetation condition index (VCIx) above 1. The regions with low VCIx (<0.5) were concentrated in the Southern Plains. As the major rice production region, good crop condition was recorded in Arkansas in spite of below average rainfall.

In this reporting period, crop condition for Northern Plains,Southern Plains, Corn Belt, Lower Mississippi, California, Southeast were described as following:

Regional analysis

The Northern Plains are an important spring crops zone. In general, above crop condition was reported due to abundant precipitation (RAIN was 51% above the average), TEMP was just 0.3℃ below. As a result, BIOMSS was significantly above the average (+28%). The planting was favored by abundant precipitation and CALF rose 9% over the average of the last 5 years. The good crop condition is confirmed by the VCIx value of 0.94.

The Southern Plains constitute the most important winter wheat area of the United State. In general, below average crop condition was reported in this region due to water deficit. RAIN was 7% below the average, TEMP was average and the potential Biomass dropped 1%. Drought caused the decrease of cropped land in this region and CALF fell 6% below the average of the last 5 years. The VCIx was 0.76 and the northern part of Texas even lower than 0.5, confirming below average crop condition.

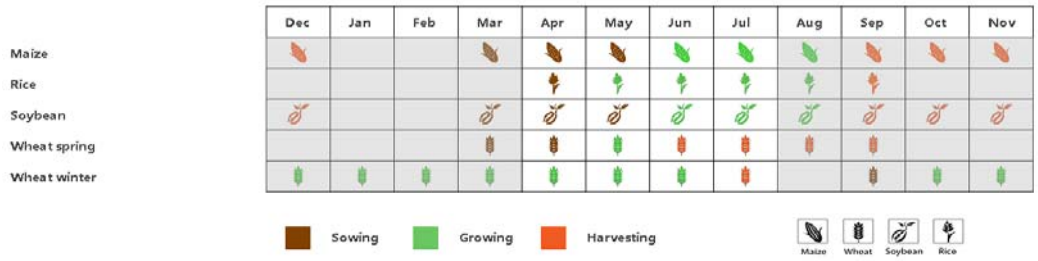
The Lower Mississippi is the major rice production zone. In general, above crop condition was recorded by CropWatch, even if agro-climatic conditions were only fair: RAIN -7%, TEMP -0.5℃ and RADPAR -1%. Irrigation compensated the RAIN deficit and rice performed well (VCIx 0.94).

Crop condition was mixed in the Corn Belt, the most important maize and soybean zone of United States. Agro-climatic conditions was normal, with RAIN (0%), TEMP(-0.4℃), and RADPAR (1%) and caused a small drop in potential biomass (-1%). As described above, Michigan, Missouri, Indiana and Ohio suffered

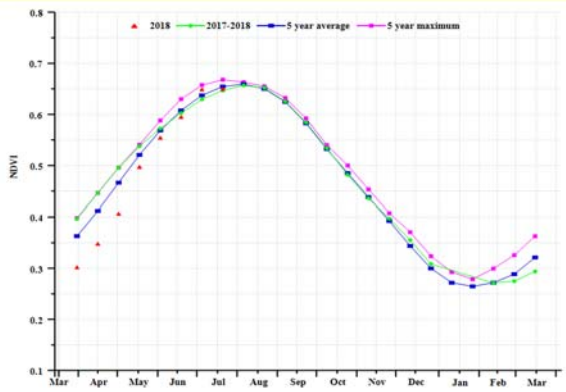
drought, with RAIN below average by 33%, 20%, 18% and 10%, respectively. Below average crop condition in Michigan, some parts of Indiana and Ohio is confirmed by the spatial distribution of NDVI profiles. The West and the core region (Illinois and Iowa) of Corn Belt, however, recorded high values of VCIx (above 0.9). This region deserves close monitoring.

Crop condition was generally below average In the Northwest, an important winter crops producing region in the United States. Agro-climatic variables were close to average: RAIN -3%, TEMP +0.4℃ and RADPAR -4% but Washington State suffered serious drought (rain was short by 23%). The below average crop condition was confirmed by spatial the distribution of NDVI profiles, negative from April to July. Agronomic indicator, however, are more favourable with CALF at 0.85 (+4%) and VCIx at 0.88.

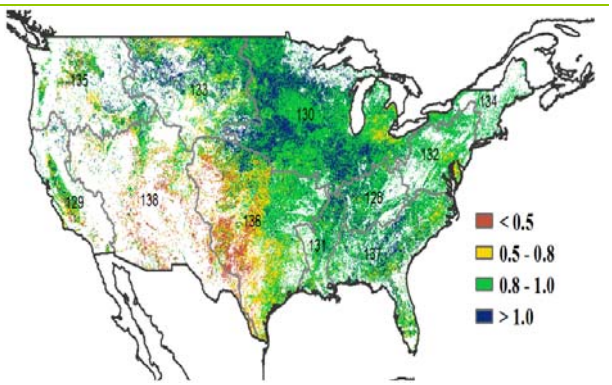
**Figure 3.43. United States's crop condition, April -July 2018**



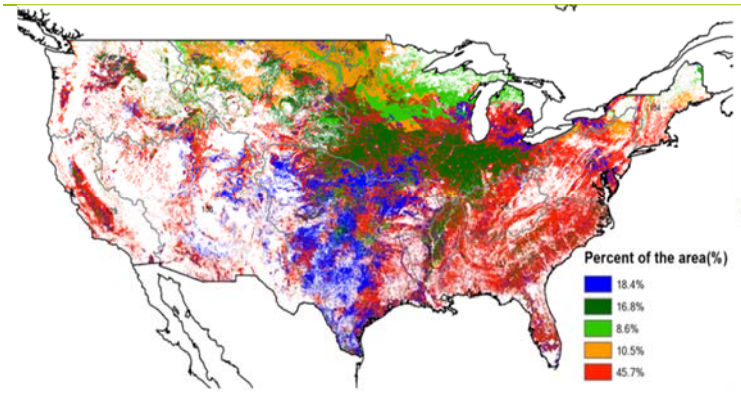

(a). Phenology of major crops



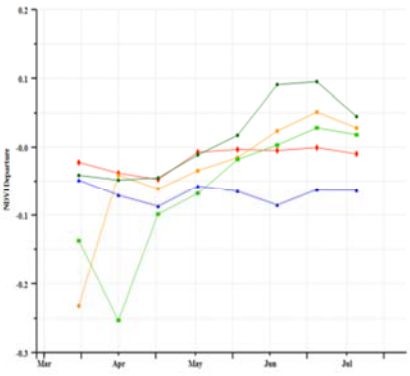

(b) Crop condition development graph based on NDVI



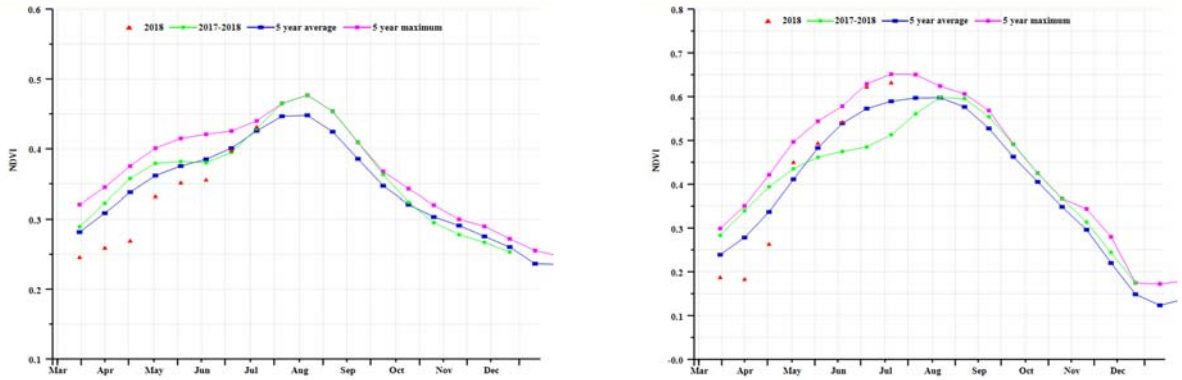

(c) Maximum VCI



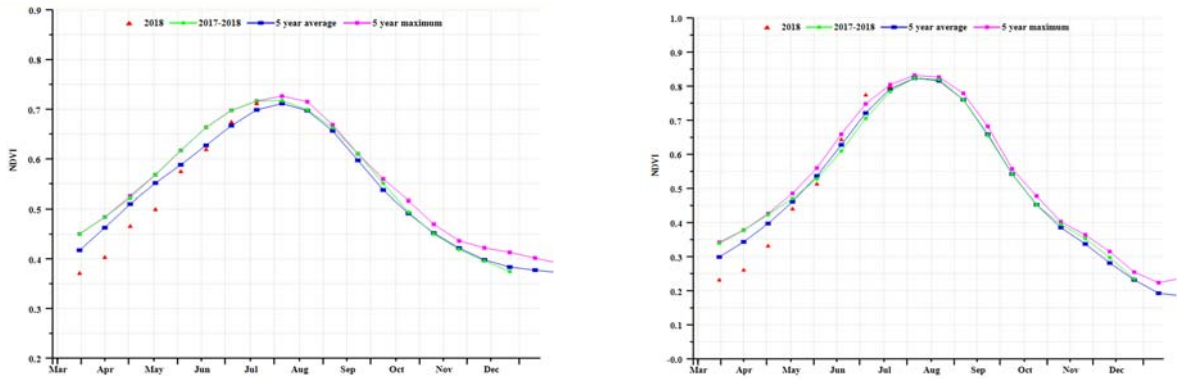

(d) Spatial NDVI patterns compared to 5YA



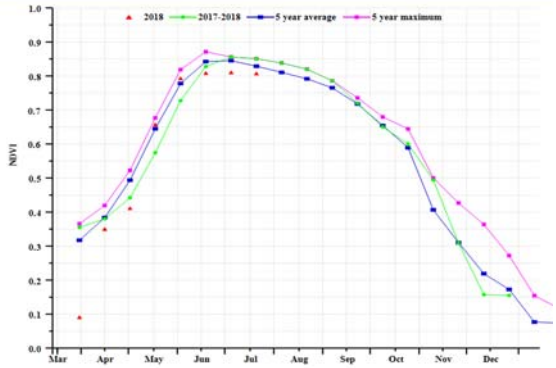
(e) NDVI profiles




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




(f) Crop condition development graph based on NDVI (Mississippit (left) and corn belt (right))




(f) Crop condition development graph based on NDVI (Northwest )

**Table 3.109. United States's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current ($MJ/m^2$) | Departure from 15YA (%) |
| **California** | 82 | -5 | 16.8 | 0.3 | 1566 | -2 |
| **Corn Belt** | 449 | 0 | 17.1 | -0.4 | 1275 | -1 |
| **Lower Mississippi** | 474 | -7 | 23.7 | -0.5 | 1300 | -1 |
| **Middle Atlantic** | 426 | -3 | 17.7 | -0.4 | 1145 | -7 |
| **Northern Plains** | 403 | 51 | 14.2 | -0.3 | 1332 | -4 |
| **Northeast** | 269 | -33 | 14.5 | -0.2 | 1182 | 0 |
| **Northwest** | 149 | -3 | 13.3 | 0.4 | 1364 | -4 |
| **Southern Plains** | 380 | -7 | 22.8 | -0.1 | 1376 | 0 |
| **Southeast** | 543 | 5 | 23.0 | -0.6 | 1228 | -5 |
| **California** | 82 | -5 | 16.8 | 0.3 | 1566 | -2 |
| **Corn Belt** | 449 | 0 | 17.1 | -0.4 | 1275 | -1 |

**Table 3.110. United States's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current ($gDM/m^2$) | Departure from 5YA (%) | Current | Departure from 5YA (%) | Current |
| **California** | 279 | -10 | 0.76 | 12 | 0.82 |
| **Corn Belt** | 1374 | -1 | 1.00 | 0 | 0.97 |
| **Lower Mississippi** | 1551 | 3 | 1.00 | 0 | 0.94 |
| **Middle Atlantic** | 1452 | -3 | 1.00 | 0 | 0.93 |
| **Northern Plains** | 1302 | 28 | 0.92 | 9 | 0.94 |
| **Northeast** | 1069 | -22 | 1.00 | 0 | 0.96 |
| **Northwest** | 649 | 2 | 0.85 | 4 | 0.89 |
| **Southern Plains** | 1184 | -1 | 0.80 | -6 | 0.76 |
| **Southeast** | 1614 | 2 | 1.00 | 0 | 0.94 |
| **California** | 279 | -10 | 0.76 | 12 | 0.82 |
| **Corn Belt** | 1374 | -1 | 1.00 | 0 | 0.97 |

**Table 3.111. CropWatch-estimated Wheat production for United States in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation (%) | Area variation (%) | Production 2018 | Production variation (%) |
|---|---|---|---|---|---|
| Maize | 37017.3 | -2.4 | 2.7 | 37111.8 | 0.3 |
| Rice | 1093.3 | 1.8 | 13.7 | 1265.3 | 15.7 |
| Wheat | 5481.2 | 1.4 | -5.3 | 5265.7 | -3.9 |
| Soybean | 10964.9 | -2.5 | 1.7 | 10872.8 | -0.8 |

# [UZB] Uzbekistan

The monitoring period covers the growing and harvesting of wheat and the planting and early growth of maize. Crop condition was generally unfavorable. The national average VCIx was 0.67, and the cropped arable land fraction decreased by 20%. Among the CropWatch agroclimatic indicators, TEMP and RADPAR were slightly below average (-0.5°C and -2%), while RAIN increased by 5%. The combination of factors resulted in increased BIOMSS (2%) compared to the recent five-year average. As shown by the NDVI development graph, crop condition was below average from April to July. NDVI cluster graphs and profiles showed that most areas across Uzbekistan experienced the unfavorable crop condition during the monitoring period. About 18.9% of the crop land had above average condition from April to May, covering most of the four wheat provinces (Namangan, Andijon, Quqon andFarghona) and some small parts of Angren, Nawoiy, Qarshi, Urganch, Samarqand, Bukhoro and Guliston provinces. Overall, CropWatch expects a decrease of 4.7% in wheat production and 5.5% in wheat yield compared with last year, while the wheat area increased by 0.9%.

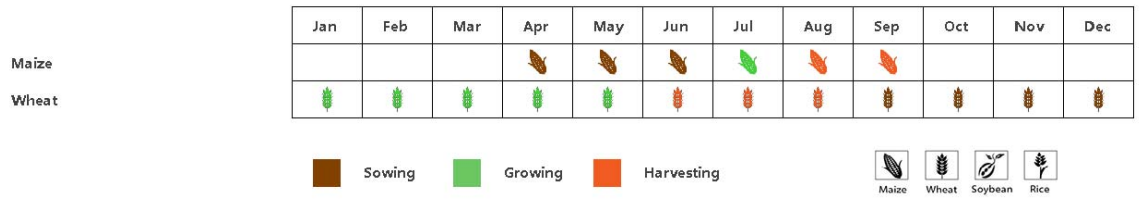
Regional analysis

According to cropping systems, climatic zones, and topographic conditions, Uzbekistan is divided into three agro-ecological zones of which the two first are covered below: the Aral sea cotton zone, Eastern hilly cereals zone and Central region with sparse crops. The following are crop condition analyses for main cropped regions.

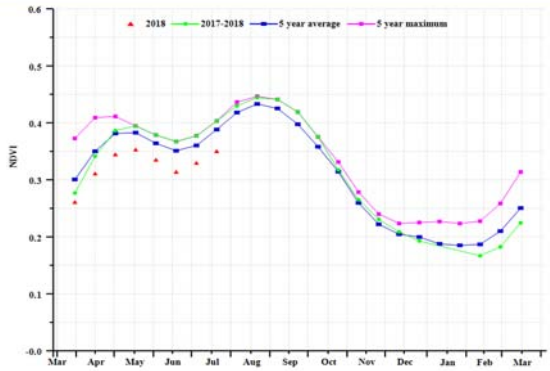
In the rainfed Eastern hilly cereals zone, NDVI was generally below the five-year average from April to July. RAIN was above average (+3%) and RADPAR and TEMP were below average (-2% and -0.5°C). The combination of the factors resulted in a slight BIOMSS increase (+3%) compared to the five-year average. The maximum VCI index was 0.66, while the cropped area decreased by 23% compared to the five-year average. Overall crop prospects are poor.

In the irrigated Aral Sea cotton zone, crop condition was close to 5YA only in May and below in the other months. Accumulated rainfall was above average during the monitoring period (RAIN 30%), radiation and temperature were below average (RADPAR -1% and TEMP -0.8°C). The BIOMSS index increased by 27% compared to the five-year average. The maximum VCI index was 0.72, while the cropped arable land decreased by 12%. Overall crop prospects are unfavorable.

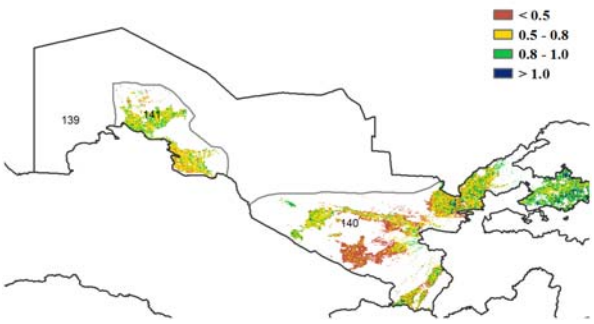
**Figure 3.44. Uzbekistan's crop condition, April -July 2018**



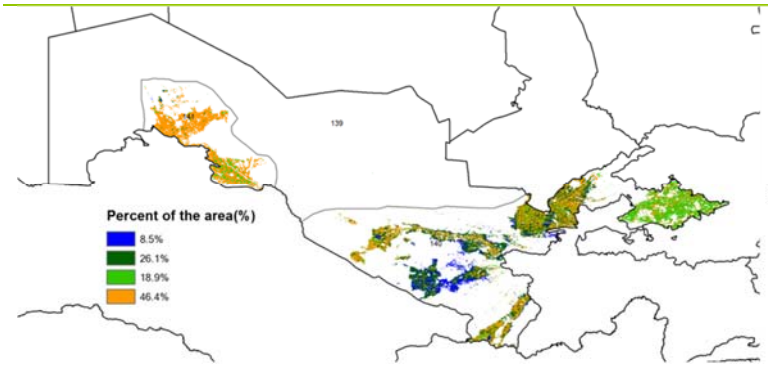

(a). Phenology of major crops



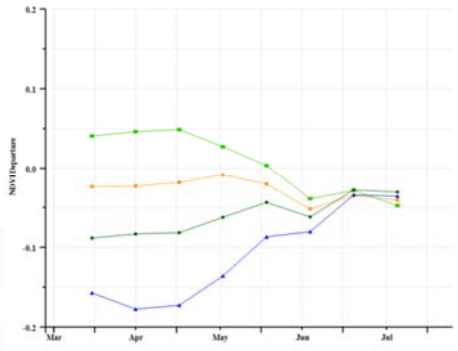

(b) Crop condition development graph based on NDVI



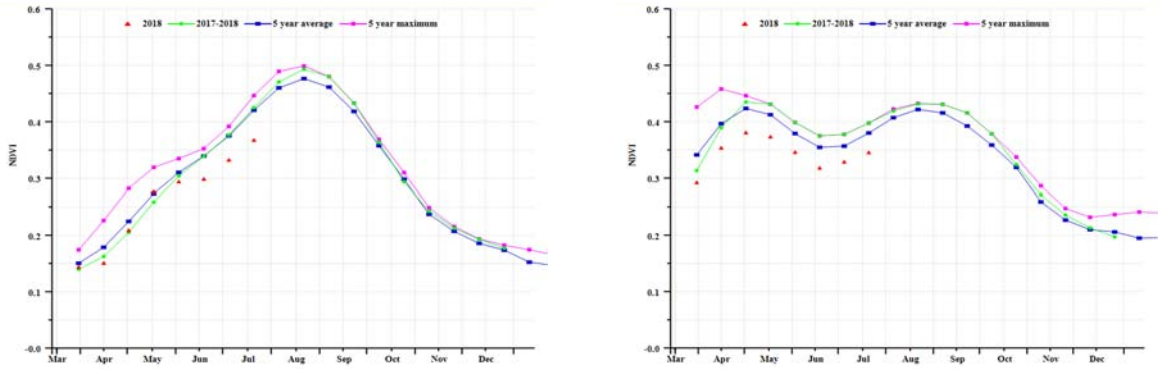

(c) Maximum VCI




(d) Spatial NDVI patterns compared to 5YA




(e) NDVI profiles




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

**Table 3.112. Uzbekistan's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current (MJ/m²) | Departure from 15YA (%) |
| Cotton zone (UZB) | 91 | 30 | 23.3 | -0.8 | 1399 | -1 |
| Maize and Cereals zone (UZB) | 118 | 3 | 21.6 | -0.5 | 1416 | -2 |

**Table 3.113. Uzbekistan's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 2018**

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current ($gDM/m^2$) | Departure from 5YA (%) | Current | Departure from 5YA (%) | Current |
| Cotton zone (UZB) | 402 | 27 | 53 | -12 | 0.72 |
| Maize and Cereals zone (UZB) | 428 | -3 | 52 | -23 | 0.66 |

**Table 3.114. CropWatch-estimated Wheat production for Uzbekistan in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| Wheat | 6442 | -5.5 | 0.9 | 6141 | -4.7 |

# [VNM] Vietnam

The monitoring period covers the sowing of the 10th month rice, as well as the harvesting of winter and spring rice. Generally, compared with the average of the past five years and the average of the same period last year, the crop condition in Vietnam was significantly lower, except in April. The initial NDVI value was close to average but was affected by wide fluctuations after May. The NDVI values in the north of Vietnam show a rapid decline which may result from cloudy weather. CropWatch agroclimatic indicators show that precipitation (+11%), BIOMSS (+1%) and VCIx (0.91) were above their respective reference averages (15YA and 5YA) while temperature (-0.8°C) and CALF (-0.5) were all below average. RADPAR was also below average (-6%). Overall crop condition in the country is unsatisfactory.

Regional analysis

Based on cropping systems, climatic zones, and topographic conditions, three sub-national regions can be distinguished for Vietnam: Northern Vietnam, Central Vietnam and Southern Vietnam.

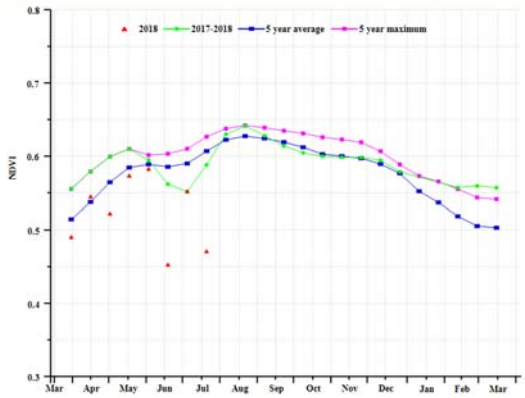
In Northern Vietnam the situation of RADPAR (-6%) and TEMP (+0.8°C departure) is almost identical with the one in the South of the country, but the abundant RAIN (15%), high CALF (0.99) and VCIx (0.94) compared to the average (5YA) resulted in increased BIOMSS (7%). The crop condition development graph of NDVI indicates exceeds the 5 years average from April to May. According to agroclimatic indicators, above average output is expected.

The situation and expected impact on crop production in Central Vietnam is very similar with the preceding zone with the exception of more abundant rainfall and lower temperature and RADPAR: RAIN +34%; TEMP -0.8°C; RADPAR -9%; BIOMSS +6%. VCIx reaches 0.91 and CALF is average. The graph of NDVI indicates that crop condition reaching the average of 5 years in April and May. Based on agroclimatic indicators, average output is expected.

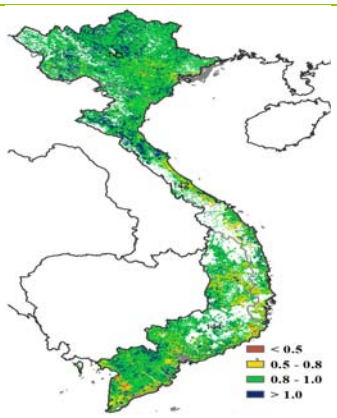
Southern Vietnam, recorded low RADPAR (-5%), RAIN (-5%) and TEMP (-0.8°C compared with the reference value). As a result BIOMSS fell by 8% compared with the averages (5YA). VCIx was low (0.89) with CALF down 1% below average. The crop condition development graph of NDVI also indicates mostly below average crop condition. CropWatch expects below average production.

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

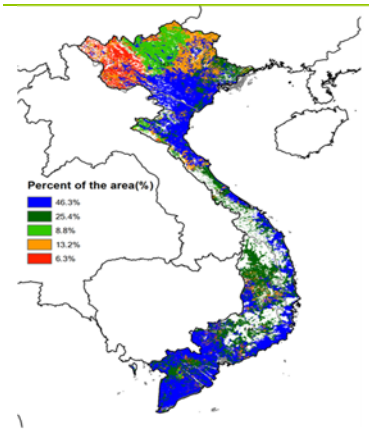

(a). Phenology of major crops



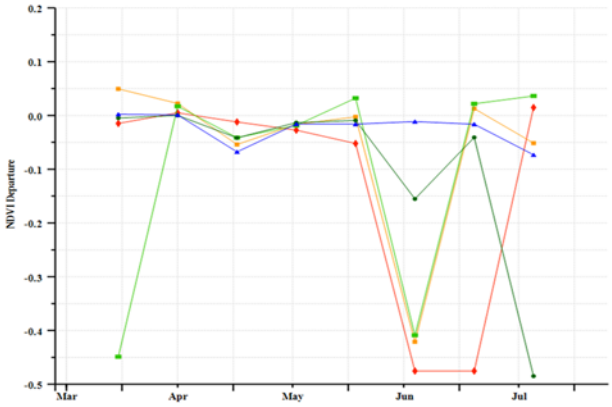

(b) Crop condition development graph based on NDVI



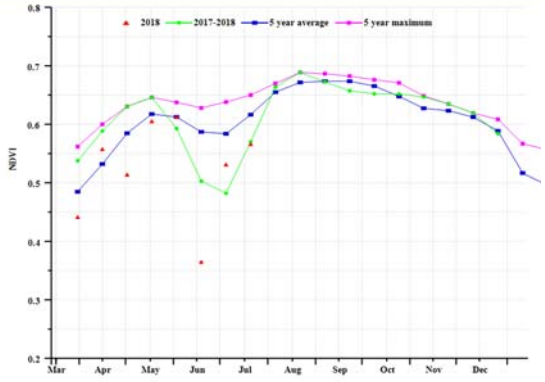

(c) Maximum VCI



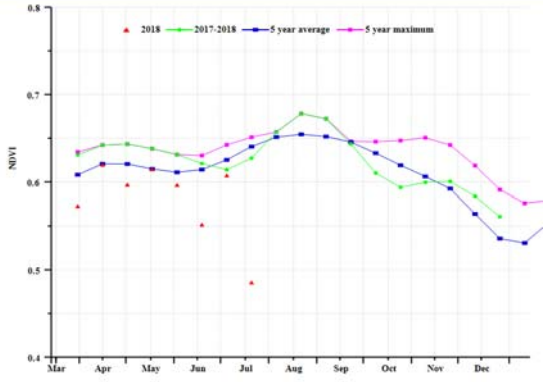

(d) Spatial NDVI patterns compared to 5YA



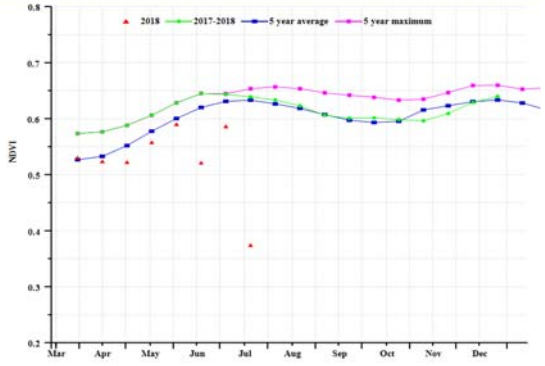

(e) NDVI profiles




(f) Crop condition development graph based on NDVI(Northern zone with Red river Delta)




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




(h) Crop condition development graph based on NDVI(Southern zone with Mekong Delta)

**Table 3.115. Vietnam's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April -July 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 | 1113 | 15 | 25.3 | -0.8 | 954 | -6 |
| Central coastal areas from Thanh Hoa to Khanh Hoa | 867 | 34 | 27.8 | -0.8 | 1077 | -9 |
| Southern zone with Mekong Delta | 780 | -5 | 26.7 | -0.8 | 1057 | -5 |

**Table 3.116. Vietnam's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April -July 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 | 2251 | 7 | 99 | 0 | 0.94 |
| Central coastal areas from Thanh Hoa to Khanh Hoa | 1749 | 6 | 97 | 0 | 0.91 |
| Southern zone with Mekong Delta | 1837 | -8 | 90 | -1 | 0.89 |

**Table 3.117. CropWatch-estimated rice production for Vietnam's in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| Rice | 45422 | 0.5 | 0.1 | 45678 | 0.6 |

# [ZAF] South Africa

During the monitoring period south-African summer crops (maize, rice, and soybean) were at the end of their growing period or had already been harvested. Wheat, however, was just at planting in Mediterranean climate areas and as an irrigated dry-season crop in the north-west. Average rainfall (RAIN) was 69 mm, 19% below the 15YA. At 14.0 °C TEMP was virtually average while RADPAR was just below (-1%). The biomass production potential was below the average (298 gDM/m2 or -15%).

The nationwide crop condition, based on NDVI graph, was above the maximum five years conditions indicating favorable weather after the recent El Niño conditions. The map of spatial NDVI patterns shows that only 4% of the total cropped area, especially located in western Cape province, was significantly below the average. A slight deficit of 0.02 NDVI units also occurs in 19.3% or cropland, MOSTLY around Western Cape and in the Northern Province. The pattern is confirmed in the maximum VCI map by values below 0.8. For the country as a whole VCIx reached 0.9; CALF was 0.9， 20% above the 5 years average.

CropWatch currently puts 2018 maize production 2.4% below last year's. For the wheat season, which is just starting, the production is tentatively put 1.9% below the 2017 output.

Regional analysis

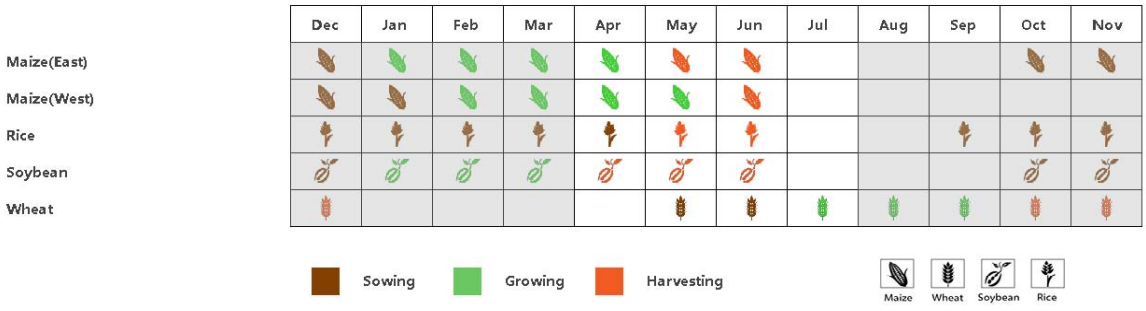
CropWatch adopts three agro-ecological zones (AEZs) relevant for crop production in South-Africa: Humid Cape Fold mountains, the Mediterranean zone and the Dry Highveld and Bushveld maize areas.

In the Humid Cape Fold mountains, the average rainfall (RAIN) was 28% below the average, leading to a 22% reduction in estimated BIOMSS compared to the average. No significant departure was recorded for temperature (TEMP) or RADPAR (-2%). The NDVI-based crop conditions graph shows that the conditions were above the maximum 5 years conditions and the VCI value for the whole zone was high (0.9).

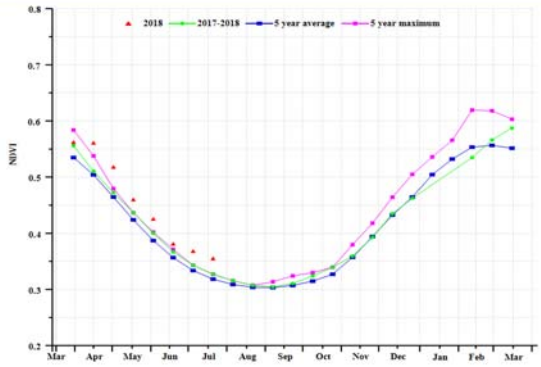
The Mediterranean zone recorded just 93mm of RAIN, 45% below the average. TEMP was 13.7 °C, 0.6 °C above the average. No significant change occurred for RADPAR (2% below the average), while the estimated BIOMSS dropped 33%. NDVI profiles showed below average conditions from April to mid-May but then rapidly rose above average until the end of the reporting period. The maximum VCI was 0.5 and CALF was 0.9, 3% above the average.

In Dry Highveld and Bushveld maize areas, the rainfall (RAIN) and the biomass production potential (BIOMSS) were both was about 10% below average. The CALF reached 1 (100%), 28% above the average. The VCI was 1, indicating excellent crop conditions confirmed by the NDVI-based crop conditions graph showing crop condition exceeding the recent 5-year maximum.

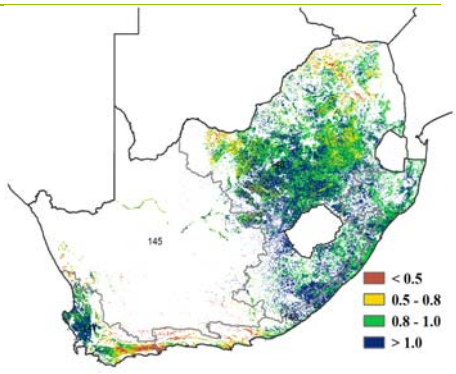
**Figure 3.46. South Africa's crop condition, April-July 2018**



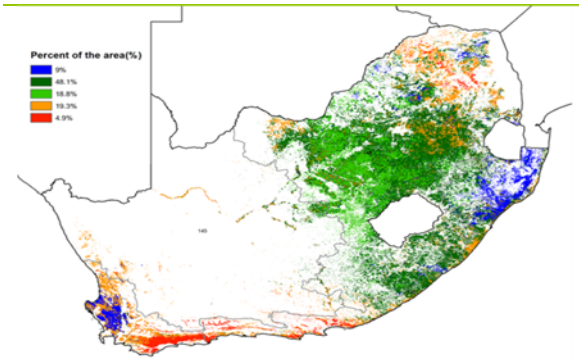

(a). Phenology of major crops



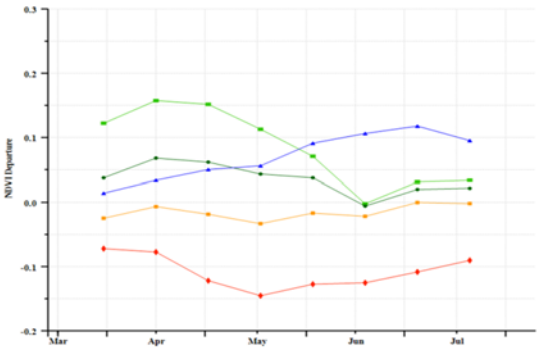

(b) Crop condition development graph based on NDVI



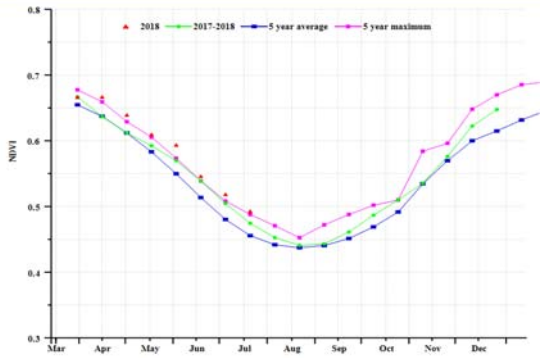

(c) Maximum VCI

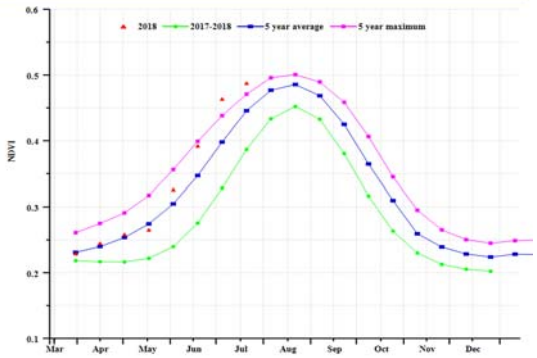



(d) Spatial NDVI patterns compared to 5YA

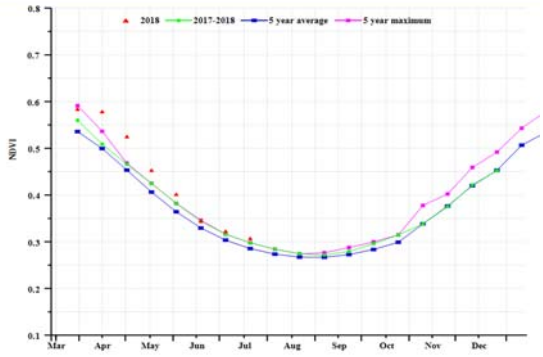



(e) NDVI profiles




(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 3.118. South Africa's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 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 | 77 | -28 | 16.1 | 0.0 | 755 | -2 |
| Mediterranean Zone | 93 | -45 | 13.7 | 0.6 | 674 | -2 |
| Dry Highveld and Bushveld | 64 | -12 | 13.5 | 0.0 | 871 | -1 |

**Table 3.119. South Africa's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 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 | 342 | -22 | 1 | 2 | 0.9 |
| Mediterranean Zone | 397 | -33 | 1 | 3 | 0.5 |
| Dry Highveld and Bushveld | 274 | -10 | 1 | 28 | 1.0 |

**Table 3.120. CropWatch-estimated maize and Wheat production for South Africa in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| **Maize** | 14161 | 8.8% | -10.3% | 13827 | -2.4% |
| **Wheat** | 1576 | 8.6% | -9.7% | 1546 | -1.9% |

# [ZMB] Zambia

During the monitoring period (April-July, 2018), the maize was being harvested and wheat has been sown. For the same period, the agro-climatic indicators estimated by CropWatch indicated that the average rainfall (RAIN) was 23% above the average, while the average temperature (TEMP) was 0.4°C below the average. The RADPAR was only 3% below the average, but the BIOMSS was 17% above the average.

According to NDVI graphs crop condition was slightly above; it was below average only in 11% of the cropped area. Both the maximum VCI and the spatial NDVI patterns map showed that the conditions were slightly better in the south than the middle and the north of the couintry. The VCI for the whole country was 0.9, while the CALF was 1.

All of the CropWatch indicators agree in assessing crop conditions as fairly good during this period and no significant variation in crop production is expected (-1% maize production variation compared to last season).

Regional analysis

Zambia can be divided into four agro-ecological zones (AEZ): Northern high rainfall zone, Western semi-arid plain, Central (Eastern and Southern Plateau) zone, and Luangwa Zambezi rift valley.

In the Northern high rainfall zone, the average rainfall (RAIN) was 39% above the average, while the temperature (TEMP) was 0.6°C below. RADPAR was low as well (-3%) and BIOMSS was 28% up.

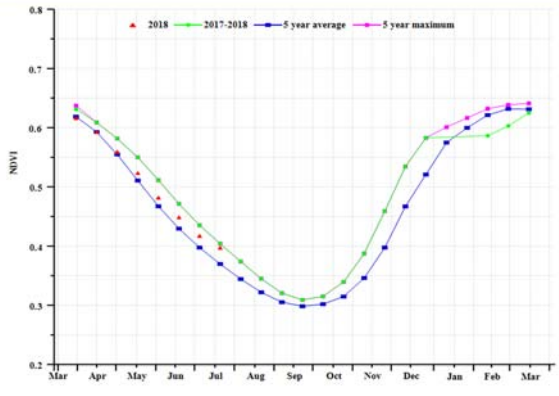
In the Western semi-arid plain, RAIN and TEMP were both above average (+36% and 0.8°C, respectively). RADPAR was low (-4%) and BIOMSS followed RAIN (+33%).

In the Central zone, and the Luangwa-Zambezi rift valley, RAIN was closer to average than in the two previous AEZs at +5% and +9%, respectively. The temperature (TEMP) was 0.7°C below the average in the Central zone. The RADPAR was only 3% below the average, and the BIOMSS was 9% above the average for both zones.

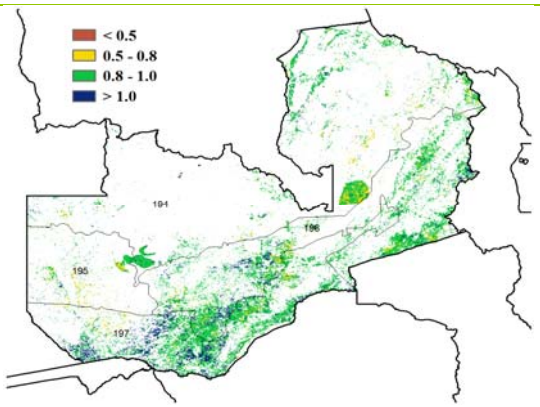
The NDVI-based crop condition graphs for the agro-ecological zones show that the crops were slightly below average until mid-May, after which they returned to average, except for the Luangwa Zambezi rift valley zone where crops conditions were slightly above the average during the whole reporting period. Maximum VCI was between 0.8 to 0.9 for all zones.

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

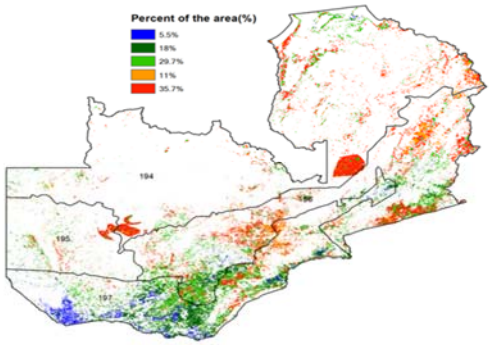

(a). Phenology of major crops



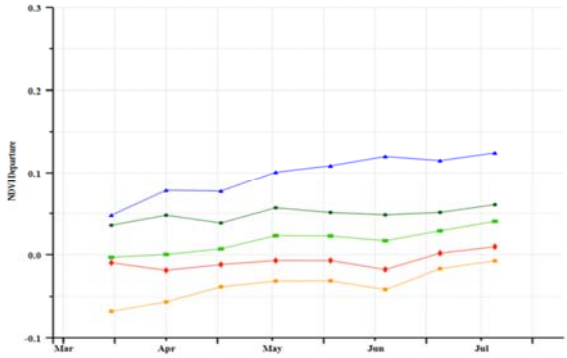

(b) Crop condition development graph based on NDVI



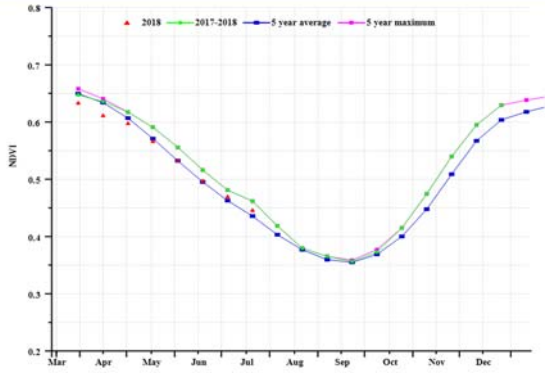

(c) Maximum VCI

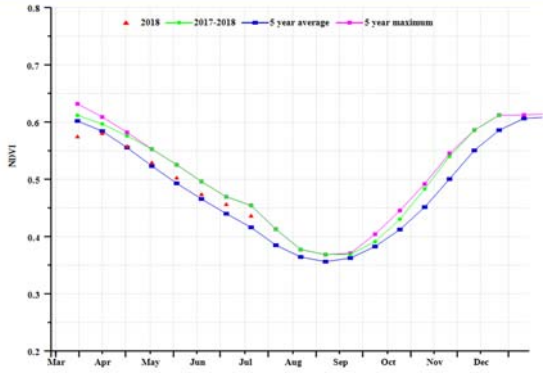



(d) Spatial NDVI patterns compared to 5YA

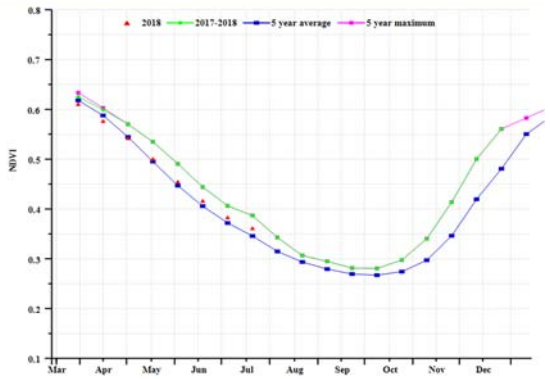


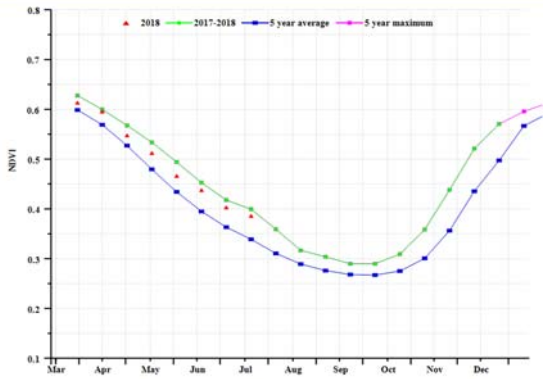

(e) NDVI profiles




(f) Crop condition development graph based on NDVI ( Northern high rainfall zone (left) and Western semi-arid plain (right))




(g) Crop condition development graph based on NDVI ( Central (Eastern and Southern Plateau) zone (left) and Luanguwa Zambazi rift valley (right))

**Table 3.121. Zambia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, April-July 2018**

| Region | RAIN | | TEMP | | RADPAR | |
|---|---|---|---|---|---|---|
| | Current (mm) | Departure from 15YA (%) | Current (°C) | Departure from 15YA (°C) | Current ($MJ/m^2$) | Departure from 15YA (%) |
| **Luanguwa Zambazi rift valley** | 44 | 9 | 21.6 | 0.0 | 1028 | -3 |
| **Central ( Eastern and Southern Plateau)** | 53 | 5 | 20.9 | -0.7 | 1036 | -3 |
| **Western semi-arid plain** | 61 | 36 | 22.2 | 0.8 | 1089 | -4 |
| **Northern high rainfall zone** | 131 | 39 | 20.3 | -0.6 | 1110 | -3 |

**Table 3.122. Zambia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, April-July 2018**

| Region | BIOMSS | | Cropped arable land fraction | | Maximum VCI |
|---|---|---|---|---|---|
| | Current ($gDM/m^2$) | Departure from 5YA (%) | Current | Departure from 5YA (%) | Current |
| **Luanguwa Zambazi rift valley** | 185 | 9 | 1.0 | 1 | 0.9 |
| **Central ( Eastern and Southern Plateau)** | 215 | 9 | 1.0 | 0 | 0.9 |
| **Western semi-arid plain** | 225 | 33 | 1.0 | 1 | 0.8 |
| **Northern high rainfall zone** | 402 | 28 | 1.0 | 0 | 0.9 |

**Table 3.123. CropWatch-estimated maize production for Zambia in 2018 (thousand tons)**

| Crops | Production 2017 | Yield variation | Area variation | Production 2018 | Production variation |
|---|---|---|---|---|---|
| **Maize** | 2394 | -2% | 1% | 2367 | -1% |