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Note: CropWatch resources, background materials and additional data are available online at www.cropwatch.com.cn.

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Abbreviations

5YA	Five-year average, the average for the four-month period for April-July from 2012 to 2016; one of the standard reference periods.
15YA	Fifteen-year average, the average for the four-month period from April-July from 2002 to 2016; one of the standard reference periods and typically referred to as “average.”
BIOMSS	CropWatch agroclimatic indicator for biomass production potential
BOM	Australian Bureau of Meteorology
CALF	Cropped Arable Land Fraction
CAS	Chinese Academy of Sciences
CWAI	CropWatch Agroclimatic Indicator
CWSU	CropWatch Spatial Units
DM	Dry matter
EC/JRC	European Commission Joint Research Centre
ENSO	El Niño Southern Oscillation
FAO	Food and Agriculture Organization of the United Nations
GAUL	Global Administrative Units Layer
GVG	GPS, Video, and GIS data
ha	hectare
kcal	kilocalorie
MPZ	Major Production Zone
MRU	Monitoring and Reporting Unit
NDVI	Normalized Difference Vegetation Index
OISST	Optimum Interpolation Sea Surface Temperature
PAR	Photosynthetically active radiation
PET	Potential Evapotranspiration
RADI	CAS Institute of Remote Sensing and Digital Earth
RADPAR	CropWatch PAR agroclimatic indicator
RAIN	CropWatch rainfall agroclimatic indicator
SOI	Southern Oscillation Index
TEMP	CropWatch air temperature agroclimatic indicator
Ton	Thousand kilograms
VCIx	CropWatch maximum Vegetation Condition Index
VHI	CropWatch Vegetation Health Index
VHIn	CropWatch minimum Vegetation Health Index
W/m ²	Watt per square meter

Bulletin overview and reporting period

This CropWatch bulletin presents a global overview of crop stage and condition between April and July 2017, a period referred to in this bulletin as the AMJJ (April, May, June and July) period or just the “reporting period.” The bulletin is the 106th such publication issued by the CropWatch group at the Institute of Remote Sensing and Digital Earth (RADI) at the Chinese Academy of Sciences, Beijing.

CropWatch analyses and indicators

CropWatch analyses are based mostly on several standard as well as new ground-based and remote sensing indicators, following a hierarchical approach. The analyses cover large global zones; major producing countries of maize, rice, wheat, and soybean; and detailed assessments for 30 major agricultural countries and Chinese regions. In parallel to an increasing spatial precision of the analyses, indicators become more focused on agriculture as the analyses zoom in to smaller spatial units.

CropWatch uses two sets of indicators: (i) agroclimatic indicators—RAIN, TEMP, and RADPAR, which describe weather factors; and (ii) agronomic indicators—BIOMSS, VHIn, CALF, and VCIx, describing crop condition and development. Importantly, the indicators RAIN, TEMP, RADPAR, and BIOMSS do not directly describe the weather variables rain, temperature, radiation, or biomass, but rather they are spatial averages over agricultural areas, which are weighted according to the local crop production potential. For each reporting period, the bulletin reports on the *departures* for all seven indicators, which (with the exception of TEMP) are expressed in relative terms as a percentage change compared to the average value for that indicator for the last five or fifteen years (depending on the indicator). For more details on the CropWatch indicators and spatial units used for the analysis, please see the quick reference guide in Annex C, as well as online resources and publications posted at www.cropwatch.com.cn.

This bulletin is organized as follows:

Chapter	Spatial coverage	Key indicators
Chapter 1	World, using Monitoring and Reporting Units (MRU), 65 large, agro-ecologically homogeneous units covering the globe	RAIN, TEMP, RADPAR, BIOMSS
Chapter 2	Major Production Zones (MPZ), six regions that contribute most to global food production	As above, plus CALF, VCIx, and VHIn
Chapter 3	30 key countries (main producers and exporters) and sub-national regions	As above plus NDVI and GVG survey
Chapter 4	China	As above plus high resolution images; information on pests and diseases; and food import/export outlook
Chapter 5	Production outlook, a focus on the Horn of Africa area, and updates on disaster events and El Niño.	

Regular updates and online resources

The bulletin is released quarterly in both English and Chinese. E-mail cropwatch@radi.ac.cn to sign up for the mailing list or visit CropWatch online at www.cropwatch.com.cn.

Executive summary

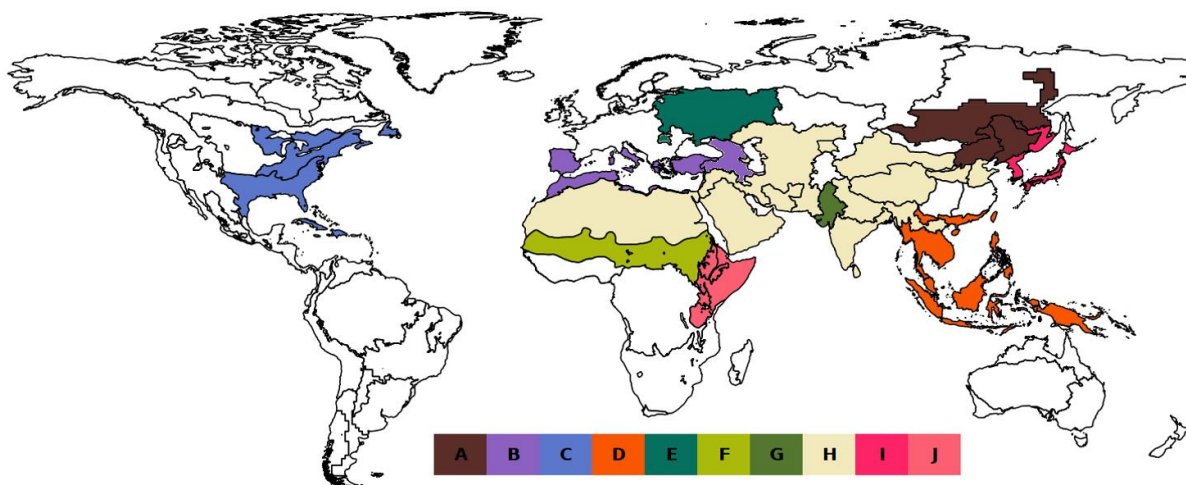
The current CropWatch bulletin is based mainly on remotely sensed data, both for agroclimatic data and crop condition. The bulletin focuses on crops that were either growing or harvested between April and July 2017. It covers prevailing weather conditions (including extreme conditions) at different spatial scales, starting with global patterns in Chapter 1. Chapter 2 focuses on agroclimatic and agronomic conditions in major production zones in all continents. Chapter 3 covers the major agricultural countries that, together, make up at least 80% of production and exports (the “top 30”), while chapter 4 zooms into China. Detailed data and narratives about crops and environmental conditions are presented in both chapters 3 and 4, with special attention paid to the major producers of maize, rice, wheat, and soybean. The bulletin then, in chapter 5, presents a global production estimate for crops to be harvested throughout 2017 (Chapter 5.1), a revision from the first CropWatch estimate for this year published in May; at least 95% of the current production estimates are based on modeled data and 5% or less are based on statistical projections. Subsequent sections of Chapter 5 describe the global disasters that occurred from April to July 2017, as well as a comprehensive analysis of the humanitarian emergency in the Horn of Africa and the current situation of El Niño.

Global agroclimatic conditions

This bulletin is issued at a time when almost all winter crops in the northern hemisphere, including China, have been harvested, summer crops are in their late stages, and monsoon/autumn crops are in a planting stage; in the southern hemisphere winter crops are growing and the planting of the summer season/monsoon season will start in a month or so.

This bulletin confirms a pattern observed in previous issues of a continent-sized reach of land extending from West Africa to semi-arid Central Asia in which precipitation exceeds the recent average. The area is identified as (H) in figure 0.1, but actually includes some of the smaller zones listed below, such as (E), which is most of Ukraine to Ural Mountains, where both temperature and sunshine were below average (TEMP, -2.2°C and RADPAR, -4%) but rainfall was abundant (RAIN, +22%) (this area also recorded the lowest temperature departure for the reporting period); (F) the west African Sahel where the corresponding values of the CropWatch agroclimatic indicators are -0.9°C, -2%, and +35%, respectively; and (G) Punjab to Gujarat, which has relatively lower TEMP and RADPAR departures (-0.8°C and -2%) but rather high precipitation (RAIN, +72%). Another wet area to mention is the mostly pastoral semi-arid Southern Cone of South America which had an increase of 83% above average RAIN.

Figure 0.1. Major agroclimatic anomalies between April and July 2017



Note: Refer to the text for details of the legend.

Dry conditions prevailed in the lowlands of the Horn of Africa (HoA, area J) with precipitation 32% below the average amount. The HoA suffered the third consecutive rainfall deficit season, resulting in severe hardship for people, animals, and crops. The HoA is included in a major humanitarian crisis zone that is described in chapter 5, section 5.2. The neighboring highlands of East Africa (also part of area J) suffered a more moderate deficit (RAIN, -13%) and less serious impacts are expected, if not for the massive movements of refugees that increase the demand for food and drive up prices. Finally, drought, although less pronounced, also affected the Mediterranean (area B, especially the north), extending east into the Caucasus.

Several additional anomalies deserve mentioning. These include (i) a record warm sunshine departure of RADPAR +4% in East Asia (area A); (ii) cooler than expected weather with low sunshine (RADPAR -4%) and abundant rainfall (RAIN+17%) over the eastern United States, parts of Mexico, and the Caribbean (C); as well as (iii) maritime eastern and south-eastern Asia (D) with (on average) TEMP at -0.9°C and RADPAR at a very significant -5%, while the RAIN departure was consistently positive at +24%. The areas under consideration include Southern China, Hainan, Taiwan, as well as continental and maritime south-east Asia.

As discussed in Chapter 3, among the major agricultural countries, Argentina generally experienced above-average rainfall (RAIN, +48%) that benefited winter crops, although sunshine was abnormally low (RADPAR, -10%). The Cropped Arable Land Fraction decreased 2% compared with average. In Brazil, the slight RAIN deficit (-3%) resulted from a large disparity between states. Meanwhile, its cultivated area varied little compared with 2016, but the vegetation condition index was rather favorable (VCIx 0.90). In the northern hemisphere, Russia (RAIN, +19%) and India (+17%) had generally favorable rainfall at the early stages of their summer and monsoon crops, respectively. India nevertheless underwent a very large drop in cropped land (-18%), which is reflected in the CropWatch production estimates. Mixed RAIN conditions occurred in Canada (RAIN, -8%), China (+9%), Kazakhstan (+12%, with an 8% increase in cultivated area), and the United States (+21%, dry in the north). Generally poor conditions are reported for France (RAIN, -23%) and Ukraine (-17%), with the shortfall occurring over most of the territory of both countries. The same observation applies to much of western Europe west of Albania to Belgium. France had abnormally high temperatures throughout the country but close to normal sunshine.

Crop production

CropWatch estimates the global 2017 production at 1,008 million tons of maize, up 0.6% over 2016; 748 million tons of rice (up 1.6%); 737 million tons of wheat (0.5% increase over 2016); and 315 million tons of soybeans, down 0.7%. The top 30 producers contribute 887 million tons of maize (+0.3%), 672 million tons of rice (+1.6%), 624 million tons of wheat (-0.9%); and 298 million tons of soybeans (+0.9%).

Maize. Large increases are estimated for maize production in Australia (+61.4%), Poland (+27.8%), Uzbekistan (15.4%), and Kazakhstan (4.8%). The largest modeled, and thus more reliable, increases are those of Argentina (+16.5%), Brazil (+19.3%), and especially South Africa (+57%), as the country recovers from the 2016 El Niño drought. In the first country, Argentina, the production was achieved through a 20% expansion of land cropped with maize, while in Brazil the yield increased 19% due to favorable agroclimatic conditions. Among the major producers in the northern hemisphere, CropWatch puts China at 194 million tons (-3.2% compared to last year) and the United States at 355 million tons (-3.6%).

Rice. For the major Asian producers and exporters of rice, positive increases over 2016 are recorded in India (+4.3% to 163 million tons), Vietnam (+9.3%), and Thailand (+1.8%). These increases were usually achieved through increase in area or, especially in Vietnam, yield (+8.4%). China suffered a small and comparable drop in both area and yield (-0.6%), which, together, brought about the nation-wide near-stagnation of production.

Wheat. For the current report, due to less favorable agroclimatic conditions than during the previous years, CropWatch expects a drop in wheat production in three of the major wheat producers: Canada, down 7.8% to 31 million tons; United States, down 4.6% to 54 million tons; and Australia, down 6.0% to 30 million tons. In China, the change is +0.3%.

Soybean. China remains a minor soybean producer (14 million tons) when compared to the United States (109 million ton), Brazil (97 million tons), and Argentina (51 million tons).

China

This bulletin covers the peak of the agricultural season for most of China. The vegetation condition index at the national level was moderate (0.75). Higher values appear in Northeast and Southwest China, as well as in Huanghuaihai; lower values occur in the Loess region and Inner Mongolia. Compared with average, cropland decreased by 1.7%, with significant declines in the Loess region (-13%) and Inner Mongolia (-9%).

As mentioned above, for both maize and rice, Crop Watch puts the national production close to 200 million tons (193,853 thousand tons and 200,371 thousand tons, respectively). Compared with 2016, maize is down 3.2% and rice 0.1%. Wheat is estimated to reach 118,902 thousand tons (+0.3%) and soybean, 13,860 thousand tons, a significant +4.3% change. This is the second consecutive increase in soybean production (after a decade long decline) and was brought about by a new agricultural policy. Winter crops production in China increased by 0.9%, in which wheat accounts for 90%. The major winter crop producing area is Henan province. It produced 26.3 million tons, which is 3.9% or 988,000 tons more than its 2016 production. Significant drops in production occurred in Anhui (-7.8%), Shaanxi (-4.8%), and Jiangsu (-3.9%) provinces.

The overall rice production in China remained close to 2016, but different situations occur according to the type of the growing season. Early rice and late rice production increased by 0.7% and 0.1%, respectively, while single-cropped rice production was 0.3% below the 2016 level. To some extent, the performance of rice was affected by pest attacks which were severe in several provinces: rice hopper in central Guizhou, northern Guangxi, and most of Guangdong; leaf roller in central Guizhou and northern

Guangdong over around 2.7 million hectares; and sheath blight in southern Jiangsu and northern Zhejiang for close to 4.5 million hectares.

The most significant increase in soybean production (+7.0%) was observed in Heilongjiang, the top soybean producer in China, thanks to both favorable yield and increased area. Inner Mongolia also outputs 2% above 2016 production due to the expanded planted area. Soybean production decreased in the North China Plain including Henan, Shandong, and Shanxi. As for maize, the provinces in the North China Plain, and Southwestern China all displayed lower production, including Anhui, Jiangsu, Hebei, Shandong, Shanxi, Inner Mongolia, Ningxia, Sichuan, Chongqing, and Yunnan. The reasons differ from province to province, such as a shrinking area in Inner Mongolia, Ningxia, and Shanxi. In Anhui, Chongqing, Sichuan, and Yunnan the main factor was a drop in yield.

Due the significant drop in maize production, CropWatch puts the total 2017 output of summer crops (including maize, single rice, late rice, spring wheat, soybean, minor cereals, and tubers at 399.6 million tons, a 1.8% drop from 2016 or a decrease in production of 7.3 million tons. The total annual crop production is at 558.7 million tons, 1.2% lower from 2016 (a decrease of 6.9 million tons). As late rice is still at the vegetative stage, and maize and single rice are at grain filling, CropWatch will further revise the production for each crop type as well as total production in the next bulletin.

Winter crops production in China were revised in this bulletin and close to 2016 (+0.1%), in which wheat accounts for 90%. The major winter crop producing area is Henan province. It produced 26.3 million tons, which is 3.9% or 988,000 tons more than its 2016 production. Significant drops in production occurred in Anhui (-7.8%), Shaanxi (-4.8%), and Jiangsu (-3.9%) provinces.

Chapter 1. Global agroclimatic patterns

Chapter 1 describes the CropWatch Agroclimatic Indicators (CWAIs) rainfall (RAIN), temperature (TEMP), and radiation (RADPAR), along with the agronomic indicator for potential biomass (BIOMSS) in sixty-five global Monitoring and Reporting Units (MRU). Rainfall, temperature, and radiation indicators are compared to their average value for the same period over the last fifteen years (called the “average”), while BIOMSS is compared to the indicator’s average of the recent five years. Indicator values for all MRUs are included in Annex A table A.1. For more information about the MRUs and indicators, please see Annex C and online CropWatch resources at www.cropwatch.com.cn.

1.1 Introduction

A statistical analysis of table A.1 (CWAIs by CropWatch MRU) does not highlight any marked connections between CWAIs (RAIN, TEMP, RADPAR, and BIOMSS) apart from those expected from climatology: higher temperatures in high rainfall (that is, equatorial) areas compared with temperate zones. Other parallel variations include the changes in RADPAR and temperature and, because of the model used, BIOMSS and RAIN. One interesting observation, however, involves TEMP departures, which tend to be negative in high rainfall areas, meaning that tropical areas generally tended to experience below average TEMP.

As a reminder: CropWatch agroclimatic indicators are computed only over agricultural areas (with additional weighting to highlight the most productive areas), while non-agricultural areas are not included in the averaging process. Moreover, where large spatial intra-MRU climatic variations occur, this is usually visible from the higher resolution national and sub-national data described in Chapter 3.1, not to mention the national analyses in Chapters 3 and 4. Note also that the MRUs only have been given names for easy reference; these names do not, generally, correspond with existing political entities (such as for example in the case of the "Eastern Central Asia" MRU (MRU-52).

1.2 Rainfall (RAIN)

Among the locations that do expect significant rainfall during the reporting period (“significant” is somewhat arbitrarily put at 150 mm over the 4 months from April to July), the largest deficits occurred in Oceania and in Africa. In Australia, three MRUs deserve mentioning: MRU-54 (Queensland to Victoria) where rainfall was 32% below the expected amount of 168 mm, and Nullarbor to Darling (MRU-55), where the recorded amount of 94 mm was 57% below average. This MRU in fact experienced the worst departure in the CropWatch RAIN indicator of the current reporting period. In New-Zealand (MRU-56) the rainfall deficit is put at 29% (223 mm instead of 315).

In the lowlands of the Horn of Africa (HoA, MRU-04), measured rainfall reached 129 mm, 32% below the expected amount of 189 mm. As described in the focus section (Chapter 5) of this bulletin, the HoA suffered the third consecutive rainfall deficit season, resulting in severe hardship for people, animals and, crops. The neighboring highlands of East Africa (MRU-02) suffered a more moderate deficit (RAIN, -13%) which, combined with mostly high rainfall amounts (average above 50 mm) led to no serious consequences. MRU-02 and MRU-04 are shown as J in the summary figure 1.5.

Still significant--considering the scale of the MRUs--deficits are reported from eastern Asia (MRU-43, RAIN, -26%) and southern Japan and Korea (MRU-46, -30%). The area is indicated as I in figure 1.5.

RAIN deficit areas also include the Brazilian Nordeste (MRU-22 with RAIN, -26%) and the Southwestern Southern Cone (Western Patagonia, MRU-27), which recorded 328 mm instead of 469 mm.

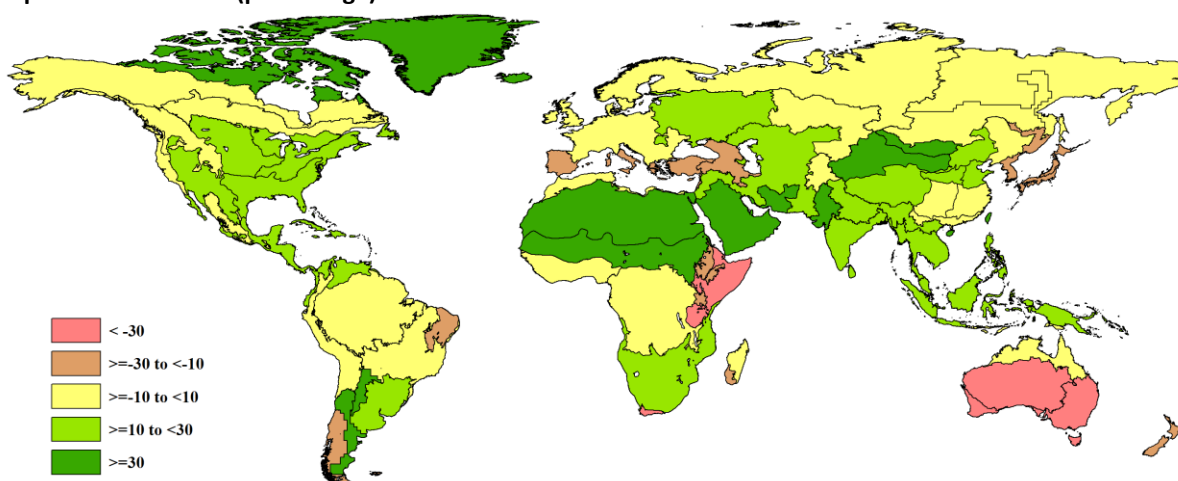
Two more areas deserve mentioning: Southern Africa and the northern Mediterranean. The first includes Mediterranean South Africa (MRU-10, Western Cape, -54% below the expected 167 mm) and southern Madagascar (MRU-06, -15%), while remaining areas of southern Africa (MRU-09) that suffered a serious drought last year are at +12% RAIN. The area has now concluded the maize harvest, the main staple in most of the region. The northern Mediterranean encompasses several MRUs, including Mediterranean Europe and Turkey (MRU-59, RAIN -13%) and the “Caucasus” (MRU-29, RAIN -16%), with the latter including the coastal eastern Mediterranean. It is the northern part of the area identified as B in figure 1.5.

Figure 1.1 confirms a pattern observed in previous bulletins, which is a continent-wide area extending from Senegal to semi-arid central Asia in which precipitation has recently increased over average. The area is shown as H in figure 1.5 and includes also the adjacent areas coded F, G, E and D. The most significant positive departures are observed in the Mongolia region (MRU-47, RAIN +126%) and in Gansu-Xinjiang (MRU-32, +83%), confirming a recent trend of favorable precipitation in central Asia. Other high precipitation areas include MRU-48 (Punjab to Gujarat, +72% with 559 mm instead of 325 mm) in Asia and the Sahel (+35%), which indicates an early start of the rainy season in West Africa.

It is worth noting that most of central, southeast and western Asia had favorable precipitation, sometimes associated with floods (see also Chapter 5, section on disasters).

In Latin America, the semi-arid Southern Cone (MRU- 28) had an increase in rainfall of 83% above average.

Figure 1.1. Global map of April-July 2017 rainfall anomaly (as indicated by the RAIN indicator) by MRU, departure from 15YA (percentage)



1.3 Temperature (TEMP)

Although the largest negative departure over the reporting period occurred in MRU-58 (Ukraine to Ural mountains, TEMP -2.2°C), it was (as mentioned above) mostly tropical and equatorial areas that tended to experience below average TEMP on all continents, starting with Asia. The following areas experienced negative temperature departures close to -1°C (-0.7°C to -1.1°C): Hainan (MRU-33), Southern China (MRU-40), Taiwan (MRU-42), Mainland Southeast Asia (MRU-50), Punjab to Gujarat (MRU-48; also mentioned as one of the areas with very large rainfall excess), and Southwest China (MRU-41) and the Southern Himalayas (MRU-44), both of which were at 0.7°C below average.

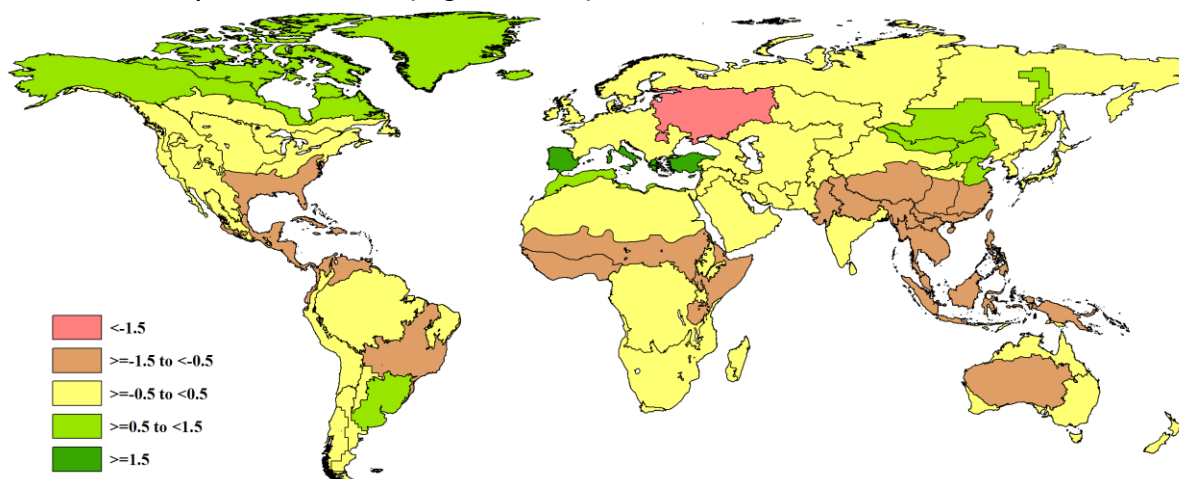
In West Africa, the Sahel (MRU-08, TEMP -0.9°C) must be mentioned, as well as the Gulf of Guinea states (MRU-03, -0.7°C), described also in more detail in Chapter 2 under the West Africa MPZ, and the Horn of Africa. In the Horn of Africa, temperature departure was less marked (-0.5°C).

In Central America and adjacent areas, several MRUs also stand out, starting with the relatively “coldest” area, which encompasses the United States Cotton Belt and the Mexican Coastal Plain (MRU-14, TEMP -0.7°C). In Central America and northern South America (MRU-19) the TEMP departure was -0.6°C , while in central-eastern Brazil (MRU-23) temperatures were closer to average at -0.5°C .

Positive temperature anomalies also occur on all continents, except Oceania. In South America, the major agricultural area of the Pampas stands out with warm temperatures (MRU-26, $+0.6^{\circ}\text{C}$). The most marked warm anomalies, however, affected the Mediterranean basin where rainfall was low (see above). The two affected MRUs here include North Africa (MRU-07; TEMP 0.8°C) and Mediterranean Europe and Turkey (MRU-59), which had the largest positive departure with temperatures as much as 1.6°C above average.

Southeast Brazil (MRU-26, $+0.6^{\circ}\text{C}$) is to be mentioned next, as well as a large block of MRUs in central-eastern Asia, centered around MRU-47 (Mongolia region, TEMP $+1.3^{\circ}\text{C}$), Eastern Central Asia (MRU-52, $+0.9^{\circ}\text{C}$), Inner Mongolia (MRU-35, $+0.8^{\circ}\text{C}$) and Huanghuaihai (MRU-34, $+0.5^{\circ}\text{C}$).

Figure 1.2. Global map of temperature anomaly (as indicated by the TEMP indicator) by country and sub-national areas, departure from 15YA (degrees Celsius)



1.4 Photosynthetically Active Radiation (PAR) and combinations of CWAls

PAR is assessed using the RADPAR indicator. For the current reporting period, the indicator shows an atypically weak correlation with TEMP. Areas with MRUs where the two indicators--RADPAR and TEMP--agree are the following:

- *East Asia*, including MRU-35 (Inner Mongolia, China), MRU-38 (Northeast China), MRU-52 (Eastern Central Asia), MRU-43 (East Asia), MRU-46 (Southern Japan and Korea), and MRU-34 (Huanghuaihai). In this region, TEMP departure was $+0.5^{\circ}\text{C}$ (on average) and RADPAR was $+2\%$ (with values of $+4\%$ in MRU-38 and MRU-46, constituting a record for the reporting period.) Rainfall across the region varied from -30% (MRU-46) to $+17\%$ (MRU-35). (Area A in figure 1.5.)
- *Mediterranean sea area*, covering both the Europe and Turkey MRU (MRU-59) and North Africa (MRU-07). The area's TEMP departure is $+1.2^{\circ}\text{C}$, with a close to average positive RADPAR departure and lower than expected rainfall. (Area B in figure 1.5.)
- *An area covering three American MRUs*, including the Corn Belt (MRU-13), the Caribbean (MRU-20), and the Cotton Belt extending into the northern Mexican coastal plain (MRU-14). Here,

negative departures of both TEMP (-0.6°C on average) and RADPAR (-4%) occur with consistent above average RAIN (+17% on average). (Area C in figure 1.5.)

- *Maritime eastern and southeastern Asia*, with coherent negative departures of TEMP (-0.9°C on average) and RADPAR (a very significant -5%), while RAIN was consistently positive at +24%. Included are MRU-40 (Southern China), MRU-33 (Hainan), MRU-42 (Taiwan), MRU-50 (Southeast Asia mainland), and MRU-49 (Southeast Asia islands). (Area D in figure 1.5).

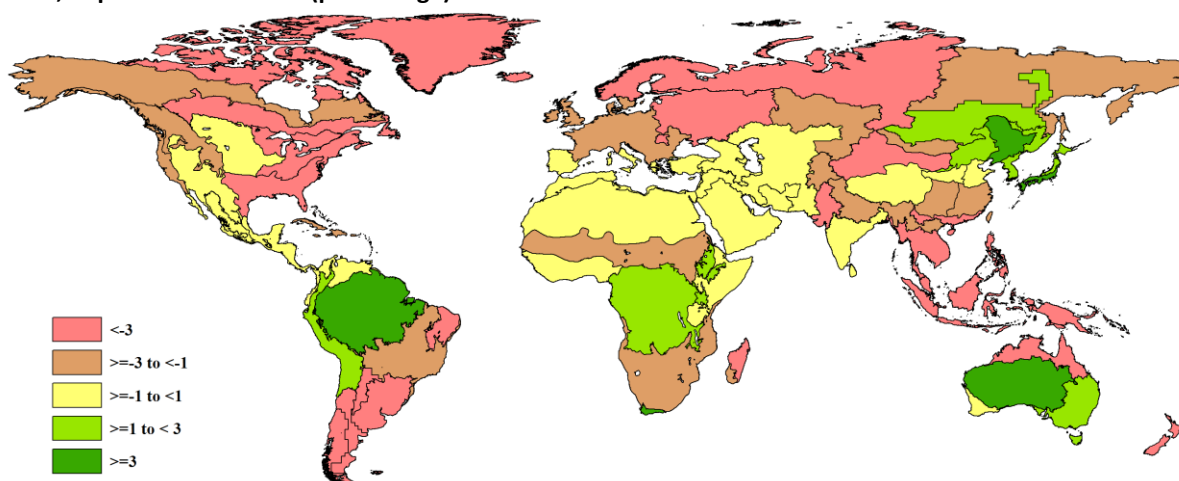
Isolated MRUs where behavior of CWAls, especially TEMP, RADPAR, and RAIN agree include:

- Ukraine to Ural Mountains (MRU-58), with TEMP at -2.2°C, RADPAR at -4%, and RAIN +22%. (Area E in figure 1.5.)
- The Sahel (MRU-08), with respective values for TEMP, RADPAR, and RAIN of -0.9°C, -2%, and +35%. (Area F in figure 1.5.)
- Punjab to Gujarat (MRU-48), with TEMP -0.8°C, RADPAR -2%, and RAIN +72%. (Area G in figure 1.5.)

Finally, New Zealand (MRU-56) stands out with a less classical combination of low rainfall (RAIN, -29%) accompanied by cooler than average temperature (TEMP, -0.3°C) and low sunshine (RADPAR, -9%).

Isolated areas characterized by abnormally low sunshine include central-north Argentina (MRU-25, RADPAR -11%), the Pampas (MRU-26, -7%), and the Brazilian Nordeste (MRU-22), where the end of the growing season had both low sunshine (-6%) and poor rainfall (-26%).

Figure 1.3. Global map of PAR anomaly (as indicated by the RADPAR indicator) by country and sub-national areas, departure from 15YA (percentage)



1.5 Biomass Production Potential (BIOMSS)

Under most circumstances, BIOMSS patterns follow RAIN patterns rather closely, as RAIN tends to vary more than TEMP, the second factor affecting the biomass production potential in the Miami model (see Annex C). The similarity between the BIOMSS (figure 1.4) and RAIN (figure 1.1) map is immediately apparent. However, large differences in the ranking of BIOMSS and RAIN occur in Western Patagonia (MRU-27) and Qinghai-Tibet (MRU-39) due to the combination of high rainfall with unusually cold temperature.

Figure 1.4. Global map of biomass anomaly (as indicated by the BIOMSS indicator) by country and sub-national areas, departure from 5YA (percentage)

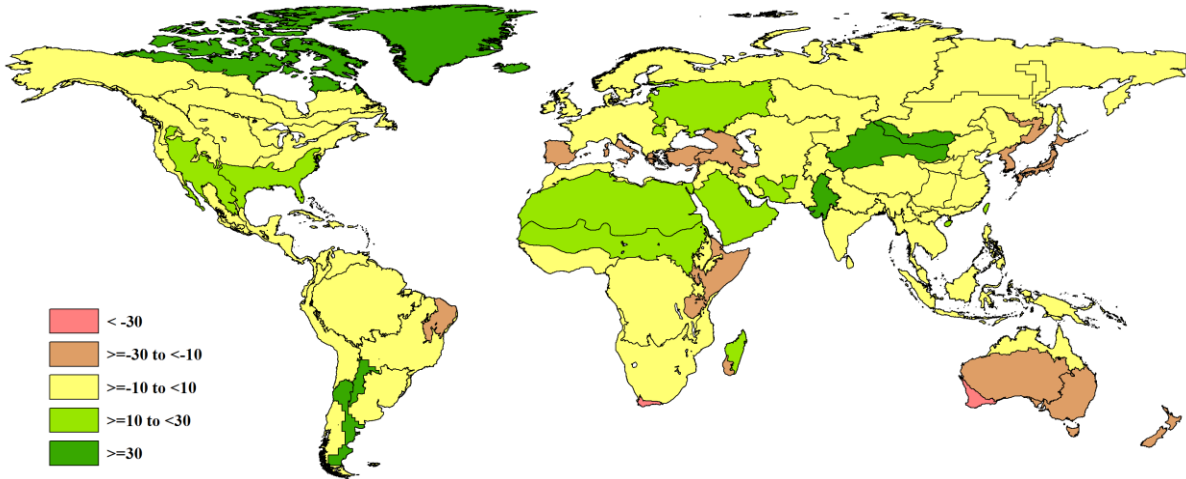
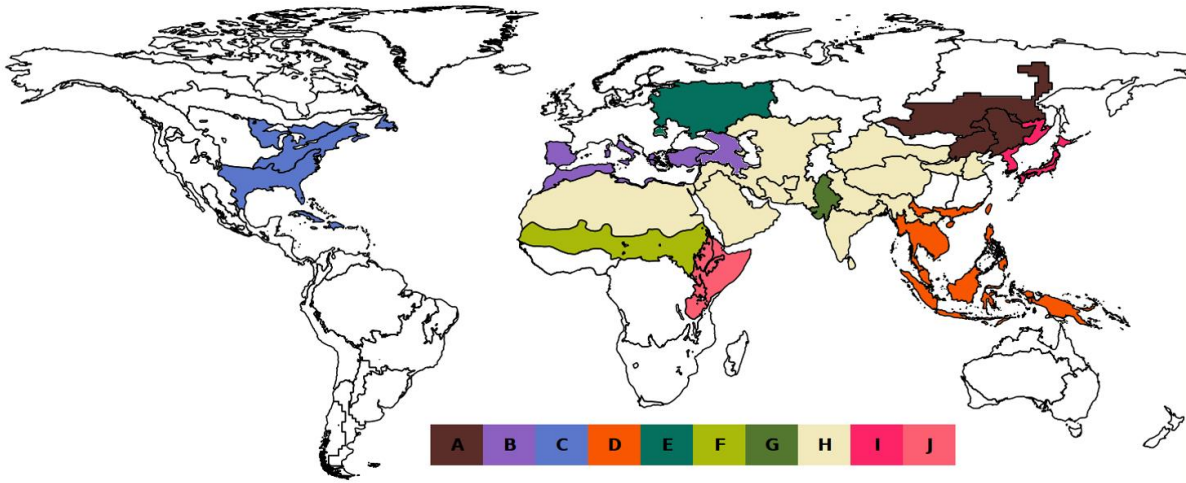


Figure 1.5. Areas of major climatic anomalies



Note: Wet areas are D, E, F, G, and H; dry areas are B, I, and J; sunny and warm: A; dry and warm: B; cool, rainy with low sunshine: C and D. Refer to the text for details.

Chapter 2. Crop and environmental conditions in major production zones

Chapter 2 presents the same indicators—RAIN, TEMP, RADPAR, and BIOMSS—as those used in Chapter 1, and combines them with the agronomic indicators—cropped arable land fraction (CALF), maximum vegetation condition index (VCIx), and minimum vegetation health index (VHIn)—to describe crop condition in six Major Production Zones (MPZ) across all continents. For more information about these zones and methodologies used, see the quick reference guide in Annex C as well as the CropWatch bulletin online resources at www.cropwatch.com.cn.

2.1 Overview

Tables 2.1 and 2.2 present an overview of the agroclimatic (table 2.1) and agronomic (table 2.2) indicators for each of the six MPZs, comparing the indicators to their fifteen and five-year averages, respectively.

Table 2.1. April-July 2017 agroclimatic indicators by Major Production Zone, current value and departure from 15YA

	RAIN		TEMP		RADPAR	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m ²)	Departure (%)
West Africa	671	9	27.9	-0.7	1105	-1
South America	367	13	19.0	0.1	761	-4
North America	502	21	19.3	-0.2	1286	-2
South and SE Asia	908	17	29.0	-0.6	1128	-2
Western Europe	261	-5	15.6	0.8	1160	-1
C. Europe and W. Russia	287	17	14.2	-1.8	1098	-5

Note: Departures are expressed in relative terms (percentage) for all variables, except for temperature, for which absolute departure in degrees Celsius is given. Zero means no change from the average value; relative departures are calculated as $(C-R)/R*100$, with C=current value and R=reference value, which is the fifteen-year average (15YA) for the same period (April-July) for 2002-2016.

Table 2.2. April-July 2017 agronomic indicators by Major Production Zone, current season values and departure from 5YA

	BIOMSS (gDM/m ²)		CALF (Cropped arable land fraction)		Maximum VCI Intensity
	Current	Departure (%)	Current	Departure (% points)	Current
West Africa	1773	6	90	-1	0.94
South America	914	0	98	1	0.70
North America	1352	7	94	0	0.88
S. and SE Asia	1558	5	66	-11	0.84
Western Europe	1029	-3	96	0	0.90
Central Europe and W Russia	1153	15	99	1	0.96

Note: See note for table 2.1, with reference value R defined as the five-year average (5YA) for April-July 2012-2016.

2.2 West Africa

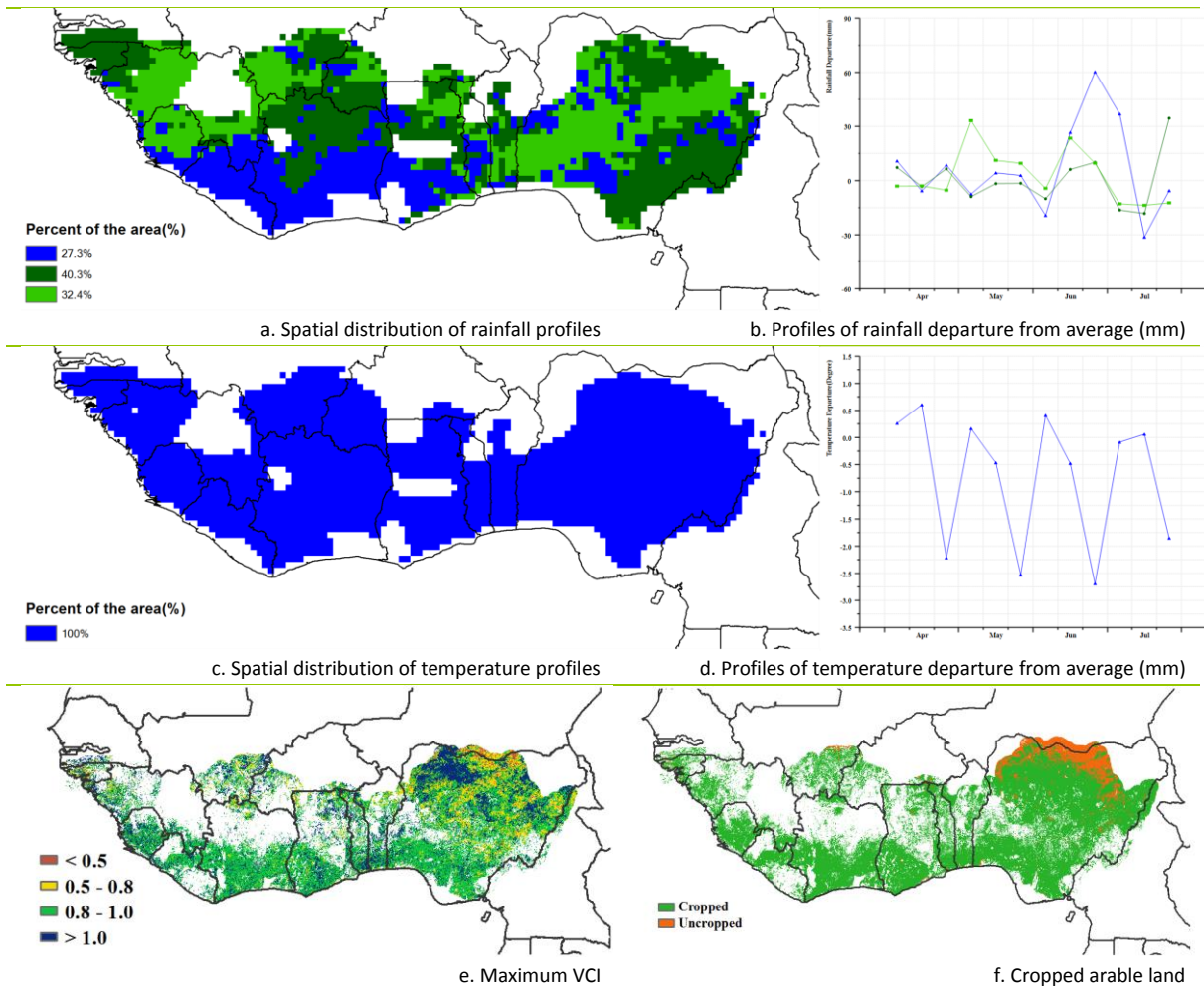
The reporting period marks the beginning of the main rainy season and the sowing of main cereals (maize, sorghum, millet, and rice) throughout the region under both rainfed and irrigated conditions. In the south

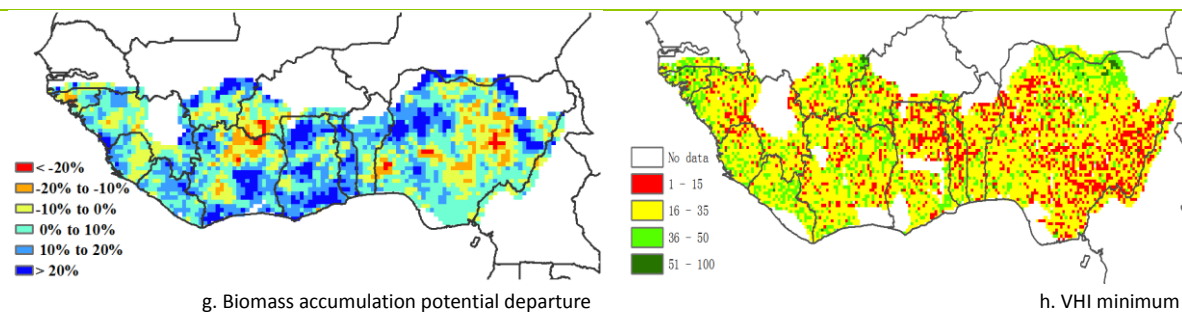
of the MPZ, in a region covering southern Côte d'Ivoire to Nigeria that tends to record bimodal rainfall, harvesting of yams is underway. In the west (Guinea to Liberia), rice plays an important role, the harvest of which extends into December and sometimes even January. In the areas that tend to record bimodal rainfall, the first maize crop is harvested in October, while the short season maize was harvested in early 2017. In contrast, cassava (the main staple in the region) is still growing, as reflected by the area of cropped arable land.

Based on CropWatch observations, average rainfall was 671 mm over croplands of the MPZ, corresponding to an increase of +9% for RAIN. The highest rainfall was recorded in Guinea (731 mm, +14%). The MPZ had close to average temperature (27.9°C, -0.7%) and sunshine (RADPAR with a -1.0% deviation), which gave a slight increase of the biomass production potential (BIOMSS, +6%). For the MPZ as a whole, the cropped arable land fraction (CALF) reached 90%. Precipitation is currently building up and positively supporting plant growth. According to the maximum VCI (VCIx) map in relation to crop condition, the average VCIx was above 0.8 (BIOMSS, +6%) with values exceeding 1.0 in parts of northern Nigeria, indicating generally favorable condition across the northern Savannah agro-ecological zone. Over the reporting period, Nigeria had a good share of cropped arable land reflecting the extent of agricultural production in the region.

Generally, as the growing season intensified during this reporting period, the climatic conditions were close to average, with precipitation well distributed in time. The temperature fluctuated around average within a +/-0.7°C margin after onset of the main rainy season. CropWatch indicators depict a stable and coherent climatic condition conducive for crop growth buildup leading to harvest in late 2017.

Figure 2.1. West Africa MPZ: Agroclimatic and agronomic indicators, April-July 2017





2.3 North America

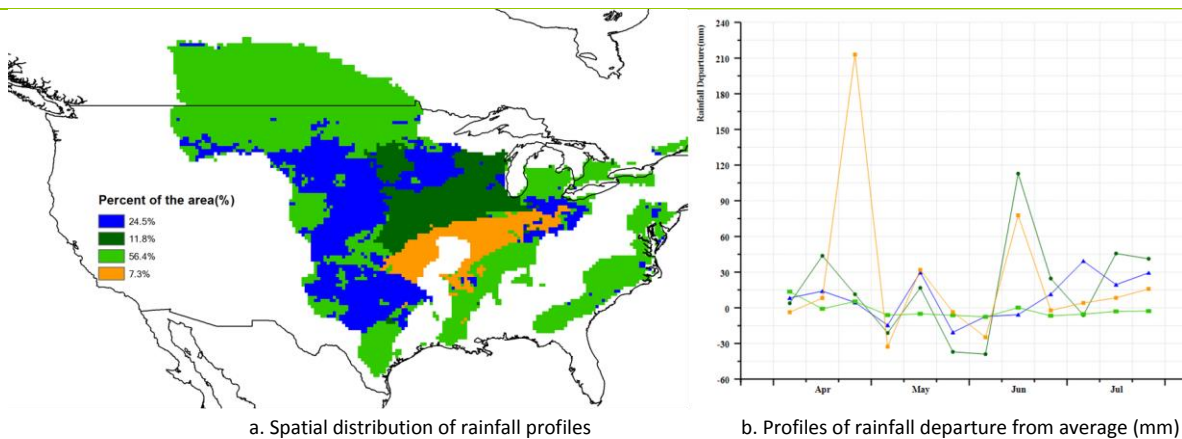
This monitoring period covers the harvesting season of winter crops and the growing season of summer crops.

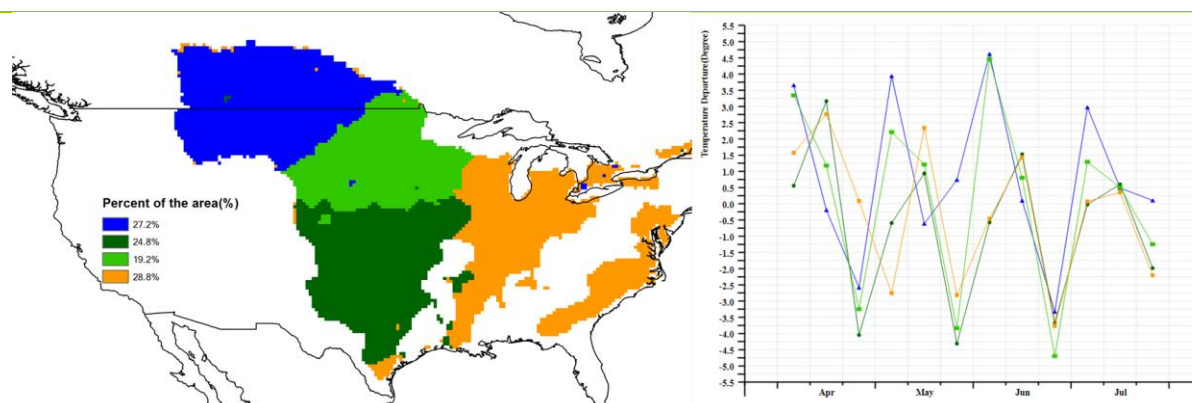
The agroclimatic indicators show that rainfall (RAIN) was 21% above average, temperature (TEMP) was down by 0.2°C, while PAR (RADPAR) was 2% below average. Abundant rainfall fell over the major crop production zones, including the Northern Great Plains (RAIN, +20%), Corn Belt (+13%), and Cotton Belt to Mexican Nordeste (+20%), which would replenish soil moisture for the growth of crops. Unfavorable agroclimatic conditions were recorded in wheat production zones, with some major spring wheat areas suffering drought (including Manitoba (RAIN, -25%), Saskatchewan (-24%), North Dakota (-21%), Montana (-10%), and Oregon (-25%)), and some winter wheat states in the United States suffering flooding, especially in Oklahoma (+51%). Abundant rainfall is also confirmed by the spatial rainfall clusters in parts of Oklahoma, Missouri, and Indiana (abnormally heavy rain in late April). At the beginning of June, the western Corn Belt and some winter wheat zones suffered heavy rainfall again, while in the northern Plains and Canadian Prairie, rainfall was consistently below average. Unfortunately, the northern Plains and Canadian Prairie also suffered very high temperature (+4°C to 4.5°C) in late April, May, and June, which accelerated the loss of soil moisture.

Unfavorable crop condition is confirmed by BIOMSS values of 20% below the recent average of the biomass production potential in the north of North Dakota and south of Canadian Prairie, indicating drought, which also was confirmed by the VHI map. Agronomic indices also indicate depressed crop condition in wheat zones, especially in the north of North Dakota and Montana, as well as in the southern part of Saskatchewan in Canada where the value of VCIx was below 0.5. Agronomic indices including an unchanged cropped arable land fraction (0%) and BIOMSS (+7%) were normal in remaining areas.

In general, crop condition is below average in the North American MPZ.

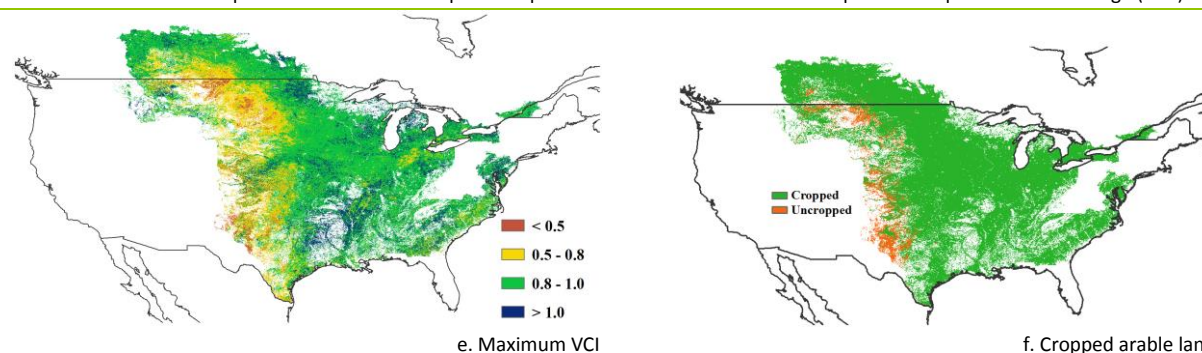
Figure 2.2. North America MPZ: Agroclimatic and agronomic indicators, April-July 2017





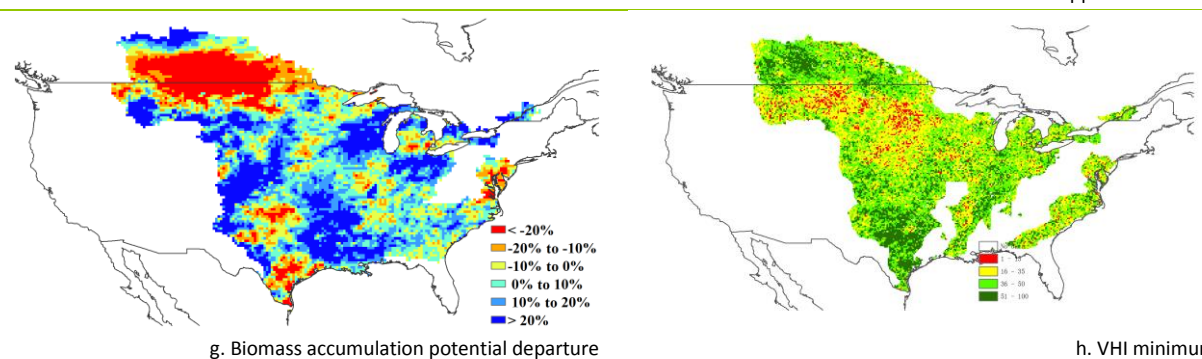
c. Spatial distribution of temperature profiles

d. Profiles of temperature departure from average (mm)



e. Maximum VCI

f. Cropped arable land



g. Biomass accumulation potential departure

h. VHI minimum

Note: For more information about the indicators, see Annex C.

2.4 South America

In Argentina and Uruguay, most winter crops were planted and most of the late maize was harvested over the reporting period; soybean and maize fields are in their fallow periods. In the south of Brazil, the second maize crop is growing, while most of the main maize crop has been harvested and most wheat was planted.

For the whole MPZ, rainfall (RAIN) showed a 13% increment, while radiation (RADPAR) was 4% below average and temperature was average (TEMP, 0.1°C). Temperature was above average during the last two months in the southern half of the region, probably promoting wheat growth during the winter. Precipitation is showing a continuity of data below average (a pre-condition for dryness) at the end of this period in the center and south of Brazil's main cropping areas. Precipitation in the south of Brazil was above average during May, which reduces the dry condition for this area that would otherwise be expected for the end of this reporting period.

BIOMSS for the MPZ showed an increment of less than 1% compared to its five-year average for the zone at this time of year. This indicator is showing positive departures in the south (most of Argentina), probably associated with the high temperatures observed for that area and the lack of precipitation

anomalies. At the same time, lower than normal precipitation could be the cause of lower BIOMSS values in Brazil.

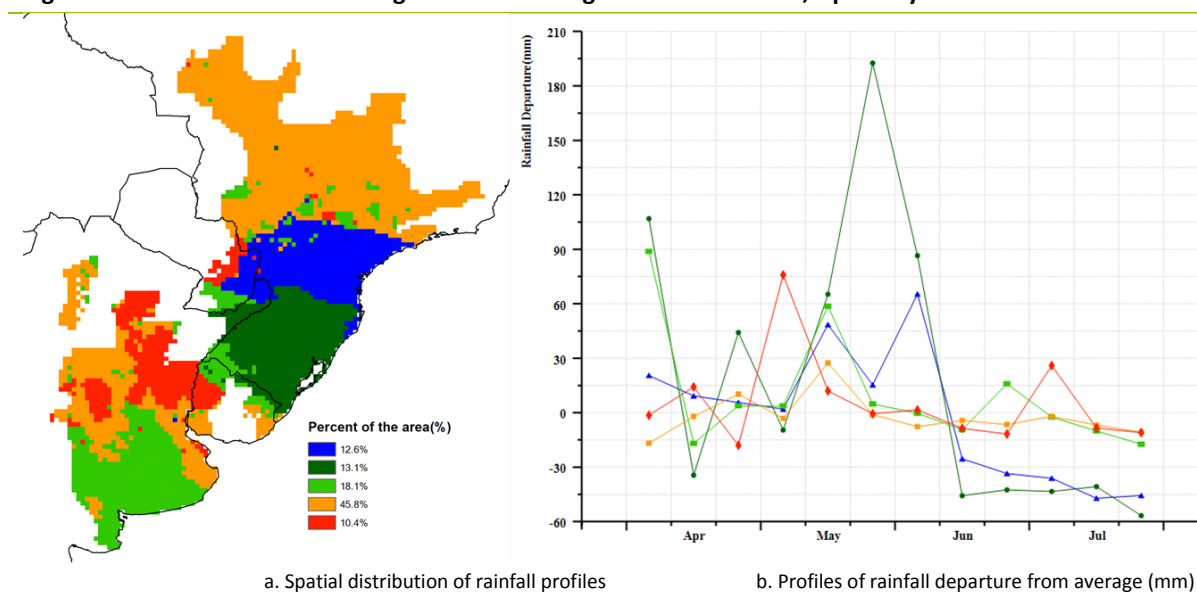
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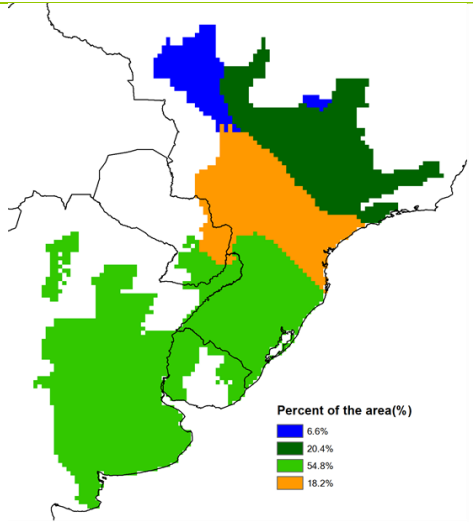
Arable land is cropped over most of the MPZ with 1% increase compared to the five year average of the Cropped Arable Land Fraction (CALF). An exception to this occurs in the central Pampas, where water logged soil may subsist locally due to the high rains from last season.

Over the reporting period, soybean--the main crop in the region--is not present in the field; changes in VCIx could reflect both the condition of the present crop (that is, wheat in Argentina and Uruguay and maize in Brazil) and changes in planted area with respect to average years. South of Buenos Aires province, the main wheat production area shows high VCIx values, which can be more accurately associated with good crop condition.

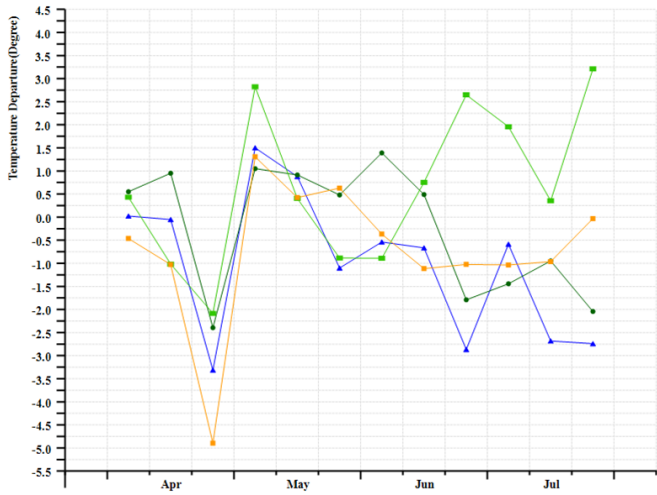
Low VHIx values in the central Pampas and the south of Brazil could result from the high temperatures observed there and are not necessarily associated with poor growing conditions as they are occurring in winter.

Figure 2.3. South America MPZ: Agroclimatic and agronomic indicators, April-July 2017

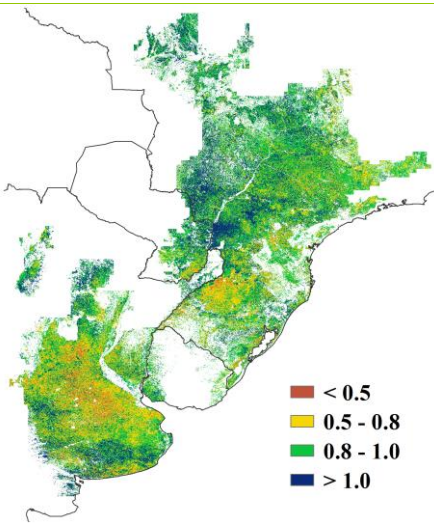




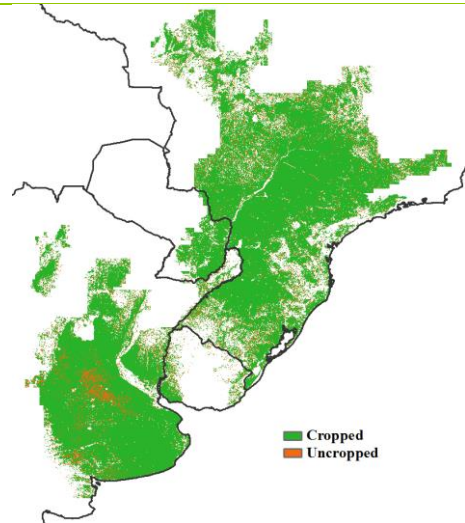
c. Spatial distribution of temperature profiles



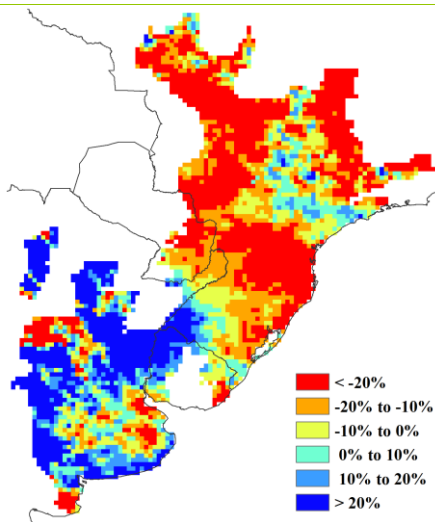
d. Profiles of temperature departure from average (mm)



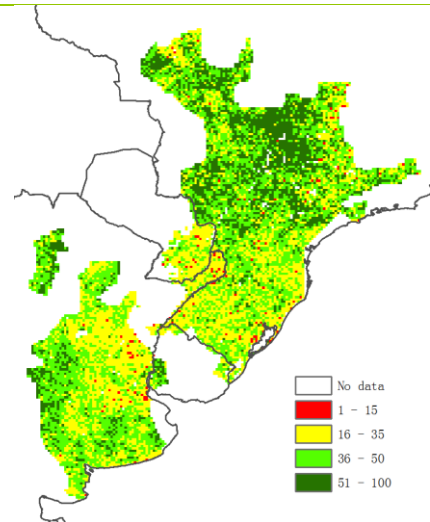
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

Note: For more information about the indicators, see Annex C.

2.5 South and Southeast Asia

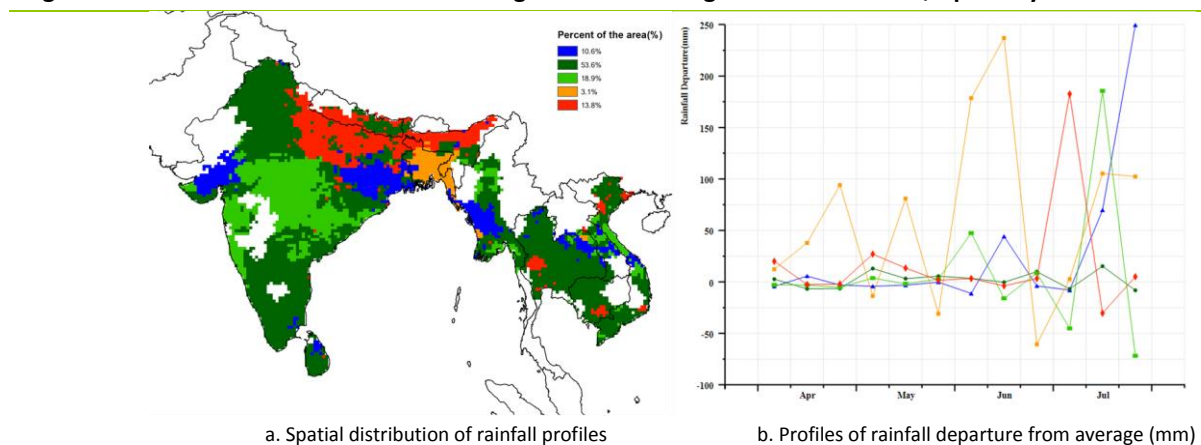
The reporting period covers a variety of phenological situations in the region, listed here by country. Bangladesh: Aman rice planting, Aus rice planting and harvesting, and Boro rice harvesting; Cambodia: maize planting, dry season rice harvesting, and wet season rice planting; India: planting of Kharif rice, maize, and soybean, as well as harvesting of Rabi rice and wheat; Myanmar and Nepal: planting of rice and maize and harvesting for wheat; Thailand: planting as well as harvesting of rice and maize crops; and Vietnam: rice planting as well as harvesting, which continues here almost year-round.

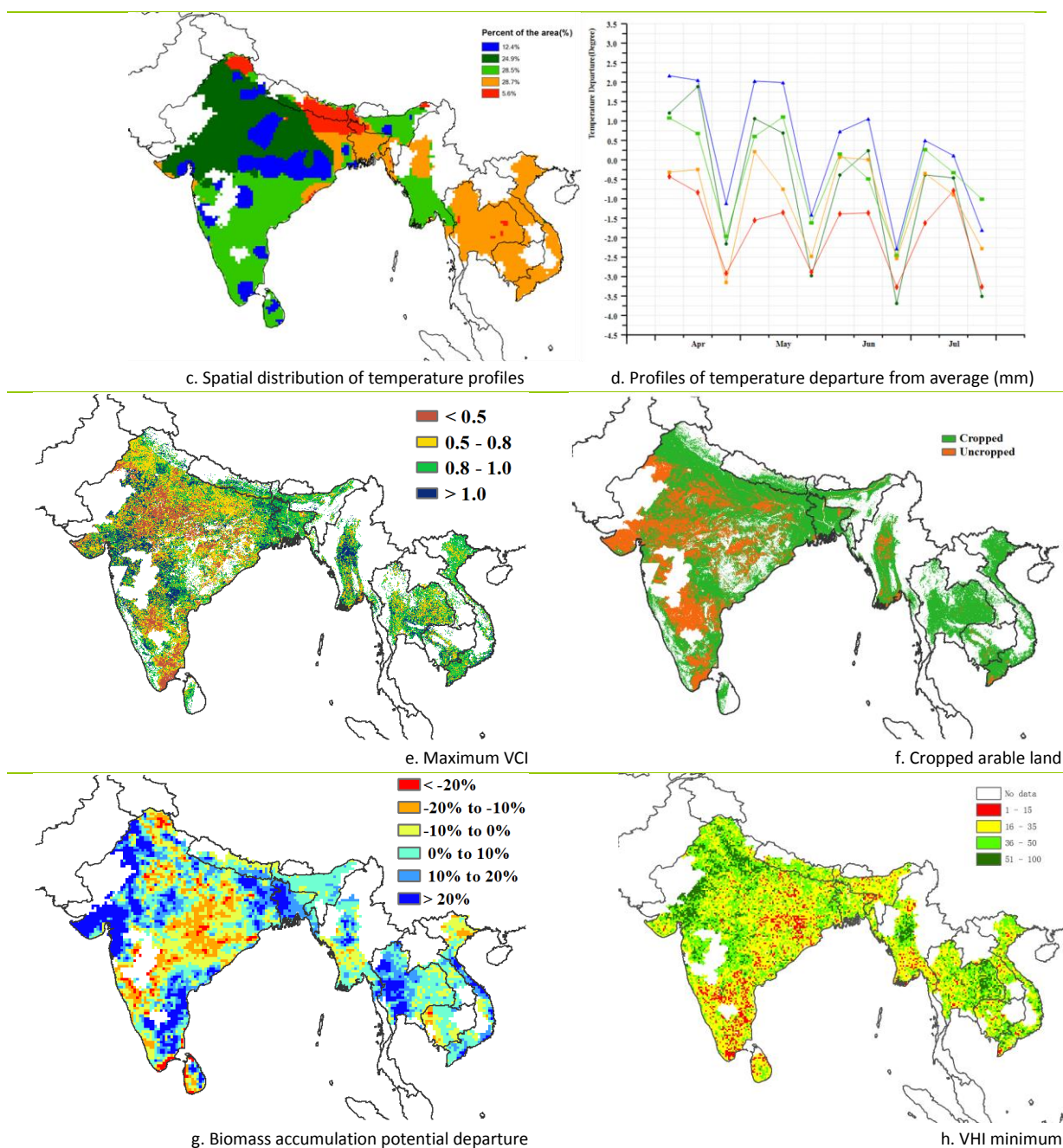
Overall, the South and Southeast Asia MPZ received about 17% above average rainfall (RAIN), nearly average temperature (TEMP, -0.6°C) and nearly normal radiation (RADPAR, -2%). All countries recorded above average precipitation: Bangladesh RAIN $+46\%$, India $+17\%$, Thailand $+16\%$, Vietnam $+12\%$, Laos $+9\%$, Cambodia $+7\%$, Nepal $+6\%$, and Myanmar $+3\%$. Particularly in June and July the weather was cooler than normal in all countries in the zone. RADPAR was low in Bangladesh (-7%) and Vietnam (-6%), for other countries in this region it was within 5% of average. With mostly favorable agroclimatic condition, the prevailing biomass accumulation potential BIOMSS was above average for most countries (Bangladesh $+15\%$, India $+8\%$, Thailand $+6\%$, Cambodia $+3\%$, Nepal $+3\%$, and Vietnam $+1\%$), with the exception of Laos (-2%) and Myanmar (-3%).

Among the agronomic indicators, the VCIx value was generally favorable at about 0.8 and above across the region, except in India where it displays mixed patterns. The Cropped Arable Land Fraction (CALF) indicates that most countries other than India and Myanmar have almost fully cropped their arable land. Uncropped arable land occurs in central Myanmar and especially in India where central, western, and southern areas are affected. The pattern is mostly confirmed by the BIOMSS indicator, which shows also some low values in Thailand. Favorable BIOMSS departures are observed in east, west, and parts of south India, Bangladesh, most of Thailand, and in Vietnam except in the north. Cambodia shows a mixed pattern of high and low biomass potential as well. Crop stress as indicated by VHI was confined to peninsular India and south Myanmar, and only sporadically in other countries.

The overall situation in the MPZ was good. Because the reporting period covered mostly planting and crop growth periods, the weather in the coming months will be important.

Figure 2.4. South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, April-July 2017





Note: For more information about the indicators, see Annex C.

2.6 Western Europe

In general, crop condition was above average in most parts of the continental Western European MPZ during this reporting period, favoring winter crop grain filling and harvesting, as well as growth of spring crops. The figures present an overview of CropWatch agroclimatic and agronomic indicators for this MPZ.

The agroclimatic indicators show that total rainfall was 5% below average over the region, resulting from marked negative departures in Spain, most of France, central and east Italy, central and east Slovakia, north Hungary, northeast Austria, and the west and east of the Czech Republic. The most severely affected three countries were Spain (RAIN, -29%), Italy (-26%), and France (-23%). Exceptional positive departures, however, were recorded (i) from mid-April to late April, mid-May, early and late June, and after mid-July over most of Germany, England, Denmark, most of the Czech Republic, northwest Austria, the southwest of Slovakia, and southern Hungary and (ii) in mid-May and early and late June in Spain,

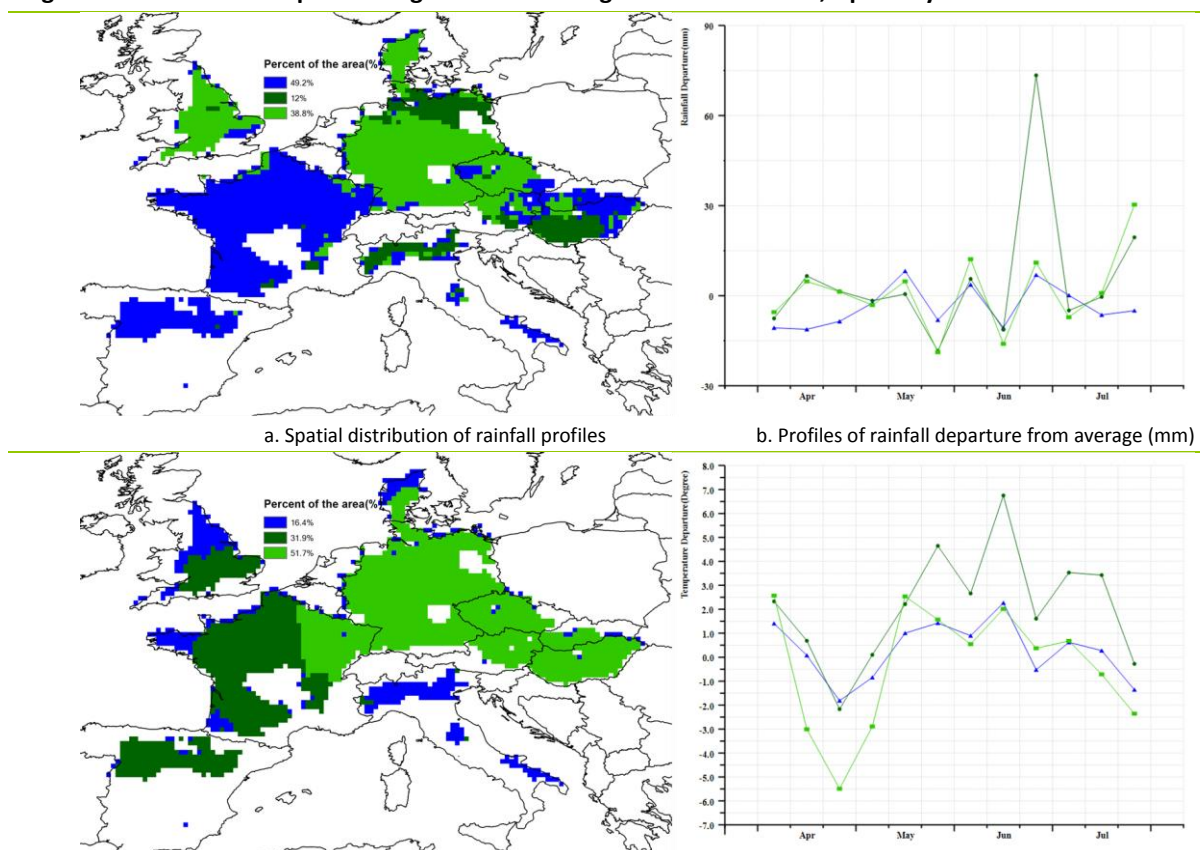
most of France, and in the center and east of Italy. Abundant precipitation was recorded in northern Germany, southern Hungary, the middle England, and in northeast Austria from mid-June to early-July. More rain is needed in some Western European countries for summer crops. Radiation for the MPZ as a whole was slightly below average with RADPAR at -1%.

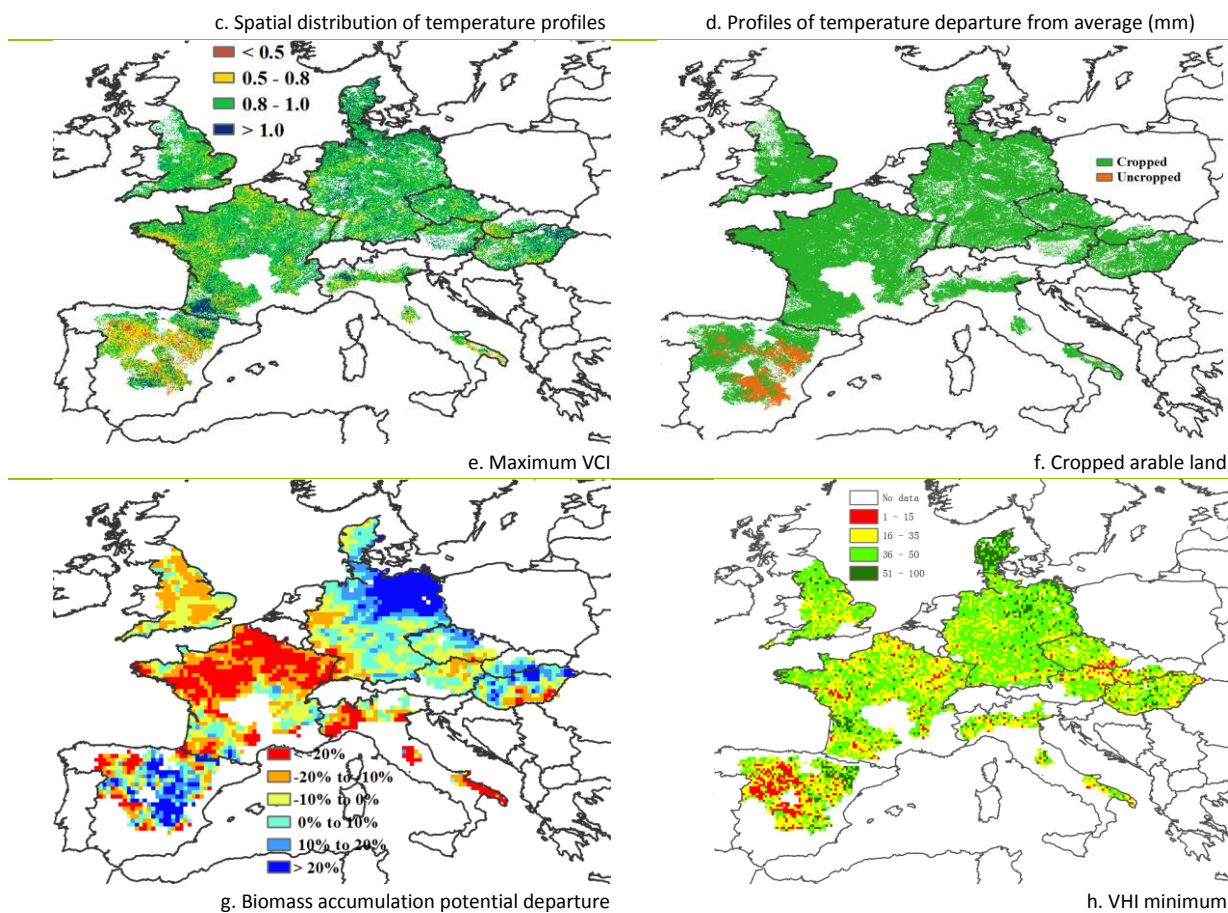
Temperature for the MPZ as a whole was above average (+0.8°C); below average temperatures were observed from mid-April to early May in most of Italy, northern England, southwest and west France, and in northern Denmark. Low minimum temperatures that set in after mid-April are likely to have affected flowering rapeseed in eastern France, western and southern Germany, the Czech Republic, Slovakia, Austria, and Hungary. Unusually cold conditions occurred in large parts of western, central, and northern Europe, affecting rapeseed flowering in Germany and Central Europe in May. A less severe cold spell occurred at the beginning of May, mainly affecting the Czech Republic and Slovakia. Warmer-than-usual weather conditions prevailed in the Iberian Peninsula, France, southeastern England, and Italy. An extreme heat spell affected the Iberian Peninsula, Italy, and southern Hungary at the beginning of June.

Due to hot (especially after mid-May) and dry weather conditions, the biomass accumulation potential BIOMSS was 3% below the recent five-year average. The lowest BIOMSS values (-20% and less) occurred in France, the United Kingdom, Spain, Italy, southwest Germany, the south of Hungary, southern Czech Republic, and northwest Austria. In contrast, BIOMSS was above average (sometimes exceeding a 10% departure) in the north of Germany and the north of the Czech Republic, south Slovakia, and the north of Hungary. The average maximum VCI for the MPZ reached a value of 0.90 during this reporting period, indicating favorable crop condition. More than 96% of arable lands were cropped, which is the same as the recent five-year average. Most uncropped arable land is concentrated in Spain and southeast Italy.

Generally, crop condition in the Western Europe MPZ was mixed: just fair in the west and favorable in the east. More rain is needed in summer crop production areas to sustain good yields.

Figure 2.5. Western Europe MPZ: Agroclimatic and agronomic indicators, April-July 2017





Note: For more information about the indicators, see Annex C.

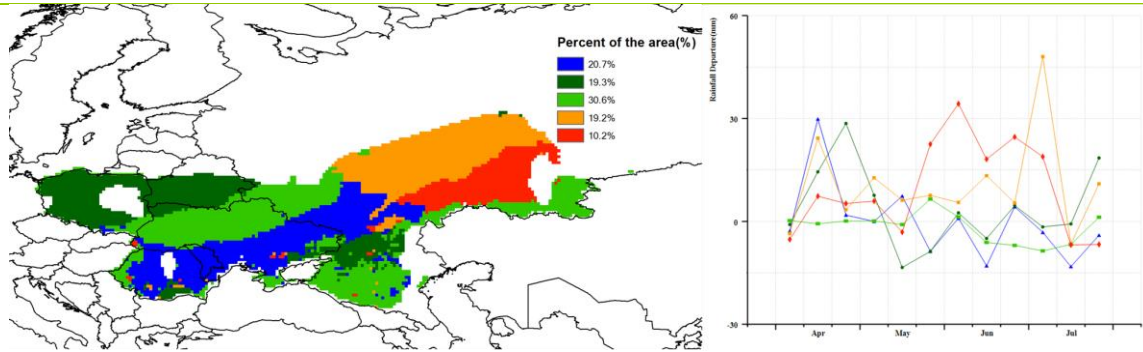
2.7 Central Europe to Western Russia

During the current monitoring period, most parts of the Central Europe to Western Russia MPZ presented favorable conditions of winter and summer crop (average $VCI_x=0.96$). The whole MPZ experienced colder (TEMP 1.8°C below average), wetter (RAIN, $+17\%$) and less sunny (RADPAR, -5%) than average weather. This provided good soil moisture but slowed down crop growth.

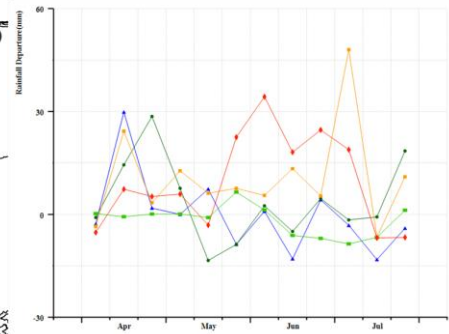
As indicated by the temperature profiles, lowest temperatures (5.5°C below average in May) affected especially the east part of the MPZ, which is west and south Russia. In Belarus and Poland, temperature dropped rapidly from early April (with more than 5°C below average at the end of the month), but then recovered to average in June. Rainfall profiles show that most parts of western Russia (accounting for most arable land in this area, including the Oblasts of Sverdlovskaya, Permskaya, Kirovskaya and the Bashkortostan Republic) received well above average rainfall from April to mid-July, with almost 45% above average rainfall in early July. In Belarus, Poland, Romania, and southern Ukraine, which together make up almost 40% of the MPZ, rainfall decreased from early May and stayed at an average or slightly below average level from May to June.

Almost all of the arable land was actually cropped during the reporting period (with a CALF of $+1\%$ over average). Due to the favorable moisture condition across the entire MPZ, the accumulated potential biomass (BIOMSS) is much above the five-year average (BIOMSS, $+15\%$). However, most of Ukraine and Timis in Romania showed a drop (more than 20%) in BIOMSS, which is consistent with low VHI values in central Ukraine. Most areas of the MPZ show maximum VCI values above 1, except Ukraine. Overall, with most parts indicating above average crop conditions and favorable agroclimatic factors, prospects for crop production are promising in Central Europe to Western Russia.

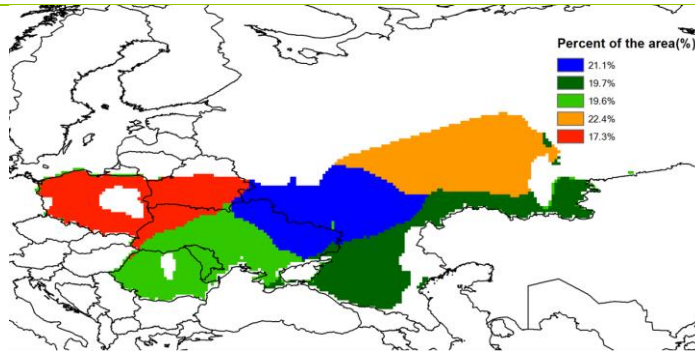
Figure 2.6. Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, April-July 2017



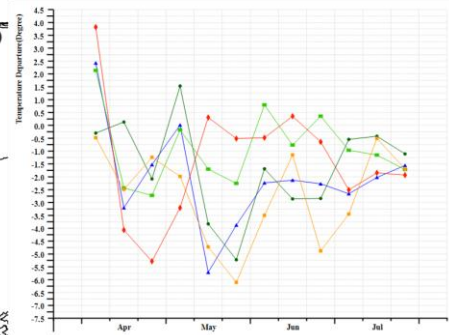
a. Spatial distribution of rainfall profiles



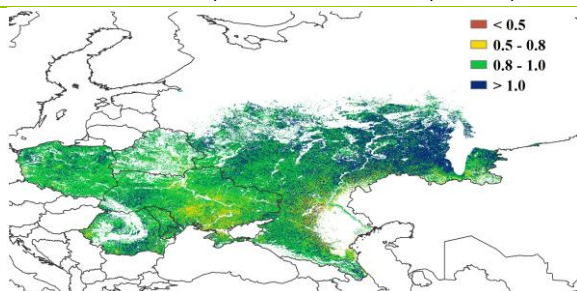
b. Profiles of rainfall departure from average (mm)



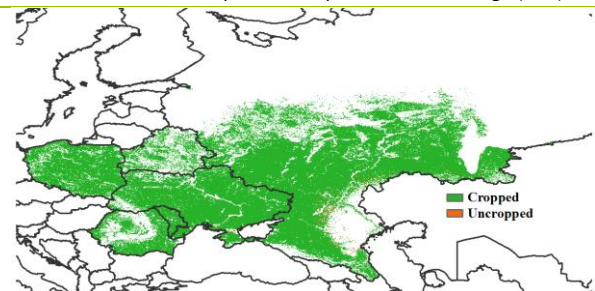
c. Spatial distribution of temperature profiles



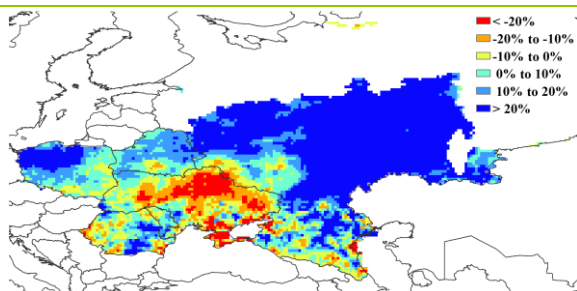
d. Profiles of temperature departure from average (mm)



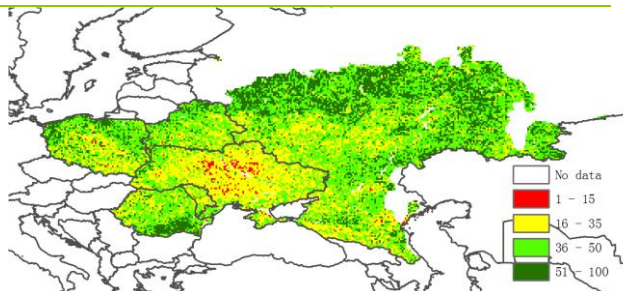
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

Note: For more information about the indicators, see Annex C.

Chapter 3. Main producing and exporting countries

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

3.1 Overview

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

Rainfall

Wet areas

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

Dry areas

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

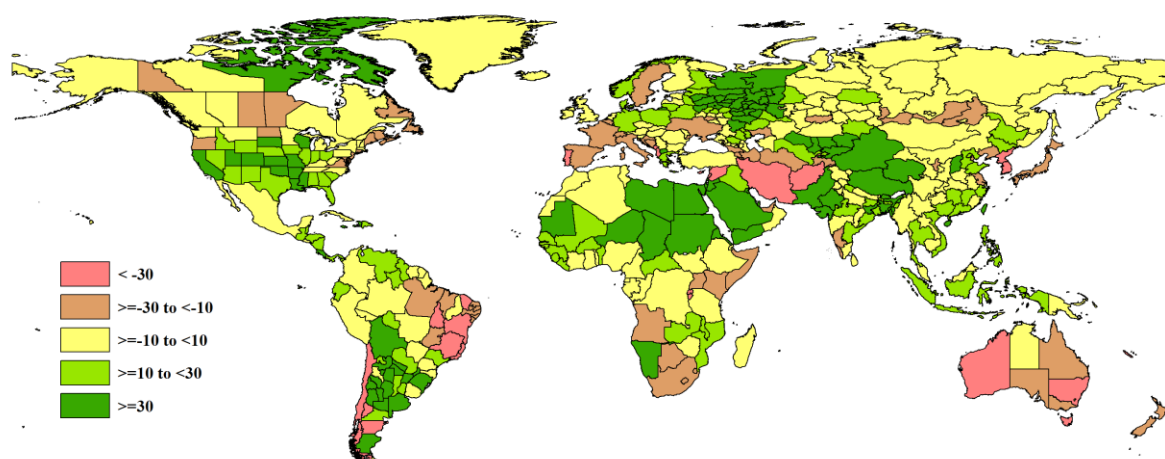
end of the growing season and may worsen a tense humanitarian situation. It is interesting to compare Ethiopia (RAIN, -4%, nationwide) and Kenya (RAIN, -30% nationwide).

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

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

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

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



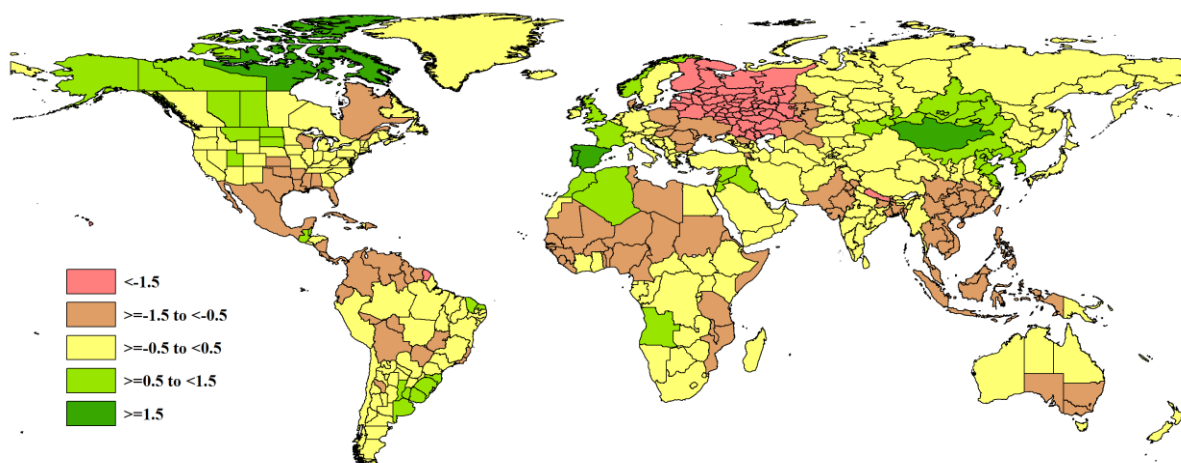
Temperature

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

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

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

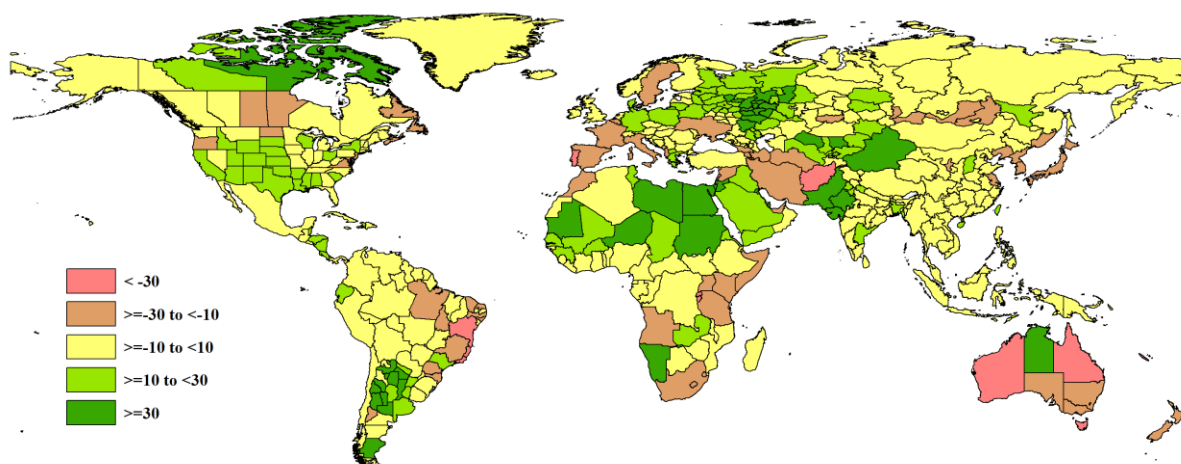
Figure 3.2. Global map of April-July 2017 temperature (TEMP) by country and sub-national areas, departure from 15YA (degrees)



Sunshine (RADPAR)

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

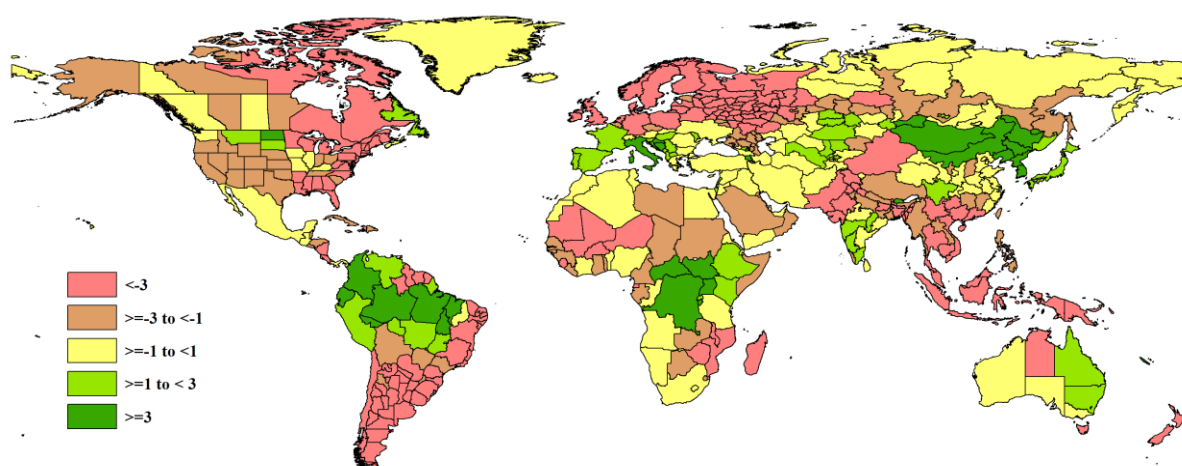
Figure 3.3. Global map of April-July 2017 PAR (RADPAR) by country and sub-national areas, departure from 15YA (percentage)



Biomass accumulation potential

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

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

Figure 3.4. Global map of April-July 2017 biomass (BIOMSS) by country and sub-national areas, departure from 15YA (percentage)**Table 3.1. CropWatch agroclimatic and agronomic indicators for April-July 2017, departure from 5YA and 15YA**

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

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

3.2 Country analysis

This section presents CropWatch analyses for each of thirty key countries (China is addressed in Chapter 4). The maps refer to crop growing areas only and include: (a) Graph for the phenology of major crops; (b) Crop condition development graph based on NDVI average over crop areas at national scale, comparing the April-July 2017 period to the previous season and the five-year average (5YA) and maximum; (c) Maximum VCI (over arable land mask) for April-July 2017 by pixel; (d) Spatial NDVI patterns up to July 2017 according to local cropping patterns and compared to the 5YA; and (e) NDVI profiles associated with the spatial pattern under (d). Next, separate graphs (labeled as figures (f), (g), and subsequent letters) are included to illustrate crop condition development graphs based on NDVI average over crop areas for different regions within the country, again comparing the April-July 2017 period to the previous season and the five-year average (5YA) and maximum.

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

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

[ARG] Argentina

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

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

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

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

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

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

Regional analysis

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

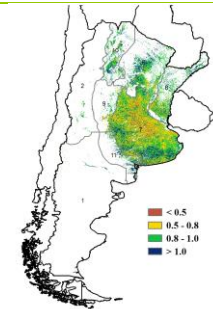
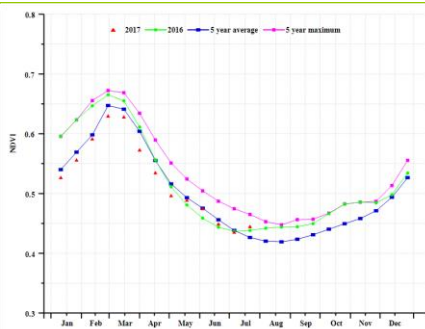
All regions received well above average rainfall (RAIN at least 33% above the fifteen-year average). Correspondingly, the departure of RADPAR for the regions ranges from -1% to -12%. Favorable conditions altogether benefited the crops as indicated by above average BIOMASS values. The Cropped Arable Land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

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

Figure 3.5. Argentina crop condition, April-July 2017

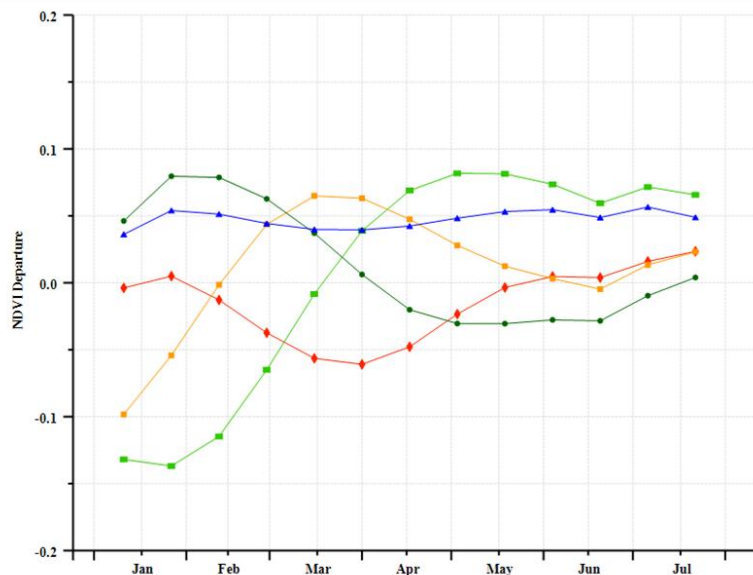
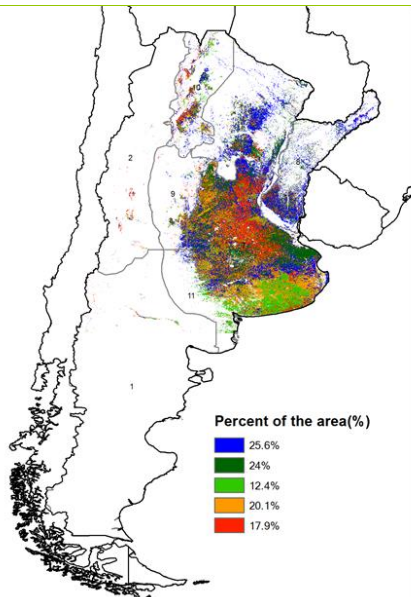


(a). Phenology of major crops



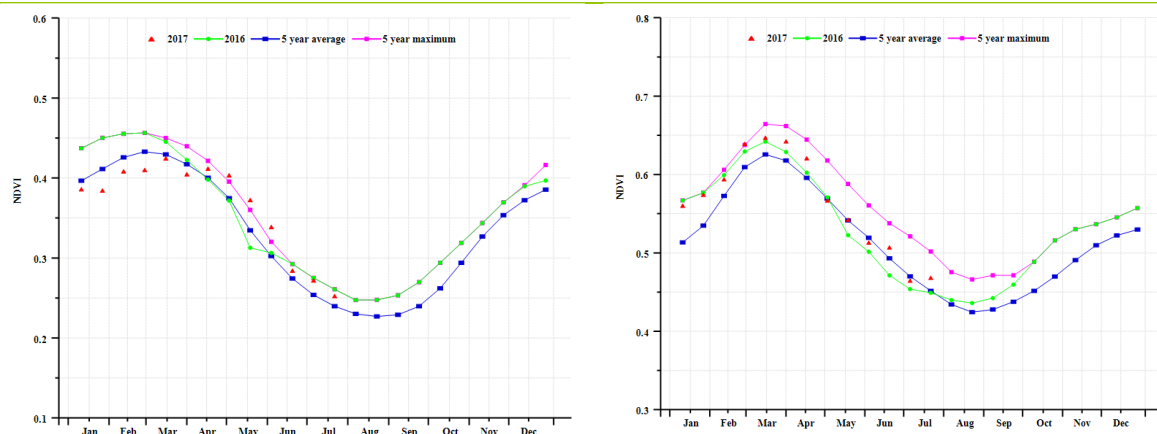
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

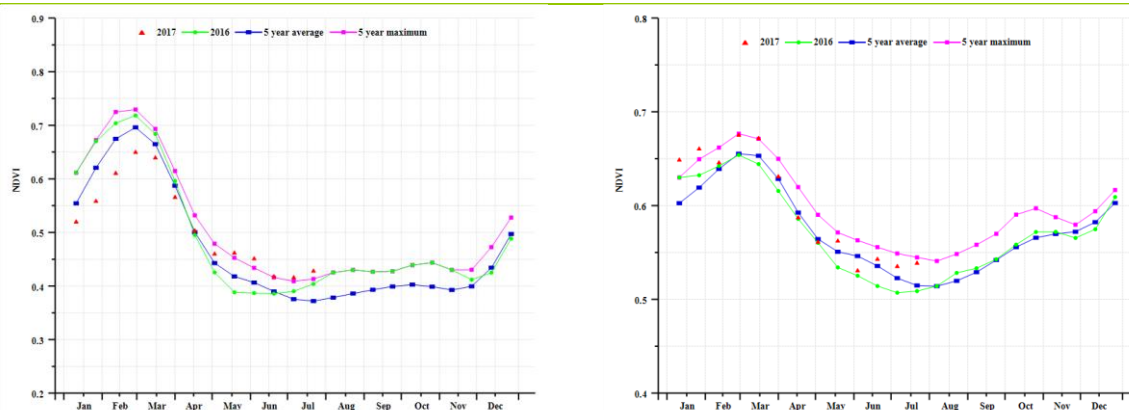


(d) Spatial NDVI patterns compared to 5YA

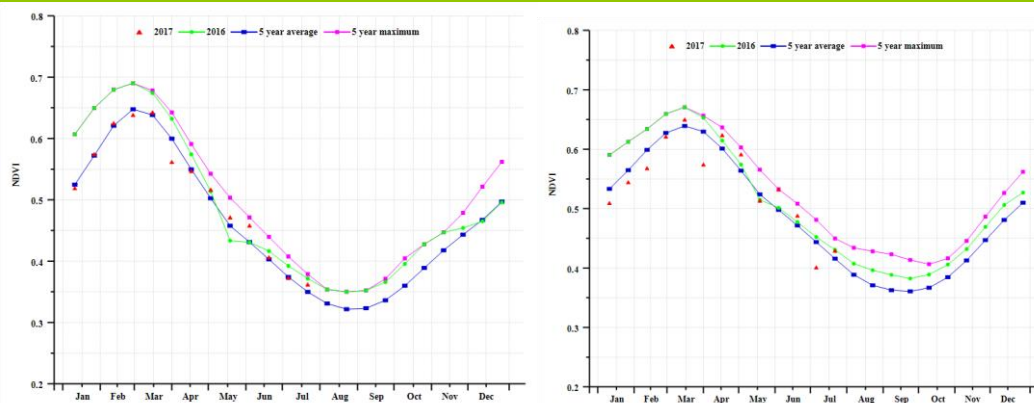
(e) NDVI profiles



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



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



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

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

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Andes mountain region	87	81	7.7	-0.1	853	-1
Chaco region	365	57	17.9	0.0	621	-10
Pampas region	260	33	13.2	0.6	549	-12
Mesopotamia	630	49	17.1	0.5	624	-8
Pampas mountains	152	71	12.0	-0.4	624	-10
Tropical highland	121	98	16.3	-0.3	667	-9

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

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Andes mountain region	347	76	74	18	0.66
Chaco region	950	42	100	0	0.92
Pampas region	777	18	94	1	0.23
Mesopotamia	1331	20	99	1	0.86
Pampas mountains	570	69	91	10	0.58
Tropical highland	332	50	100	3	0.95

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

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

[AUS] Australia

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

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

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

Regional analysis

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

Southeastern wheat zone

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

Southwestern wheat zone

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

Arid and semi-arid zone

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

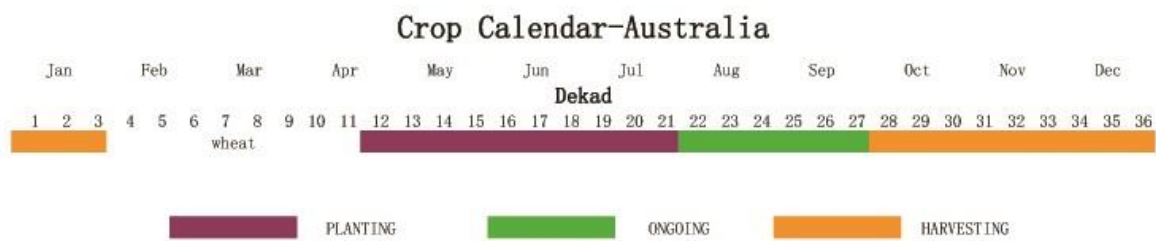
Wet temperate and subtropical zone

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

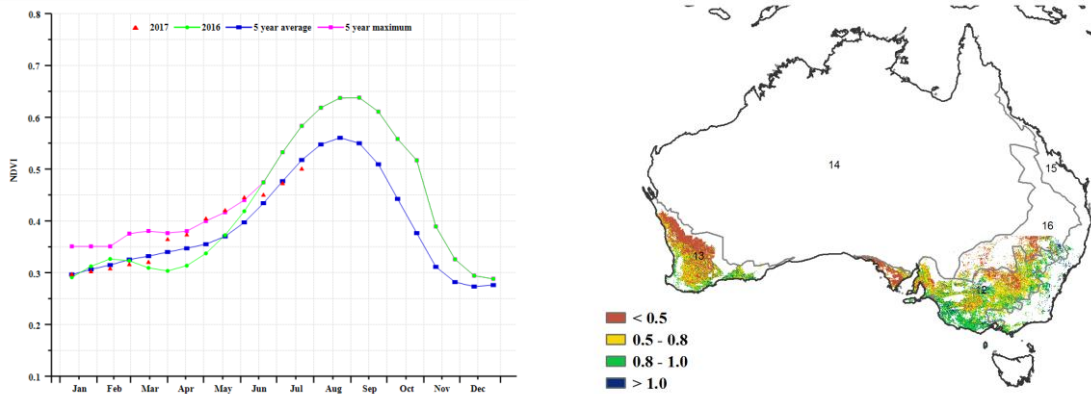
Subhumid subtropical zone

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

Figure 3.6. Australia crop condition, April-July 2017

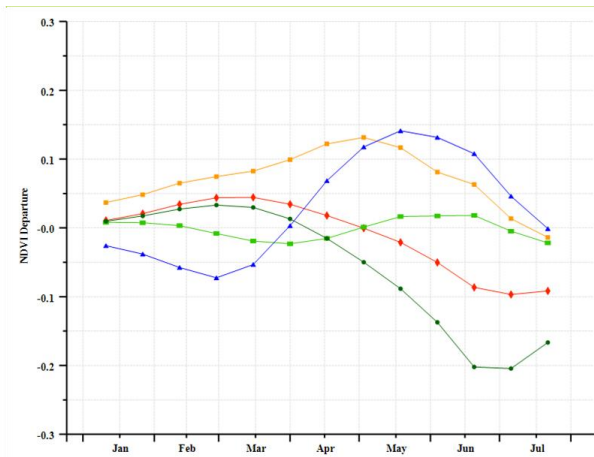
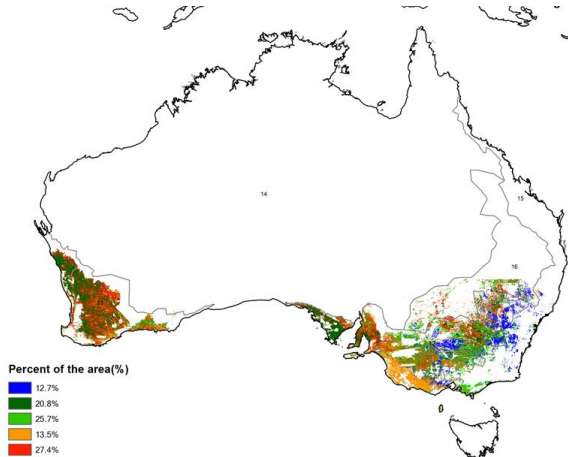


(a). Phenology of major crops



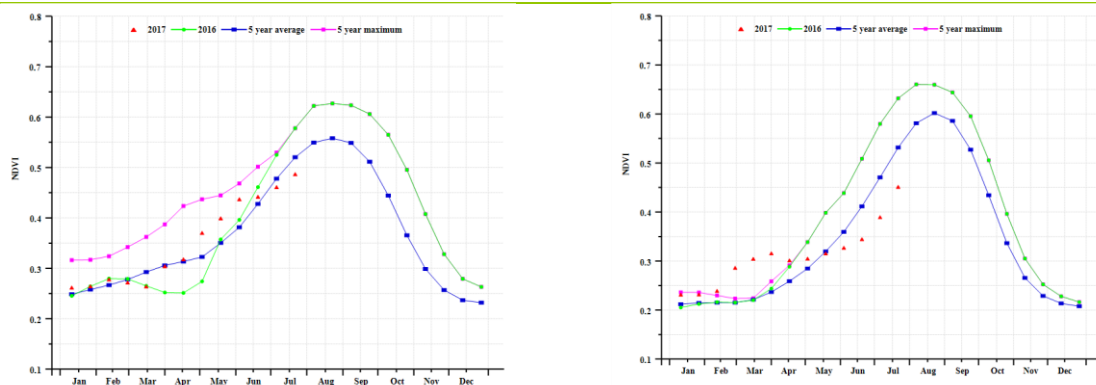
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

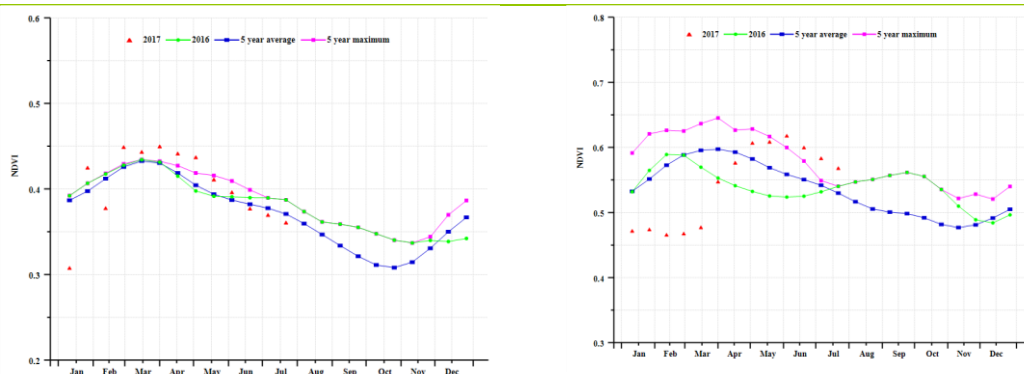


(d) Spatial NDVI patterns compared to 5YA

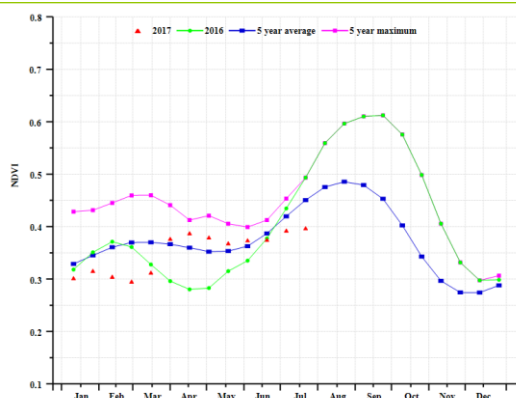
(e) NDVI profiles



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



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



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

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

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Southeastern wheat zone	143	-13	11.2	-0.8	620	1
Southwestern wheat zone	93	-57	13.8	-0.2	669	0
Arid and semi-arid zone	78	-19	23.5	-0.1	1052	-1
Wet temperate and subtropical zone	136	-35	13.5	-0.3	700	1
Subhumid subtropical zone	65	-46	14.3	-0.1	825	

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

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

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

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

[BGD] Bangladesh

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

Regional analysis

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

Coastal Region

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

Gangetic Region

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

Hill Region

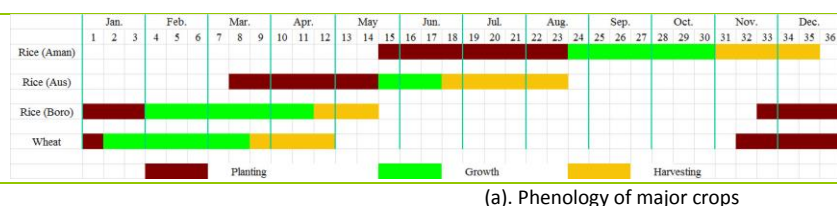
The largest rainfall excess of more than 50% was recorded in the Hill region. Here, RADPAR was average and temperature was relatively low at 27.4°C (-1.2°C); the BIOMSS indicator was 10% above average. In combination with low NDVI, high VCIx (0.92) and CALF at 97%, the agroclimatic indicators are indicating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

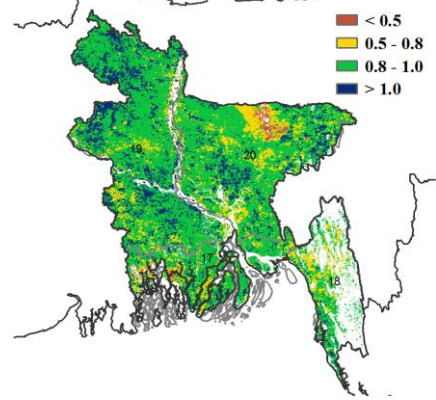
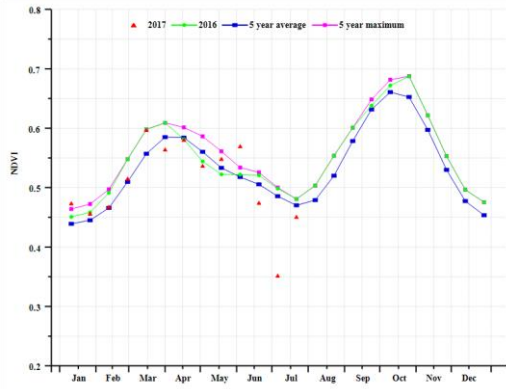
Sylhet Basin

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

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

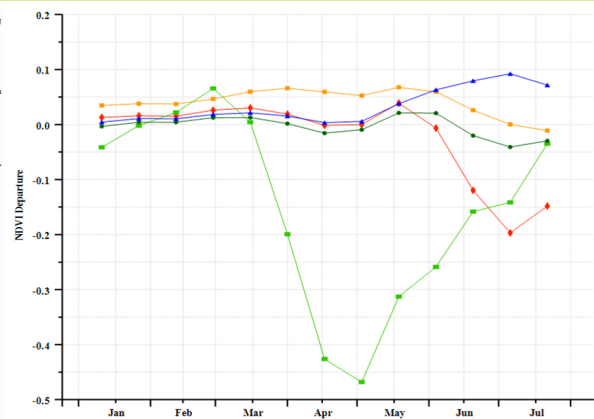
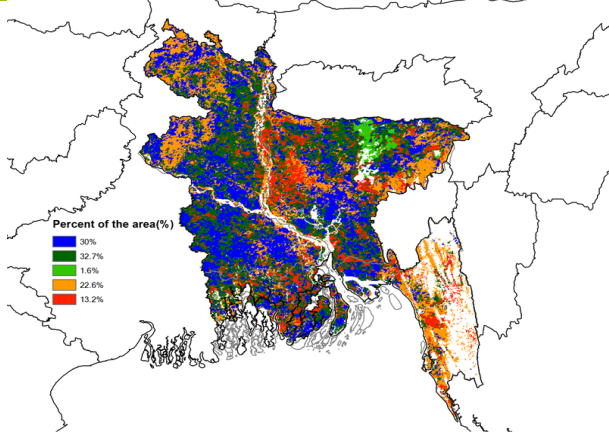
Figure 3.7. Bangladesh crop condition, April – July 2017





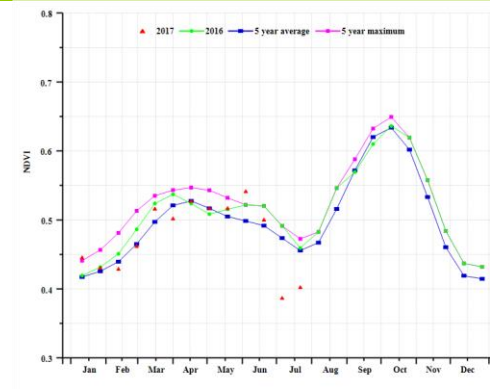
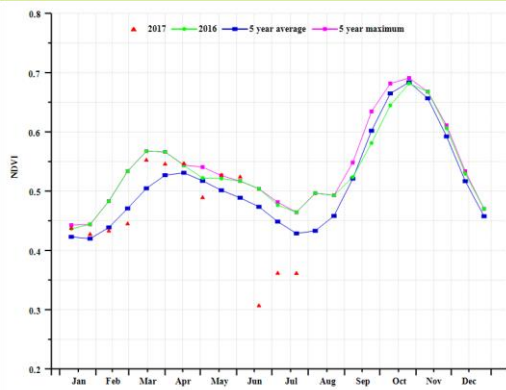
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

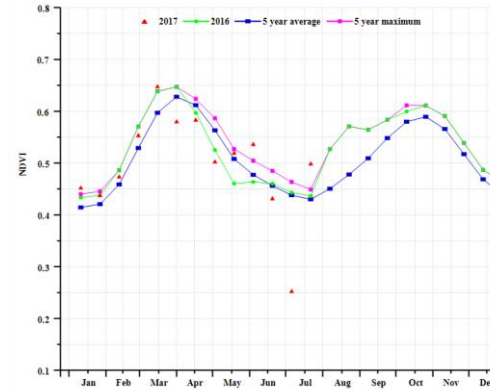
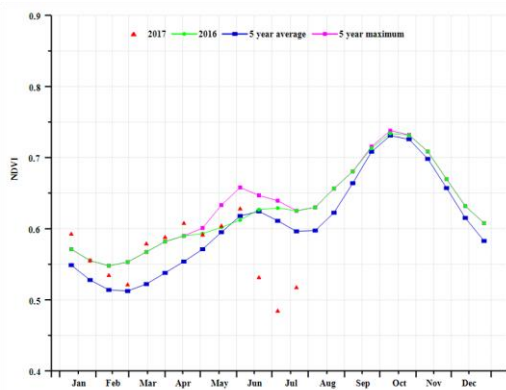


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

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

Region	RAIN		TEMP		RADPAR	
	Current	Departure from	Current	Departure from	Current	Departure from
	(mm)	15YA (%)	(°C)	15YA (°C)	(MJ/m ²)	15YA (%)
Coastal region	1739	39	29.4	-0.7	1019	-6
Gangetic plain	1698	48	29.0	-1.3	982	-7
Hill region	2637	51	27.4	-1.2	968	-6
Sylhet basin	2449	45	28.1	-0.9	864	-9

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

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

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

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

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

[BRA] Brazil

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

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

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

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

Regional analysis

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

Central Savanna

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

East coast Brazil

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

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

Parana River Region

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

Amazon region

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

Mato Grosso region

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

Subtropical rangeland region

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

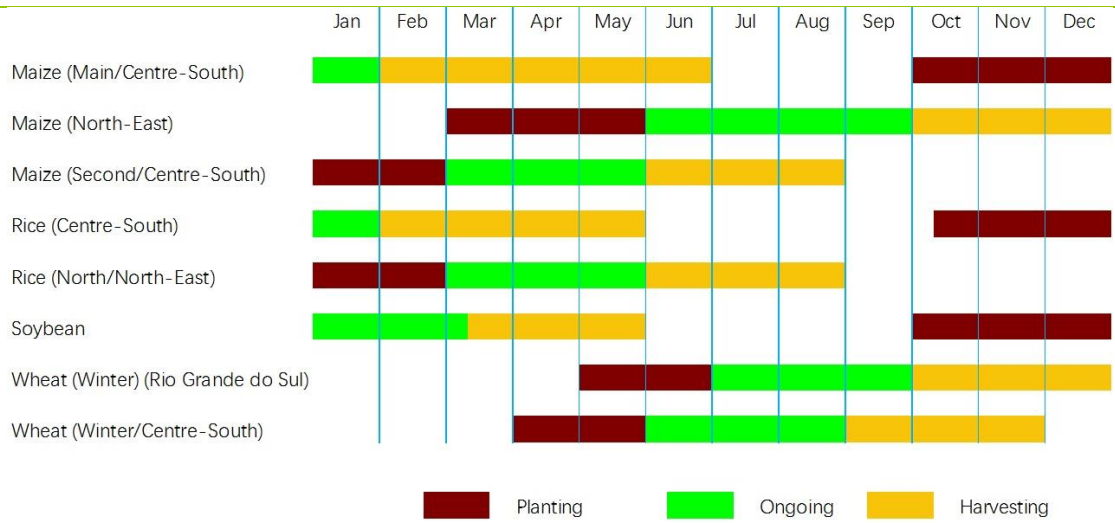
Mixed forest and farmland region

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

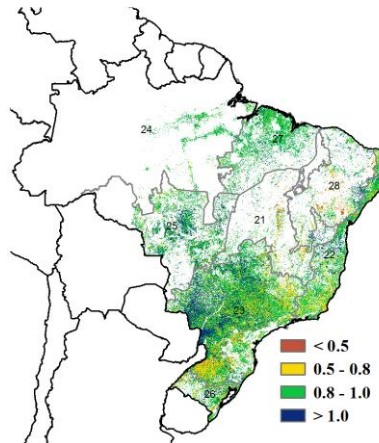
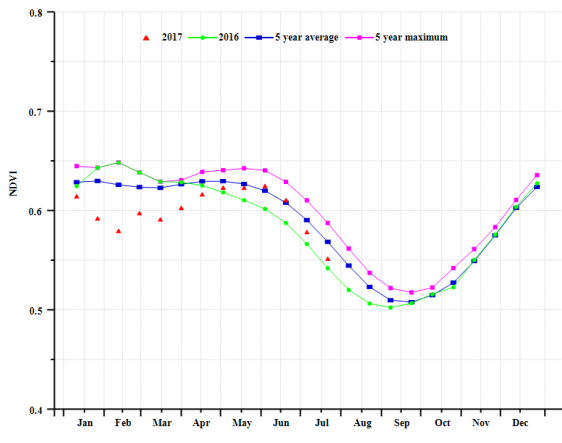
Nordeste region

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

Figure 3.8. Brazil crop condition, April-July 2017

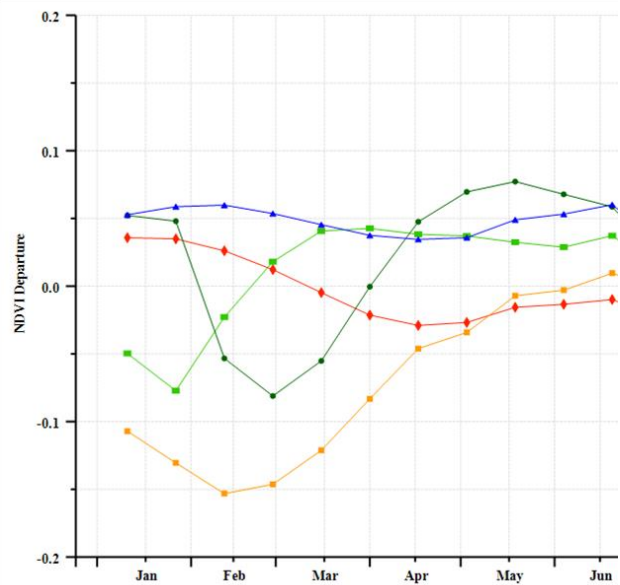
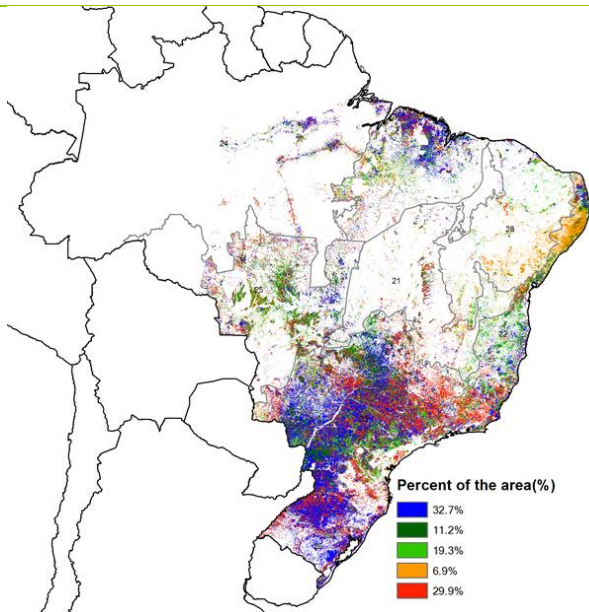


(a). Phenology of major crops



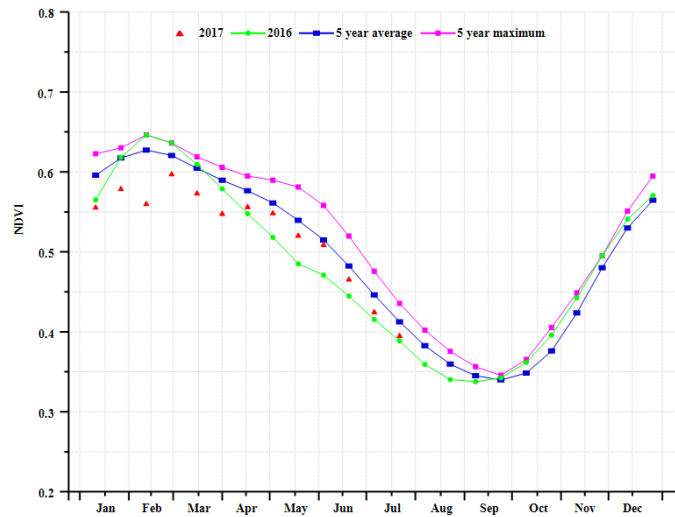
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

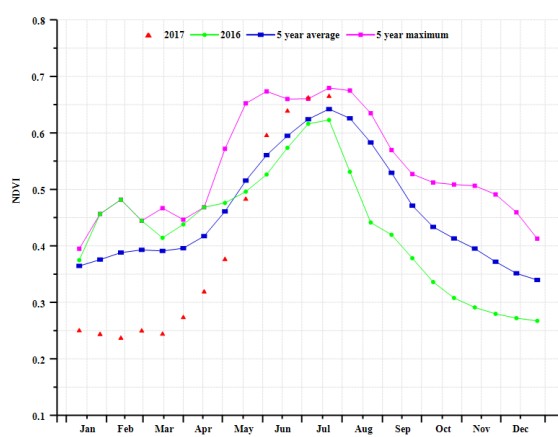
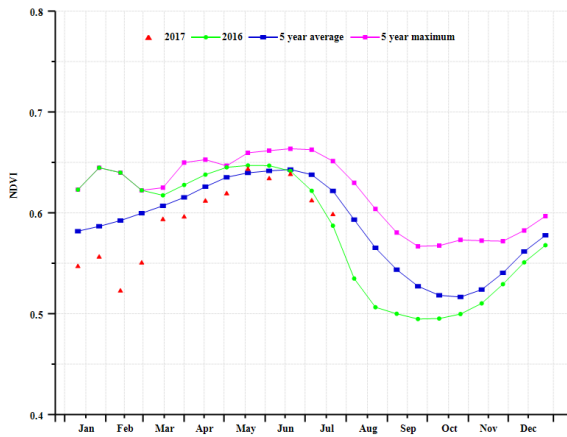


(d) Spatial NDVI patterns compared to 5YA

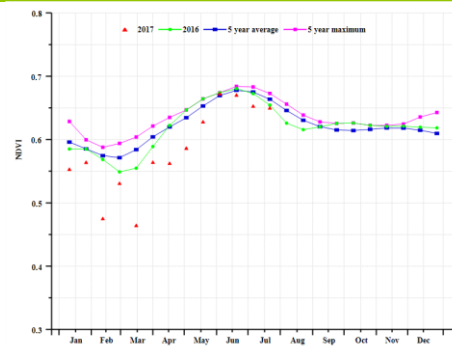
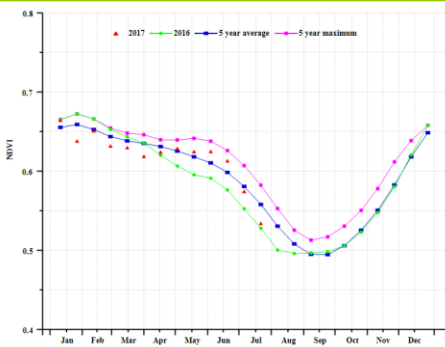
(e) NDVI profiles



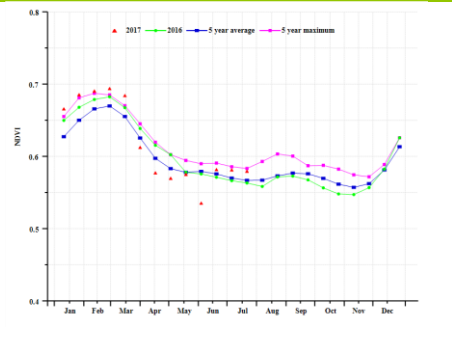
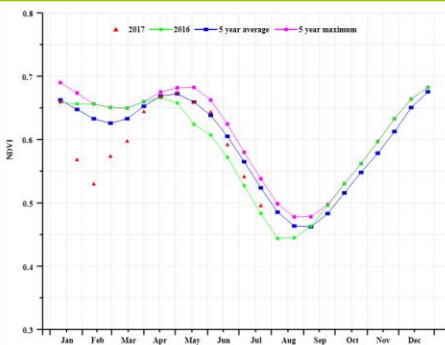
(f) Crop condition development graph based on NDVI (Central Savanna)



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



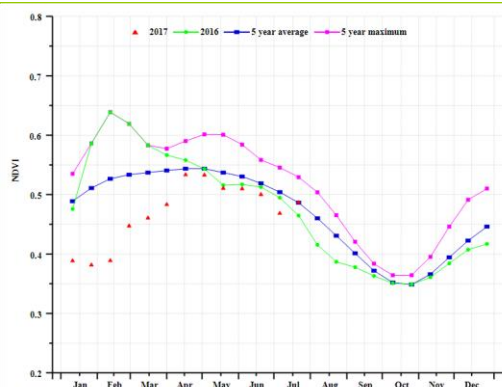
(h) Crop condition development graph based on NDVI (Parana River (left) and Amazon (right))



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



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



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

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

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

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

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

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

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

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

[CAN] Canada

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

Regional analysis

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

Canadian Prairies

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

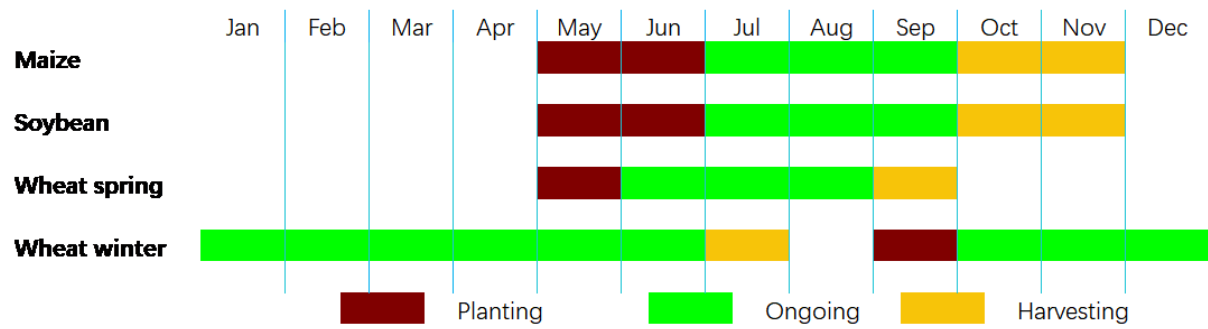
Atlantic Ocean (CAN)

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

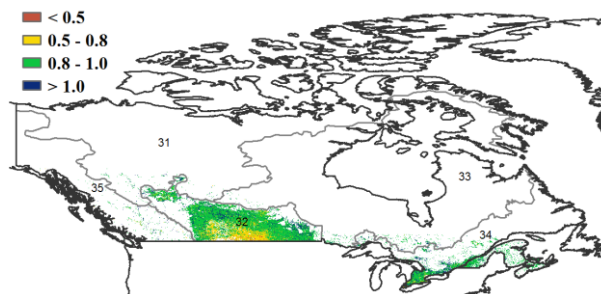
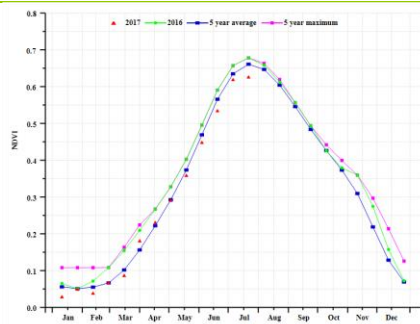
Overall, crop production of Canada could undergo a slight drop due to mild drought conditions, which affected mostly late stages of winter wheat. Maize, soybean, and spring wheat are mostly unaffected. As a result, CropWatch predicts a drop in wheat production (33,290 ktons, -6.8% below 2016), but increases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

Figure 3.9. Canada crop condition, April – July 2017

Crop Calendar - Canada

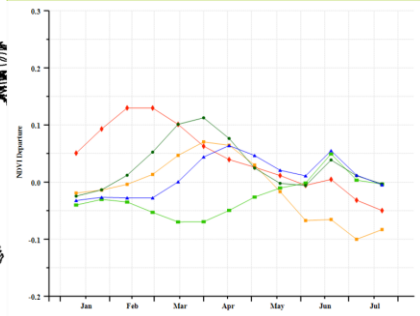
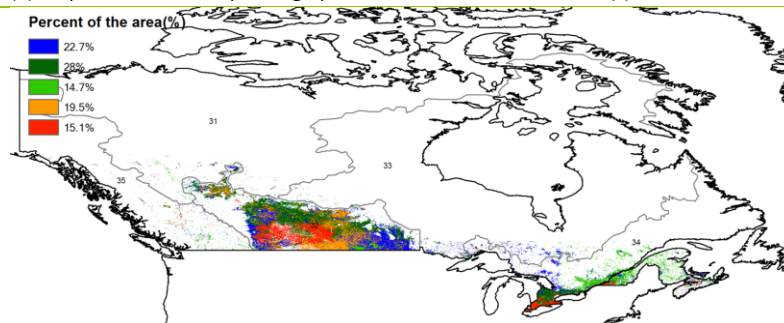


(a). Phenology of major crops



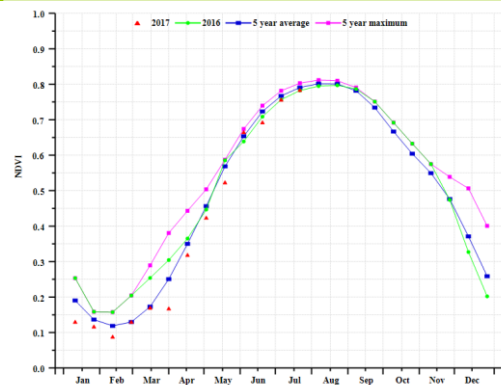
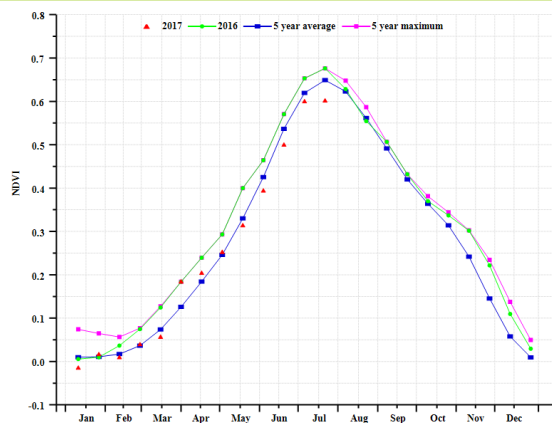
(b) Crop condition development graph based on NDVI

(c) Maximum VCI



(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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

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

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

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

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

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

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

[DEU] Germany

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

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

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

Regional analysis

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

Northern wheat zone

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

Northwest mixed wheat and sugarbeets zone

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

Central wheat zone

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

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

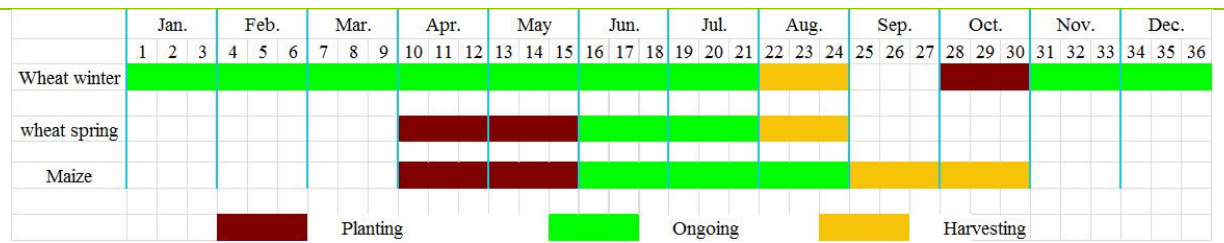
Eastern and western sparse crop areas

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

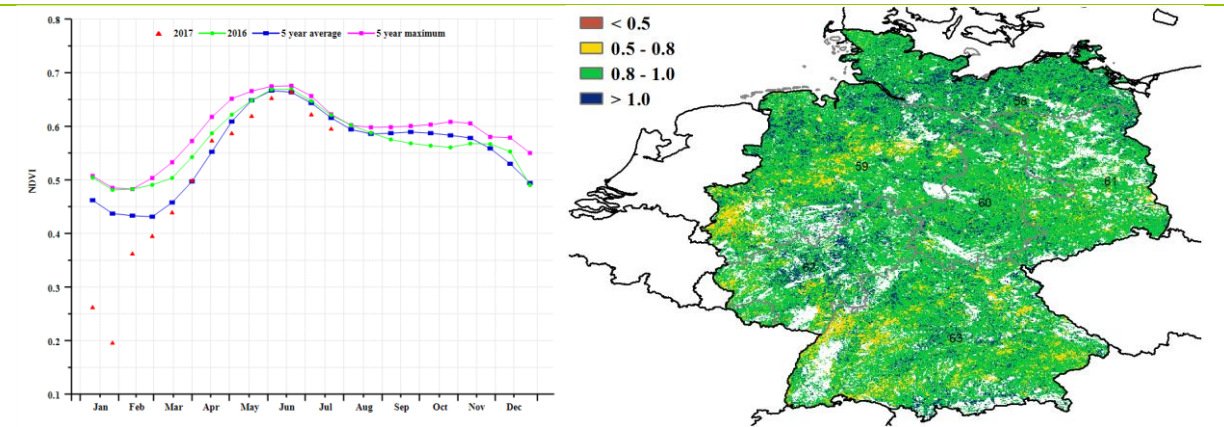
Southern highland

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

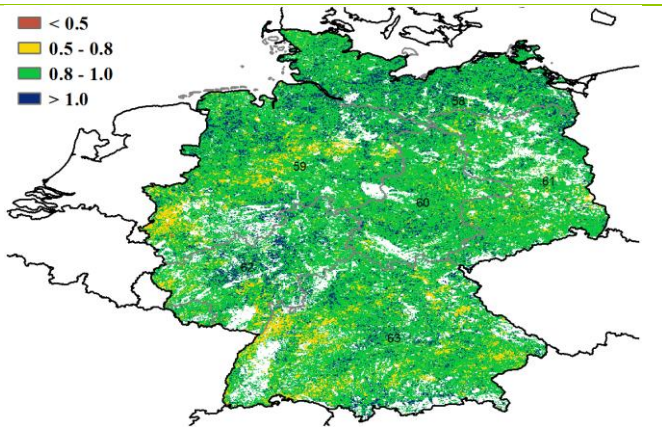
Figure 3.10. Germany crop condition, April-July 2017



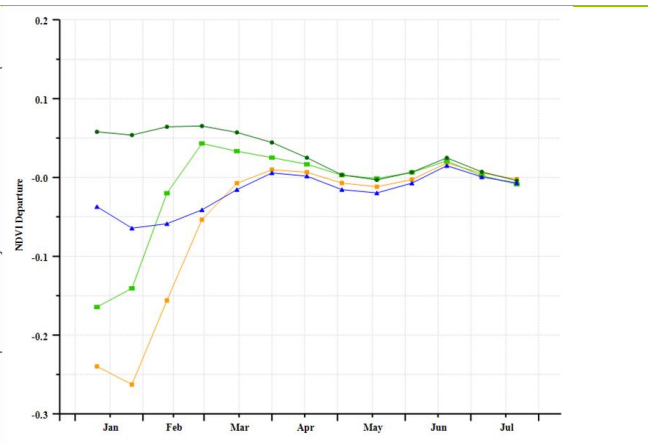
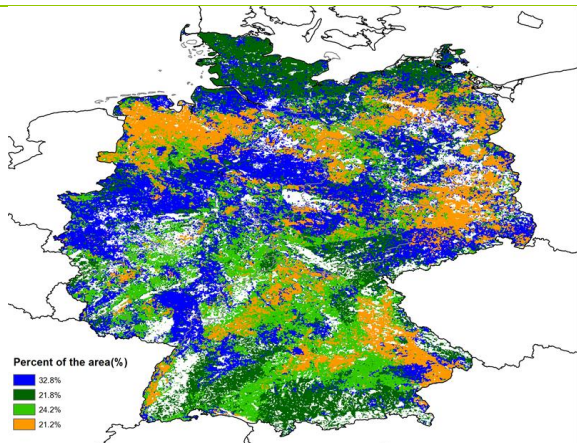
(a). Phenology of major crops



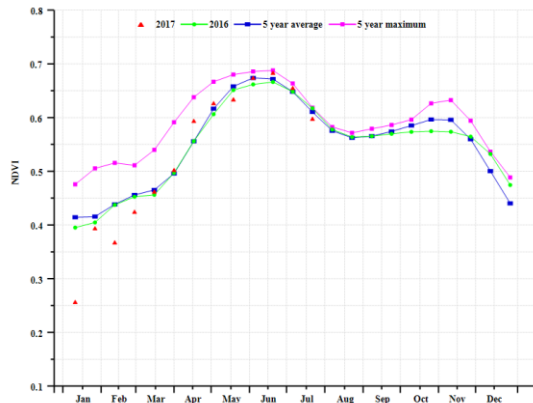
(b) Crop condition development graph based on NDVI



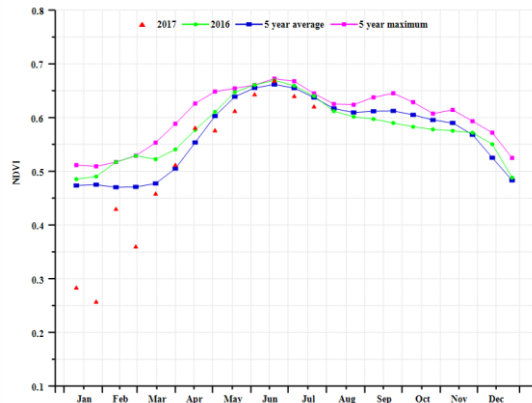
(c) Maximum VCI



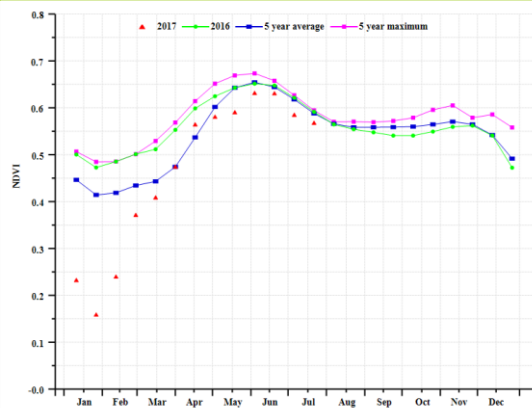
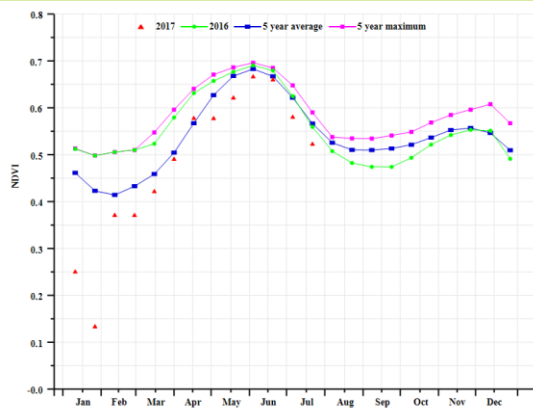
(d) Spatial NDVI patterns compared to 5YA



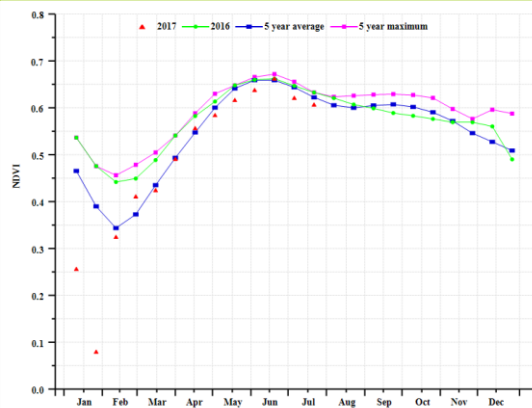
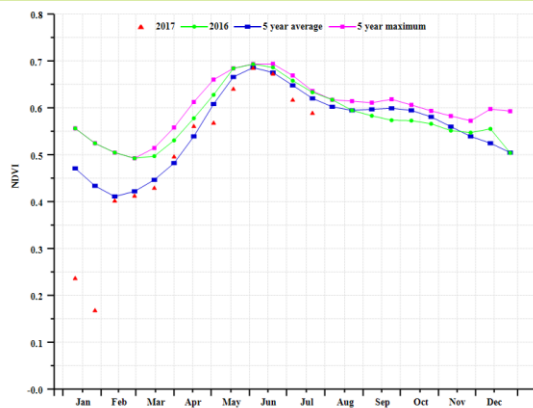
(e) NDVI profiles



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



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



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

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

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

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

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

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

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

[EGY] Egypt

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

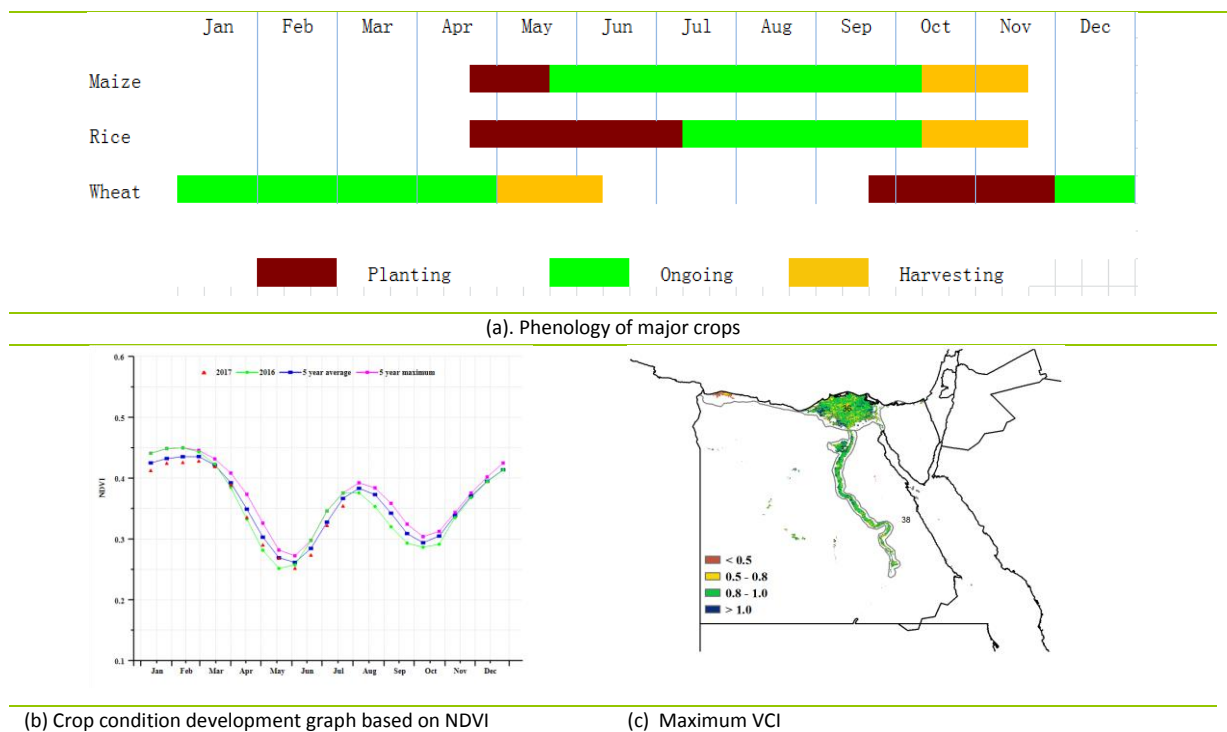
Regional analysis

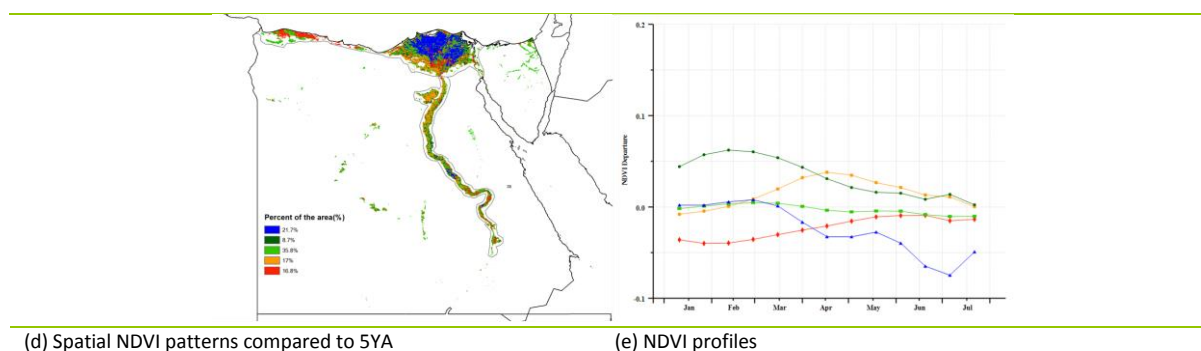
Based on cropping systems, climatic zones, and topographic conditions, three sub-national regions can be distinguished for Egypt, two of them relevant for crops cultivation. They are Nile Delta and Nile Valley area.

Nile Delta and Valley

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

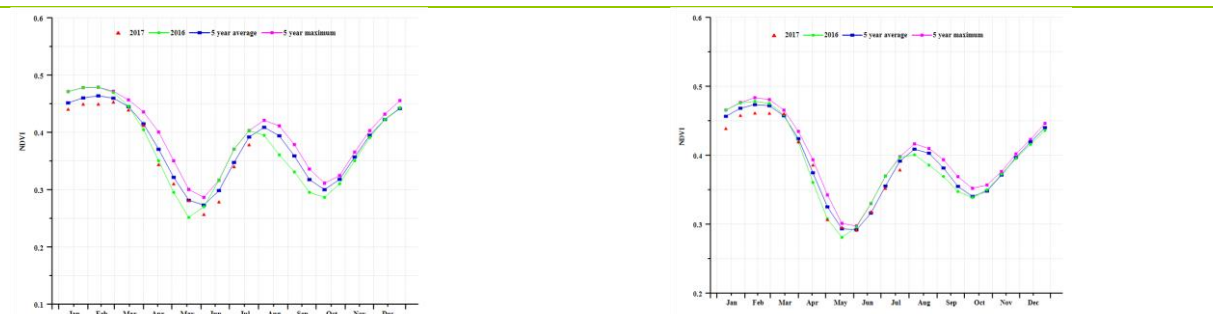
Figure 3.11. Egypt crop condition, April-July 2017





(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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

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

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Nile Delta	15	143	24	0	1582	0
Nile Valley	28	107	27	0	1637	-1

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

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Nile Delta	81	127	63	1	0.76
Nile Valley	92	99	67	1	0.87

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

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

[ETH] Ethiopia

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

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

Regional analysis

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

Semi-arid pastoral zone

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

Southeastern Mendebo highlands and mixed-maize zones

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

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

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

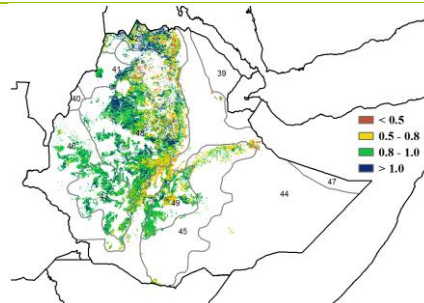
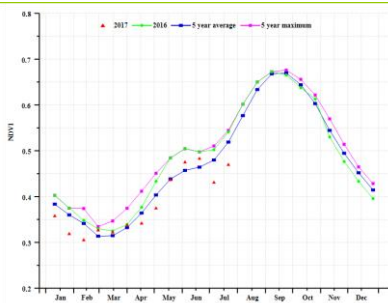
Altogether, pastoral low rainfall areas suffered drought and the Belg season was poor, but the situation remains fair for Belg crops to be harvested from August until the end of the year.

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

Figure 3.12. Ethiopia crop condition, April-July 2017

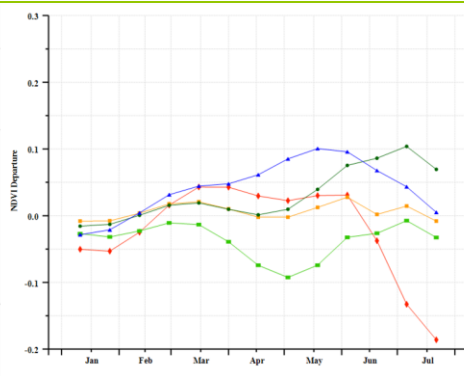
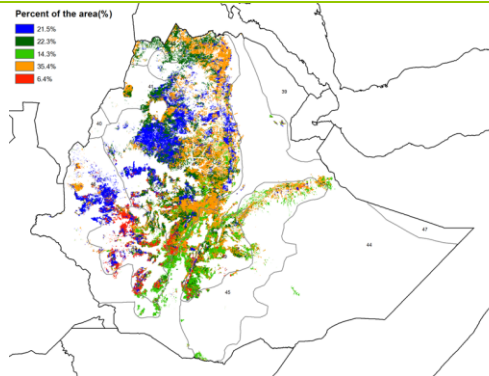


(a). Phenology of major crops



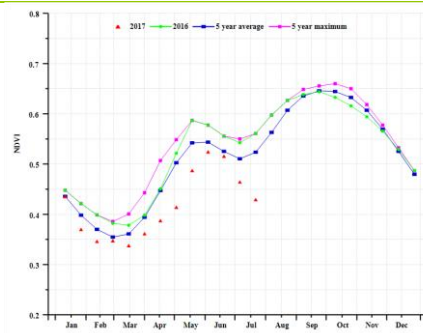
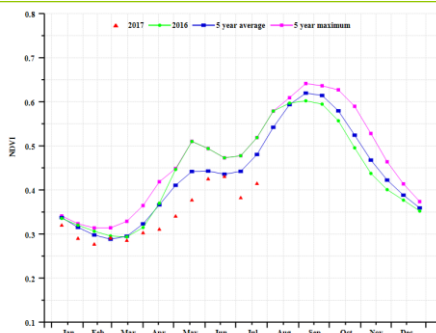
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

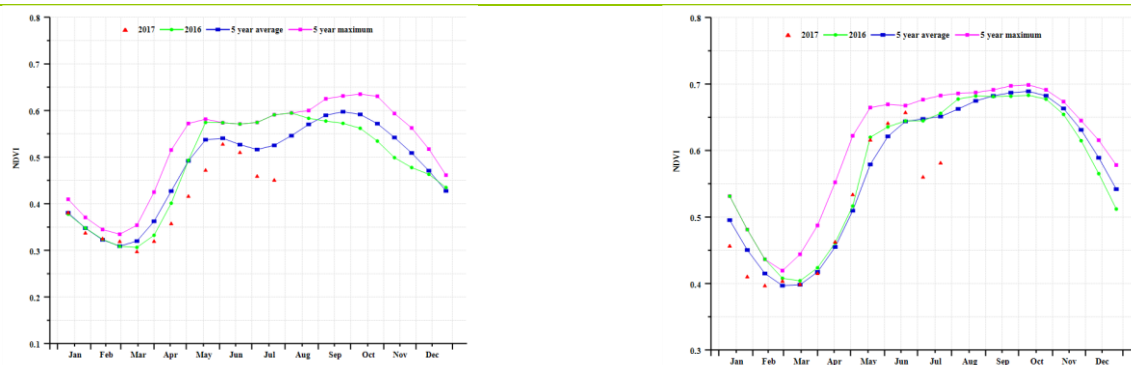


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

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

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

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

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	
Semi-arid pastoral	1059	-20	73	-9	0.77
South-eastern mixed maize zone	1067	-23	88	-4	0.77
Western mixed maize zone	2010	9	100	0	0.94
Central-northern maize-teff highlands	1457	-1	75	-8	0.89
South-eastern Mendebo highlands	1107	-25	99	1	0.87

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

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

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[FRA] France

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

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

Regional analysis

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

Northern barley region

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

Western mixed maize, barley, and rapeseed region

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

Northwest mixed maize and barley region

The main crops in this area in the northwest of the country (an area labeled '52' on the VCIx map and NDVI profile map) are maize and barley. Rainfall decreased 22% compared to average for this period, while temperature and radiation were slightly above average. Crop condition was below average according to the NDVI development graph, an observation confirmed by the decrease of BIOMSS by 16% compared to average. The VCIx map, however, shows that the crop condition was favorable, with a high VCIx value recorded for the region as a whole (0.92).

Rapeseed region

In this region, situated in the country's southeast, rapeseed is naturally the major crop. Over the reporting period, RAIN here is 21% below average, RADPAR 2% above, and TEMP average. BIOMSS is 16% below the five-year average. A high VCIx value for the region, however, is reflecting overall favorable crop condition, even as the amount of rainfall (237 mm) received during the season is insufficient for crops. Overall crop condition is favorable compared with the previous five years according to the crop condition development graph.

Middle arid region

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

Southwest maize region

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

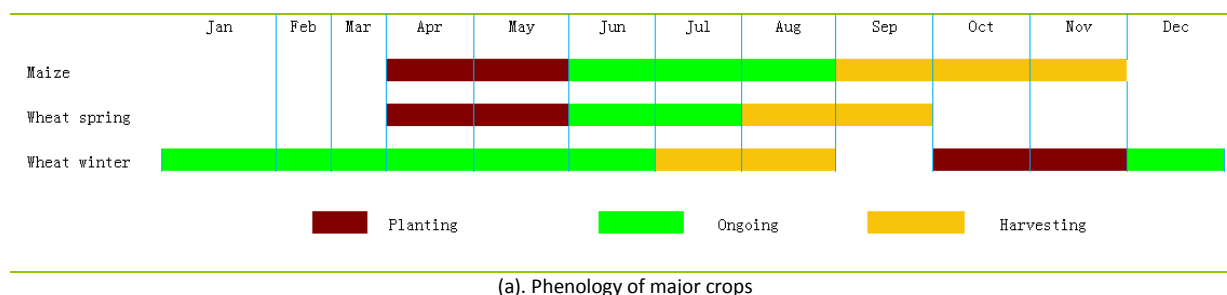
Eastern highland region

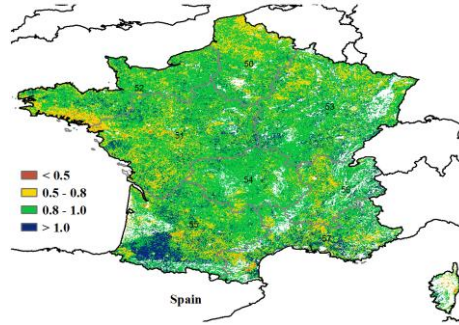
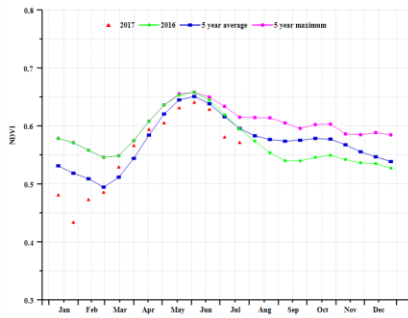
Generally, crop condition for this region is slightly above average, while climate conditions are close to average (RAIN, -1%; TEMP, +1°C; and RADPAR, +2%). Some arable land was not cropped during the monitoring period, and the average VCIx is only 0.89. The NDVI profile confirms the favorable conditions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

Mediterranean climate region

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

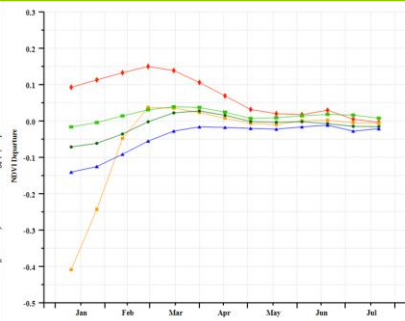
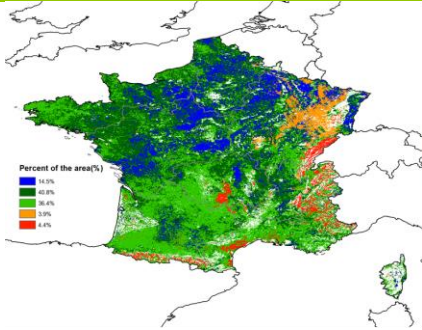
Figure 3.13. France crop condition, April-July 2017





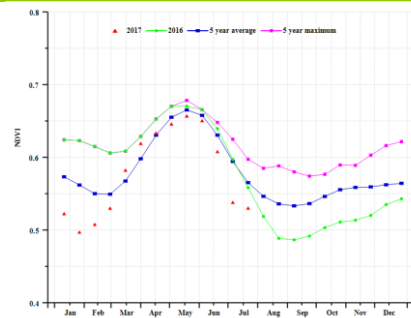
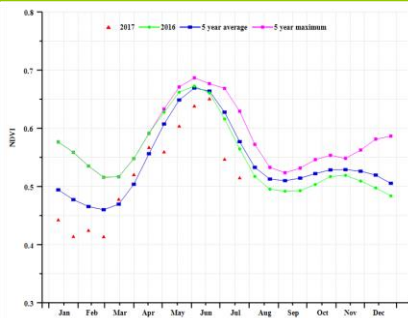
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

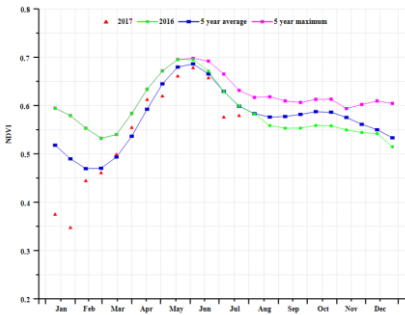
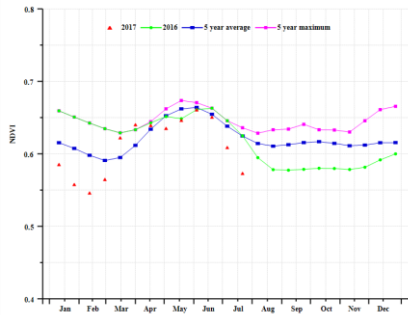


(d) Spatial NDVI patterns compared to 5YA

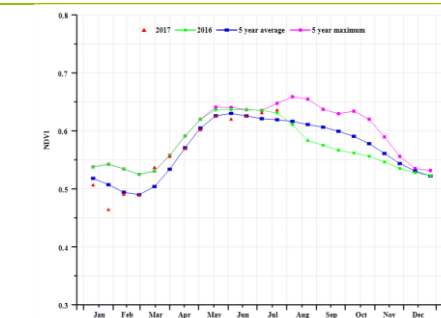
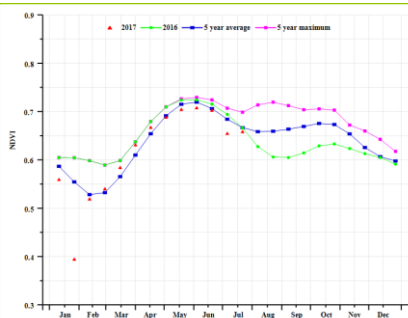
(e) NDVI profiles



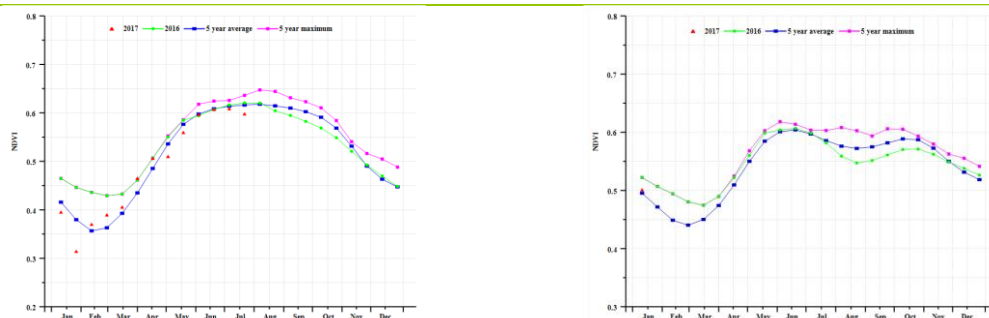
(f) Crop condition development graph based on NDVI (Northern barley region (left) and Western mixed maize, Barley and Rapeseed zone (right))



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



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



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

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

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

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

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

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

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

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[GBR] United Kingdom

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

Regional analysis

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

Central sparse crop region

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

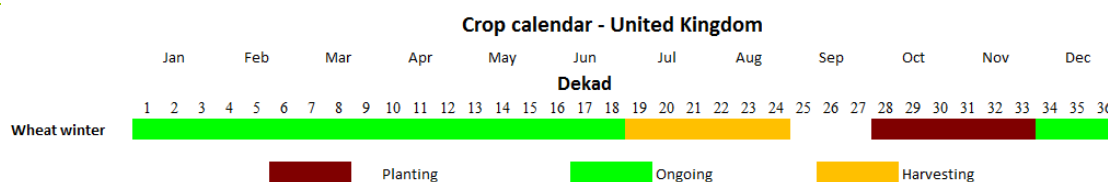
Northern barley region

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

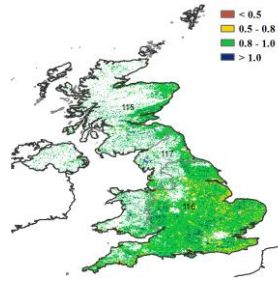
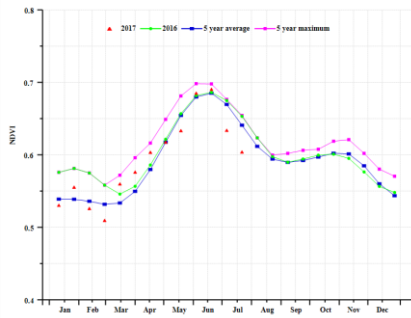
Southern mixed wheat and barley region

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

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

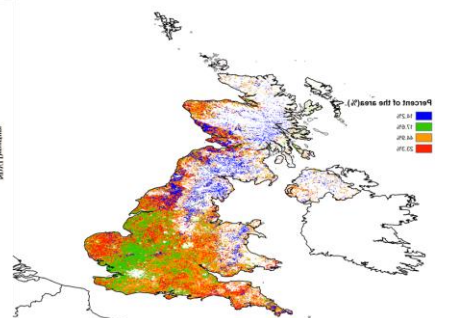
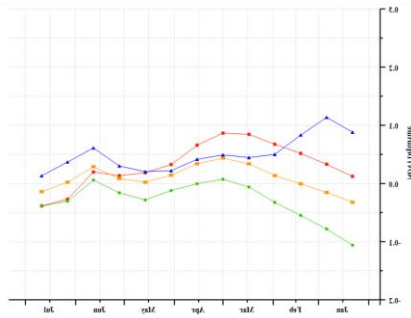


(a). Phenology of major crops



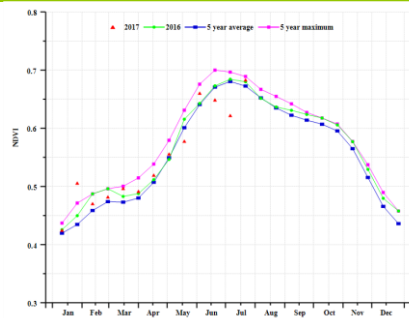
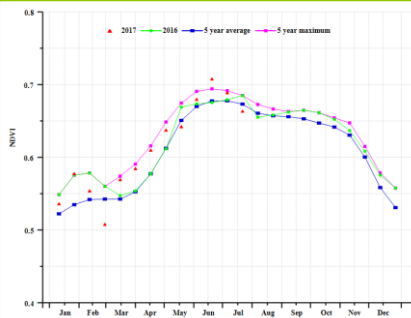
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

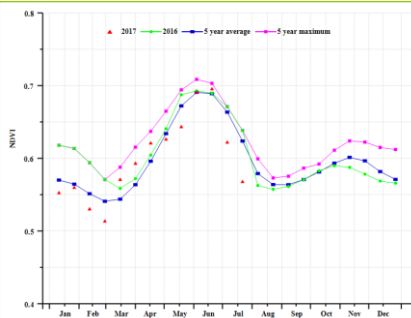


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

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

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Northern Barley area	386	10	10.4	0.2	868	-9
Southern mixed wheat and barley zone	250	1	13.8	1.5	984	-6
Central sparse crop area	336	6	12.00	0.48	951	-7

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

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

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

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

[IDN] Indonesia

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

Regional analysis

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

Sumatra

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

Java

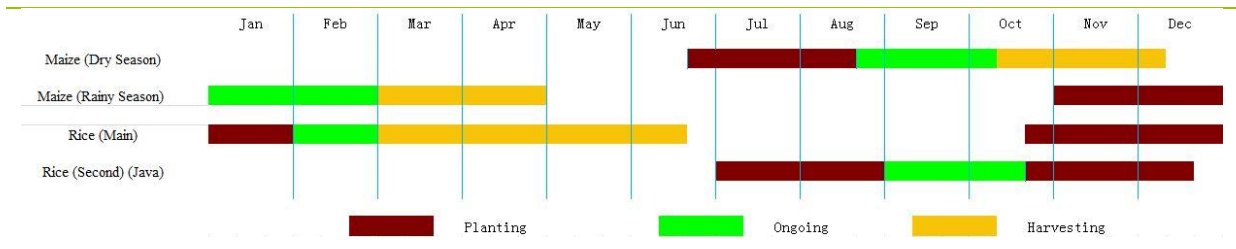
Unlike other regions in the country, rainfall in Java was below average by as much as 21%, while radiation was 4% below average. Affected by the deficit of soil moisture and sunshine, the biomass production potential indicator was 13% below its five-year average. The NDVI profile of Java also shows a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

Kalimantan and Sulawesi

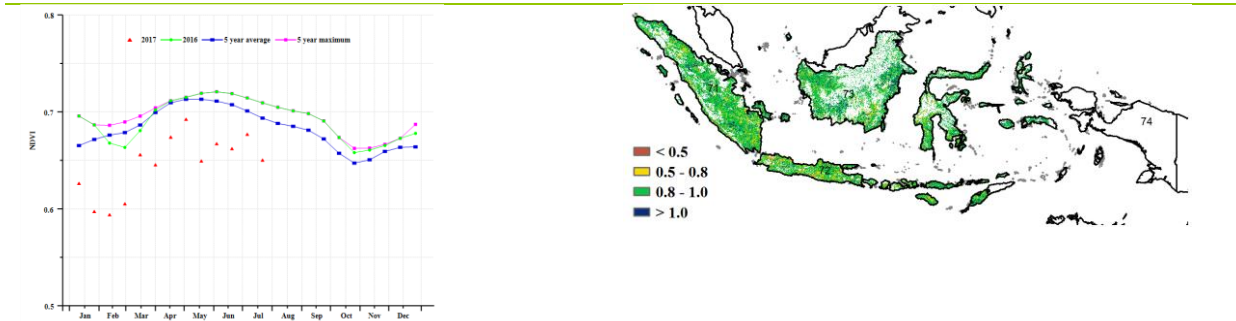
Kalimantan and Sulawesi experienced very wet weather conditions, with rainfall 21% above average and a significant radiation decrease of 9%. Although the BIOMSS indicator increased by 10% compared to the recent five-year average, the low sunshine is likely to have negatively affected rice growth. According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

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

Figure 3.15. Indonesia crop condition, April-July 2017

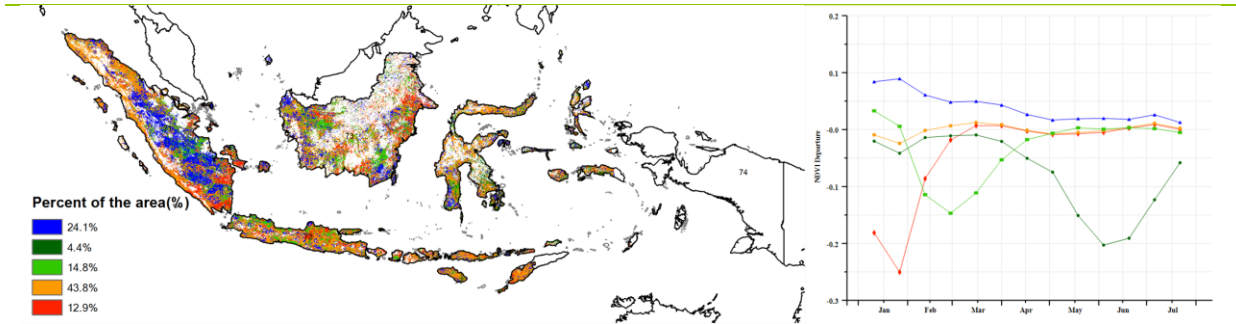


(a). Phenology of major crops



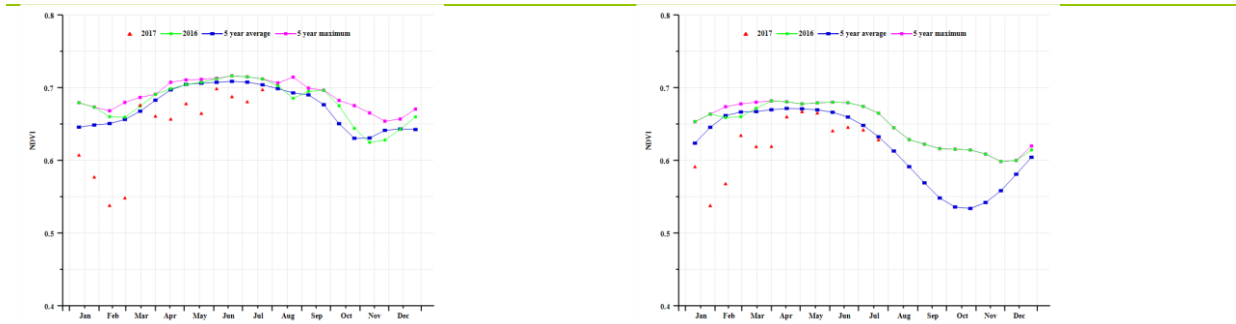
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

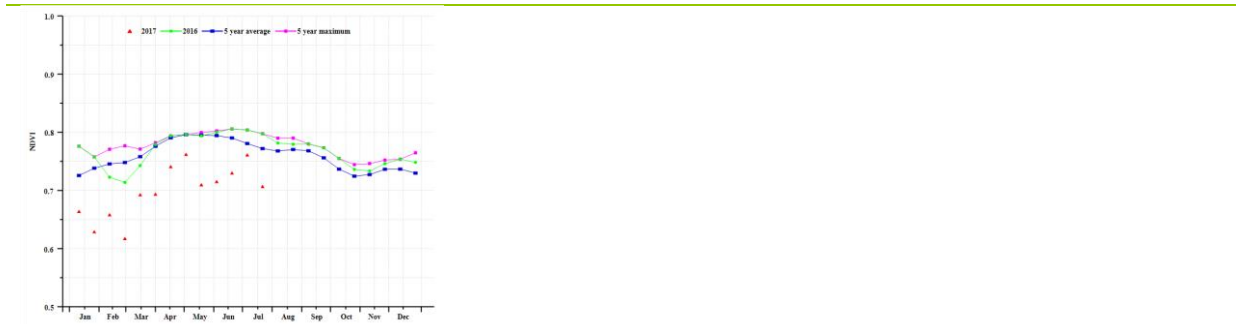


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

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

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure (%)	Current (°C)	Departure (%)	Current (MJ/m ²)	Departure (%)
Sumatra	897	12.8	25.8	-0.8	977	-5.0
Java	409	-20.7	25.7	-0.4	1018	-3.9
Kalimantan Sulawesi	1166	21.4	26.0	-0.7	891	-8.6
Irian Jaya	1593	34.3	24.7	-0.6	769	-10.5

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

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m ²)	Departure (%)	Current (%)	Departure (%)	Current
Sumatra	2059	5	100	0	0.96
Java	1065	-13	100	0	0.91
Kalimantan Sulawesi	2342	10	99	0	0.96
Irian Jaya	2287	8	100	0	0.96

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

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

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[IND] India

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

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

Regional analysis

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

Central India

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

Eastern Coastal Region

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

Gangetic Plains

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

Northeastern Region

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

Western Coastal Region

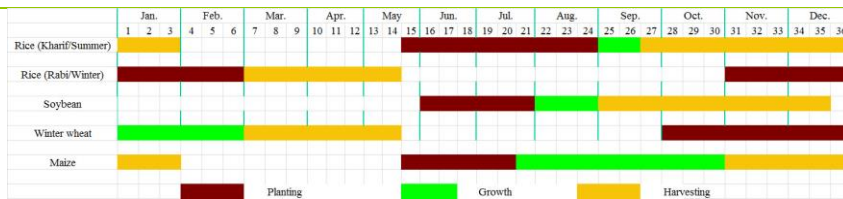
While temperature and radiation were normal, rainfall was below average for the western coastal region over the reporting period. As a result, the accumulated biomass is expected to be marginally below average. The effect of the low rainfall is also reflected in the low Cropped Arable Land Fraction (48%),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

Western Dry Region

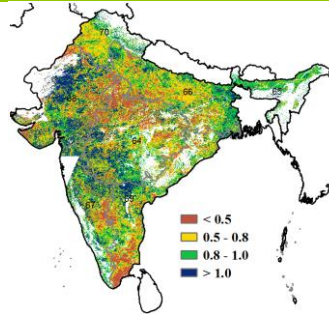
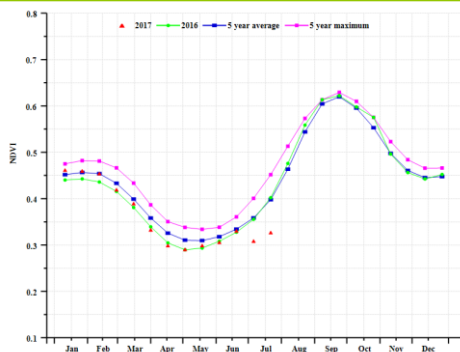
This region with normally low rainfall received an amount more than 70% over average, as indicated by the CropWatch RAIN indicator. Combined with moderate temperature and radiation, the region thus has a much improved prospect for biomass accumulation. The Cropped Arable Land Fraction is low (24%), but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

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

Figure 3.16. India crop condition, April-July 2017

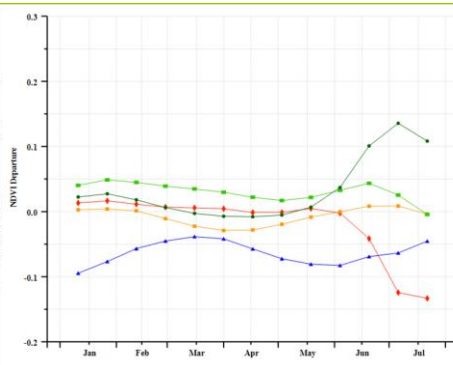
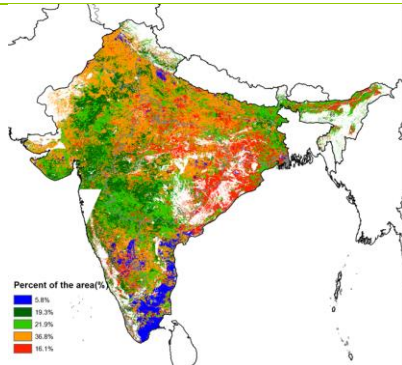


(a). Phenology of major crops



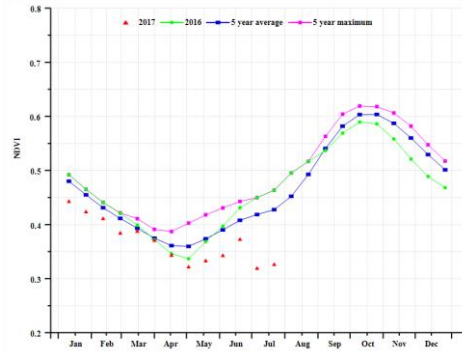
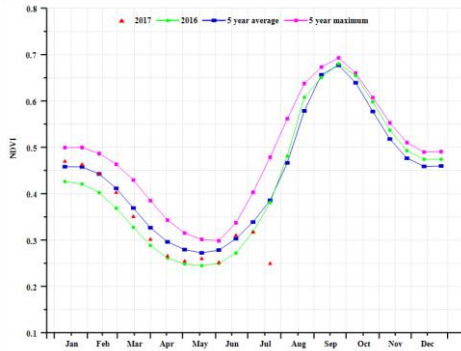
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

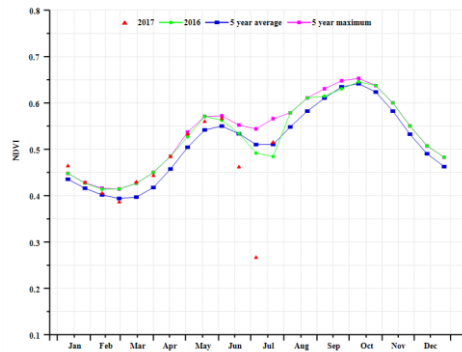
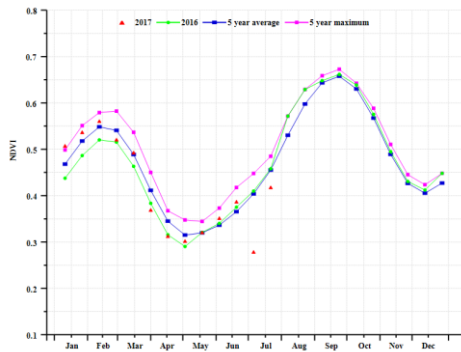


(d) Spatial NDVI patterns compared to 5YA

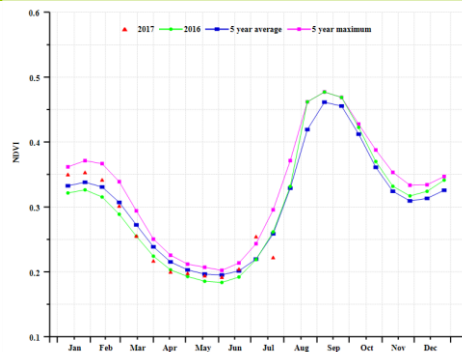
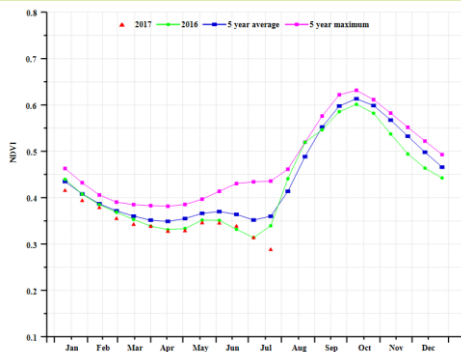
(e) NDVI profiles



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



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



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

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

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

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

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Central India	1211	0	43	-31	0.76
Eastern Coastal Region	1369	7	57	-12	0.76
Gangatic Plain	1395	6	68	-16	0.82
North Eastern Region	2459	6	96	0	0.94
Western Coastal Region	1311	-4	48	-8	0.85
Western Dry Region	1074	44	24	-35	0.92

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

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

[IRN] Iran

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

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

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

Regional analysis

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

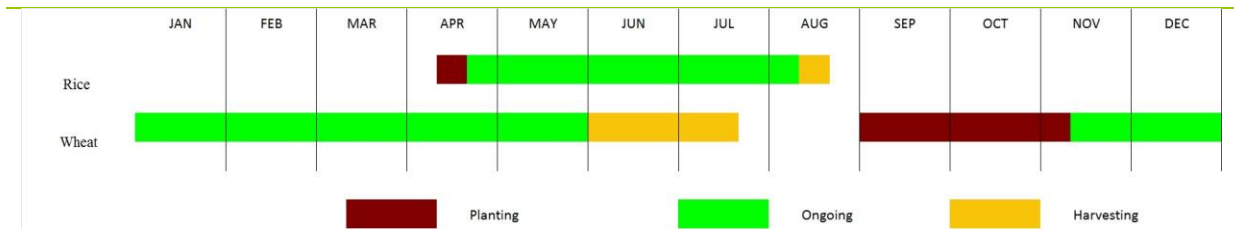
West and north region

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

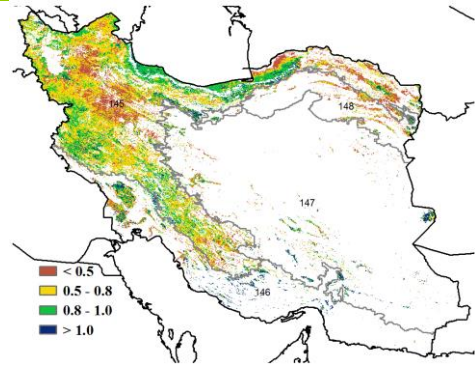
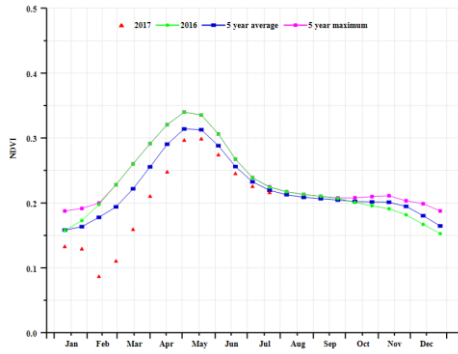
South coast region

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

Figure 3.17. Iran crop condition, April-July 2017

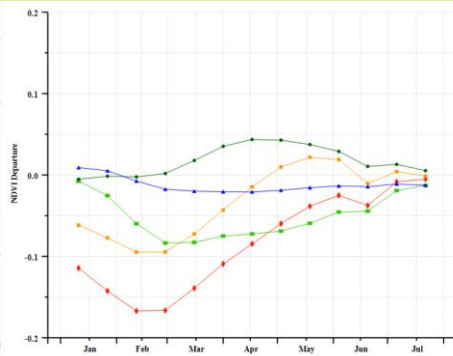
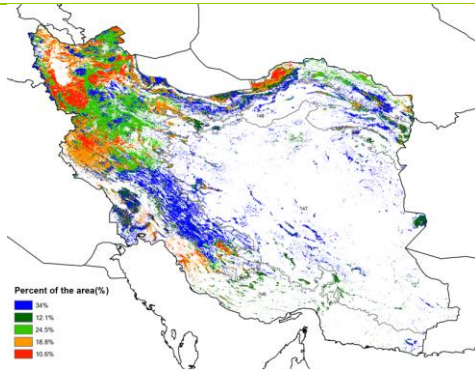


(a) Phenology of major crops



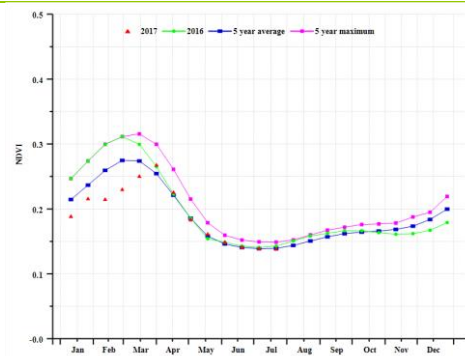
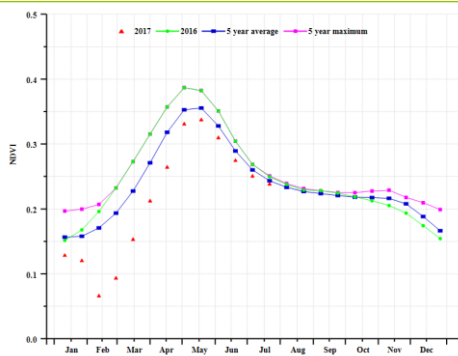
(b) Crop condition development graph based on NDVI

(c) Maximum VCI



(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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

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

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

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

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

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

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

[KAZ] Kazakhstan

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

Regional analysis

Northern zone

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

Southeast zone

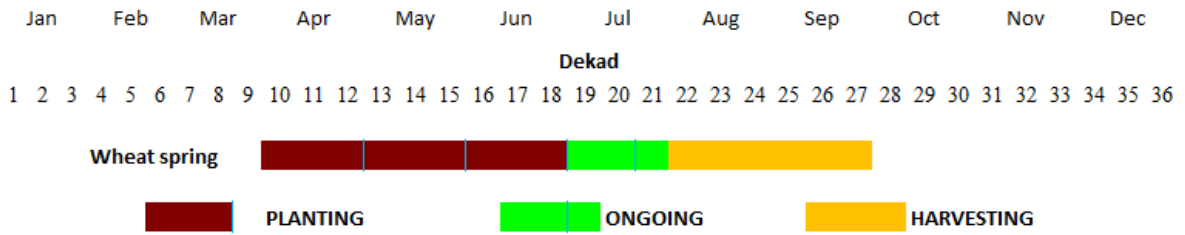
NDVI for this region was significantly above the five-year average, and crop condition was generally favorable. RAIN was 50% above average, but TEMP and RADPAR were normal (+0.1°C and -1%, respectively). The agroclimatic indicators also resulted in an increase of the BIOMSS index by 29%. The maximum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

Southwest zone

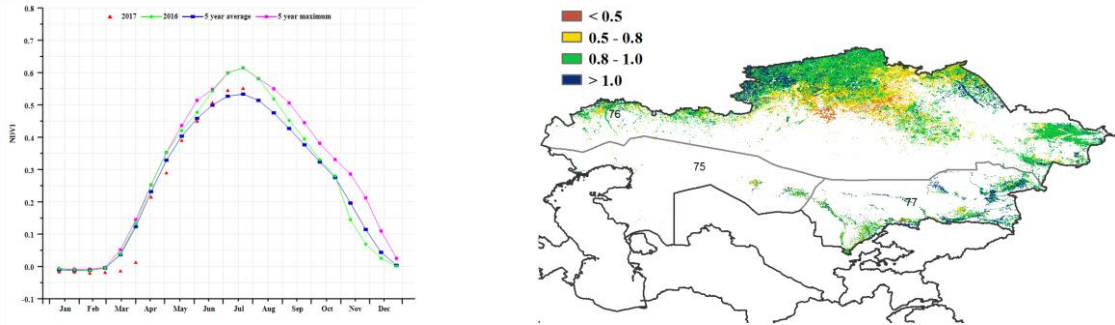
In this area, NDVI was generally below the five-year average. RAIN was above average (+50%), while TEMP was slightly below (-1°C). The agroclimatic conditions resulted in a BIOMSS increase of 57%. VCIx reached 0.81, and the fraction of cropped arable land (CALF) significantly increased by 8% compared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

Figure 3.18. Kazakhstan crop condition, April-July 2017

Crop Calendar - Kazakhstan

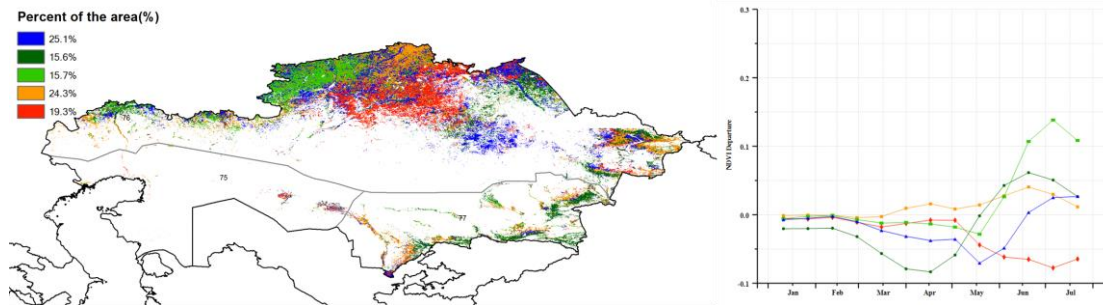


(a). Phenology of major crops



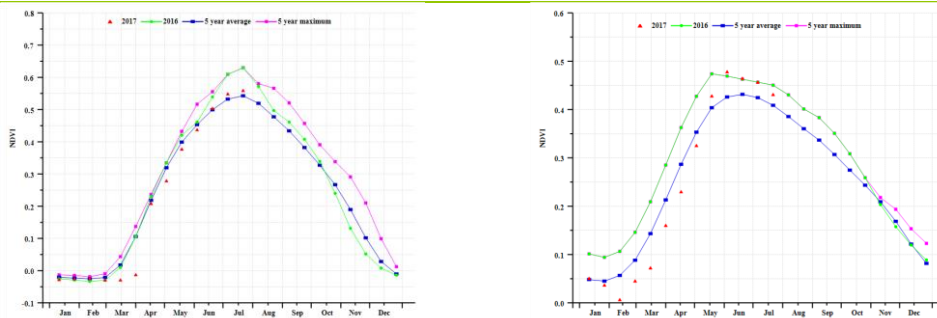
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

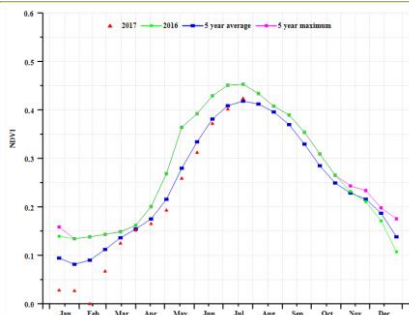


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

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

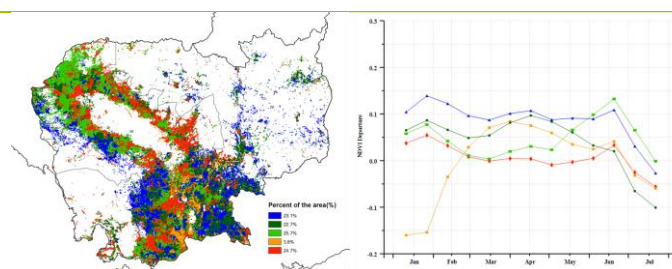
Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Northern region	175	1	15.0	-0.4	1245	1
Southeast region	290	50	18.9	0.1	1377	-1
Southwest region	123	54	21.1	-1.0	1360	0

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

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

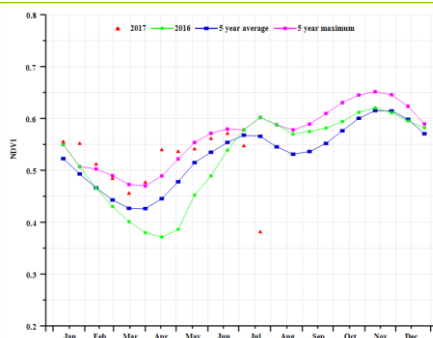
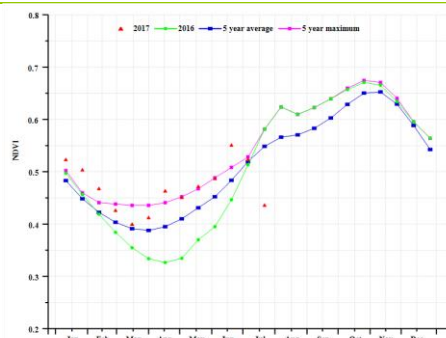
Table 3.43. CropWatch-estimated wheat production for Kazakhstan in 2017 (thousand tons)

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



(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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

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

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

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

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

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

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

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

[MEX] Mexico

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

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

Regional analysis

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

Northwestern mixed wheat and maize area

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

Southern maize zone

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

Central temperate zone

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

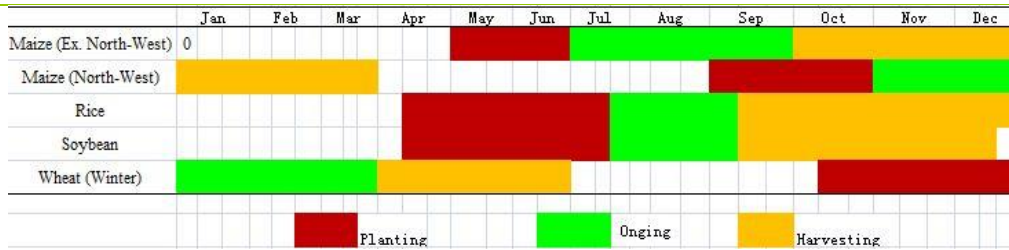
Northern mixed cotton and wheat area

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

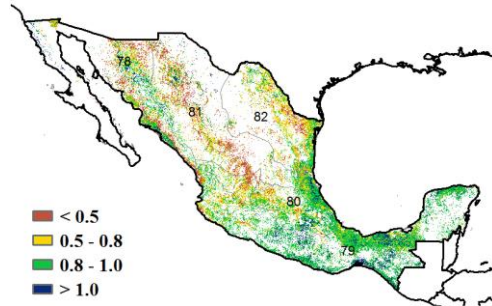
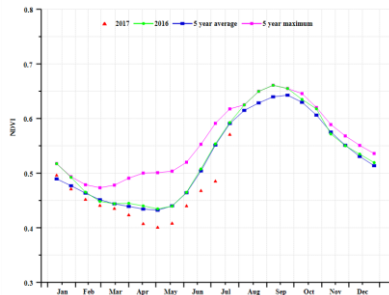
Northeastern mixed sorghum and maize area

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

Figure 3.20. Mexico crop condition, April-July 2017

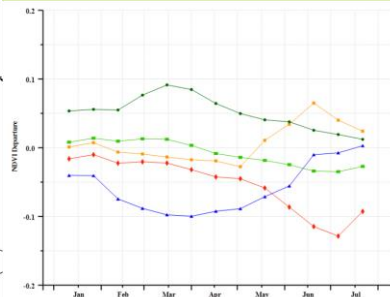
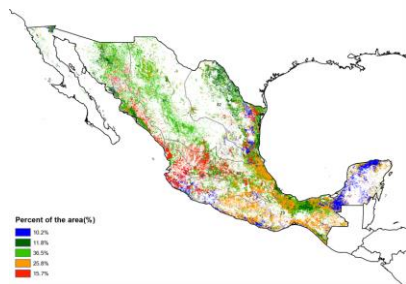


(a). Phenology of major crops



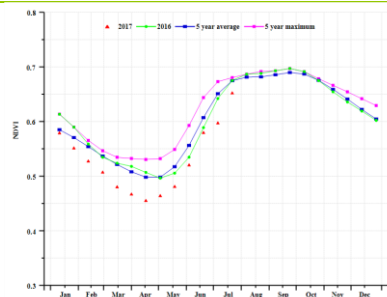
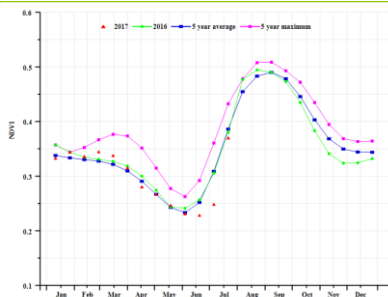
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

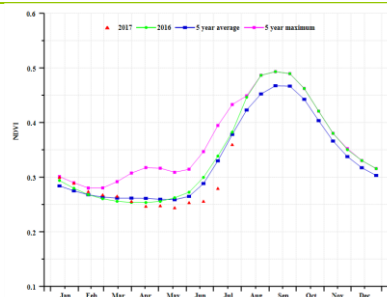
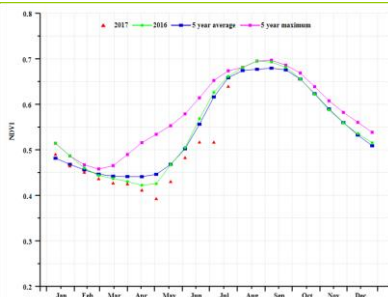


(d) Spatial NDVI patterns compared to 5YA

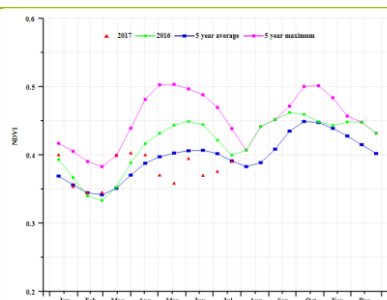
(e) NDVI profiles



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



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



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

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

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

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

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Northwestern mixed wheat and maize area	496	5	70	-3	0.73
Southern maize zone	1570	9	99	0	0.90
Central temperate zone	1229	-1	94	-1	0.84
Northern mixed cotton and wheat area	715	-6	52	-10	0.68
Northeastern mixed sorghum and maize area	906	1	70	8	0.74

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

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

[MMR] Myanmar

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

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

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

Regional analysis

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

Hill region

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

Central plain area

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

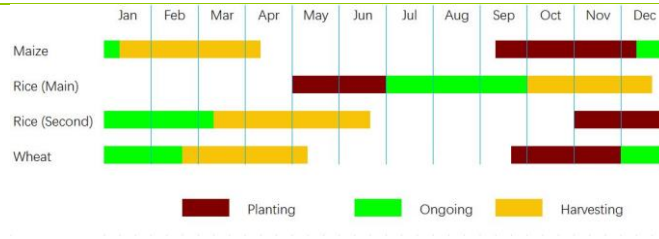
Coastal region

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

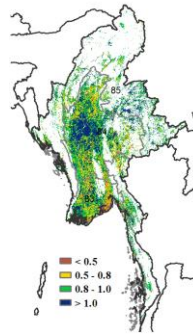
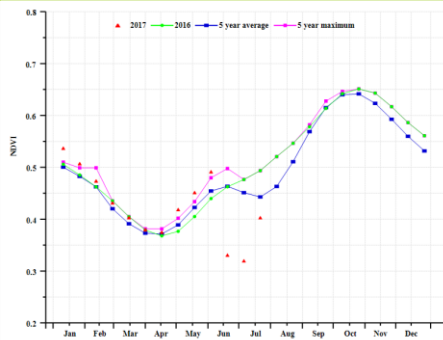
Overall for Myanmar, crop condition is generally average due to the close to average weather conditions

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

Figure 3.21. Myanmar crop condition, April-July 2017

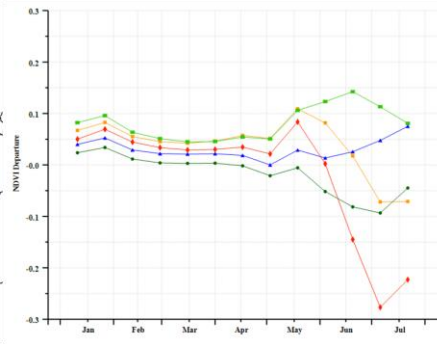
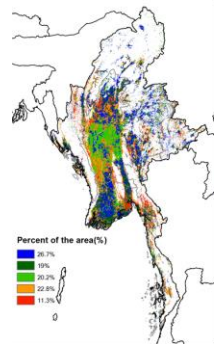


(a). Phenology of major crops



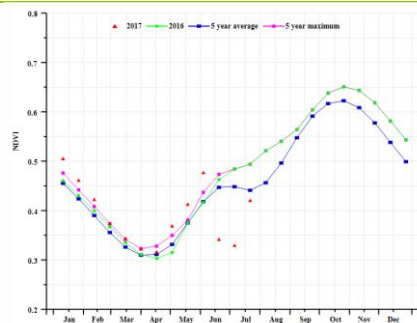
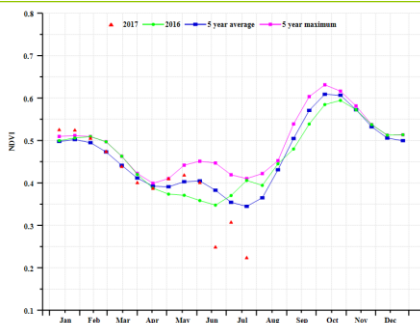
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

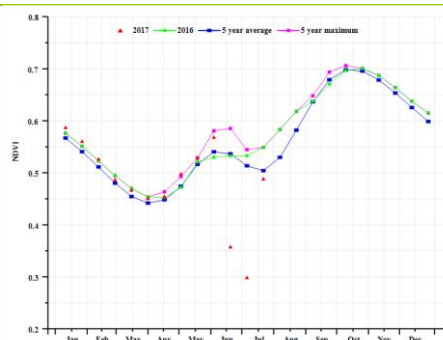


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

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

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

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

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

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

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

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

[NGA] Nigeria

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

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

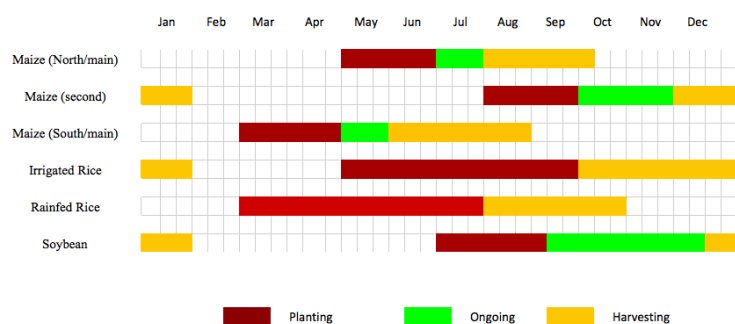
According to the NDVI profiles, 47.9% of the cropped area had better than average conditions, while 14.9% of areas were characterized by an increasing NDVI trend that started in early May and by June led to NDVI levels above average. For 7.0% of the cropped area, crop condition was below average during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

Regional analysis

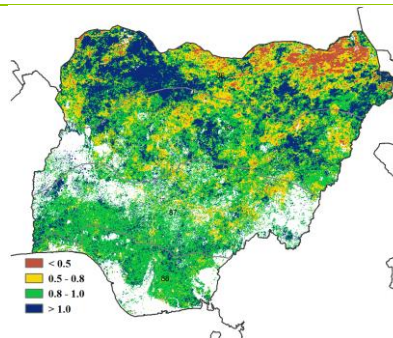
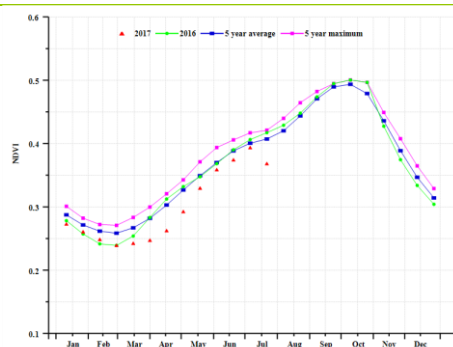
At the sub-national level, the agroclimatic conditions showed that with the exception of the Derived Savana region (which registered a slight decrease in rainfall (RAIN, -1%)), all agro-ecological zones registered an increase, especially the Sudano Sahelian zone (RAIN, +29%). All four zones recorded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

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

Figure 3.22. Nigeria crop condition, April-July 2017

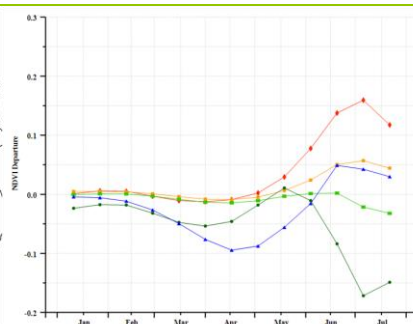
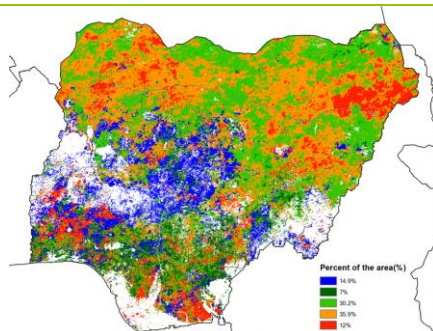


(a) Phenology of major crops



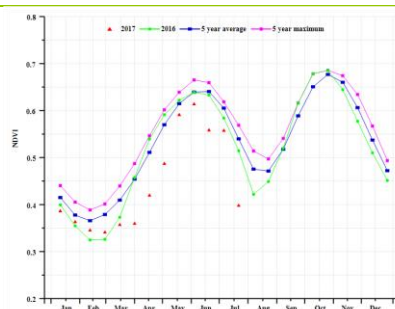
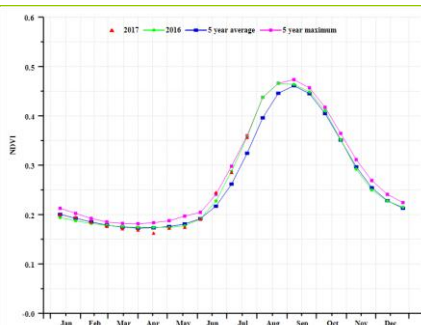
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

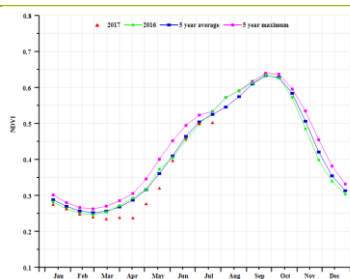
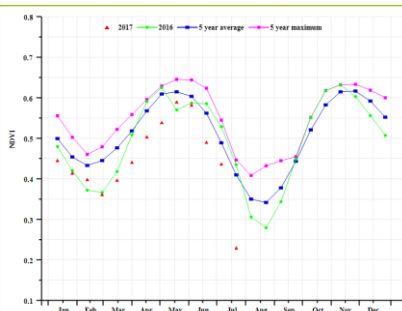


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

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

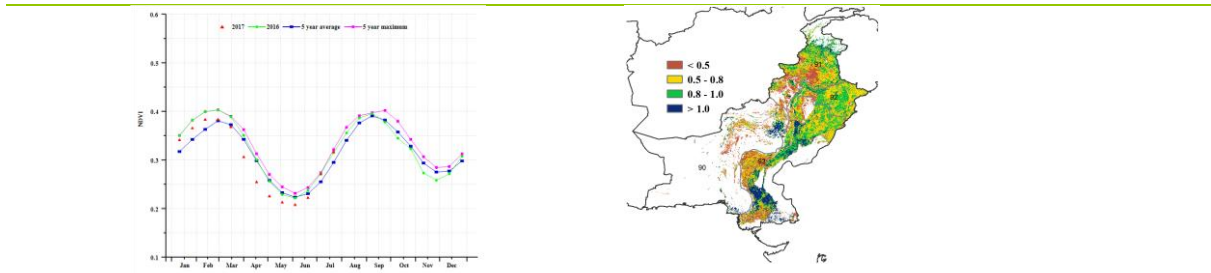
Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m2)	Departure from 15YA (%)
Sudano Sahelian	453	29	31	-1	1362	-3
Derived Savana	658	-1	28	-1	1076	2
Humid Forest Zone	1176	18	27	-1	885	-4
Guinean Savanna	548	4	28	-1	1235	-1

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

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

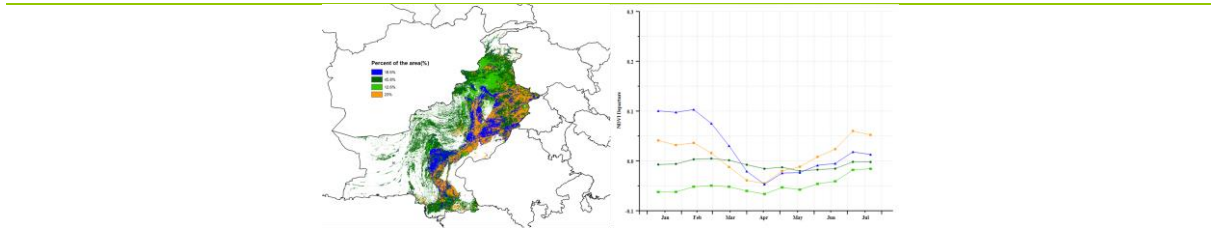
Table 3.55. CropWatch-estimated maize and rice production for Nigeria in 2017 (thousand tons)

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



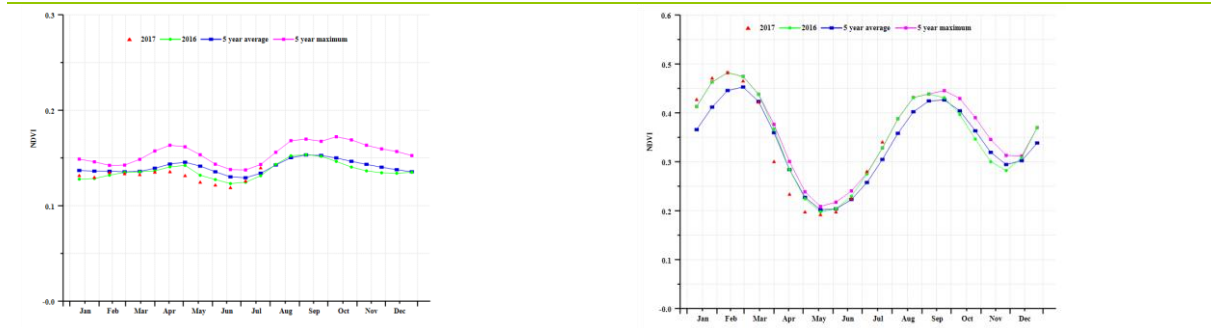
(b) Crop condition development graph based on NDVI

(c) Maximum VCI



(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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

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

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

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

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

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current (%)	Departure from 5YA (%)	Current
Lower Indus River Basin	790	91	38	1	0.77
Northern Highland	1070	10	45	-9	0.72
Northern Punjab	1096	22	62	-11	0.79

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

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

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

[PHL] The Philippines

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

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

Regional analysis

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

Lowland agriculture region

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

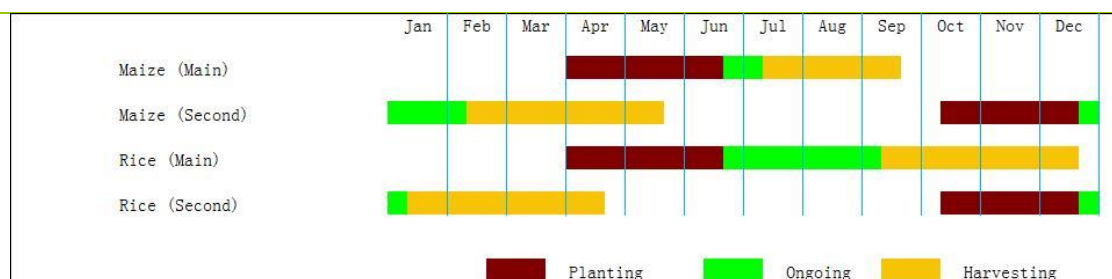
Hilly agriculture region

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

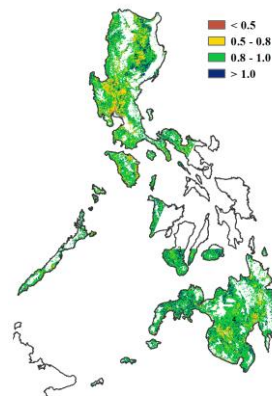
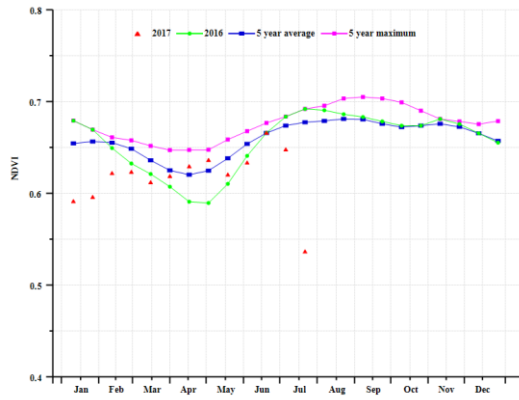
Forest region

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

Figure 3.24. Philippines crop condition, April-July 2017

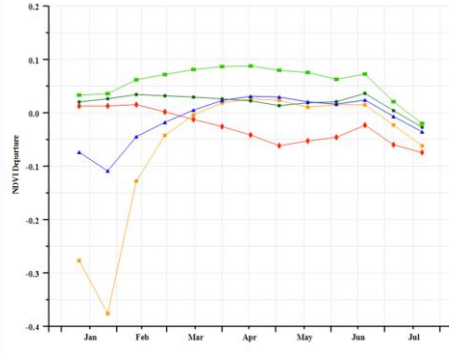
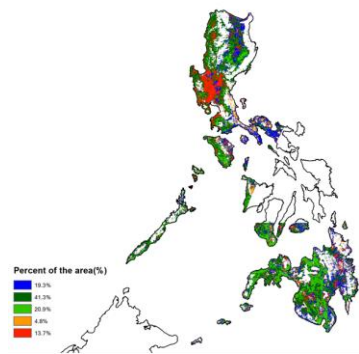


(a). Phenology of major crops



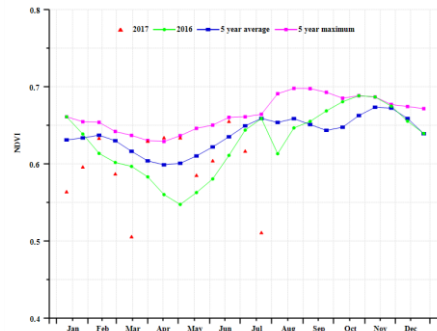
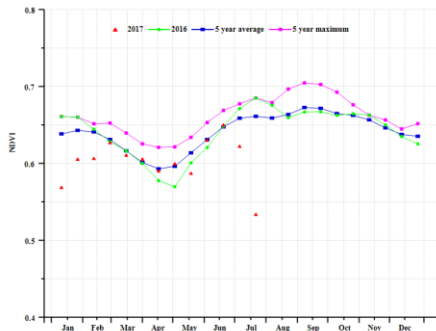
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

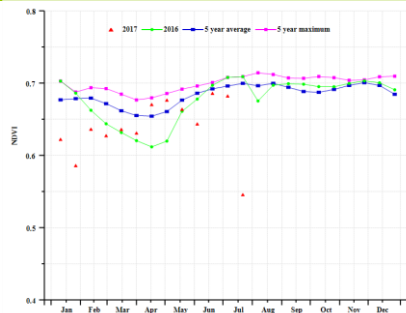


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

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

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

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

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

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

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

[POL] Poland

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

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

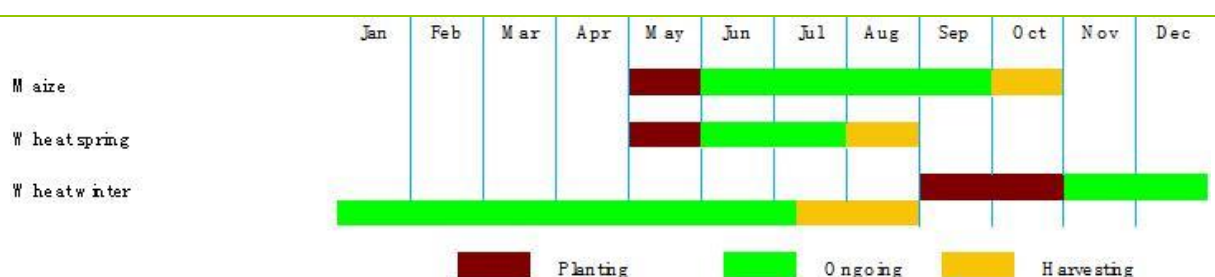
Regional analysis

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

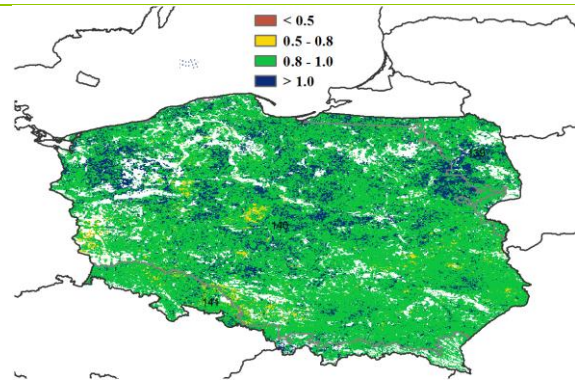
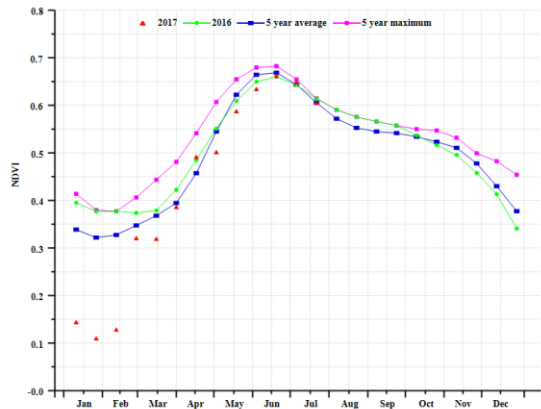
In the largest zone, the Cool temperate and dry zone, agroclimatic indicators show an increase of rainfall over average (RAIN, $+24\%$) and a decline of radiation (RADPAR, -7%). Temperature was below average (TEMP, -1°C), while the biomass production potential is above (BIOMSS, $+21\%$). The Cropped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

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

Figure 3.25. Poland crop condition, April-July 2017

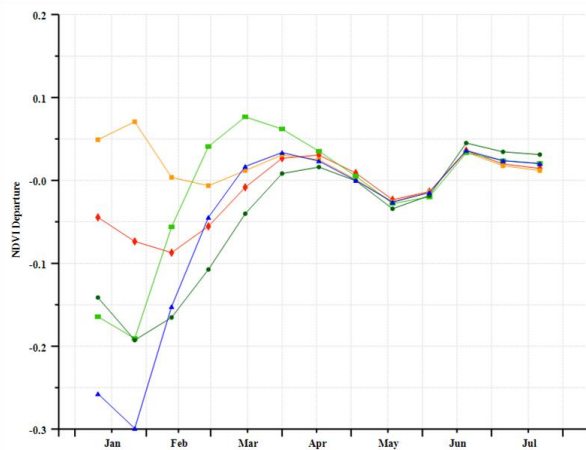
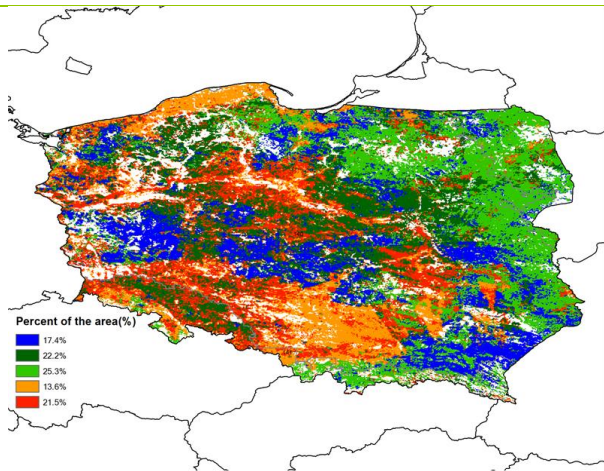


(a). Phenology of major crops



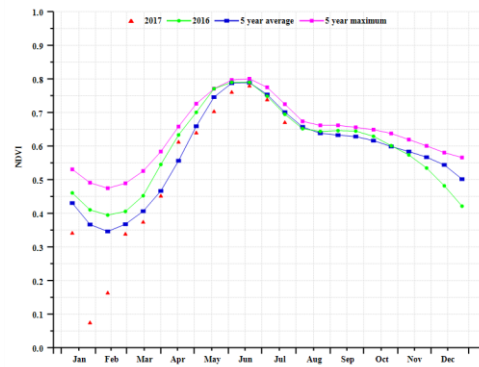
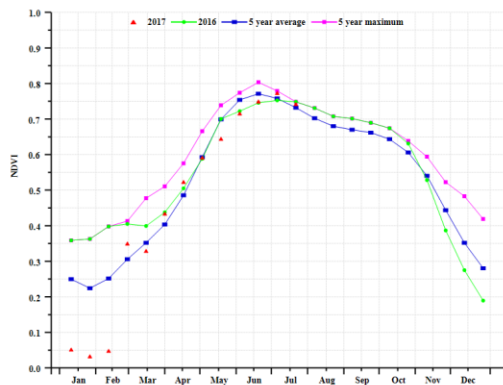
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

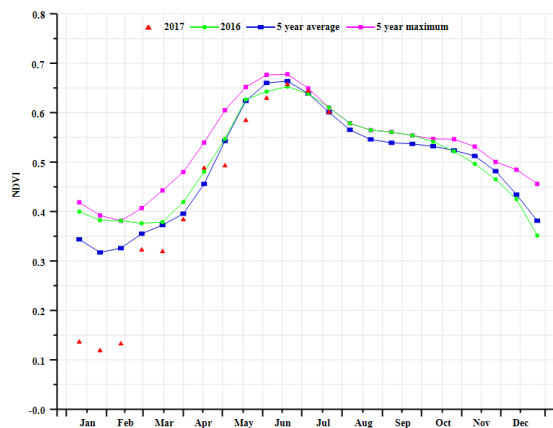


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

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

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Cold and mesic forest zone	296	11	13	-1	1020	-6
Cool temperate and dry zone	322	24	14	-1	1023	-7
Cool temperate and moist zone	341	6	14	-1	1048	-4

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

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Cold and mesic forest zone	1247	11	1	0	0.97
Cool temperate and dry zone	1310	21	1	0	0.96
Cool temperate and moist zone	1397	10	1	0	0.95

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

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

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

[ROU] Romania

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

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

Regional analysis

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

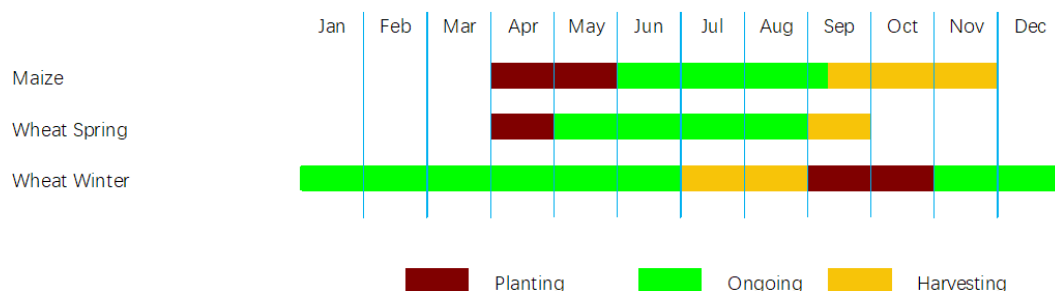
In the West, crop condition was somewhat below average during the monitoring period, while it was average in the Middle region. In the Southern and eastern plain region, crop condition was above average. Crop condition development was generally fair over the whole country.

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

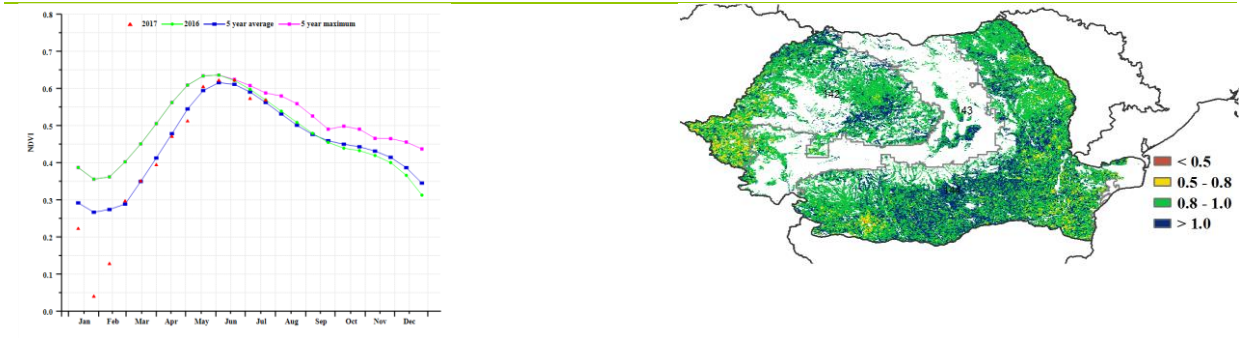
All regions enjoyed a high maximum VCI (VCIx) in excess of 0.8. For the West region, crop condition was not so good near the western border (VCIx ranging from 0.5 to 0.8), while condition in the Middle region is nearly as good as in the Southern and eastern plain region (VCIx close to 1.0). Although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

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

Figure 3.26. Romania crop condition, April-July 2017

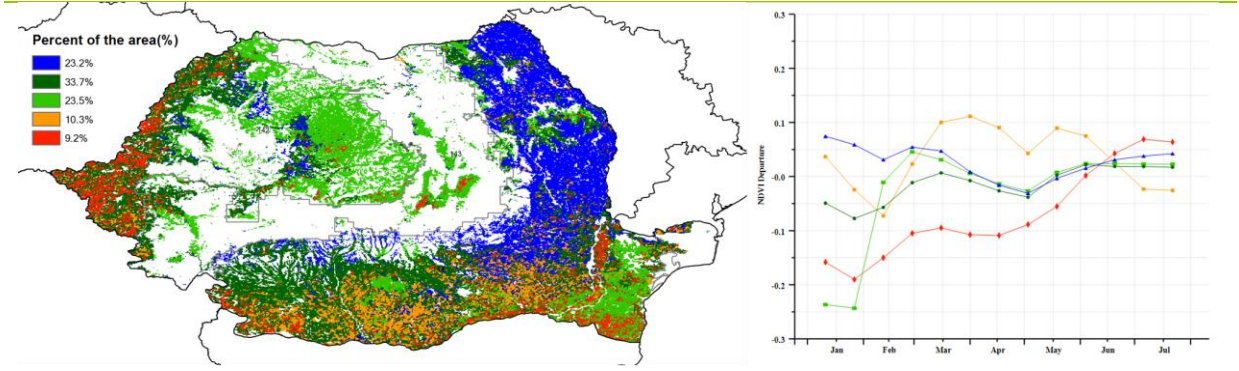


(a). Phenology of major crops



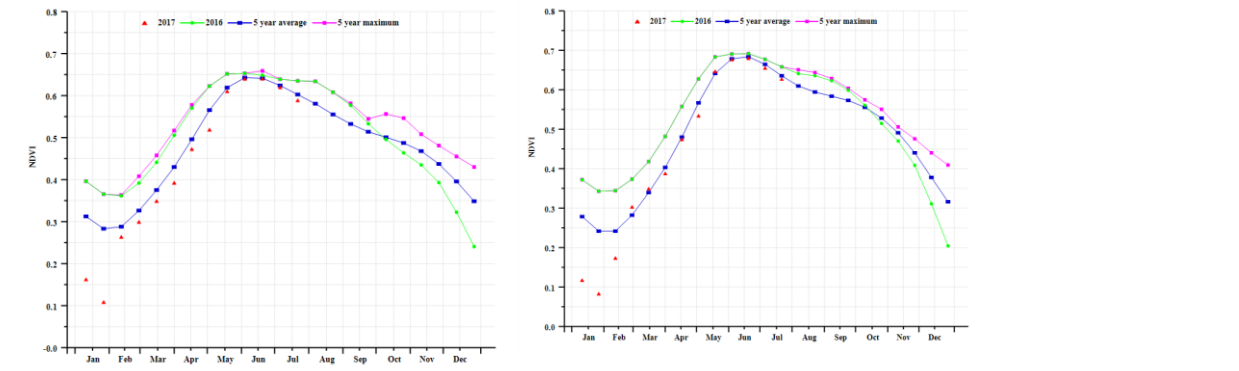
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

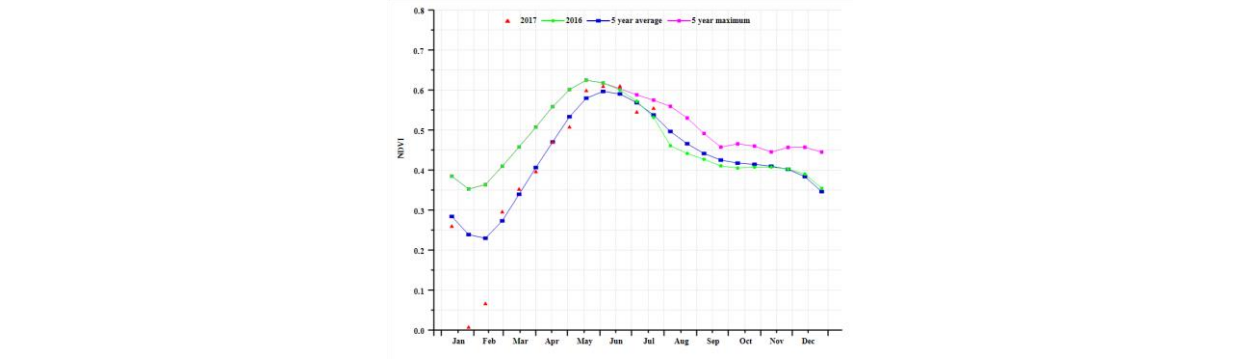


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

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

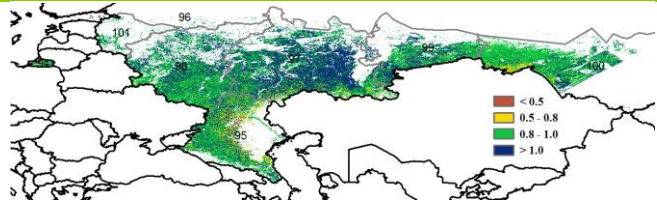
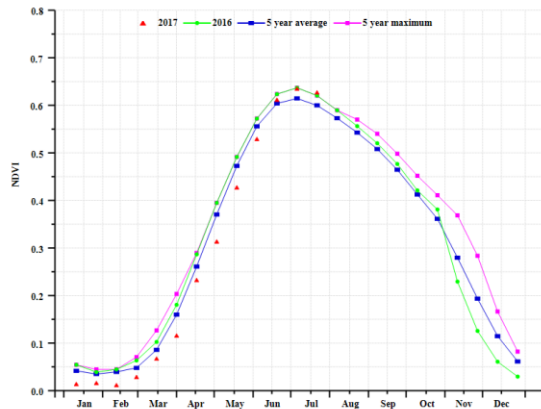
Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
West region	312	-9.26	16	-0.66	1222	1.85
Middle region	362	-4.20	13	-0.65	1201	1.12
South & east plain	299	4.62	17	-1.02	1234	-0.19

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

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
West region	1235	-2.87	1	0	0.94
Middle region	1335	0.40	1	0	0.96
South & east plain	1139	5.02	1	0	0.96

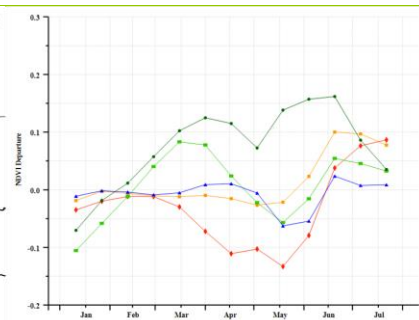
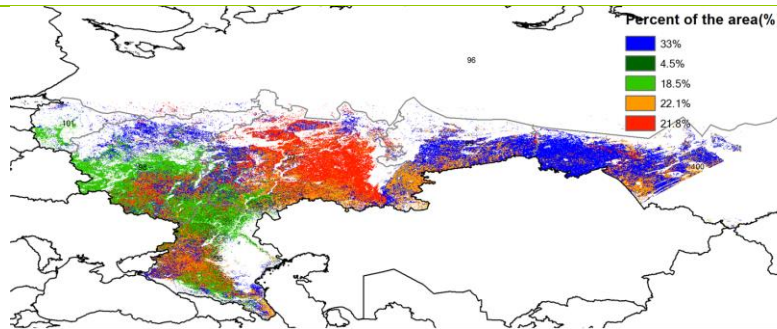
Table 3.67. CropWatch-estimated maize and wheat production for Romania in 2017 (thousand tons)

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



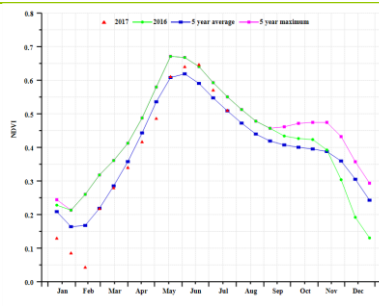
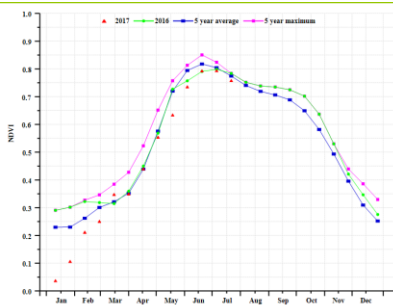
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

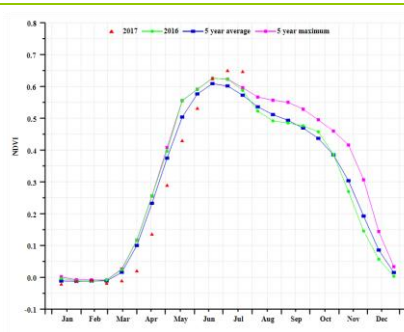
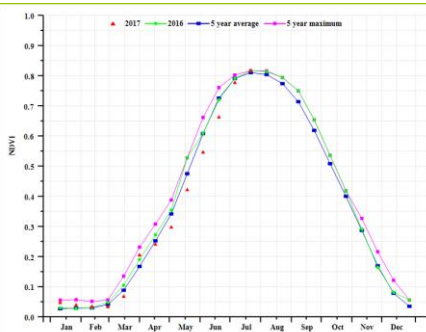


(d) Spatial NDVI patterns compared to 5YA

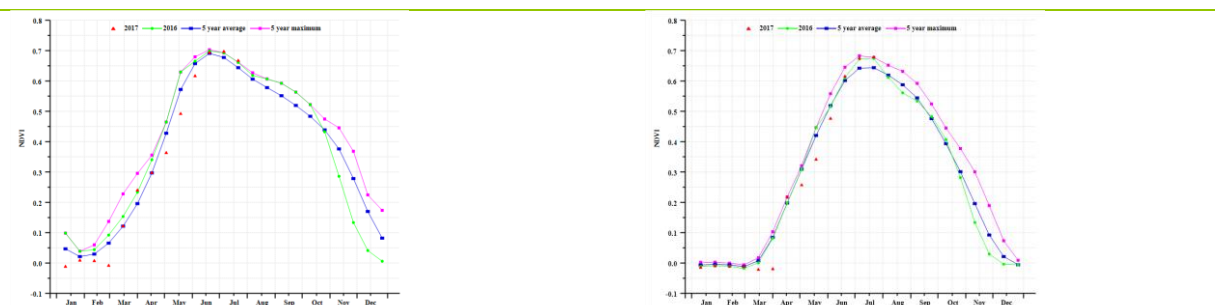
(e) NDVI profiles



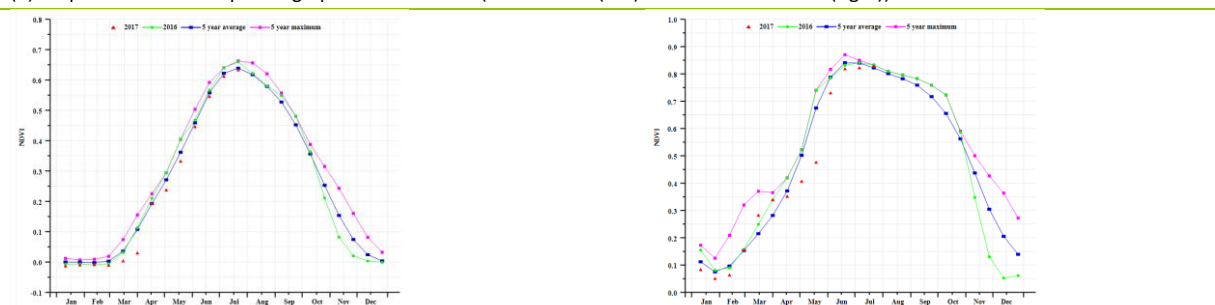
(f) Crop condition development graph based on NDVI (Kalingrad (left) and Caucasian (right))



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



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



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

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

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

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

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

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

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

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

[THA] Thailand

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

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

Regional analysis

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

Double and triple-cropped rice area

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

Mountain area

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

Horticulture area

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

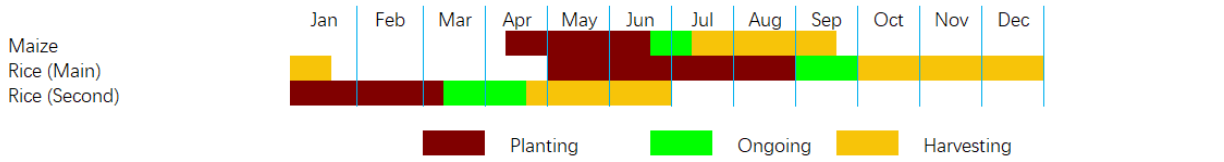
Single-cropped rice area

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

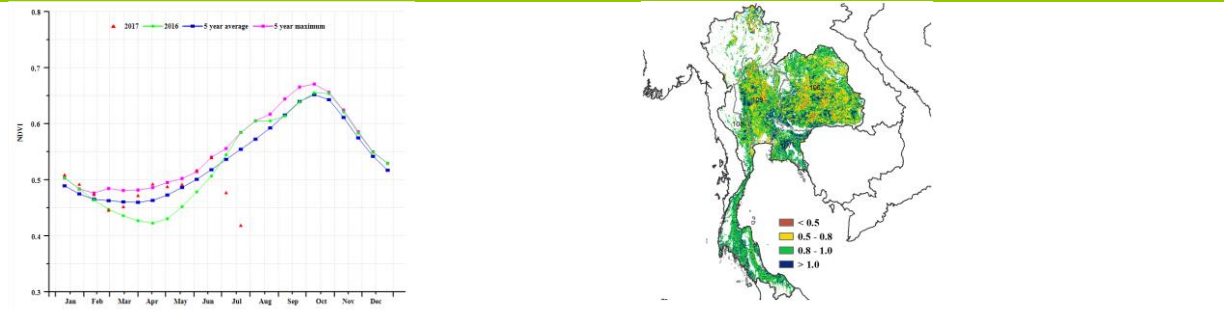
the crop condition in the area is assessed as close to or possibly below average, but overall average.

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

Figure 3.28. Thailand crop condition, April-July 2017

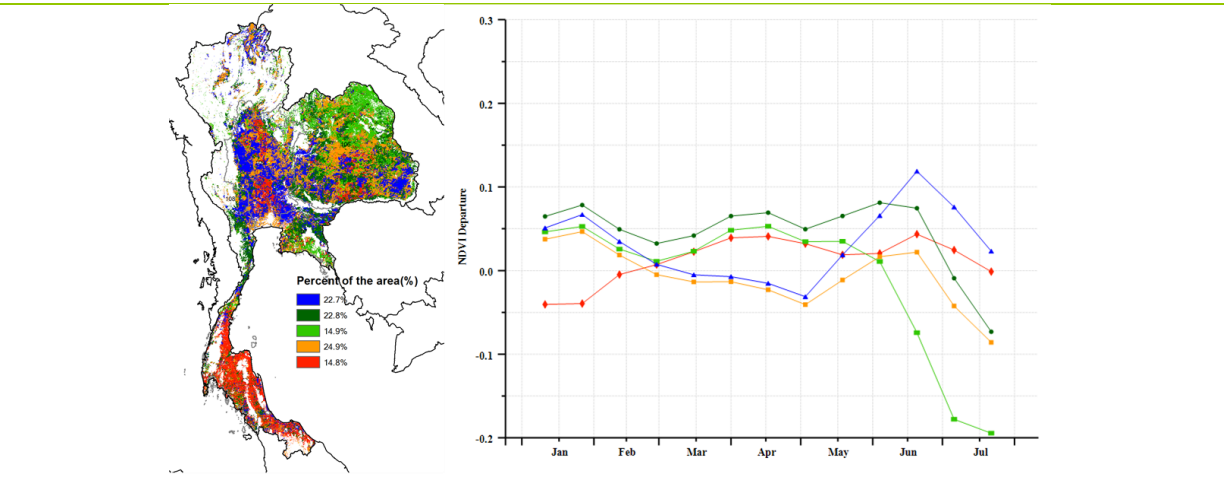


(a). Phenology of major crops



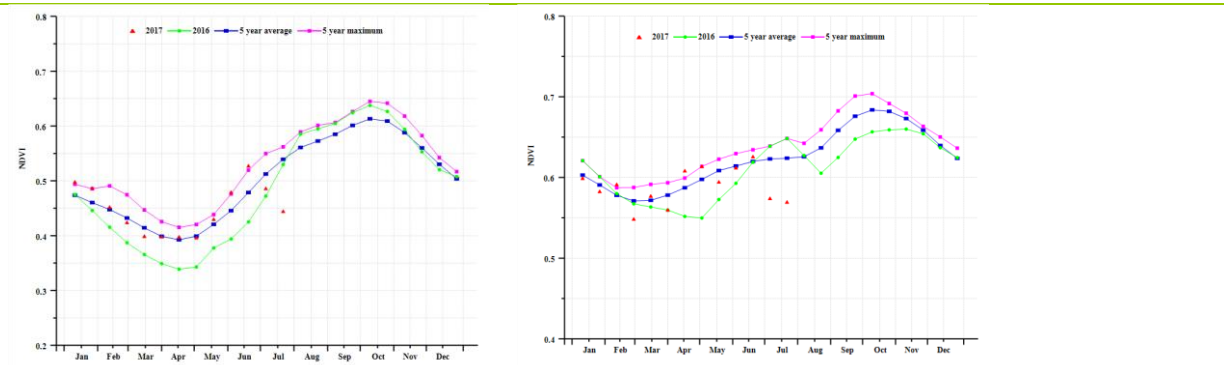
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

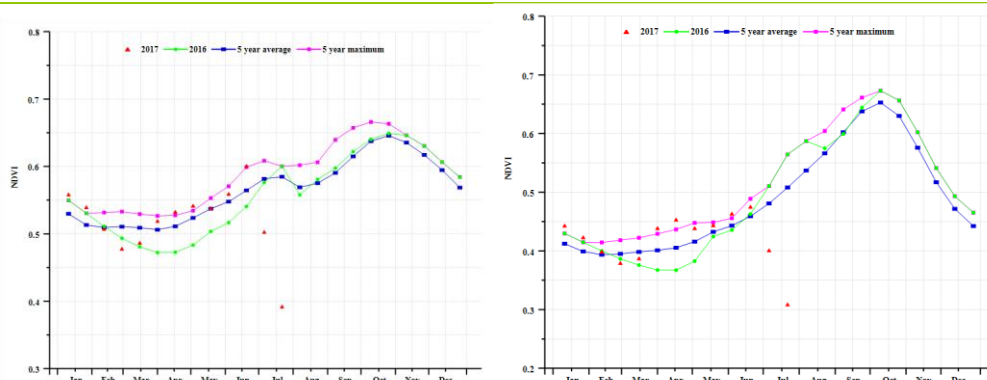


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

Table 3.71. April- July 2017 agroclimatic indicators by sub-national regions, current season values and departure from 15YA

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Single-cropped rice area	994	24	28.3	-1.3	1094	-3
Horticulture area	844	0	27.9	-1.2	1038	-4
Mountains area	799	7	27.1	-0.9	1040	-3
Double and triple-cropped rice area	762	30	28.5	-1.0	1081	-3

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

Region	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Double and triple-cropped rice area	1935	11	0.99	1	0.91
Mountains area	2007	6	0.99	1	0.97
Horticulture area	2048	-1	0.99	1	0.97
Single-cropped rice area	2044	4	0.98	1	0.91

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

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

[TUR] Turkey

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

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

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

Regional analysis

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

Black Sea region

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

Northeast Region

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

Southeast region

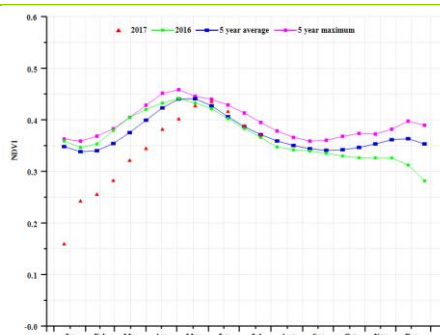
Crop condition in this region was less favorable in this monitoring period than during the same period in 2016. Rainfall (RAIN, -23%) was below average, while temperature (+1.1°C) and radiation (RADPAR, +1%) were both above. The Cropped Arable Land Fraction dropped 3.2%, while VCIx was just fair (0.81)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

Central Anatolia

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

Marmara, Aegean and Mediterranean

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



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

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

Region	Rain		TEMP		RADPAR	
	Rain Current (mm)	Rain 15 YA Departure (%)	TEMP Current (°C)	Temp 15YA Departure (°C)	RADPAR Current (MJ/m ²)	RADPAR 15YA departure (%)
Black Sea region	237	-4	14.8	-0.3	1266	-1
Northeast region	228	-22	12.3	0.7	1407	3
Southeast region	141	-23	20.0	1.1	1517	1
Central Anatolia region	208	13	16.3	-0.3	1412	-1
Marmara, Agean and Mediterranean region	177	18	18.9	-0.2	1433	-1.2

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

Region	BIOMSS		CALF		Maximum VCI
	BIOMSS Current (gDM/m ²)	BIOMSS 5 YA Departure (%)	CALF(%)	Departure from 5YA (%)	VCI Current
Black Sea region	921	-6	98	1	0.96
Northeast region	888	-20	83	1	0.91
Southeast region	585	-20	70	-3	0.81
Central Anatolia region	782	3	61	3	0.81
Marmara, Agean and Mediterranean region	676	7	78	-1	0.80

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

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

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

[UKR] Ukraine

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

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

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

Regional analysis

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

Central wheat area

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

Northern wheat area

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

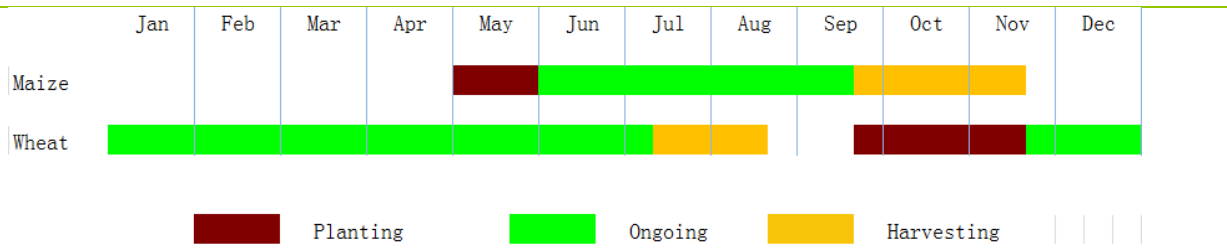
Mountain region

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

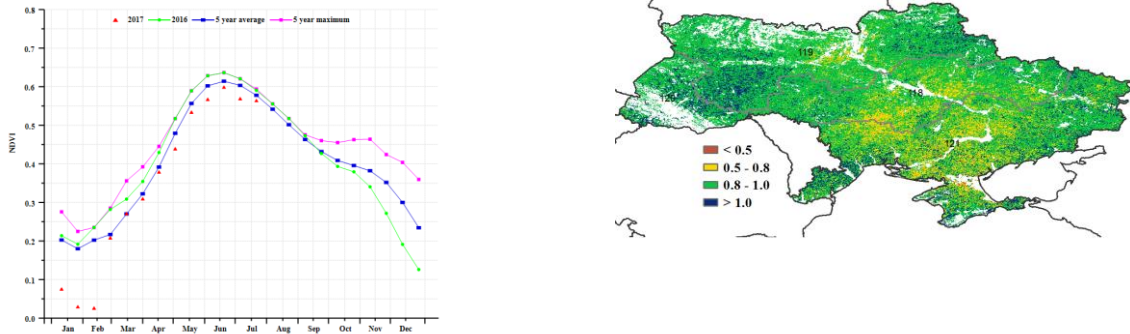
Southern wheat and maize area

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

Figure 3.30. Ukraine crop condition, April-July 2017

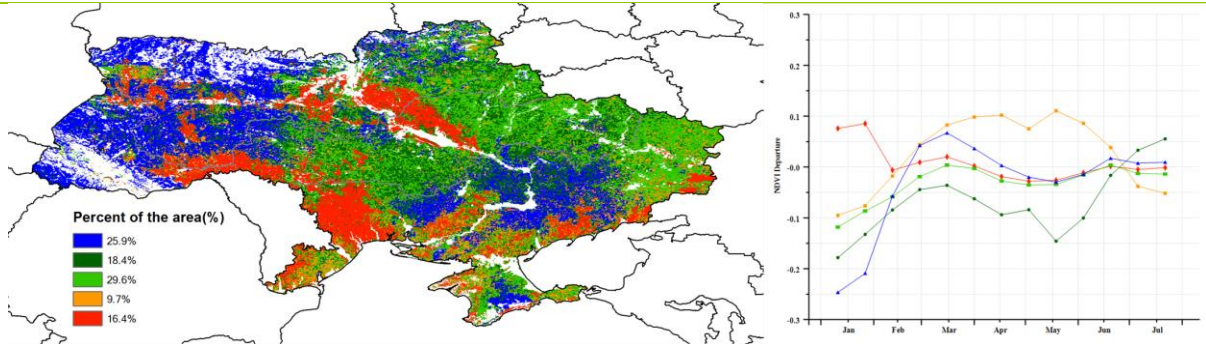


(a). Phenology of major crops



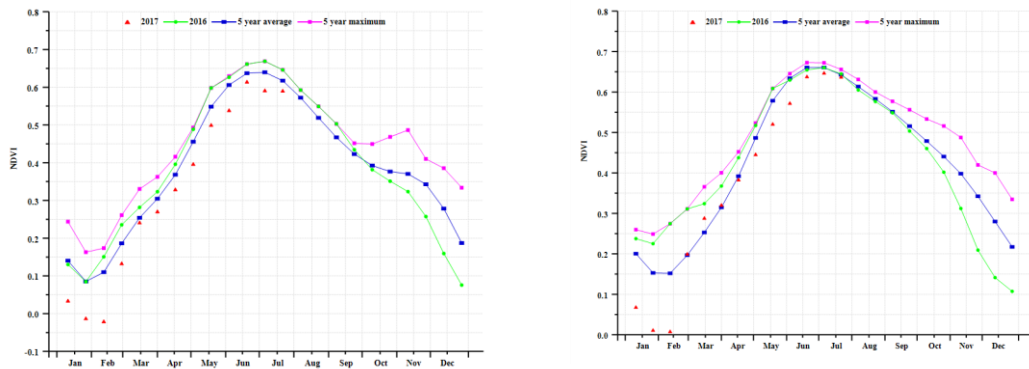
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

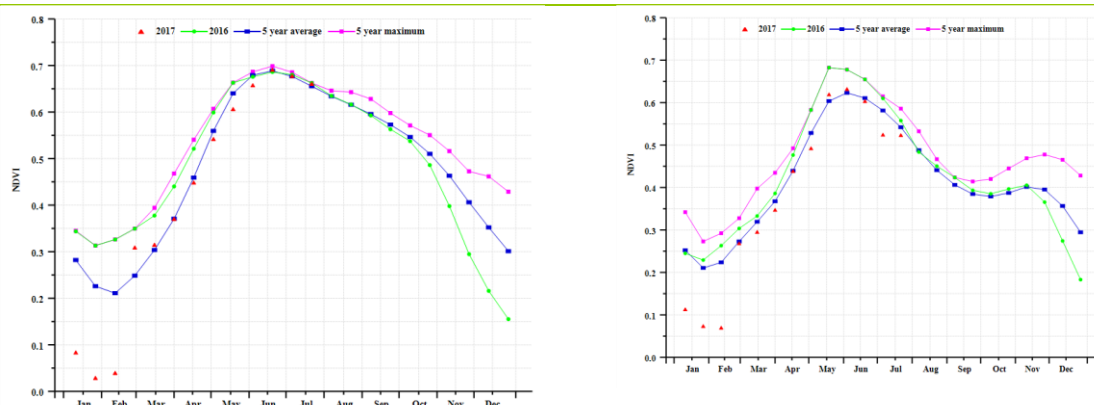


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

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

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

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

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

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

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

[USA] United States

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

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

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

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

Regional analysis

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

Northwest region

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

Northern plains

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

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

Southern plains

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

California

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

Corn Belt

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

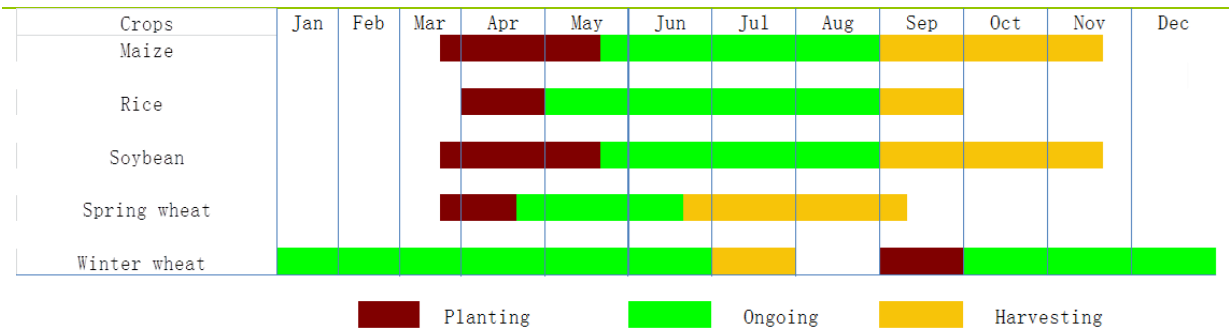
Southeast

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

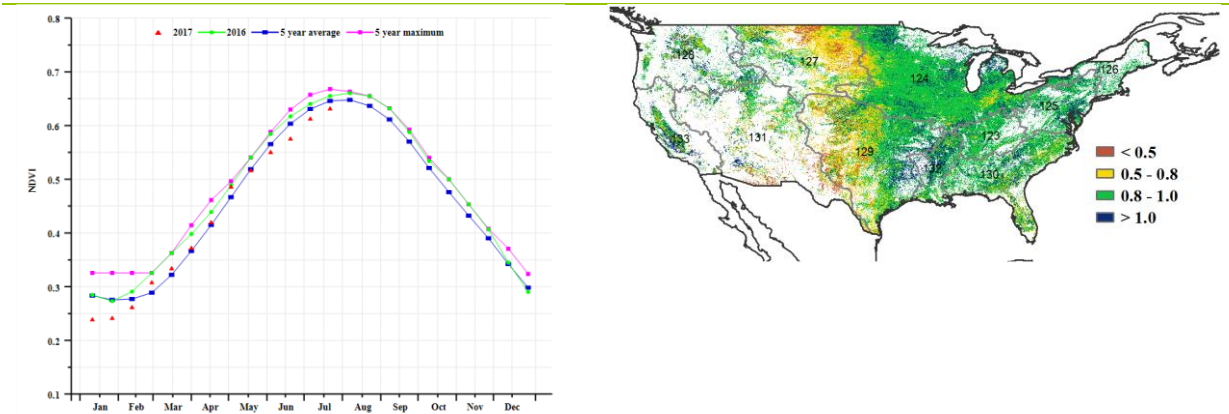
Lower Mississippi

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

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

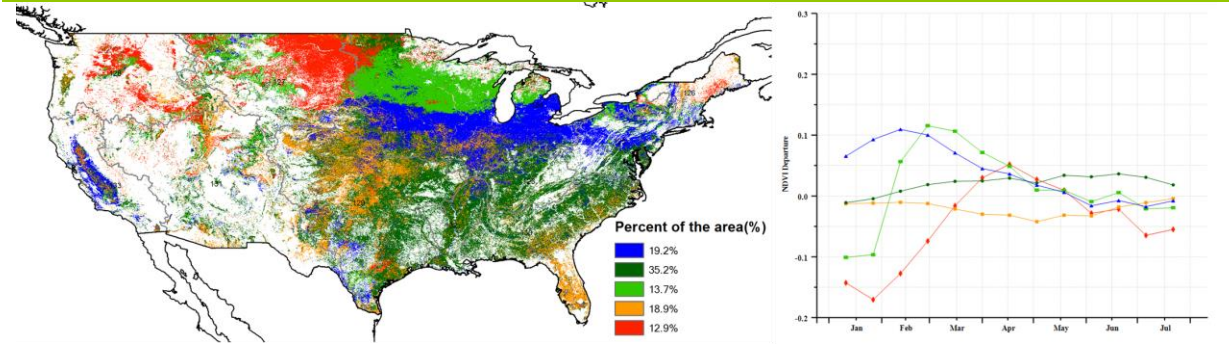


(a). Phenology of major crops



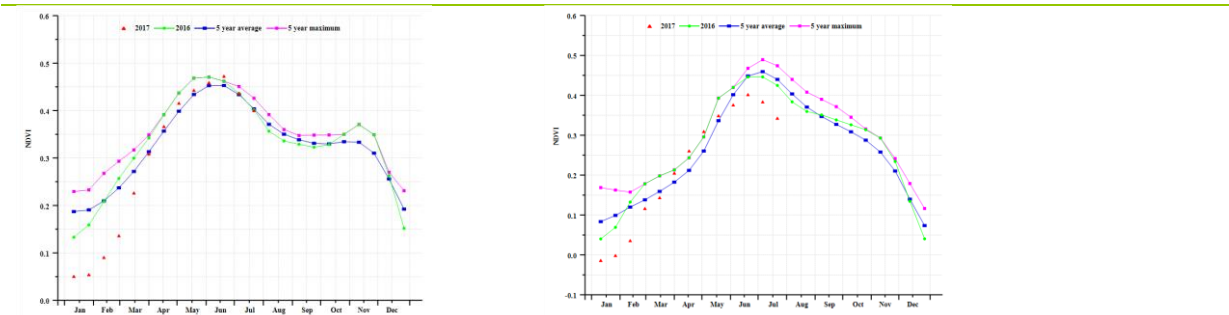
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

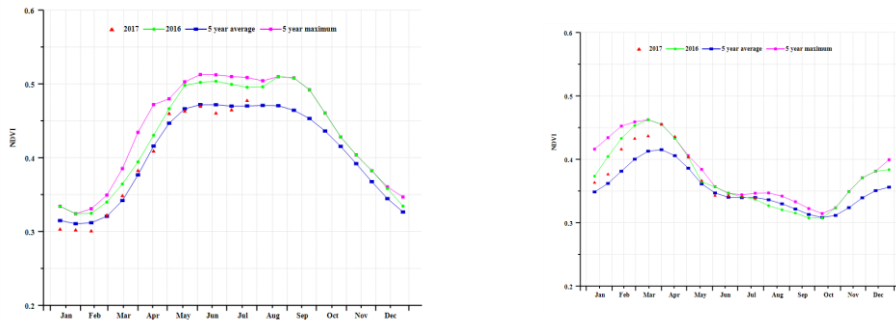


(d) Spatial NDVI patterns compared to 5YA

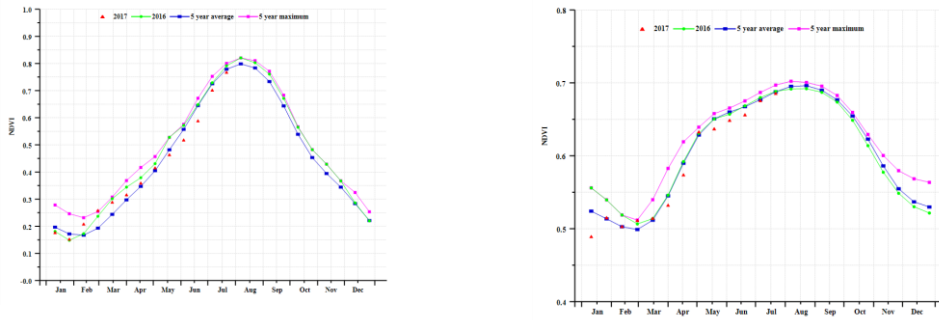
(e) NDVI profiles



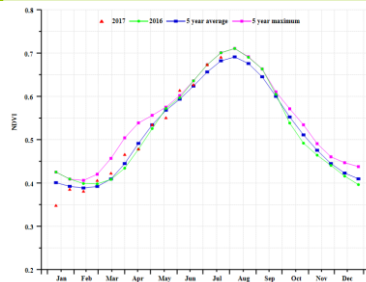
(f) Crop condition development graph based on NDVI (northwest region (left) and North plains (right))



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



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



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

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

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

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

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

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

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

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

[UZB] Uzbekistan

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

Regional analysis

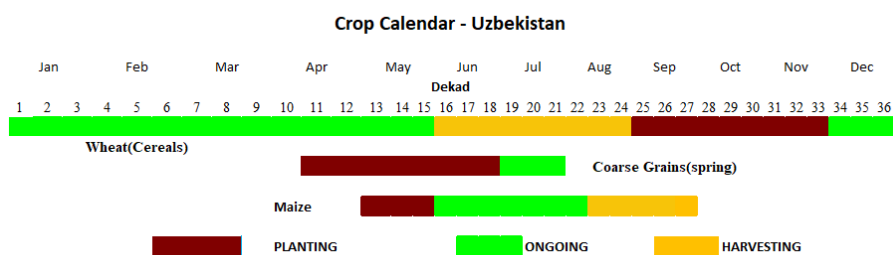
Maize and cereals zone

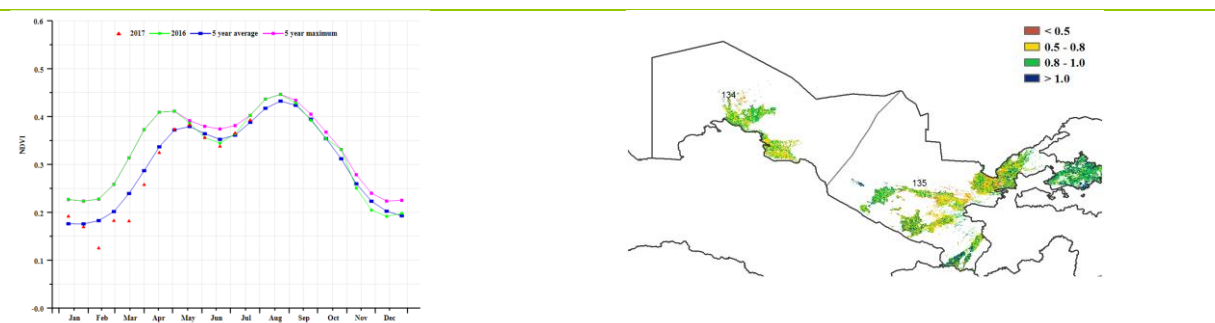
In this area in the east of the country, the harvesting of 2017 winter cereals (mainly wheat) is underway and will be completed by the end of August. Harvesting of the spring crops will start soon and is expected to continue until the end of September. The crop condition was below the five-year average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

Cotton zone

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

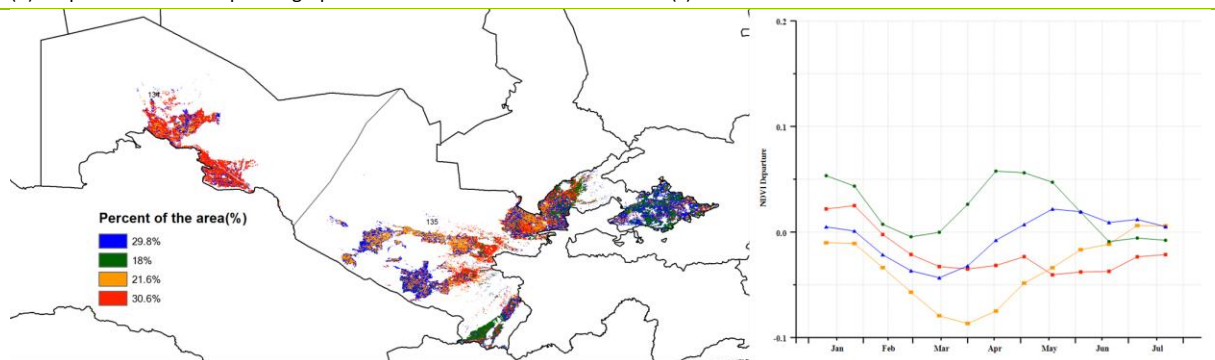
Figure 3.32. Uzbekistan crop condition, April-July 2017





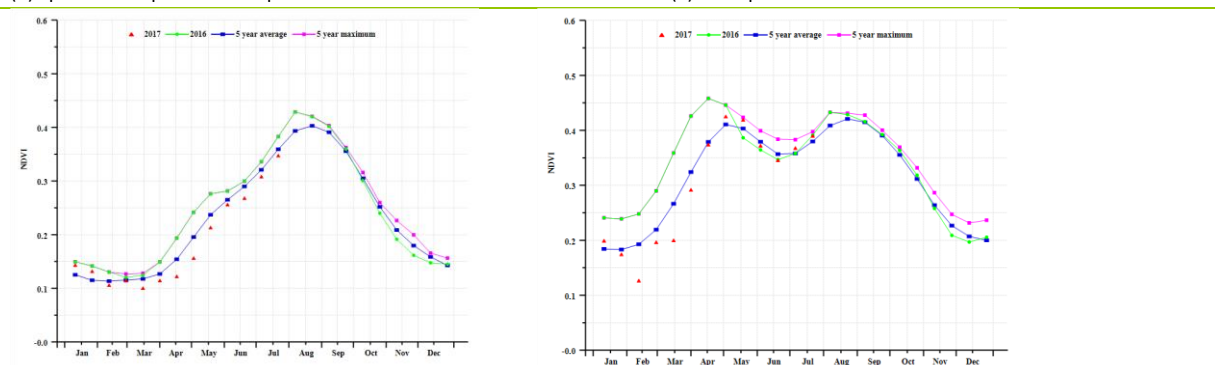
(b) Crop condition development graph based on NDVI

(c) Maximum VCI



(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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

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

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

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

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

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

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

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

[VNM] Vietnam

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

Regional analysis

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

Southern Vietnam

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

Northern Vietnam

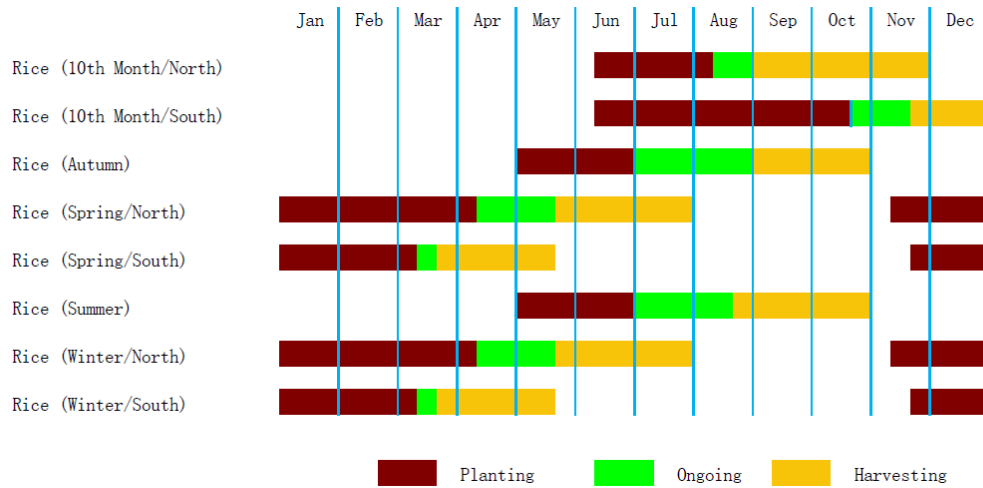
The northern part of the country recorded average rainfall (RAIN equal to 15YA) and about average TEMP (-1°C). The drop in RADPAR is 5% and BIOMSS is down 8%. CALF is unchanged compared to 2016. The crop condition development graph of NDVI shows the above mentioned erratic behavior and its interpretation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

Middle Vietnam

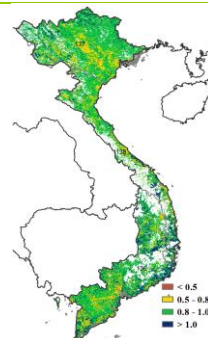
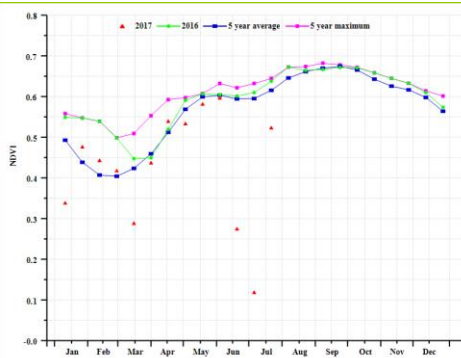
The situation and expected impact on crop production is almost identical with Southern Vietnam with the exception of a larger rainfall excess and resulting biomass production potential: RAIN, + 42%; TEMP, - 1.0°C; RADPAR, -7%; BIOMSS, +13%; VCIx 1; and CALF, +1%.

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

Figure 3.33. Vietnam crop condition, April-July 2017

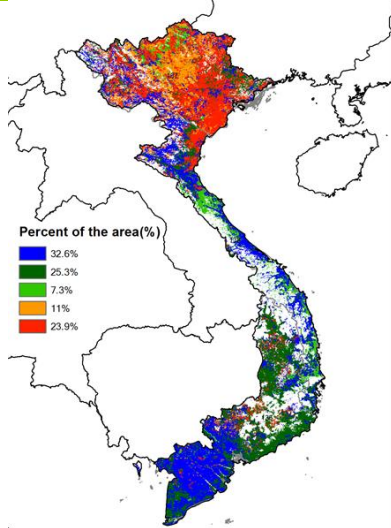


(a). Phenology of major crops

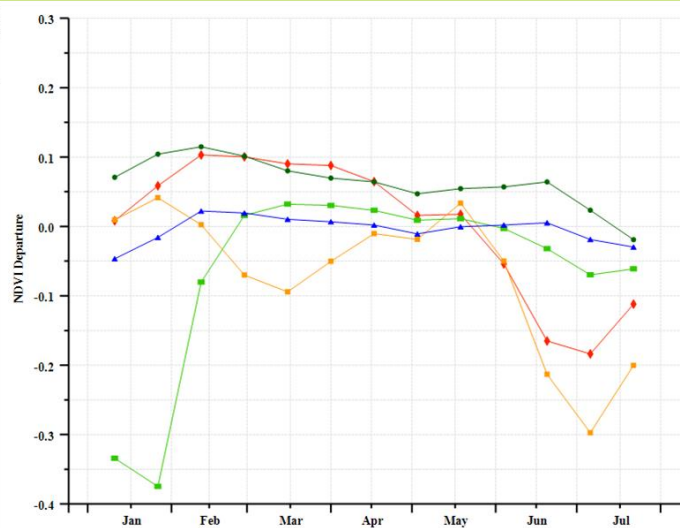


(b) Crop condition development graph based on NDVI

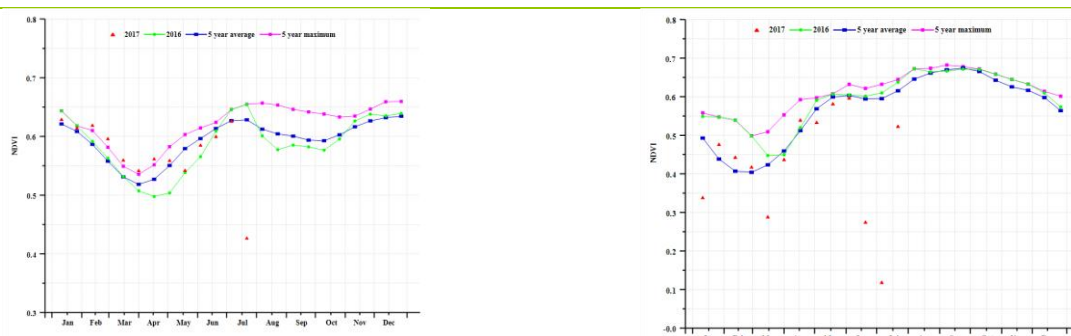
(c) Maximum VCI



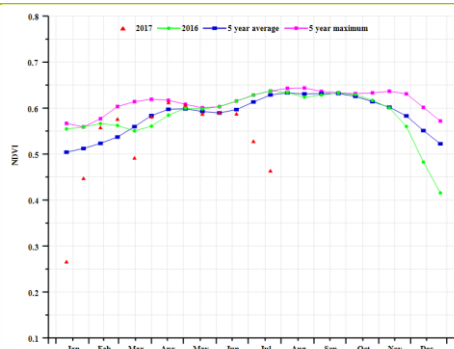
(d) Spatial NDVI patterns compared to 5YA



(e) NDVI profiles



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



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

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

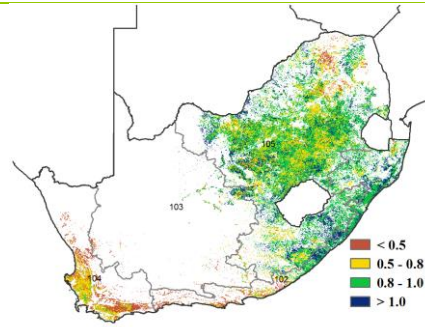
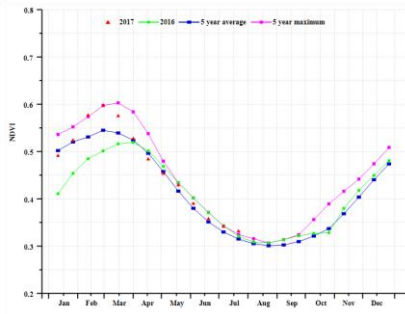
Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
South Vietnam	890	11	26.8	-0.7	1048	-6
North Vietnam	974	0	25.2	-0.9	966	-5
Middle Vietnam	890	42	27.8	-0.9	1098	-7

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

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

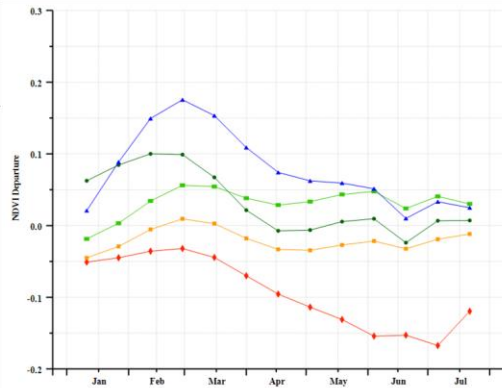
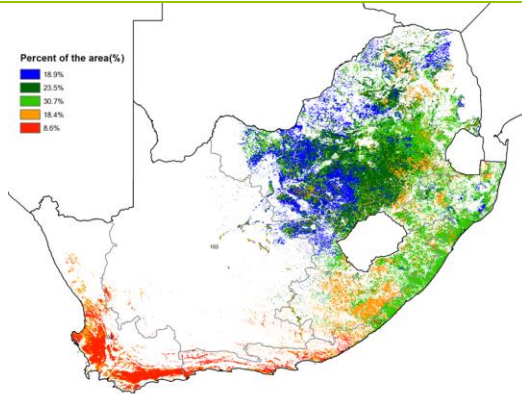
Table 3.88 CropWatch-estimated rice production for Vietnam in 2017 (thousands tons)

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



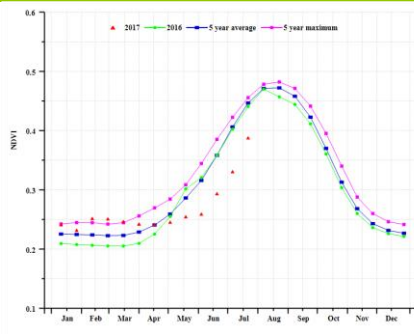
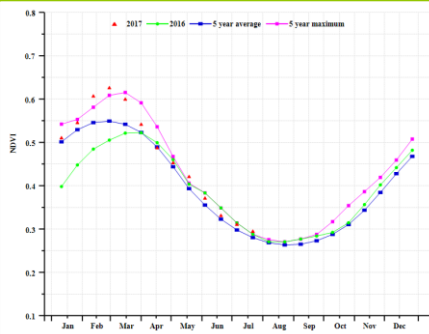
(b) Crop condition development graph based on NDVI

(c) Maximum VCI

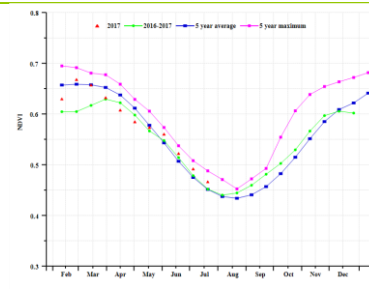
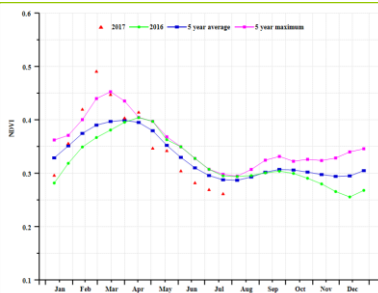


(d) Spatial NDVI patterns compared to 5YA

(e) NDVI profiles



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



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

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

Region	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m ²)	Departure from 15YA (%)
Humid sub-tropical zone	78	-32	16.5	0.4	758	-1
Arid desert zone	64	-24	13.4	0.8	822	1
Mediterranean zone	82	-52	13.3	0.3	721	4
Semi-arid steppe zone	66	-11	13.8	0.4	878	-1

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

Region	BIOMSS		CALF		Maximum VCI
	Current (gDM/m ²)	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
Humid sub-tropical zone	318	-31	0.9	-1	0.76
Arid desert zone	275	-23	0.4	25	0.80
Mediterranean zone	305	-47	0.8	-5	0.28
Semi-arid steppe zone	275	-13	0.8	19	0.84

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

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

Chapter 4. China

After a brief overview of the agroclimatic and agronomic conditions in China over the reporting period (section 4.1), Chapter 4 presents an updated estimate of national winter crop production (4.2) and describes the situation by region, focusing on the seven most productive agro-ecological regions of the east and south: Northeast China, Inner Mongolia, Huanghuaihai, Loess region, Lower Yangtze, Southwest China, and Southern China (4.3). Section 4.4 presents the results of ongoing pests and diseases monitoring, while sections 4.5 and 4.6 describe trade prospects (import/export) of major crops (4.5) and an updated outlook for domestic prices of maize, rice, wheat and soybean (4.6). Additional information on the agroclimatic indicators for agriculturally important Chinese provinces are listed in table A.11 in Annex A.

4.1 Overview

On the national scale, rainfall increased by 9% above average, while temperature and RADPAR decreased by 0.3°C and 0.5%, respectively. The resulting biomass production potential indicator BIOMSS was average (+1%). At the sub-national level, above-average rainfall occurred in almost all regions, except Northeast China. Temperature was close to average everywhere, with departures ranging between -1.0°C and +0.8°C. The spatial distribution of rainfall and temperature profiles showed that these two climatic variables fluctuated over time (figure 4.1 and figure 4.2). Although rainfall was continuously close to average for 70.3% of areas in China, 29.7% of regions experienced excess rainfall from June to July, with these areas mainly located in south and southeast China. Moreover, precipitation was significantly above average (with an increase of more than 270 mm) in most regions of Hunan, Jiangxi, and Guizhou provinces in late June, accounting for 11.5% of planted areas of China. As a result, these areas may suffer from flood damage. During the monitoring period, consistent temperature fluctuations occurred in different regions of China.

As shown in figure 4.3, most cropland in China was cropped (with the exception of central Inner Mongolia, south Ningxia, and eastern Gansu) during the reporting period as it is now the the peak of the agricultural season for most of China. The VCIx at the national level was 0.75. Higher values appear in northeast and southwest China, as well as in Huanghuaihai (table 4.1). In contrast, lower values occur in the Loess region and Inner Mongolia, which might be affected by drought. Compared with average, the Cropped Arable Land Fraction for the country decreased by 2%, with significant declines occurring in the Loess region (-13%) and Inner Mongolia (-9%). In contrast, Huanghuaihai, Lower Yangtze, Northeast, Southern, and Southwest China regions all had average levels for CALF. The map for VHI_n showed that low values were mainly located in Northeastern and Northern China (figure 4.5), consistent with the pattern of VCIx.

Table 4.1. CropWatch agroclimatic and agronomic indicators for China, April-July 2017, departure from 5YA and 15YA

Region	Agroclimatic indicators			Agronomic indicators		
	Departure from 15YA (2002-2016)			Departure from 5YA (2012-2016)		Current
	RAIN (%)	TEMP (°C)	RADPAR (%)	BIOMSS (%)	CALF (%)	Maximum VCI
Huanghuaihai	15	0.5	0	3	0	0.79
Inner Mongolia	17	0.8	2	2	-9	0.64
Loess region	19	0.0	-1	8	-13	0.67
Lower Yangtze	7	-0.6	-1	-4	0	0.73
Northeast China	0	0.3	4	-5	0	0.84
Southern China	8	-1.0	-4	0	0	0.71

Region	Agroclimatic indicators			Agronomic indicators		
	Departure from 15YA (2002-2016)			Departure from 5YA (2012-2016)		Current
	RAIN (%)	TEMP (°C)	RADPAR (%)	BIOMSS (%)	CALF (%)	Maximum VCI
Southwest China	3	-0.7	-1	-2	0	0.77

Figure 4.1. China spatial distribution of rainfall profiles, April-July 2017

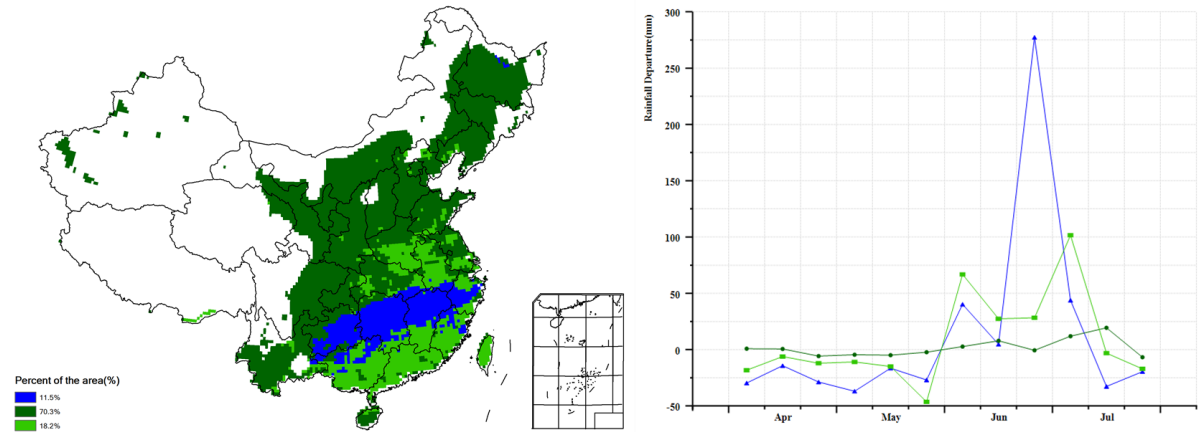


Figure 4.2. China spatial distribution of temperature profiles, April-July 2017

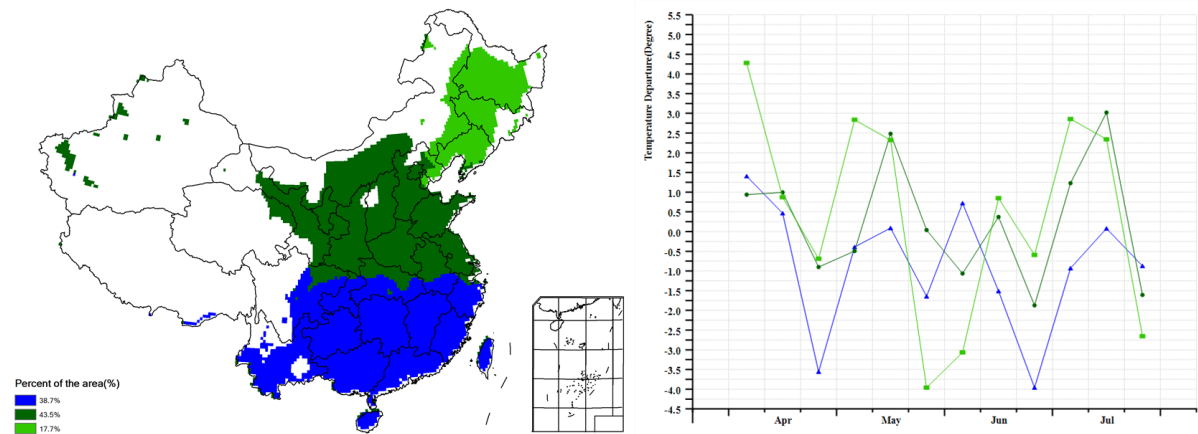


Figure 4.3. China cropped and uncropped arable land, by pixel, April-July 2017

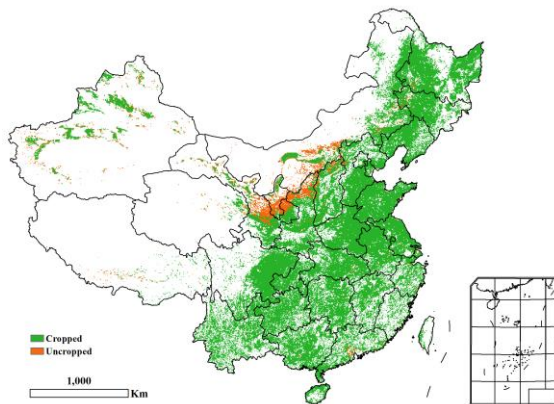


Figure 4.4. China maximum Vegetation Condition Index (VCIx), by pixel, April-July 2017

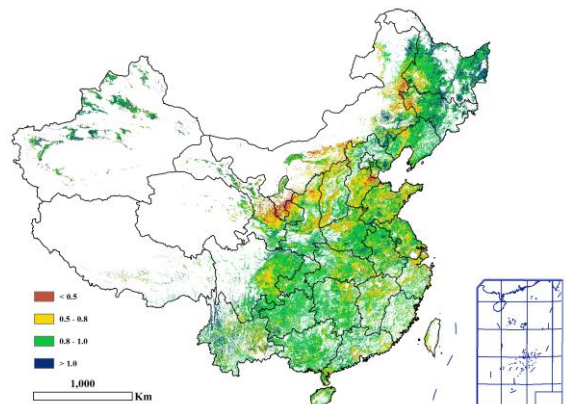
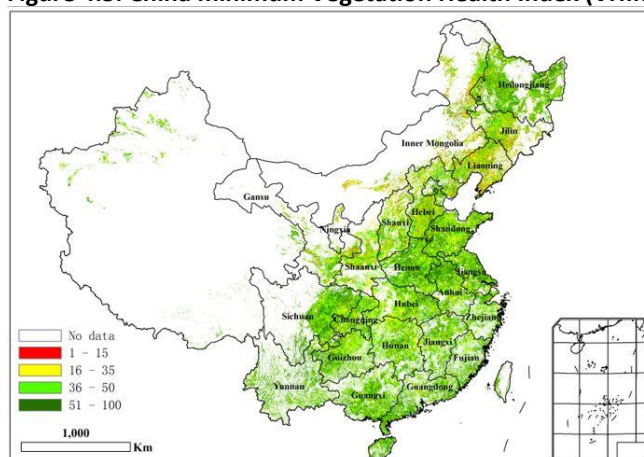


Figure 4.5. China minimum Vegetation Health Index (VHI_{min}), by pixel, April-July 2017

4.2 China crop production

Adequate environmental conditions over China resulted in a 0.9% increase in the yield of winter crops (among which wheat accounts for more than 90%) compared with the previous year (table 4.2). However, planted area dropped by 0.8% with most of the uncropped arable land distributed in central Anhui and southern Jiangsu. Based on the latest remote sensing data and meteorological information, CropWatch revised the winter crop production down to 124,814 thousand tons, which is about equivalent to the 2016 output (0.1% increase). The most significant production decreases occurred in Anhui (-7.8%), Shaanxi (-4.8%), and Jiangsu (-3.9%). The top winter crop area, Henan Province, produced 26.3 million tons, 3.9% up from 2016 with an absolute increase of 988,000 tons compared to that year, mitigating the poor performance of other provinces.

Table 4.2. China 2016-17 winter crops production (in thousand tons) and variation (%) from 2015-16, by province

	Production			Area	Yield Change
	2015-2016	2016-2017	Δ(%)	Δ(%)	Δ(%)
Hebei	11615	11391	-1.9	0	-1.9
Shanxi	2218	2251	1.5	-3.1	4.7
Jiangsu	9971	9585	-3.9	-6	2.3
Anhui	12044	11101	-7.8	-5.1	-2.9
Shandong	24100	24540	1.8	0.9	0.9
Henan	25305	26293	3.9	2.5	1.4
Hubei	5875	5756	-2	-1.8	-0.2
Chongqing	2316	2289	-1.1	-1.5	0.4
Sichuan	5541	5513	-0.5	-1.7	1.2
Shaanxi	4085	3889	-4.8	-3.3	-1.5
Gansu	3002	2999	-0.1	0.4	-0.5
Sub total	106072	105606	-0.4	-	-
Other provinces	18613	19207	3.2	-	-
National total*	124685	124814	0.1	-0.8	0.9

Note: * Production for Taiwan province is not included.

Table 4.3 lists the latest revision of CropWatch production estimates for maize, rice, wheat, and soybean production. Additional estimates for different types of rice (by growing seasons) are shown in table 4.4. As illustrated in these tables, the production of maize and rice is 3.2% and 0.1% below that of 2016, while for wheat and soybean, the production is 0.3% and 4.3% above.

Starting in 2016, China has implemented a new agricultural policy that encourages farmers to shift from maize to other, more suitable crops in regions where maize cultivation is less than optimal due to soil or climate conditions. As a result, the soybean area increased by a significant 4.6% at the national level,

while maize planted area dropped 2.5%, indicating the conversion of maize cultivation to other more profitable crops.

The most significant increase in soybean production (+7%) was observed in Heilongjiang, the top soybean producer in China, thanks to both favorable yield and increased area. Inner Mongolia also outputs 2% above 2016 production due to the expanded planted area. Soybean production decreased in the North China Plain including in Henan, Shandong, and Shanxi. As for maize, the provinces in the North China Plain and South-western China all display lower production, including Anhui, Jiangsu, Hebei, Shandong, Shanxi, Inner Mongolia, Ningxia, Sichuan, Chongqing, and Yunnan. The reasons differ from province to province: in Inner Mongolia, Ningxia, and Shanxi, both yield and area decreased, while in Anhui, Chongqing, Sichuan, and Yunnan the main factor was a drop in yield.

The overall rice production for China remains close to 2016, although the situation depends on the type of growth (Table 4.4). Early rice and late rice production increased by 0.7% and 0.1%, respectively, while single rice production was 0.3% below 2016 values. Since rice is mostly irrigated in China, yield changes only marginally between years. The inter-annual production variation by province is not as significant as for maize, wheat, and soybean. Large production changes include single rice in Ningxia, Sichuan, and Yunnan, and late rice in Hubei.

Table 4.3. China 2017 production of maize, rice, wheat, and soybean, and percentage change from 2016, by province

	Maize		Rice		Wheat		Soybean	
	2017	Change (%)	2017	Change (%)	2017	Change (%)	2017	Change (%)
Anhui	3485	-3	16878	1	10233	-10	1095	0
Chongqing	2066	-2	4673	-1	1089	-2		
Fujian			2828	-2				
Gansu	5136	7			2559	0		
Guangdong			11128	1				
Guangxi			11408	1				
Guizhou	5184	2	5430	0				
Hebei	17690	-1			10626	-2	195	5
Heilongjiang	27271	0	21449	3	473	5	4919	7
Henan	17126	2	3780	-2	25619	2	773	-2
Hubei			15773	2	4281	-1		
Hunan			24667	0				
Inner Mongolia	15263	-6			2118	3	1039	2
Jiangsu	2161	-1	16619	0	9540	-2	787	1
Jiangxi			16880	1				
Jilin	24215	0	5845	3			725	3
Liaoning	15651	0	4477	2			427	2
Ningxia	1633	-5	510	-8	782	-1		
Shaanxi	3517	3	1020	0	3841	-4		
Shandong	18945	-1			22293	2	693	-1
Shanxi	8353	-4			2254	6	164	-2
Sichuan	7014	-3	14551	-3	4677	1		
Xinjiang	6876	2						
Yunnan	5987	-2	5408	-4				
Zhejiang			6331	1				
Sub total	187574	-2.1	189654	0.5	100384	-0.7	10816	3.5
Other provinces	6279	-27.9	10716	-9	18518	5.5	3044	7.4
China*	193853	-3.2	200371	-0.1	118902	0.3	13860	4.3

* Production for Taiwan province is not included.

Note: Wheat data include both winter wheat and spring wheat.

Table 4.4. China 2017 early rice, single rice, and late rice production and percentage difference from 2016, by province

	Early rice		Single		Late rice	
	2016	Change (%)	2016	Change (%)	2016	Change (%)
Anhui	1802	1	13345	1	1731	1
Chongqing			4673	-1		
Fujian	1686	-2			1142	-2
Guangdong	5285	1			5842	1
Guangxi	5476	1			5932	1
Guizhou			5430	0		
Heilongjiang			21449	3		
Henan			3780	-2		
Hubei	2320	2	10639	2	2814	4
Hunan	8229	0	8153	0	8284	0
Jiangsu			16619	0		
Jiangxi	7341	1	2724	0	6816	1
Jilin			5845	3		
Liaoning			4477	2		
Ningxia			510	-8		
Shaanxi			1020	0		
Sichuan			14551	-3		
Yunnan			5408	-4		
Zhejiang	802	1	4683	1	846	1
Sub total	32940	0.6	123788	0.7	33408	1
China*	34326	0.7	131066	-0.3	34979	0.1

* Production for Taiwan province is not included

Due the significant drop of maize production, CropWatch puts the total 2017 output of summer crops (including maize, single rice, late rice, spring wheat, soybean, minor cereals, and tubers) at 399.6 million tons, a 1.8% drop from 2016 or a 7.3 million ton decrease in production. The total annual crop production is estimated at 558.7 million tons, down 1.2% from 2016 (6.9 million tons decrease).

As late rice is still at an early growing stage, and maize and single rice are at grain filling stage, CropWatch will further revise the production for each crop type as well as total production in the next bulletin.

4.3 Regional analysis

Figures 4.6 through 4.12 present crop condition information for each of China's seven agricultural regions. The provided information is as follows: (a) Phenology of major crops; (b) Crop condition development graph based on NDVI, comparing the current season up to July 2017 to the previous season, to the five-year average (5YA), and to the five-year maximum; (c) Spatial NDVI patterns for April to July 2017 (compared to the (5YA)); (d) NDVI profiles associated with the spatial patterns under (c); (e) maximum VCI (over arable land mask); and (f) biomass for April-July 2017. Additional information about agroclimatic indicators and BIOMSS for China is provided in Annex A.

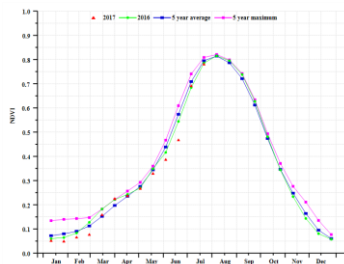
Northeast region

For the Northeast region, the monitoring period mostly covers the sowing and cultivation of spring maize. Single-season rice is sowed in part of the region from April on forward, which is similar to the planting window of soybean. Starting in May, the overall condition of crops was below the five-year average, but it recovered in the middle of June as a result of additional precipitation.

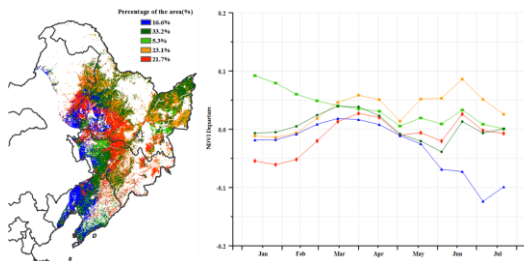
According to the CropWatch agroclimatic and agronomic indicators, rainfall was +12% compared to average in Heilongjiang and Jilin, while a 23% drop was observed for Liaoning. These dry conditions, however, changed into wet conditions during late June according to a ground survey in Liaoning. All three provinces experienced an increase in temperature (+0.3°C for the region) and radiation (RADPAR, +4%), which is beneficial for photosynthesis. Shortage of soil moisture led to an overall 5% decrease of biomass (BIOMSS) for the region, with a drop most serious in Liaoning (BIOMSS, -20%).

The NDVI profiles for the entire region stayed below the five-year average before July, but then recovered to average. According to the the VCIx map of Northeast China, the drought area is mainly distributed in the west of Liaoning and Jilin. The biomass map and NDVI cluster show a similar deficit pattern in the same area. Due to recent heavy rain in this area, crop condition is expected to recover but nevertheless deserves close monitoring.

Figure 4.6. Crop condition China Northeast region, April - July 2017

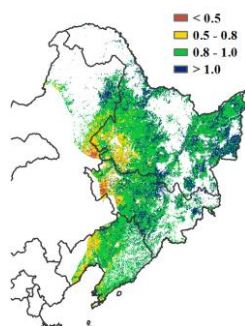


(a) Crop condition development graph based on NDVI

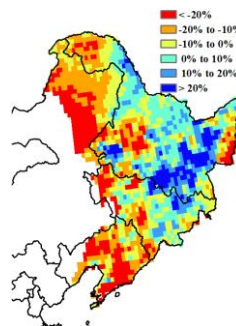


(b) Spatial NDVI patterns compared to 5YA

(c) NDVI profiles



(d) Maximum VCI



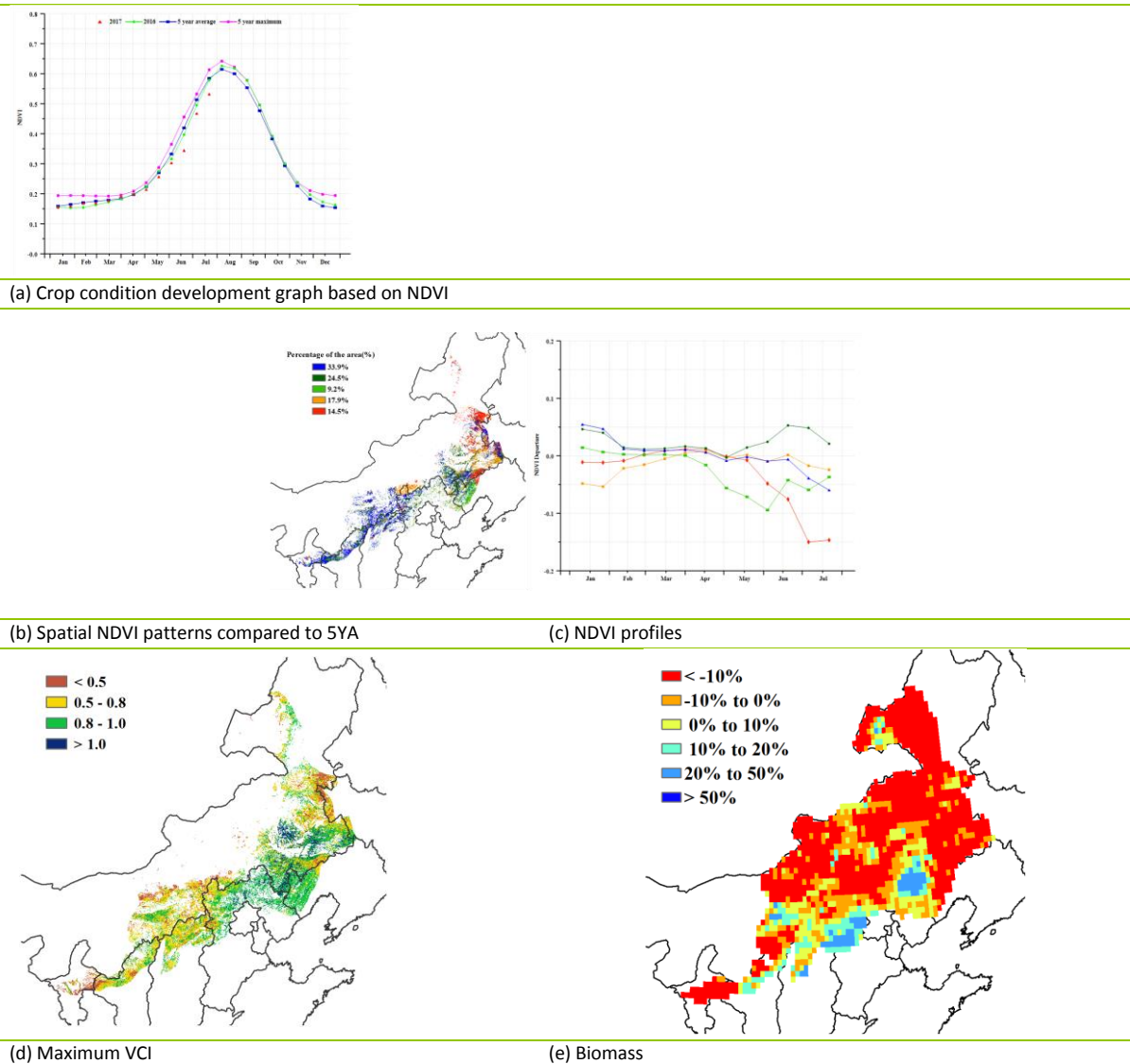
(e) Biomass

Inner Mongolia

The condition of spring crops was unfavorable in Inner Mongolia over the reporting period. Globally, among the CropWatch agroclimatic indicators, RAIN was below average (-17%), while TEMP was above (+0.8°C), and a small increase was reported for both RADPAR and the potential biomass production index BIOMSS (+2%). The spatial and temporal distribution for these CropWatch indicators, however, was very uneven. Conditions were generally unfavorable for the sowing and early growth of spring crops, as illustrated in the crop development graph (starting in April). West Liaoning, central and east Inner Mongolia, central Ningxia, and northern Shaanxi and Shanxi all suffered unfavorable condition according to the VCIx map (with VCIx values below 0.5). The biomass accumulation potential (BIOMSS) is also poor in most areas. According to the NDVI profiles, about a tenth (9.2%) of the cropped areas display consistently below average conditions since the beginning of early April, especially in west Liaoning, northern Shanxi and Shaanxi, northwest Hebei, along with some areas in Inner Mongolia. Later in the reporting period, the situation even worsened in 15% of the cropped areas (including in west Liaoning and eastern and northern Inner Mongolia) to the extent that 76% of areas have shown below average conditions.

Overall, crop condition was unfavorable for this part of China from April to July. If unfavorable conditions are maintained over the remainder of the cropping season, the outcome may altogether be a poor season.

Figure 4.7. Crop condition China Inner Mongolia, April - July 2017

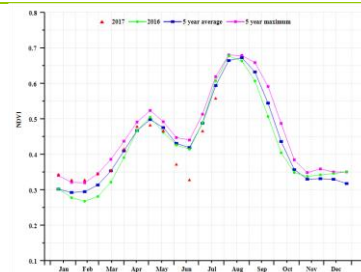


Huanghuaihai

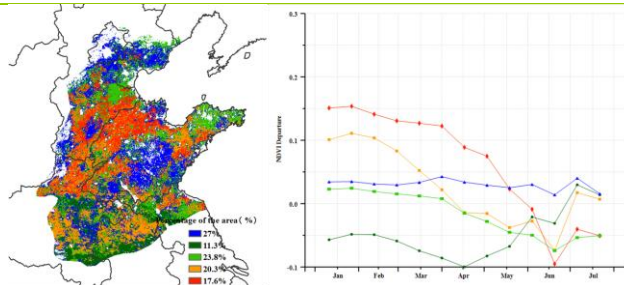
Crop condition in Huanghuaihai was not favorable over the monitoring period. The main crops in the region are winter wheat--in full development since spring and with harvests starting in early June--and summer maize, which is planted after the harvesting of winter wheat. As shown by the NDVI development graph, crop condition was generally satisfactory compared with the recent five-year average and NDVI values of last year. From mid-May to early June, however, NDVI over the harvested field appeared largely below average, possibly due to strong precipitation since late May and the cloud over the region.

In terms of the spatial distribution of findings, many parts of the Huanghuaihai area had a below average condition but to different extents. In addition to east and central Hebei and central Shandong, a scattered area over eastern Henan and northern Anhui had below average condition throughout the reporting period. This is also visible from the VCIx map and biomass departure map. According to the CropWatch agro-climatic indicators, temperature and radiation over the region were normal, but precipitation, as mentioned above, was in excess since late May, which may influence the harvesting of mature winter wheat and possibly depress its yield. Meanwhile, precipitation can also provide favorable soil moisture condition for the growth of maize.

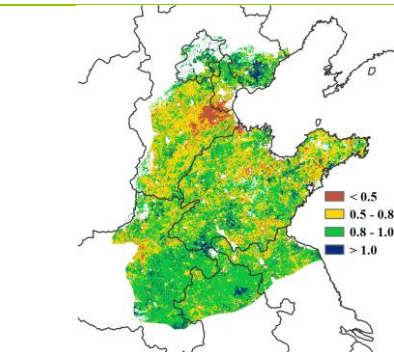
Figure 4.8. Crop condition China Huanghuaihai, April - July 2017



(a) Crop condition development graph based on NDVI

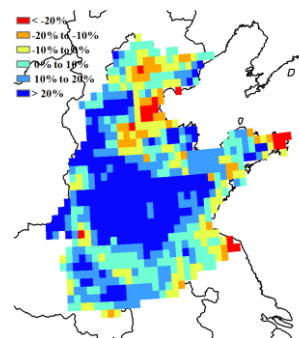


(b) Spatial NDVI patterns compared to 5YA



(d) Maximum VCI

(c) NDVI profiles

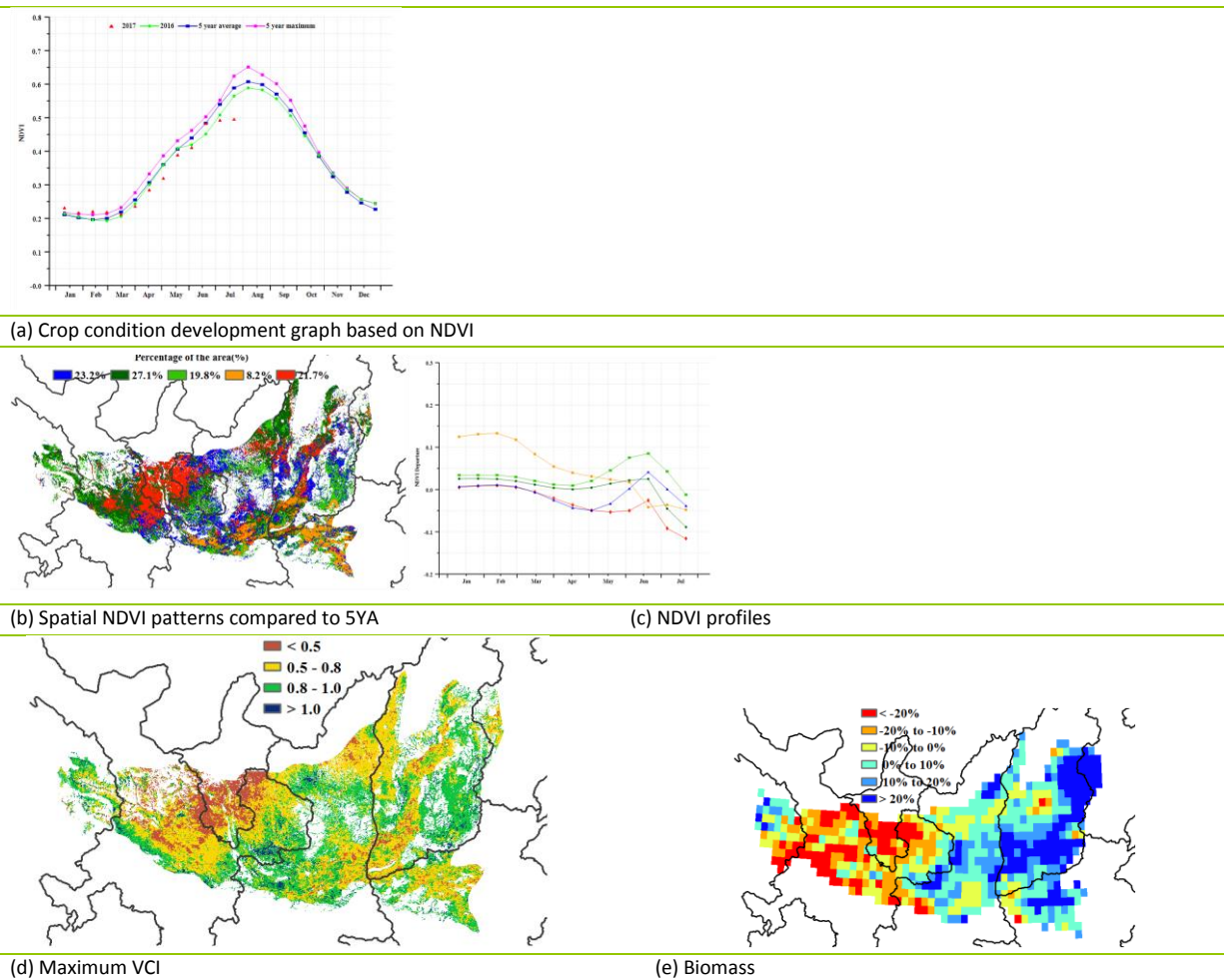


(e) Biomass

Loess region

In the Loess region, winter wheat was harvested from late May to late June, while summer maize has been planted gradually from late April to late June. Compared to average, rainfall (RAIN) was 19% above average, radiation (RADPAR) dropped by 1%, while temperature (TEMP) was close to normal. The potential biomass (BIOMASS) was 8% above the five-year average as a result of ample rainfall and fair radiation. Up to mid-July, crop condition was mostly below the five-year average and last year's level, except during late June; the VCIx for the area is 0.67. The spatial NDVI clusters and profiles indicate that only 19.8% of areas have better crop condition than the average over the reporting period. Some important agricultural areas started suffering from poor crop condition during mid-June to late July owing to the local drought. In detail, crop condition was unfavorable in central and eastern Gansu, southern Ningxia, and several areas in central Shanxi, coinciding with a low VCIx in those regions. The Cropped Arable Land Fraction decreased 13%, resulting in a pessimistic crop production outlook for the region, which was also confirmed by figure 4.3.

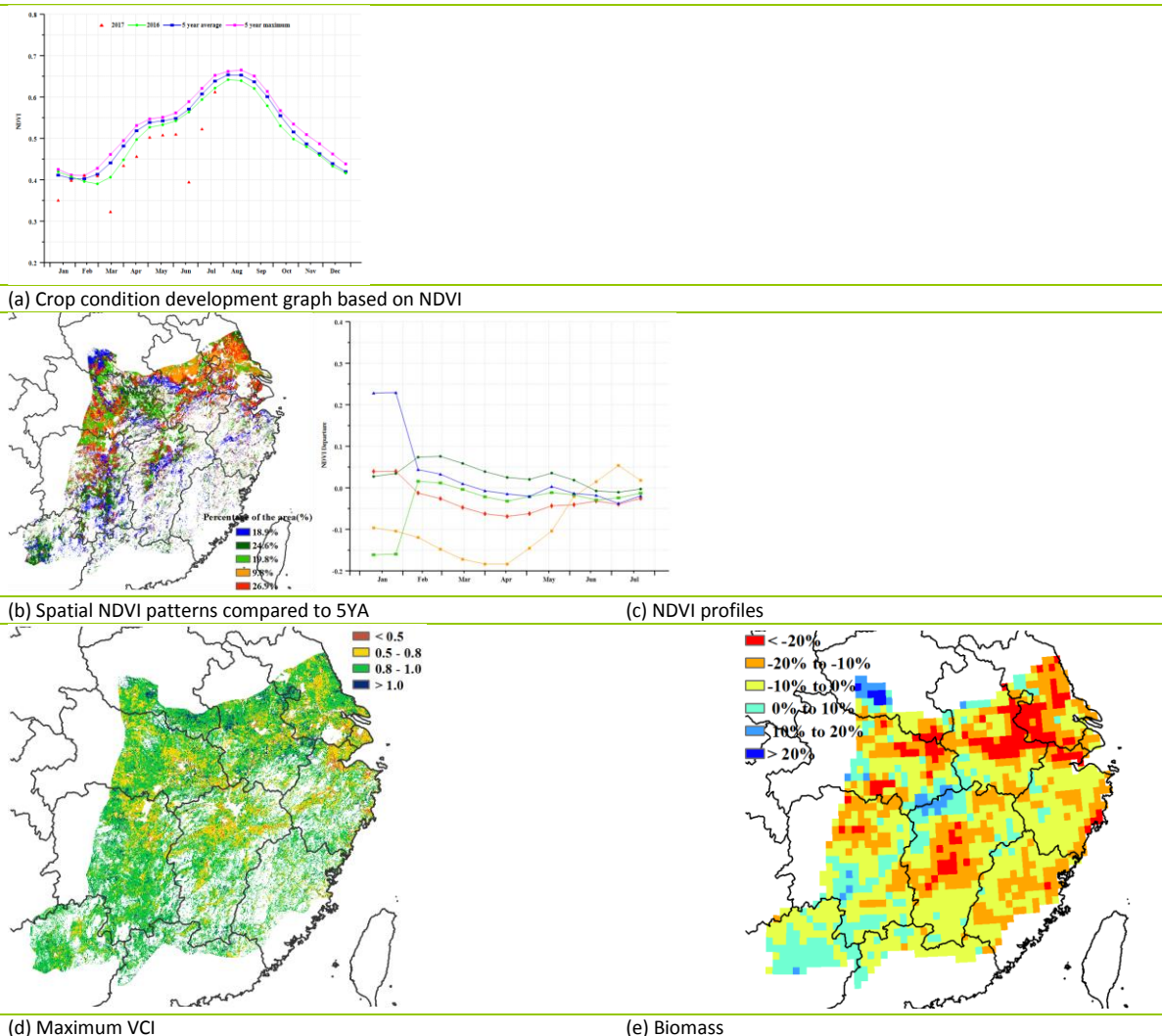
Figure 4.9. Crop condition China Loess region, April - July 2017



Lower Yangtze region

During April to July, the winter wheat harvest was completed in the north of the Lower Yangtze region, including the south of Henan, Jiangsu, and Anhui provinces. The semi-late and late rice is still growing in the south and the center of the region (including in Fujian, Jiangxi, Hunan, and Hubei provinces), while early rice has been harvested. Crop condition was below but close to average according to agroclimatic indicators. Accumulated rainfall was above average (RAIN, +7%), but radiation and temperature were below but close to average (RADPAR, -1% and TEMP, -0.6°C, respectively), which brought about a slight decrease of biomass production potential (BIOSMSS, -4%). As shown in the NDVI development graph, crop condition was below last year's and the five-year average, especially at the beginning of March and in June. According to the BIOMSS map, the biomass production potential was below average in most of this region, especially in the north of Zhejiang and Hunan, central Jiangxi, Anhui, and west Hubei, which coincides with the situation depicted by the VCIx map. Finally, NDVI profiles show that crop condition was slightly below but close to average in 90.2% of cropped areas at the end of July, except the area in the middle of Anhui and Jiangsu where crop condition was above average. Overall, the yield of crops in this region is expected to be below average.

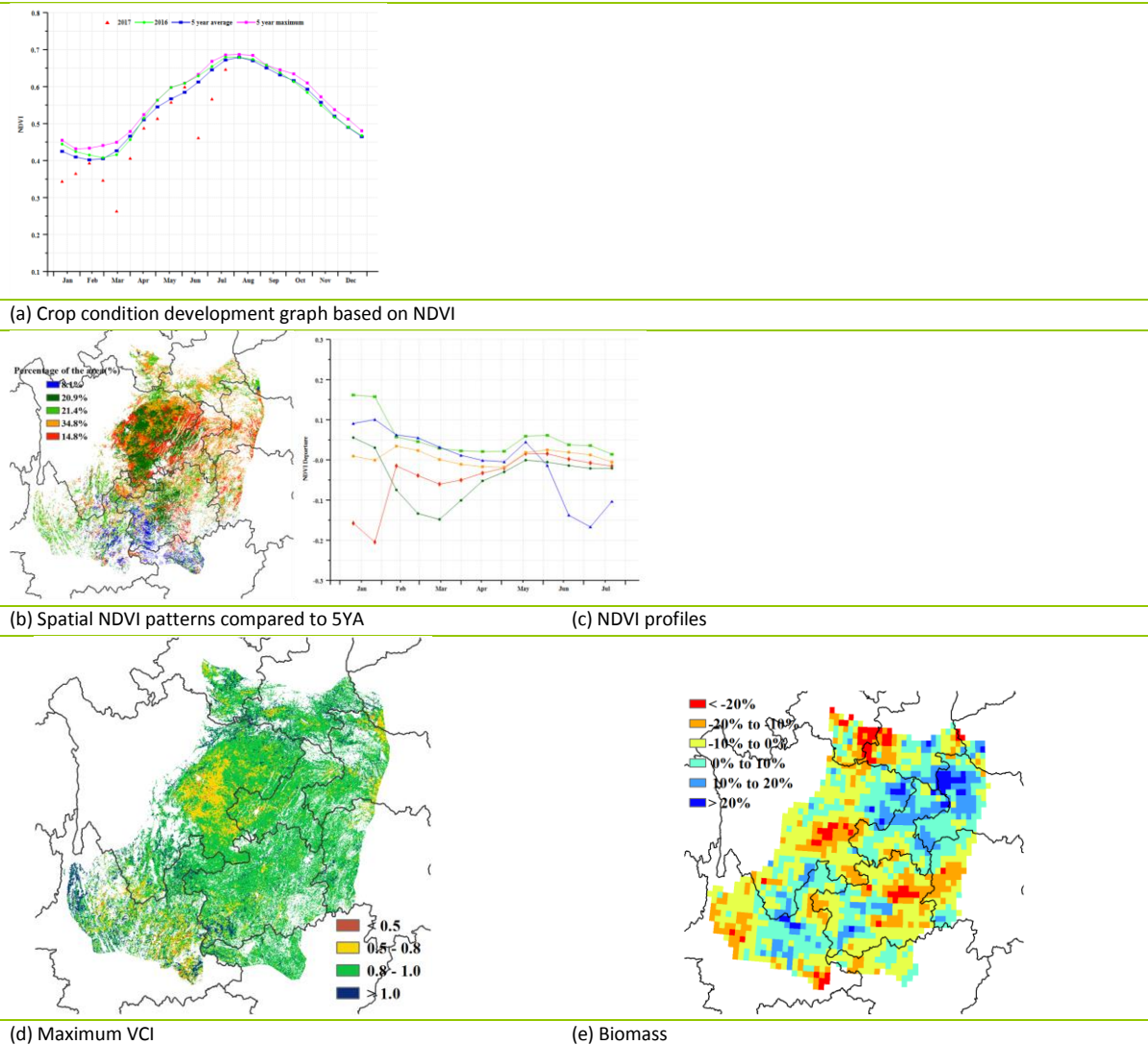
Figure 4.10. Crop condition Lower Yangtze region, April - July 2017



Southwest China

The ongoing season covers the harvest of winter wheat and rapeseed, as well as the planting and early growing of summer maize and semi-late rice. Crops showed mostly average condition throughout the monitoring period. The NDVI profile was below average in April, recovered to average and above average from May to June, but dropped again to below average in July due to the sustainable cloudy and rainy weather. All agroclimatic indicators for the region were average: RAIN +3%, TEMP -0.7°C, RADPAR -1%, and BIOMSS -2%. The Cropped Arable Land Fraction was unchanged from 2016, while VCIx was just fair, indicating average conditions as well. Southwestern Guizhou, northeastern Yunnan, and northwestern Guangxi appear to show a below-average crop condition from May to July, according to the NDVI clusters. In eastern Sichuan, below average condition lasted for the whole monitoring period, with VCIx in the range of 0.5-0.8. CropWatch will monitor the region closely over the coming months.

Figure 4.11. Crop condition Southwest China region, April - July 2017



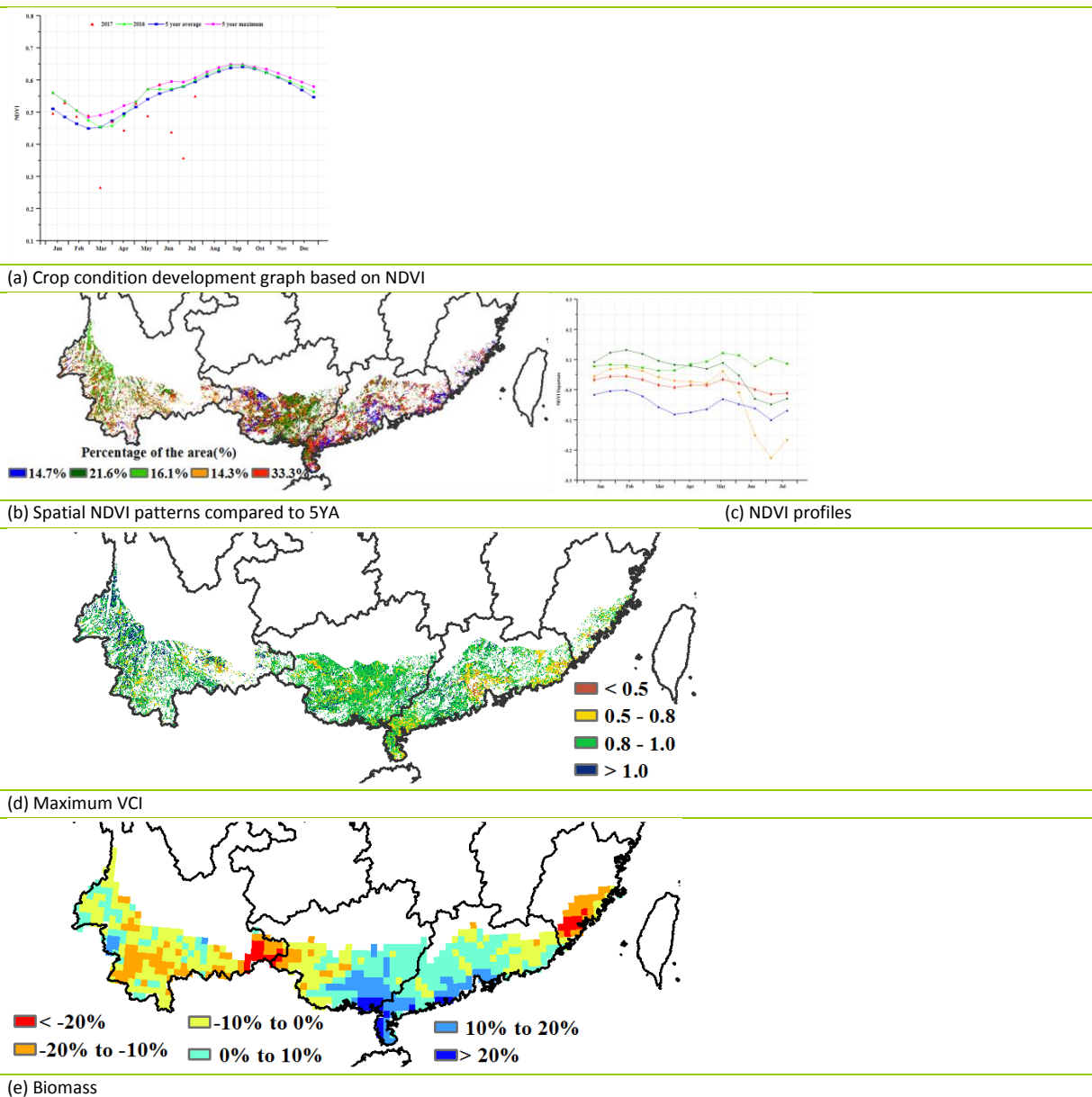
Southern China

In Southern China, crop condition was below average over the reporting period. For the region as a whole, precipitation (RAIN) was 8% above average, with precipitation departures for each province as follows: Fujian, -3%; Guangxi, +21%; and Guangdong, +11%. Temperature (TEMP) dropped by 1.0°C on average, and radiation (RADPAR) decreased by 4%. Potential accumulated biomass (BIOMSS) was largely unchanged in Southern China.

The NDVI development graph for Southern China indicates that crop condition in the region was below average over the entire period. Although almost all of the cultivated land has been planted crops, the Cropped Arable Land Fraction (CALF) was still 0.5% lower than the average level. Spatial NDVI patterns and NDVI profiles showed that crop condition is generally below the average during monitoring period, except for the central part of Guangxi and central and western of Yunnan. Over the reporting period, 16.1% of the cropped area had above average condition, while about 14.7% of the cropped area continued to be below the average, sporadic scattered throughout the region.

Based on the above analysis, the yield of crops in this region is expected to be below average in 2017.

Figure 4.12. Crop condition Southern China region, April - July 2017



4.4 Pest and diseases monitoring

Rice pests and diseases

The impact of pests and diseases was relatively moderate during mid to late July 2017 in the main rice regions of China. Affected by severe convective rain and storms, the habitat conditions in the fields were conducive to rice planthopper and rice leaf roller migration. In addition, for Lower Yangtze River and east Southern China, there was more precipitation and higher temperature than during the previous years, which provided appropriate conditions for rice sheath blight reproduction.

Rice planthopper

The distribution of rice planthopper during mid to late July 2017 is shown in figure 4.13 and table 4.5. The total area affected by the planthopper reached 6.1 million hectares, with severe impact in central Guizhou, northern Guangxi, and most of Guangdong; the pest only moderately affected rice crops in northern Yunnan and northern Hunan.

Figure 4.13. Distribution of rice planthopper in China, mid to late July 2017

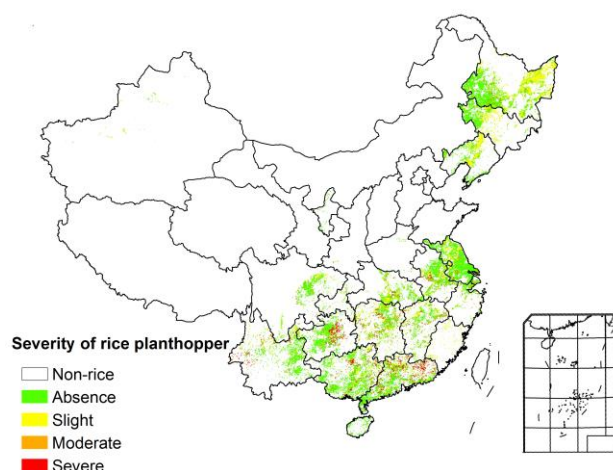
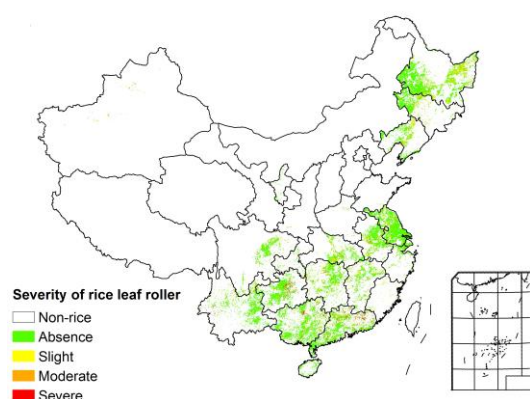


Table 4.5. Statistics of rice planthopper in China, mid to late July 2017

Region	Occurrence ratio (%)			
	Absence	Slight	Moderate	Severe
Huanghuaihai	85	9	4	2
Inner Mongolia	78	20	2	0
Loess region	78	20	2	0
Lower Yangtze	79	12	5	4
Northeast China	75	21	3	1
Southern China	81	9	2	8
Southwest China	80	11	4	5

Rice leaf roller

Rice leaf roller (figure 4.14 and table 4.6) damaged around 2.7 million hectares, and even severely so in central Guizhou and northern Guangdong. Damage was only moderately in northern Guangxi and northern Hunan.

Figure 4.14. Distribution of rice leaf roller in China, mid to late July 2017**Table 4.6. Statistics of rice leaf roller in China, mid to late July 2017**

Region	Occurrence ratio (%)			
	Absence	Slight	Moderate	Severe
Huanghuaihai	94	5	1	0
Inner Mongolia	90	10	0	0
Loess region	89	10	1	0
Lower Yangtze	91	7	1	1
Northeast China	90	10	0	0
Southern China	91	6	1	2
Southwest China	90	7	2	1

Rice sheath blight

Rice sheath blight (figure 4.15 and table 4.7) damaged around 4.5 million hectares, severely so in southern Jiangsu and northern Zhejiang and moderately in central Sichuan, central Hunan, and central Jiangxi.

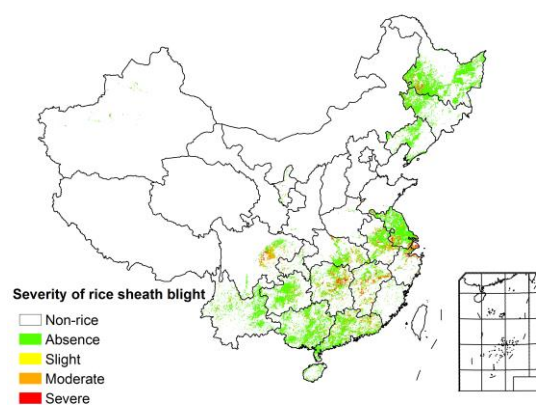
Figure 4.15. Distribution of rice sheath blight in China, mid to late July 2017

Table 4.7. Statistics of rice sheath blight in China, mid to late July 2017

Region	Occurrence ratio (%)			
	Absence	Slight	Moderate	Severe
Huanghuaihai	82	4	7	7
Inner Mongolia	97	0	2	1
Loess region	84	0	8	8
Lower Yangtze	77	5	8	10
Northeast China	95	0	3	2
Southern China	92	2	4	2
Southwest China	86	3	7	4

Maize pests and diseases

Maize suffered slightly to moderately from pest and disease attacks during late July in the main production areas. Heavy rains and high humidity in north and northeast China were conducive to armyworm reproduction and sheath blight dispersal.

Maize armyworm

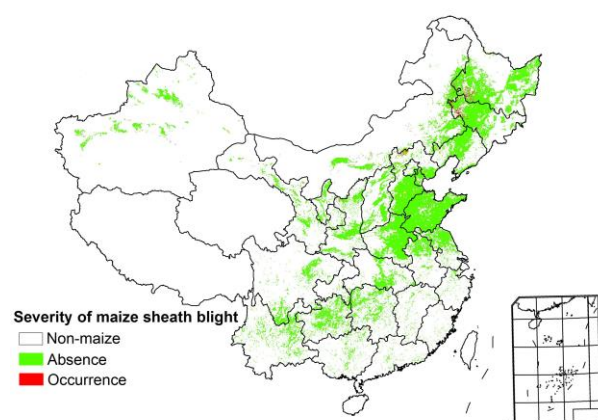
Its distribution in late July 2017 is shown in figure 4.16 and table 4.8. The total area affected reached 1.5 million hectares, with the pest mainly occurring in southwest Heilongjiang, northwest Jilin, southeast Hebei, central Shandong, and central and northern Shaanxi.

Figure 4.16. Distribution of maize armyworm in China, late July 2017**Table 4.8. Statistics of maize armyworm in China, late July 2017**

Region	Occurrence ratio (%)	
	Absence	Occurrence
Huanghuaihai	95	5
Inner Mongolia	97	3
Loess region	98	2
Lower Yangtze	94	6
Northeast China	96	4
Southern China	97	3
Southwest China	94	6

Maize sheath blight

Maize sheath blight damaged around 0.4 million hectares. The disease mainly affected southwest Heilongjiang, northwest Jilin, and northern Hebei (figure 4.17 and table 4.9).

Figure 4.17. Distribution of maize sheath blight in China, late July 2017**Table 4.9. Statistics of maize sheath blight in China, late July 2017**

Region	Occurrence ratio (%)	
	Absence	Occurrence
Huanghuaihai	99	1
Inner Mongolia	98	2
Loess region	99	1
Lower Yangtze	99	1
Northeast China	98	2
Southern China	100	0
Southwest China	99	1

4.5 Major crops trade prospects

Grain import and export in China in the first half of 2017

Rice

In the first half of 2017, the total import of rice in China was 2.1361 million tons, an increase of 6.5% compared to the previous year. The imported rice mainly stems from Vietnam, Thailand, and Pakistan, respectively accounting for 55.3%, 31.3%, and 6.4% of imports. The expenditure for rice import was US\$981 million, reflecting a year-on-year growth of 7.9%. Total rice exports over the period were 571,000 tons, up by 349.3%, mainly exported to the Côte d'Ivoire, Republic of Korea, and Liberia (29.5%, 21.0%, and 6.7%, respectively). The value of the export was US\$281 million, an increase of 117.8% over 2016.

Wheat

During the first semester of 2017, Chinese wheat imports reached 2.6534 million tons, an increase of 48.2% over 2016. The main sources include Australia (47.4%), the United States (38.2%), and Kazakhstan (7.8%). Imports amounted to US\$607 million, up by 40.9%. Wheat exports fell by 11.1% to reach 49,600 tons. Hong Kong (72.7%), Korea (20.7%), and Macao (5.4%) were the main destinations of Chinese wheat exports.

Maize

In the first half of 2017, maize imports totaled 736,000 tons, down by 74.7% year-on-year. The main importing countries were Ukraine and the United States, accounting for 81.3% and 13.5% of imports

respectively. Total maize exports were 36,300 tons, up 26.5 times compared to the same period of 2016, mainly exported to Japan (54.8%) and North Korea (38.3%).

Soybean

The total import of soybean was up by 16.2% to 44,808,200 tons in China during the first half of 2017. Brazil and the United States respectively contributed 51.8% and 42.5%, for a total value of US\$1,895,500 million, up 6.5% compared to the first six months of 2016. Soybean exports were 63,000 tons, down 11.0%. Export amounts were US\$53.5091million, down 14.0%.

Import prospects for major grains in China for 2017

Based on the latest monitoring results, China grain imports are projected to increase. The projections are based on remote sensing data and the Major Agricultural Shocks and Policy Simulation Model, which derived from the standard GTAP (Global Trade Analysis Project).

Rice

According to the model forecast, rice imports and exports increased by 5.7% and 123.3% respectively in 2017. Due to the persistence of domestic and foreign prices, rice imports showed an increasing trend in the first half of 2017. Taking into account the domestic supply and the relaxed demand environment, however, rice imports will reduce, while the exports center of gravity will shift to Africa in the second half of 2017. Rice imports are expected to grow steadily within the quota range, while exports will grow faster across the whole year.

Wheat

China's wheat imports will increase by 20.7 percent, but exports are projected to drop 4.6% compared with those of 2016. At present, the global supply and demand of wheat is still in a relaxed pattern. The inventory consumption ratio shows the highest level for the past 15 years, and the international wheat prices are expected to fall after the rise. Wheat imports will grow steadily throughout the entire year.

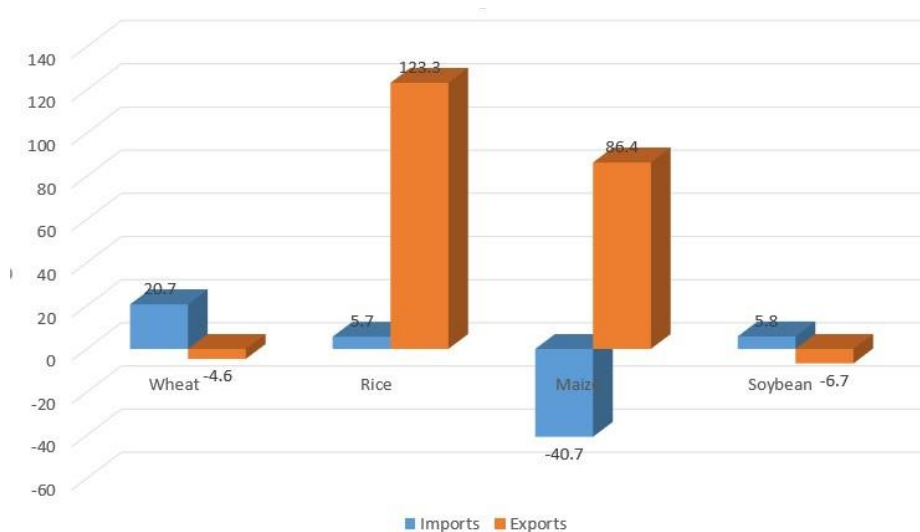
Maize

According to the model forecast results, maize imports decreased by 40.7% in China in 2017, but exports increased by 86.4%. Currently, the stage of supply exceeding demand will continue to inhibit the import in China. The domestic maize prices have been quickly close to the international standards. Foreign maize price advantage does not exist. China's maize imports continue to decline, while exports continue to increase. Maize imports are expected to decline sharply throughout the year in China.

Soybean

Soybean imports will increase by 5.8% while exports will be reduced by 6.7% in 2017. Due to a lack of soybean production, annual soybean imports will remain at a high level, but the growth in imports will slow down. For July 2017, soybean exports are expected to grow because the gap between domestic and international prices is expanding.

Figure 4.18. Rate of change of imports and exports for rice, wheat, maize, and soybean in China in 2017 compared to those for 2016 (%)



4.6 Outlook of domestic price of four major crops

Prediction of domestic prices for soybean

Historical domestic prices of soybean from June 2007 to June 2017 were analyzed based on the theory of the price spiral mode (PSM) (Fang, 2011) and the historic ratio of world soybean consumption to global soybean production (consumption ratio). According to the data for the last six months, the soybean international consumption ratio is at equilibrium. Domestic soybean prices are also at equilibrium, but fluctuating around the trend line. Domestic prices for soybean will continue to fluctuate.

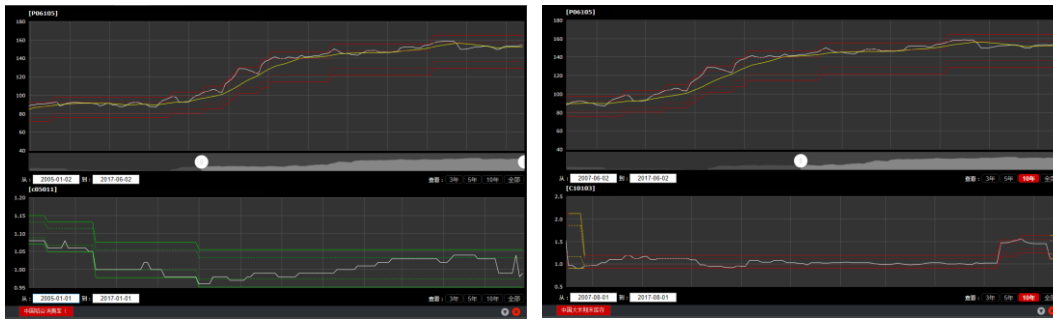
Figure 4.19. Fluctuations in soybean price, June 2007 to June 2017



Prediction of domestic prices for paddy rice

Using again the price spiral model and now combining it with China's paddy rice consumption ratio, the trend of the domestic price of paddy rice from June 2007 to June 2017 can be analyzed. From 2009 to the end of 2015, price and consumption ratio are rising in sync, and according to the latest data, paddy rice prices are at equilibrium. It is assumed that the paddy rice prices will have an upward trend, which results from the obvious decrease of the domestic paddy rice inventory. In the end, the price will reach a non-equilibrium interval according to the helical model.

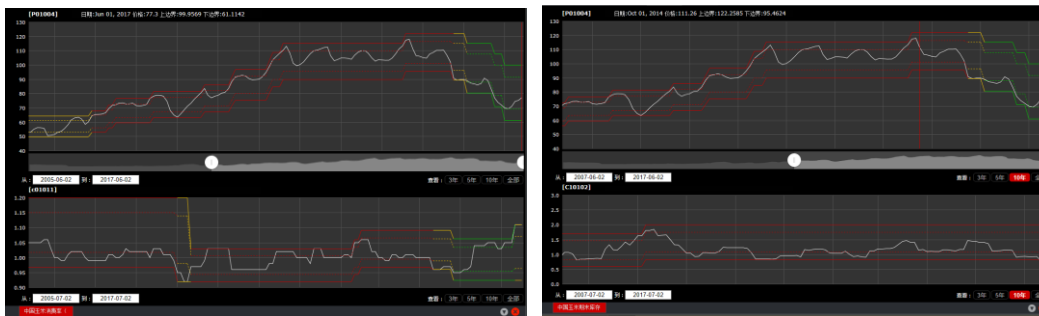
Figure 4.20. Fluctuations in paddy rice price, January 2005 to June 2017 (left) and Chinese rice ending inventory (right)



Prediction of domestic prices for maize

Domestic prices of maize from June 2005 to June 2017 were also analyzed using the same method. As predicted in previous bulletins, prices are now high, and the maize inventory has hit the lowest value of the last ten years, which will lead to a price increase.

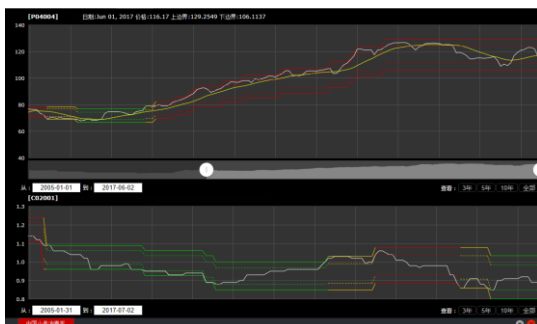
Figure 4.21. Fluctuations in maize price, June 2005 to June 2017 (left) and Chinese maize ending inventory (right)



Prediction of domestic prices for wheat

Finally, the analysis covered the domestic prices of wheat from January 2005 to June 2017, using again the model and China's wheat consumption ratio. The wheat price is going down, while the consumption ratio is at a low level. Wheat prices and consumption rates are expected to be in the equilibrium range and the price will keep going down.

Figure 4.22. Fluctuations in wheat price, January 2005 to June 2017



Chapter 5. Focus and perspectives

Building on the CropWatch analyses presented in chapters 1 through 4, this chapter presents initial CropWatch food production estimates for 2017 (section 5.1), as well as sections on recent disaster events (section 5.2), the situation in the Horn of Africa (5.3) and an update on El Niño (5.4).

5.1 CropWatch food production estimates

Methodological introduction

Table 5.1 presents the first revision of global maize, rice, wheat, and soybeans production estimates prepared for 2017 by the CropWatch team. It is issued at a time when almost all winter crops in the northern hemisphere have been harvested, and summer crops are in their late stages; in the southern hemisphere winter crops are growing and the planting of the summer season/monsoon season will start in a month or so.

The estimate is based on a combination of remote-sensing models (for major commodities at the national level) and statistical projections based on recent trends for minor producers and for those countries that will harvest their crops later during 2017, for which no directly observed crop condition information is currently available. In table 5.1, modeled outputs are in bold red. The percentage of the production that is modeled (as opposed to projected using trends) now generally exceeds 95% of production for all crops.

It is important to remember that for China and the 30 countries described in chapters 3 and 4 (listed by name as the “major producers”) the quantitative estimates in this chapter are based on inter-annual variation of average and planted area using remote sensing data. In combination with the 2016 final estimates from CropWatch, production estimates for 2017 are achieved. It is also stressed that the estimation is crop-specific, as it is based on different crop masks for each crop and, for each crop, both yield variation and cultivated area variation are taken into account when deriving the production estimates. The major producers represent at least 80% of production and 80% of exports. In the production table, “Others” (1) and the countries shown in black, were extrapolated to 2017 based on the linear trend from 2010 to 2016, with FAOSTAT data up to 2014 (the last year available) and CropWatch final estimates for 2015 and 2016.

CropWatch production estimates differ from other global estimates by the use of geophysical data in addition to statistical and other reference information such as detailed crop distribution maps. Finally, this chapter only provides national data for China; for more detail please see chapter 4.

Production estimates

CropWatch estimates the global 2017 production of the major commodities at 1008 million tons of maize (up 0.6% over 2016), 748 million tons of rice (up 1.6%), 737 million ton of wheat (a 0.5% increase over 2016), and 315 million ton of soybeans (a decrease of 0.7%). The major producers contribute 887 million ton of maize (+0.3%), 672 million tons of rice (+1.6%), 624 million tons of wheat (-0.9%), and 298 million tons of soybeans (+0.9%). The contribution of the “minor producers” (shown as “others” in the table) to the global production is 5% (soybean) to 15% (wheat), and about 10% for rice and maize. For maize and wheat, the group of minor producers outperforms the bulk of the remaining nations, with the largest increases over 2016. For rice, the increases are 1.4% (“others”) and 1.6% (main producers), while for soybean the main producers increased their production 0.9% while a very significant drop (-22.9%)

occurred among minor producers, confirming a generalized trend of many small (and not so small, such as in Pakistan) producers to move away from soybean on all continents.

Table 5.1. CropWatch productions estimates, thousands tons

	Maize		Rice		Wheat		Soybean	
	Production (ktons)	% change from 2016	Production (ktons)	% change from 2016	Production (ktons)	% change from 2016	Production (ktons)	% change from 2016
Argentina	29946	16.5	1769	4.4	11338	-2.5	51116	0.1
Australia	759	61.4	1864	23.7	29719	-6.0	92	-6.8
Bangladesh	2433	2.4	46300	-3.0	1344	11.7	64	
Brazil	84019	19.3	11129	0.7	7773	3	96726	5.4
Cambodia	780	4.1	8995	4.7			147	-11.2
Canada	12099	3.4			30679	-7.8	5584	3.7
China	193853	-3.2	200371	-0.1	118902	0.3	13860	4.3
Egypt	5721	0.3	6888	9.5	10963	7.4	33	18.1
Ethiopia	6498	-9.2	173	28.7	4180	-11.9	72	-28.2
France	14665	-0.3	380	386.8	38051	0.2	129	-38.1
Germany	4688	1.9			28130	0.1	8	
India	17492	-6.2	163514	4.3	93496	8.6	11330	-6.9
Indonesia	17565	-4.1	68339	-1.4			900	1.8
Iran	2535	-5.8	2413	-12.7	12735	-20.8	173	-0.3
Kazakhstan	722	4.8	392	-4.6	15837	-13.0	207	-23.7
Mexico	23073	-3.0	158	-10.6	3283	-7.5	278	-30.3
Myanmar	1772	1.5	25328	-0.8	190	1.4	178	40.1
Nigeria	11069	2.8	4353	-5.1	84	-26.9	517	-21.8
Pakistan	4135	-8.7	7676	-16.0	22426	-1.4		
Philippines	7854	3.8	21824	8.5				
Poland	4703	27.8			10931	2.1	1	
Romania	11571	0.7	39	-17.8	7670	-0.1	141	-32.3
Russian Federation	12918	4.7	996	-2.0	58912	2.4	2190	-3.5
South Africa	14161	57	3	-0.2	1892	11	912	-17.5
Thailand	5219	2.7	40379	1.8	1	18.5	144	-37.8
Turkey	6102	3.1	949	1.3	19174	1	180	-17.4
Ukraine	30561	-0.7	98	-8.0	22662	-5.8	3799	-16.2
U. Kingdom					14521	1.3		
United States	354763	-3.6	10888	3.4	54270	-4.6	109323	-0.6
Uzbekistan	490	15.4	496	13.4	5401	-15.5		
Vietnam	5221	-0.3	46511	9.3			172	
Sub-total	887387	0.3	672225	1.6	624564	-0.9	298277	0.9
Others	120582	3.1	75861	1.4	112622	9	16867	-22.9
Global	1007970	0.6	748085	1.6	737185	0.5	315145	-0.7

Note: Numbers in bold red represent modeled outputs. "Others" or "Minor producers" include the 151 countries from Afghanistan and Angola to Zambia and Zimbabwe.

Maize

The largest modeled increases are those of Argentina (+16.5%), Brazil (+19.3%), and especially South Africa (+57%), as the country recovers from the 2016 El Niño drought. In the first, the production was

achieved through a 20% expansion of land cropped with maize, while in Brazil the yield increased 19% due to favorable agroclimatic conditions; in South Africa, both area and yield increased (16.3% and 35.1%, respectively). In Argentina (table B.1), production increased mainly in Buenos Aires (+7.7%), Córdoba (+4.9), and Mesopotamia ("Entre Rios"; +11%). The areas described as "others," i.e., the minor provinces in terms of maize output, markedly outperformed the big six, which include San Luis, Santa Fe, and Santiago del Estero in addition to the three listed above: +86.8%. This confirms a trend - observed in both Argentina and Brazil in previous years - of the increasing importance of the minor provinces. In Brazil, the traditional maize states (Mato Gross, +11.9% and Parana, +12.4%) altogether increased their production by 13.6%, which compares with +63.8% for the minor producer states.

Among the major maize producers in the northern hemisphere, CropWatch puts China at 194 million tons (-3.2%) and the United States at 355 million ton (-3.6%). Table B.5 provides details for the United States. The largest producers generally underwent a production drop, such as Illinois (-4.6%), Iowa (-5.2%), Nebraska (-5.9%), and Minnesota (-4.9%). Some important producers increased their output (Ohio, +4.6% and Michigan +2.4%), but not to the extent of reversing the nationwide drop. Although no other maize producer comes close to China and the United States, several important producers (in the range of 10 to 30 million ton) undergo a stagnation or negative change compared with the previous season, including Ukraine and France (both at -0.3%), Mexico (-3.0%), and India (-6.2%). Ethiopia is mentioned as well (-9.2%) as the projected decrease accompanies a difficult humanitarian situation, which may, however, improve between now and the end of the year as most Meher season crops are still to be harvested. Pakistan is mentioned as well with a production of 4.1 million ton, down 8.7% compared with 2016.

Interestingly (table 5.2), the main maize importing countries collectively underwent a production deficit close to 3% for a production volume close to 223 million ton, while exporters, with a production volume around 500 million tons, increased their production by about 0.5% (0.2% to 0.8%, respectively, for the 5 and 10 first exporters). The increased demand on global markets could thus be about 10 million ton if we consider the insatiable demand of markets for maize and soybean.

Rice

Among the major Asian producers and exporters, positive rice production increases over 2016 are recorded in India (+4.3% to 163 million tons), Vietnam (+9.3%), and Thailand (+1.8%). This was usually achieved through increases in area or, especially in Vietnam, yield (+8.4%). China suffered a small and comparable drop in both area and yield (-0.6%) which, together, brought about the nation-wide near-stagnation production drop. Chapter 4 provides details about the spatial distribution of rice performance in China. Some "minor rice producers" in Asia did well, including Cambodia (+4.7%) and the Philippines (+8.5%). Bangladesh (-3%) reduced both yields and hectareage. In South America, table B.2 indicates that Santa Catarina State increased the output 10.6% to 1.1 million tons, while the increase in Rio Grande do Sul, the most important rice growing State in Brazil, is put by CropWatch at 8.8 million tons, up 3.3% from 2016.

The top five rice importers (Iran, Nigeria, the Philippines, Saudi Arabia, and Iraq) increased their production by 3.9%, largely due to the performance of the Philippines since both Iran (-12.7%) and Nigeria (-5.1%) did badly. The main exporters did well except Pakistan, but their production nevertheless increased 3.2% and 3.8% for the top 10 and top 5 producers, respectively., but their production nevertheless increased 3.2% and 3.8% for the top 10 and top 5 producers, respectively.

	Maize		Rice		Wheat		Soybean	
	Prod. (million tons)	% change from 2016	Prod. (million tons)	% change from 2016	Prod. (million tons)	% change from 2016	Prod. (million tons)	% change from 2016
Top 5 importers	223	-3.1	29	3.9	31	4.8	14	3.4
Top 10 importers	234	-2.7	301	0.1	39	3.6	15	-4.8
Top 5 exporters	514	0.2	269	3.8	221	-2.7	273	1.3
Top 10 exporters	570	0.8	310	3.2	307	-3.3	290	-1.4

5.2 Disaster events

Introduction

This section focuses on disasters that occurred between May and the end of July 2017. Because disasters that occurred in April were already mentioned in the May bulletin, they are only mentioned again here when interesting updates are available. Similarly, since the Horn of Africa with its long trail of natural—but mostly man-made—disasters is covered in detail in section 5.3, those events are generally not repeated here.

Section 5.3 illustrates the complex inter-penetration of factors associated with climate and fighting/civil unrest. These factors currently relate to the bulk of the reported emergencies. As this section deals primarily with natural disasters, purely man-made disasters (1) are not specifically discussed.

Although some droughts and cold spells are mentioned below, the current reporting period from May to July is very clearly characterized by excess precipitation and the accompanying phenomena like landslides.

Cyclones

In May (May 1 to 16), the off-season cyclone Donna affected the Solomon Islands, Vanuatu, New Caledonia, and New Zealand, with significant damage occurring in the agricultural sector in Vanuatu. At the end of May (landfall on 30 May), cyclone Mora affected Sri Lanka, Andaman and Nicobar Islands, east India, northeast India and Bangladesh, Myanmar, Bhutan, and the Tibet autonomous region of China, resulting in 239 fatalities (almost all in Sri Lanka) and damage amounting to just under US\$ 300 million (Figure 5.1). In total, 630,000 people were impacted. The cyclone brought particular hardship to refugees, such as those in Rakhine's displacement camps in Myanmar. According to OCHA (2017b), "families were living in sub-standard conditions before the cyclone struck and Mora has only made their precarious situation worse."

Figure 5.1. In the wake of Cyclone Mora, floodwaters flattened many homes in this village in Kalutara, Sri Lanka.



Source: <http://reliefweb.int/report/sri-lanka/un-and-partners-sri-lanka-appeal-resources-receding-floods-reveal-extent-damage>.

On July 17, Tropical Storm Talas made landfall in the provinces of Nghe An and Ha Tinh in central Vietnam. About 3,000 houses were damaged, 10 people died, and about 100,000 hectares of crops were damaged. The severe storm also affected South China (Hainan), Laos, Thailand, and Myanmar. Total damage is estimated at US\$ 43 million.

Drought and fires

Drought in Timor Leste is mentioned because of the extreme vulnerability of the population: 41% are below the poverty line and over 70% practice subsistence farming; about one person in three is affected by the drought and about one in ten is in IPC phase 2 (stressed). Drought has been ongoing since 2015, and the deterioration of the food security situation is likely to deepen. (See references under [DroughtTimorLeste_1](#).)

Drought is also reported, by FSO and Reliefweb, for the Democratic People’s Republic of Korea at the end of July. Rainfall was short in some key areas producing rice (the main staple), maize, potatoes, and soybean. The production drop could be as large as 30% as major cereal producing provinces (South and North Pyongan, South and North Hwanghae, and Nampo City) have been affected. ([Drought DPRK_1](#))

Fires and a heatwave occurred in much of Mediterranean Europe and Portugal where widespread fires occurred at the beginning of June. The fires happened amid a severe heatwave with temperatures reaching 40°C; the blaze reportedly was the country’s worst forest fire in more than half a century. At the end of July in Canada, fires also displaced close to 50,000 people when more than 300,000 hectares of forest were burned. ([FiresPortugal_1](#) Mid).

Floods

The previous bulletin provided ample detail about the “Putumayo floods” (named after the Department in Colombia that suffered the most) that were caused by a “Coastal El Niño” and in the beginning of April 2017 affected the border area between Peru, Ecuador, and Colombia. At the end of April ([Ref LamFlood_1](#)), the same general area of northwestern Peru was again hit by floods that affected 1.3 million people: a total of 150,000 were injured, while 31,000 lost their homes and 60 people died. Damage was most severe in the Departments of Piura, Lambayeque, La Libertad, Ancash, and Tumbes, with 435,000 people food-insecure. The timing of the floods corresponded to the growing season of

cereals and the planting of potatoes. About 90,000 hectares of crops were affected, with 26,000 hectares lost as a result of the continuous rain in previous months and the floods at the end of April. Food production in the region is expected to drop 10%. Floods also affected other areas in Peru at the beginning of May, especially the Departments of Lima and Cajamarca. Other areas were similarly affected later in May.

In Haiti, floods hit at the end of April in the Departments of Sud, Sud-Est, Grand'Anse, et Les Nippes (floodsHaiti_1). About a thousand hectares of crops were flooded mostly in Cavaillon and Les Cayes. The country is also still suffering from the impact of Hurricane Matthew in October 2016. As a result of the disasters, close to 6 million people were deemed food insecure as of mid-June.

In Russia, a dam burst in the Tyumen region in the district of Ishim led to a thousand families losing their houses (May 10 and 15, 2017) (RussiaFloods_1). Meanwhile, Ghana also has experienced major floods in five regions. On July 10, 2017, Greater Accra, Central Region, Western Region, and Eastern Region were declared as flood emergencies (FloodGhana_1).

The most serious and widespread floods of the reporting period occurred in Asia, in particular the Indian subcontinent and China.

In Sri Lanka, heavy monsoon rains on May 18 and 19 led to floods in Western, Southern, and parts of Central Province, as well as in Subaragamuwa Province. About 300 people in 15 districts lost their lives, while in total almost 700,000 people were affected. Nascent cyclone Mora contributed to the emergency. According to Reliefweb, the "floods and landslides have washed away the crops that managed to survive the drought" (FloodsLanka_1).

In Bangladesh, on June 15, mudslides in the southeast of the country have claimed additional lives and caused damage to homes and infrastructure. Over 150 people are estimated to have been killed across five districts, often when their homes were buried in mud and rubble, including over 5,000 homes in the Kawkhali upazila of Rangamati district (mudslidesBangladesh_1).

During the second half of June, 7.3 million people were affected by heavy rains and resulting floods and landslides in southern China; in Xinmo village in Sichuan province alone, about a hundred people died. The disaster has caused around 2.9 billion Yuan in direct economic losses. At the beginning of July, the government released 1.9 billion Yuan (about US\$ 280 million) to assist with floods relief. The funds will go to 20 provinces and autonomous regions including Guizhou, Hunan, Jiangxi, and Zhejiang, which were most severely hit. The funds include 700 million Yuan for evacuation of people, temporary living allowances, rebuilding of homes, and compensating people for their losses (FloodChina_1).

In India, heavy rains at the beginning of July in Assam (in the country's northeast) affected close to 400,000 people in over 850 villages across half the state's 32 districts. Flooding worsened on July 22 when new areas were submerged by the rising waters of the Brahmaputra River and its tributaries. As of 1 August, official figures show over 1.1 million people and over 3,300 villages across 21 of 32 districts affected. At least 32 people have died, most since July 22. In neighboring Bangladesh, several low-lying areas were flooded as well during the same period, affecting Sylhet and Moulvibazar districts, followed by eight more districts as water breached embankments in many places. Next to Assam, several other Indian states have suffered from excess rainfall, including Manipur, Arunachal Pradesh, Gujarat, Bihar, Uttarkand, Uttar Pradesh, and Orissa states (FloodAssam_1).

Figure 5.2. Rescue work underway in flood-hit Wenxian (Gansu province)



Source: http://www.chinadaily.com.cn/china/2017-08/13/content_30542931.htm.

Cold wave

Cold weather, described as “life threatening” has affected some villages of Cuzco province in Peru on April 18 and 19, and again on May 10 (ColdPeru_1).

5.3 Focus: The specter of famine is back in the Horn of Africa

Overview

On March 10, 2017, the United Nations (UN) Under-Secretary-General (USG) for humanitarian affairs and Emergency Relief Coordinator delivered a statement to the UN Security Council about the ongoing humanitarian crisis, the largest since the foundation of the UN more than seventy years ago. The USG reported about the Lake Chad region and his missions to Yemen [1], South Sudan, Somalia, and Kenya, in particular northern Kenya where pastoralists are badly affected by the drought caused by the recent very atypical El Niño.

The region in focus here is the Horn of Africa (HoA), a region that is most eastern on the African continent and includes the countries Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan, and Uganda. As evidenced by the statement of the USG, a large part of the region is affected by a serious emergency situation.

The causes of the emergency are complex and their relative importance varies by country. Causes include, in no specific order: drought, climate change, desertification, and the recent El Niño. Agricultural governance is generally poor in the region, with agriculture already for a long time a low-priority sector, evidenced by under-investment and a resulting degrading of agricultural infrastructure. This poor agricultural governance can be seen as one of the root causes of the low resilience of the sector against drought in this region [2].

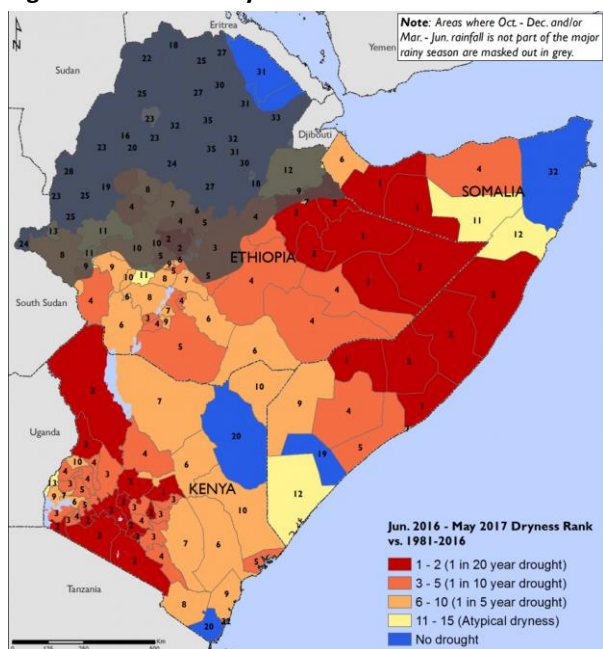
As will be explored in the following sections, the current emergency in the region is exceptional on several accounts. After a general overview of the situation and aid requirements, a more detailed assessment of the situation in individual countries in the HoA is described.

Features of the emergency situation in the Horn of Africa

In the HoA, the focus of this section, the situation is worse than during the previous emergency of 2010-11 (OCHA 2017c) because several areas have experienced three consecutive drought years, “exhausting people’s capacity to cope with another shock.” The drought also affects watering points for cattle and river flow, traditionally a source for irrigation in the HoA. Worst affected by drought are Somalia, east and southeastern Ethiopia, and northwestern Kenya, in an area adjacent to South Sudan (Figure 5.3). With the exception of southern-central and southwest Kenya and the areas shaded in gray in the figure, most of which usually record abundant rainfall, most areas in the region are semi-arid lowlands and, more rarely, highlands that experience most of their rainy season sometime between March and June. Rainy seasons are short (sometimes just two months), making cattle the mainstay of the livelihood systems. In fact, cattle herding is an efficient system to collect dispersed biomass and concentrate it in milk and meat producing cattle. As will be mentioned below, the drought badly affected cattle, the quality and numbers of which are decreasing, thus reducing or erasing the income and overall prospects of pastoralists. As a result, cattle production and markets collapsed.

As mentioned, the HoA is part of a significantly larger spatial ensemble of insecurity (including food insecurity) that it interacts with, willingly or unwillingly [3]. Although several early warning systems for climate anomalies and food insecurity operate in the area at various scales (regional, such as AGRHYMET [4] and ICPAC [5], and almost all countries), they are generally ill equipped to handle the extremely complex situations that arise from the interaction of abnormal weather and war. It remains that, according to OCHA (2017c), compared with the drought of 2011, governments were now better prepared and therefore responded efficiently to the deteriorating situation; they were proactive and led the relief efforts, especially in Ethiopia and Kenya. In addition, risk management systems for farmers have been established in several countries, including the “R4 Rural Resilience Initiative” in Ethiopia (WFP 2107a) and national agricultural insurance in Kenya (KLIP 2017).

Figure 5.3. Rank of dryness between June 2016 and May 2017 in the HoA



In both Somalia and South Sudan, between 40 and 50% of the population is exposed to insecurity and hunger (44% in Somalia, 47% in South Sudan), while percentages of 5% to 10% prevail in Ethiopia, Kenya, and Sudan, where drought victims and displaced persons constitute the bulk of the people in need. In

Djibouti, a very small and climatically vulnerable country, the population exposed to insecurity and hunger climbs to one person in 3, while for the HoA as a whole, about 8% of people are affected.

It is stressed that all refugee movements of the size of those occurring in the HoA constitute a set-back in development, with a very slow recovery curve. To start with, depending on the timing of the movements, refugees often lose their crops and livelihoods (including cattle) at home. Only if the calendar permits—and if provided with land and tools—can they produce at least part of their own food at the location of their settlement in either home or host country. Moreover, due to a stressful life and shortages, overall health declines, especially in children, which may affect them throughout their lives. Also, despite the fact that usually every effort is made to ensure schooling, refugee children typically suffer a retrogression in education that reduces their chances in life.

Short analysis of the situation by country

Djibouti

Insecurity in Djibouti stems partly from unfavorable rainfall and from the situation on its southwest border, which is contested between Djibouti and Eritrea. According to FEWSNET (FEWSNET 2017a), however, the situation in the country should improve from IPC phase 3 (Crisis) to 2 (Stressed) despite the fact that Qatar has recently withdrawn its peace-keeping force from the area. A contributing factor to this improvement has been generally satisfactory rainfall that has restored grazing lands.

Ethiopia

In June 2017, FAO listed Ethiopia among countries that face a “widespread lack of access to food,” stressing the impact of drought on local livelihood systems in southeastern areas and the lingering effects of the previous year’s severe drought in northern areas. Drought affected the secondary season (which is the first (February to June) Belg season) throughout the country, but especially crops and pastures in the south and southeastern areas (FEWSNET/WFP 2017). Meanwhile, the effects of the 2015 drought continued to impact local livelihoods in northern areas. Altogether, FAO estimates that 7.8 million people are food insecure (FAO 2017b), mostly in pastoral areas. The main season (Meher), which is to be harvested from August to October-November, is not particularly affected so far, or only in limited pockets. The problems are most serious in pastoralist areas, some of which have suffered three years of consecutive drought. As a result, some 5.6 million people in Ethiopia require emergency food assistance in 2017 (OCHA 2017c). FAO preliminary estimates suggest that up to three million cattle, calves, and milk cows have died, representing up to 90 percent of the total in some areas (Weblinks_3).

FAO (2017b) did not, however, rank Ethiopia among the countries in need of external assistance, as the main Meher crop is to be harvested between now and the end of the year, and because the country is large and diverse, with highlands usually well-endowed with rainfall. This may change, however, as about 150 thousand hectares of Belg [6] cropland are estimated to have been hit by fall armyworm, affecting 6 of the 11 states. The impact was most severe in the Southern Nations, Nationalities and Peoples’ State (SNNPS), where about 10,000 people are affected (ACAPS 2017b). The armyworms may also affect the main season crops, and the climate of uncertainty is affecting the price of maize. Over the last 3 months, the price of maize was up 9.2% (on average, it increases 5.1% over the same period), while for the last year the increase is 3.4% (instead of an average decrease of 0.7%) (FAO 2017c).

Eritrea

Eritrea is absent from virtually all accounts of the situation in the HoA, which is surprising given the similarities in climate with neighboring areas in Ethiopia, Djibouti, and Sudan. According to the World Food Programme (WFP) Seasonal Explorer (WFP 2017c), most of the country did experience a wet spell (above-normal rainfall) in April, followed by about average rain and a bout of drought in July. In fact, the

Climate Prediction Center (CPC) Outlook (CPC 2017) classifies parts of the country as suffering from “abnormal dryness.”

Kenya

At the beginning of the year, 23 out of Kenya’s 47 counties were affected by drought, and Kenya’s government declared a national emergency. Areas in the north of the country--in the north of Turkana district (which borders South Sudan and Uganda), north Hor Constituency (Marsabit district), and Mandera, on the border with Somalia and Ethiopia--are semi-arid; they usually cultivate some maize. Production fell dramatically (up to 100%), and large numbers of animals died in Turkana, Marsabit, Samburu, and Mandera counties. Data collected by UNICEF from 10 affected counties indicates that close to 175,000 children are not attending early pre-primary and primary schools, primarily due to the drought’s impact.

For poor pastoral households in the northern central and eastern regions, the crisis (IPC phase 3) may continue into 2018. This year’s long rains (March to May) were well below average in most of the country, except in the southern-central and southwestern highlands in an area from Central Region (where elevation usually exceeds 2,500 meter with moderate drought) to the regions of Nyanza and Western across the southern rift valley, where elevation is mostly close to 1,500 meter and where rainfall was average. Comparable to Ethiopia, maize prices are high and armyworm outbreaks are likely to worsen already stressed maize crops.

Somalia

According to FAO (2017a), “The two consecutive seasons of poor rainfall in 2016 created a domino effect of losses” that also extended to livestock. About 5 million people in the country are affected by food insecurity with about 1.4 million in IPC phase 3 (crisis). The situation is expected to worsen and reach its peak during the Jilaal season (dry season from January to March).

Based on a survey it conducted in June 2017, FAO’s Food Security and Nutrition Analysis Unit (FSNAU) (2017a) assesses that security outcomes and humanitarian needs are expected to persist in most parts of Somalia through the end of 2017. In some areas where livestock is the mainstay of livelihood systems (mostly in the central-western and northern parts of the country including Mudug, Galgadud, Gedo (which borders northeast Kenya), Middle Shabelle and Lower Shabelle regions), food security may deteriorate between now and the end of the year. Depending on the amount and nature of the assistance that will be provided to Somalia, local famine (IPC scale 5) cannot be excluded.

5.4 Update on El Niño

El Niño conditions have been neutral across the Pacific Ocean during the second quarter of 2017 and will presumably stay so at least to the end of 2017. Figure 5.4 illustrates the behavior of the standard Southern Oscillation Index (SOI) of the Australian Bureau of Meteorology (BOM) from July 2016 to July 2017. Sustained positive values of the SOI above +7 typically indicate La Niña while sustained negative values below -7 typically indicate El Niño. Values between about +7 and -7 generally indicate neutral conditions. During the current season, SOI shows repeated fluctuations between -10.4 and + 8.1 over the monitoring period of this bulletin, which indicates the absence of any sustained negative or positive trend. To be more precise, the SOI increased from -6.3 in April to +0.5 in May, then decreased to -10.4 in June, to increase again to +8.1 in July. The Australian BOM reports that conditions are neutral and there is no El Niño currently from a global point of view. CropWatch will keep on monitoring the condition of El Niño.

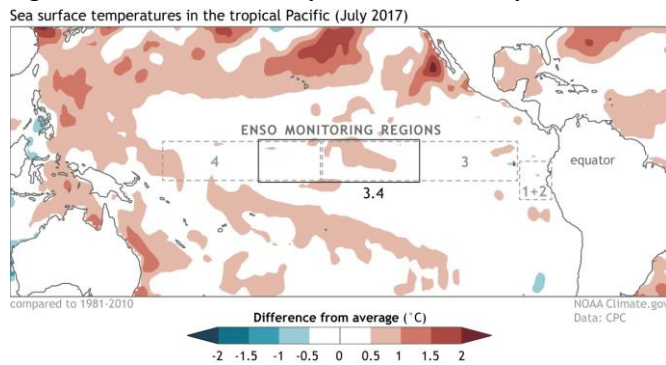
Figure 5.4. Monthly SOI-BOM time series for July 2016 to July 2017



Source: <http://www.bom.gov.au/climate/current/soi2.shtml>

The sea surface temperatures of all four El Niño regions in the tropical Pacific Ocean were between +0.3°C and -0.3°C in July 2017, resulting in slightly warmer than average condition. The other weak warm anomalies mainly lie in eastern and northern Australia and in the northern Pacific Ocean (see also figure 5.5 from NOAA). The overall slightly warm condition directly confirms the neutral El Niño state in 2017.

Figure 5.5. Sea surface temperature in the tropical Pacific, July, 2017



Source: <https://www.climate.gov/news-features/blogs/enso/august-2017-enso-update-extreme-neutral>

Annex A. Agroclimatic indicators and BIOMSS

Table A.1. April-July 2017 agroclimatic indicators and biomass by global Monitoring and Reporting Unit

65 Global MRUs	RAIN Current(mm)	RAIN 15YA dep. (%)	TEMP Current (°C)	TEMP 15YA dep. (°C)	RADPAR Current(MJ/m ²)	RADPAR 15YA dep. (%)	BIOMSS Current (gDM/m ²)	BIOMSS 5YA dep. (%)
Equatorial central Africa	371	-1	24.9	0.1	1096	2	1100	0
East African highlands	465	-13	20.8	-0.2	1176	2	1309	-9
Gulf of Guinea	695	9	27.7	-0.7	1080	-1	1826	6
Horn of Africa	129	-32	23.6	-0.5	1150	0	453	-26
Madagascar (main)	221	6	22.2	-0.2	893	-3	670	10
Southwest Madagascar	59	-15	22.1	0.1	945	-2	245	-11
North Africa- Mediterranean	93	-1	22.4	0.8	1514	0	340	-6
Sahel	455	35	31.2	-0.9	1332	-2	1261	27
Southern Africa	106	12	19.9	-0.2	949	-3	305	-1
Western Cape (South Africa)	77	-54	13.3	0.4	704	3	305	-51
British Columbia to Colorado	220	6	10.6	0.1	1407	-1	858	7
Northern Great Plains	438	20	17.1	0.2	1341	0	1194	2
Corn Belt	490	13	16.2	-0.3	1177	-5	1453	5
Cotton Belt to Mexican Nordeste	542	20	23.1	-0.7	1277	-3	1478	10
Sub-boreal America	296	2	10.7	-0.1	1157	-3	1175	4
West Coast (North America)	119	1	15.4	0.2	1459	-2	426	2
Sierra Madre	372	-5	20.9	-0.5	1452	0	994	-5
SW U.S. and N. Mexican highlands	141	15	20.8	-0.1	1564	-1	535	13
Northern South and Central America	905	17	27.2	-0.6	1125	0	1879	9
Caribbean	797	17	26.4	-0.8	1285	-3	1748	3
Central-northern Andes	382	-4	15.2	0.1	984	1	819	-2
Nordeste (Brazil)	157	-26	26.4	0.3	957	-6	512	-21
Central eastern Brazil	222	-10	23.7	-0.5	928	-1	686	-9
Amazon	643	1	27.3	-0.4	980	3	1447	-4
Central-north Argentina	190	72	17.2	-0.3	623	-11	534	46
Pampas	515	25	16.4	0.6	625	-7	1099	5
Western Patagonia	328	-30	6.9	-0.1	460	-5	929	2
Semi-arid Southern Cone	129	83	9.6	-0.1	643	-4	429	50
Caucasus	197	-16	16.9	-0.1	1361	1	749	-14
Pamir area	225	7	17.9	0.1	1463	-1	744	4
Western Asia	107	17	23.4	0	1465	0	381	3
Gansu-Xinjiang (China)	262	83	18.1	0.2	1356	-3	816	57
Hainan (China)	931	30	27	-1.1	1109	-6	2042	22
Huanghuaihai (China)	454	15	23.1	0.5	1251	0	1216	3
Inner Mongolia (China)	319	17	17.1	0.8	1304	2	1020	2
Loess region (China)	334	19	18.5	0	1270	-1	1129	8
Lower Yangtze (China)	944	7	23.2	-0.6	1053	-1	1848	-4
Northeast China	352	0	16.5	0.3	1231	4	1120	-5
Qinghai-Tibet (China)	901	28	11.1	-0.5	1199	0	1211	1
Southern China	956	8	23.5	-1	988	-4	1925	0
Southwest China	639	3	20.2	-0.7	1015	-1	1610	-2
Taiwan (China)	1339	48	23.7	-1	1101	-3	1916	13
East Asia	353	-26	15.6	0.3	1166	2	1126	-15
Southern Himalayas	986	15	26.5	-0.7	1117	-3	1594	2

Southern Asia	739	10	29.9	-0.3	1156	0	1382	3
Southern Japan and Korea	530	-30	19.4	0.1	1144	4	1463	-16
Southern Mongolia	411	126	17.7	1.3	1416	-2	1138	75
Punjab to Gujarat	559	72	31.8	-0.8	1306	-4	1071	47
Maritime Southeast Asia	1095	18	25.7	-0.6	930	-7	2175	7
Mainland Southeast Asia	1043	15	27.9	-0.9	1046	-4	2030	5
Eastern Siberia	252	6	10.1	0.3	1121	-3	1061	7
Eastern Central Asia	220	-6	11.8	0.9	1260	1	925	-4
Northern Australia	241	2	24.3	-0.3	963	-3	606	-5
Queensland to Victoria	115	-32	12.2	-0.5	691	2	488	-22
Nullarbor to Darling	94	-57	13.8	-0.2	668	0	365	-52
New Zealand	223	-29	8.9	-0.3	433	-9	804	-15
Boreal Eurasia	294	2	9.1	-0.2	1021	-5	1051	-1
Ukraine to Ural mountains	291	22	13.2	-2.2	1070	-6	1178	17
Mediterranean Europe and Turkey	144	-13	18.4	1.6	1421	1	583	-13
W. Europe (non Mediterranean)	284	-3	15.2	0.1	1140	-2	1109	-1
Boreal America	283	0	7	0.7	1018	-3	982	0
Ural to Altai mountains	228	6	14	-0.3	1194	-1	942	5
Australian desert	63	-35	13.9	-0.5	732	3	307	-29
Sahara to Afghan deserts	60	33	29.8	0.1	1536	-1	221	19
Sub-arctic America	146	62	-5	1.1	534	-4	554	132

Table A.2. April-July 2017 agroclimatic indicators and biomass by country

31 Countries	31 Countries	RAIN Current (mm)	RAIN 15YA Departure (%)	TEMP Current (°C)	TEMP 15YA Departure (°C)	RADPAR Current (MJ/m ²)	RADPAR 15YA Departure (%)	BIOMSS Current (gDM/m ²)	BIOMSS 5YA Departure (%)
ARG	Argentina	323	48	14.7	0.3	590	-10	802	29
AUS	Australia	113	-34	13.5	-0.4	715	1	455	-28
BGD	Bangladesh	2089	46	28.5	-1.1	946	-7	2477	15
BRA	Brazil	352	-3	24.4	-0.2	936	0	862	-9
KHM	Cambodia	908	7	28.6	-1.3	1080	-4	2121	3
CAN	Canada	277	-8	11.1	0.1	1170	-3	1073	-1
CHN	China	681	9	20.6	-0.3	1113	-1	1377	1
EGY	Egypt	14	110	24.1	-0.1	1593	0	71	101
ETH	Ethiopia	555	-4	21.7	-0.2	1180	1	1488	-4
FRA	France	210	-23	15.7	1.2	1217	1	874	-17
DEU	Germany	328	14	14.7	-0.4	1038	-5	1276	11
IND	India	784	17	29.8	-0.4	1185	-1	1328	8
IDN	Indonesia	1121	21	25.6	-0.7	898	-8	2123	7
IRN	Iran	58	-34	22.3	0.3	1506	1	230	-28
KAZ	Kazakhstan	197	12	15.9	-0.3	1272	0	807	8
MEX	Mexico	480	10	24.5	-0.5	1399	0	1047	4
MMR	Burma	1051	3	26.9	-0.5	1010	-3	1874	-1
NGA	Nigeria	674	9	28.5	-0.9	1147	-1	1717	9
PAK	Pakistan	309	44	28.1	-0.5	1411	-3	757	37
PHL	Philippines	1042	15	26.6	-0.7	1113	-3	2110	9
POL	Poland	322	21	13.9	-1.3	1025	-6	1313	19
ROU	Romania	316	-2	16.1	-0.8	1224	1	1202	2
RUS	Russia	284	19	13	-1.4	1105	-5	1123	13
ZAF	S. Africa	70	-21	14.3	0.4	843	0	285	-22
THA	Thailand	862	16	27.8	-1.1	1066	-3	2007	6
TUR	Turkey	194	2	17.1	0	1416	-1	745	-4
GBR	U.Kingdom	313	6	12.3	0.8	940	-7	1152	0
UKR	Ukraine	206	-17	16	-1.2	1167	-1	896	-11
USA	U. States	464	21	18.9	-0.3	1303	-3	1208	9
UZB	Uzbekistan	127	13	22.1	-0.1	1461	1	492	16
VNM	Vietnam	921	12	26.5	-0.8	1030	-6	1969	1

Table A.3. Argentina, April-July 2017 agroclimatic indicators and biomass (by province)

	RAIN Current (mm)	RAIN 15YA Departure (%)	TEMP Current (°C)	TEMP 15YA Departure (°C)	RADPAR Current (MJ/m ²)	RADPAR 15YA Departure (%)	BIOMSS Current (gDM/m ²)	BIOMSS 5YA Departure (%)
Buenos Aires	289	34	12.3	0.7	524	-11	808	10
Chaco	475	83	18.1	-0.1	622	-10	1157	54
Cordoba	158	32	13.6	0	591	-13	558	29
Corrientes	763	81	18	0.4	635	-7	1440	25
Entre Rios	382	14	15.6	0.6	585	-10	1160	26
La Pampa	262	106	11.8	0.3	552	-10	832	78
Misiones	891	34	18.6	0.5	695	-2	1551	-3
Santiago Del Estero	149	53	16.9	0.1	608	-12	529	51
San Luis	230	138	11.6	-0.3	606	-10	810	116
Salta	158	153	16.5	-0.5	681	-9	366	61
Santa Fe	301	27	16	0.5	597	-11	924	30
Tucuman	93	50	14.9	-0.2	717	-3	366	67

Table A.4. Australia, April-July 2017 agroclimatic indicators and biomass (by state)

	RAIN Current (mm)	RAIN 15YA Departure (%)	TEMP Current (°C)	TEMP 15YA Departure (°C)	RADPAR Current (MJ/m ²)	RADPAR 15YA Departure (%)	BIOMSS Current (gDM/m ²)	BIOMSS 5YA Departure (%)
New South Wales	108	-34	11.6	-0.6	715	2	457	-23
South Australia	142	-16	12.2	-0.6	605	1	571	-14
Victoria	165	-19	10.3	-0.7	544	0	676	-11
W. Australia	89	-58	14.6	-0.2	700	0	355	-51

Table A.5. Brazil, April-July 2017 agroclimatic indicators and biomass (by state)

	RAIN Current (mm)	RAIN 15YA Departure (%)	TEMP Current (°C)	TEMP 15YA Departure (°C)	RADPAR Current (MJ/m ²)	RADPAR 15YA Departure (%)	BIOMSS Current (gDM/m ²)	BIOMSS 5YA Departure (%)
Ceara	215	-36	27.8	0.5	1037	-4	772	-22
Goias	125	-18	23.7	-0.6	1038	1	468	-9
Mato Grosso Do Sul	290	-8	22.9	-0.9	875	-3	925	-6
Mato Grosso	225	5	26.6	-0.3	1035	2	718	3
Minas Gerais	94	-31	21.8	-0.2	895	-4	359	-26
Parana	508	-10	19.2	0.1	751	-3	1276	-10
Rio Grande Do Sul	827	42	17.5	1.1	650	-3	1392	-9
Santa Catarina	592	2	17.2	1	657	-5	1123	-25
Sao Paulo	339	21	20.8	-0.5	847	-3	1033	12

Table A.6. Canada, April-July 2017 agroclimatic indicators and biomass (by province)

	RAIN Current (mm)	RAIN 15YA Departure (%)	TEMP Current (°C)	TEMP 15YA Departure (°C)	RADPAR Current (MJ/m ²)	RADPAR 15YA Departure (%)	BIOMSS Current (gDM/m ²)	BIOMSS 5YA Departure (%)
Alberta	268	3	11.6	0.5	1238	-1	1081	4
Manitoba	228	-25	12.2	0.1	1208	-2	1009	-14
Saskatchewan	202	-24	12.2	0.7	1255	1	894	-15

Table A.7. India, April-July 2017 agroclimatic indicators and biomass (by state)

	RAIN Current (mm)	RAIN 15YA Departure (%)	TEMP Current (°C)	TEMP 15YA Departure (°C)	RADPAR Current (MJ/m ²)	RADPAR 15YA Departure (%)	BIOMSS Current (gDM/m ²)	BIOMSS 5YA Departure (%)
Andhra Pradesh	505	19	31.3	-0.3	1191	0	1304	11
Assam	2225	42	28.2	-0.4	887	-3	2629	6
Bihar	748	11	30.7	-1.4	1183	-3	1482	4
Chhattisgarh	715	7	31	-0.1	1191	2	1328	-4
Daman and Diu	832	13	29.5	-0.6	1223	-1	955	2
Delhi	316	2	32.5	-0.7	1341	-2	1064	16
Gujarat	813	80	31.3	-0.5	1235	-5	1063	38
Goa	809	-39	26.7	0	1072	6	1545	-6
Himachal Pradesh	545	-6	15	-1.4	1300	-7	1177	-5
Haryana	337	9	31.5	-0.7	1341	-3	1106	19
Jharkhand	886	35	30.4	-0.4	1194	-2	1566	6
Kerala	817	-28	26.5	-0.2	938	-1	1913	-8
Karnataka	538	-17	27.3	-0.2	1125	2	1321	-2
Meghalaya	2741	16	24.8	0	873	-8	2489	3
Maharashtra	658	-2	30.1	-0.1	1204	3	1128	-5
Manipur	1160	15	22.6	-0.4	939	-6	2277	9
Madhya Pradesh	657	16	31.7	-0.4	1242	0	1165	7
Mizoram	2031	48	23.6	-0.9	998	-4	2412	8
Nagaland	1717	38	22.2	0.1	939	-4	2332	5
Orissa	814	11	30.3	-0.3	1145	0	1615	0
Puducherry	106	-71	31.3	0.1	1298	3	486	-39
Punjab	320	1	30.3	-0.8	1326	-4	1021	13
Rajasthan	497	76	32.5	-1	1325	-3	1081	51
Sikkim	1268	9	12.8	-1.5	1138	-8	1381	0
Tamil Nadu	347	4	30.2	0.2	1230	1	1119	3
Tripura	2685	58	27.6	-0.8	906	-7	2629	9
Uttarakhand	819	16	20	-0.3	1256	-4	1424	10
Uttar Pradesh	542	8	32.1	-0.4	1279	-1	1139	4
West Bengal	1307	24	30.2	-0.7	1098	-3	2068	9

Table A.8. Kazakhstan, April-July 2017 agroclimatic indicators and biomass (by oblast)

	RAIN Current (mm)	RAIN 15YA Departure (%)	TEMP Current (°C)	TEMP 15YA Departure (°C)	RADPAR Current (MJ/m ²)	RADPAR 15YA Departure (%)	BIOMSS Current (gDM/m ²)	BIOMSS 5YA Departure (%)
Akmolinskaya	126	-25	15	-0.1	1244	2	600	-21
Karagandinskaya	180	2	14.9	0	1277	3	820	3
Kustanayskaya	145	-8	14.9	-1.2	1211	0	684	-4
Pavlodarskaya	163	-2	15.7	0	1236	2	763	3
Severo kazachstanskaya	184	-10	14.4	-0.3	1188	2	852	-5
Vostochno kazachstanskaya	270	27	14.5	0.6	1320	1	1039	22
Zapadno kazachstanskaya	126	10	16.6	-1.9	1198	-4	629	15

Table A.9. Russia, April-July 2017 agroclimatic indicators and biomass (by oblast, kray and republic)

	RAIN Current (mm)	RAIN 15YA Departure (%)	TEMP Current (°C)	TEMP 15YA Departure (°C)	RADPAR Current (MJ/m ²)	RADPAR 15YA Departure (%)	BIOMSS Current (gDM/m ²)	BIOMSS 5YA Departure (%)
Bashkortostan Rep.	311	40	12	-2.3	1093	-6	1210	26
Chelyabinskaya Oblast	205	-8	12.8	-1.5	1118	-3	923	-4
Gorodovikovsk Krasnodarskiy Kray	350	21	18.8	-1.2	1212	-2	1220	7
Kurganskaya Oblast	259	-4	15.1	-0.2	1181	-2	1088	-1
Kirovskaya Oblast	222	2	13.2	-1.1	1135	-2	980	4
Kurskaya Oblast	419	73	10.4	-3.1	963	-13	1413	36
Lipetskaya Oblast	204	-11	14.3	-2.1	1119	-2	934	-6
Mordoviya Rep.	203	-6	13.7	-2.3	1099	-4	952	0
Novosibirskaya Oblast	340	52	12.7	-2.6	1068	-7	1323	35
Nizhegorodskaya O.	235	8	13.2	0	1145	-2	1037	10
Orenburgskaya Oblast	360	53	11.8	-2.8	1006	-10	1376	36
Omskaya Oblast	196	24	14.1	-2.1	1177	-3	828	15
Permskaya Oblast	219	-1	13.6	0.2	1126	-2	946	-2
Penzenskaya Oblast	425	65	10.7	-2.2	988	-11	1455	32
Rostovskaya Oblast	321	52	13.1	-2.6	1091	-6	1335	42
Ryazanskaya Oblast	209	4	17.4	-1.5	1207	-1	940	8
Stavropolskiy Kray	289	25	12.8	-2.5	1028	-9	1220	21
Sverdlovskaya Oblast	291	11	18.5	-1	1198	-2	1147	9
Samarskaya Oblast	315	24	11.9	-1.1	1037	-6	1235	16
Saratovskaya Oblast	316	75	13.6	-2.3	1127	-5	1238	53
Tambovskaya Oblast	255	60	15	-2.4	1145	-5	1106	52
Tyumenskaya Oblast	243	15	13.7	-2.3	1098	-5	1087	16
Tatarstan Rep.	217	-9	13	-0.4	1106	-2	988	-2
Ulyanovskaya Oblast	325	58	12.2	-2.9	1068	-8	1250	37
Udmurtiya Rep.	306	53	13.2	-2.4	1098	-6	1255	40
Volgogradskaya O.	334	42	10.9	-2.8	1013	-10	1303	28
Voronezhskaya Oblast	218	42	16.5	-2.2	1159	-4	957	36
	202	5	15	-1.7	1118	-4	930	7

Table A.10. United States, April-July 2017 agroclimatic indicators and biomass (by state)

	RAIN Current (mm)	RAIN 15YA Departure (%)	TEMP Current (°C)	TEMP 15YA Departure (°C)	RADPAR Current (MJ/m ²)	RADPAR 15YA Departure (%)	BIOMSS Current (gDM/m ²)	BIOMSS 5YA Departure (%)
Arkansas	729	47	22.5	-0.8	1273	-3	1851	24
California	111	38	16.9	0.3	1574	-2	361	25
Idaho	185	20	12.2	-0.1	1454	-2	786	19
Indiana	613	24	19.2	-0.1	1263	-1	1631	8
Illinois	624	29	19.6	-0.1	1293	-1	1542	5
Iowa	631	23	18.2	-0.1	1295	0	1654	9
Kansas	645	48	20.4	-0.6	1355	-2	1535	16
Michigan	340	-4	14.5	-0.2	1207	-5	1211	-3
Minnesota	424	8	14.9	-0.4	1205	-4	1376	5
Missouri	871	65	20.8	-0.2	1311	-1	1715	9
Montana	204	-10	14.1	0.9	1416	2	877	-6
Nebraska	494	26	18.2	0.1	1362	-1	1490	16
North Dakota	235	-21	15	0.6	1344	4	949	-14
Ohio	569	29	18.4	-0.1	1229	-2	1681	15
Oklahoma	717	51	22.2	-1	1339	-2	1562	14
Oregon	109	-25	13.7	0.1	1385	-2	521	-12
South Dakota	446	35	17.1	0.5	1374	2	1406	20
Texas	391	14	24.5	-0.8	1359	-1	1158	13
Washington	139	-4	13.8	-0.2	1358	0	602	5
Wisconsin	664	55	14.9	-0.5	1181	-5	1660	19

Table A.11. China, April-July 2017 agroclimatic indicators and biomass (by province)

	RAIN Current (mm)	RAIN 15YA Departure (%)	TEMP Current (°C)	TEMP 15YA Departure (°C)	RADPAR Current (MJ/m ²)	RADPAR 15YA Departure (%)	BIOMSS Current (gDM/m ²)	BIOMSS 5YA Departure (%)
Anhui	685	-6	23.6	0	1153	0	1581	-8
Chongqing	716	6	20.7	-0.6	994	0	1836	2
Fujian	931	-3	22.5	-0.7	1038	0	1924	-4
Gansu	254	-4	15.8	-0.1	1265	1	961	5
Guangdong	1176	11	24.8	-1	973	-3	2248	9
Guangxi	1211	21	24.4	-1.1	943	-4	2139	5
Guizhou	711	1	20.6	-0.6	932	-3	1673	-5
Hebei	401	27	20.4	0.5	1268	0	1189	9
Heilongjiang	358	12	15.8	0.2	1213	4	1166	3
Henan	470	8	23.2	0.1	1219	0	1292	-1
Hubei	710	3	22.1	-0.5	1098	-1	1751	-1
Hunan	991	19	22.6	-1	1001	-2	1902	-2
Jiangsu	495	-11	23.4	0.6	1187	1	1259	-15
Jiangxi	1141	13	23.7	-0.8	1028	-3	2044	-2
Jilin	414	12	17	0.3	1245	5	1156	-5
Liaoning	311	-23	19	0.7	1264	4	1014	-20
Inner Mongolia	265	-1	16.4	0.8	1302	3	945	-3
Ningxia	135	-16	17.9	0.2	1341	-1	579	-13
Shaanxi	370	4	19.5	0	1218	0	1229	5
Shandong	459	20	22.6	0.6	1264	0	1228	5
Shanxi	414	46	18.2	0.2	1273	-2	1269	21
Sichuan	562	-1	18.8	-0.6	1053	1	1522	-1
Yunnan	537	-8	19.1	-1.0	1034	-5	1418	-10
Zhejiang	932	13	22.5	-0.3	1065	-1	1856	-3

Annex B. 2017 production estimates

Tables B.1-B.5 present 2017 CropWatch production estimates for Argentina, Brazil, Canada, Australia, and the United States.

Table B.1. Argentina, 2017 maize and soybean production, by province (thousand tons)

	Maize		Soybean	
	2017	Δ%	2017	Δ%
Buenos Aires	7651	7.7	13660	-2.9
Córdoba	7387	4.9	11911	-1.6
Entre Rios	1269	11	3806	5.8
San Luis	1085	-2.8		
Santa Fe	4264	-0.8	10218	-3.1
Santiago Del Estero	1210	-0.4		
Sub total	22866	4.3	39595	-1.8
Others	7080	86.8	11521	7
Argentina	29946	16.5	51116	0.1

Δ% indicates percentage difference with 2016.

Table B.2. Brazil, 2017 maize, rice, and soybean production, by state (thousand tons)

	Maize		Rice		Soybean	
	2017	Δ%	2017	Δ%	2017	Δ%
Goiás	8717	36.9			10327	5.4
Mato Grosso	20121	11.9			28146	5
Mato Grosso Do Sul	7735	17.4			6816	6.7
Minas Gerais	6351	5.4			3422	-2.6
Parana	16250	12.4			18327	6.4
Rio Grande Do Sul	4812	4.3	8770	3.3	13684	1.1
Santa Catarina	2957	5.2	1130	10.6	1790	4.8
Sao Paulo	3946	9.9			2195	1
Sub total	70888	13.6	9899	4	84708	4.4
Others	13131	63.8	1230	-20.2	12018	13.1
Brazil	84019	19.3	11129	0.7	96726	5.4

Δ% indicates percentage difference with 2016.

Table B.3. Canada, 2017 wheat production, by province (thousand tons)

	Wheat	
	2017	Δ%
Alberta	8819	-6
Manitoba	3713	-1.7
Ontario	1862	8
Saskatchewan	12631	-11.9
Sub total	27024	-7.5
others	3655	-10.4
Canada	30679	-7.8

Δ% indicates percentage difference with 2016.

Table B.4. Australia, 2017 maize and wheat production, by province (thousand tons)

	Wheat	
	2017	Δ%
New South Wales	8280	-8.9
South Australia	4685	-6.5
Victoria	4379	3
Western Australia	11774	-6.8
Sub total	29119	-6
others	600	-2.9
Australia	29719	-6

Δ % indicates percentage difference with 2016.

Table B.5. United States, 2017 maize, rice, wheat, and soybean production, by state (thousand tons)

States	Maize		Rice		Wheat		Soybean	
	2017	Δ%	2017	Δ%	2017	Δ%	2017	Δ%
Alabama	1201	2.2					522	3.6
Arkansas	2761	7.9	5601	4.9	654	1.5	4696	3.4
California			1703	-2.9	728	9.7		
Colorado	2753	-17.6			1853	-23.8		
Georgia	1457	2.4			320	2.9		
Idaho					2766	2.7		
Illinois	58903	-4.6			1210	-1.3	14839	-4.6
Indiana	27516	0.9			753	0.7	8737	0.9
Iowa	57111	-5.2					13230	-5.2
Kansas	13437	-9.3			7799	-7.7	3858	-4.7
Kentucky	6033	1.6			1007	1.3	2280	1.5
Louisiana	1775	2.7	1537	1.4			2257	0.9
Maryland					495	4.5	647	4.4
Michigan	10151	2.4			1072	1.6	2565	2.9
Minnesota	27410	-4.9			1724	-2.6	8042	-4.5
Mississippi	2341	-1.2	738	11.2	362	5.5	3332	4.4
Missouri	16262	-2.2	682	0.9	1191	-0.1	6923	-1.7
Montana					4626	-15		
Nebraska	40150	-5.9			1964	-6.7	7665	-2
New York	2808	9.4			176	7.6		
North Carolina	2679	-0.8			1203	-0.5	1886	-1.5
North Dakota	7661	-3.1			8597	-9.6	5296	-3.8
Ohio	14867	4.6			1237	3	7415	4.5
Oklahoma	672	-39.2			1350	-1.7		
Oregon					1110	13.1		
Pennsylvania	4027	3.9			270	1.8	823	8
South Carolina					281	0		
South Dakota	16846	-6.3			3394	-8.9	5551	-7.9
Tennessee	3763	-1.6			757	-0.7	2051	-0.6
Texas	6173	-5.5	483	-4.1	1995	-6.7		
Virginia	1479	4.7			501	2.4	722	4
Washington					3189	9.3		
Wisconsin	12626	-3.9			361	-19.7	2168	-3.9
Sub total	342863	-3.7	10746	2.8	52945	-5.5	105505	-2
United States	354763	-3.6	10888	3.4	54270	-4.6	109323	-0.6

Δ% indicates percentage difference with 2016

Annex C. Quick reference to CropWatch indicators, spatial units and methodologies

The following sections give a brief overview of CropWatch indicators and spatial units, along with a description of the CropWatch production estimation methodology. For more information about CropWatch methodologies, visit CropWatch online at www.cropwatch.com.cn.

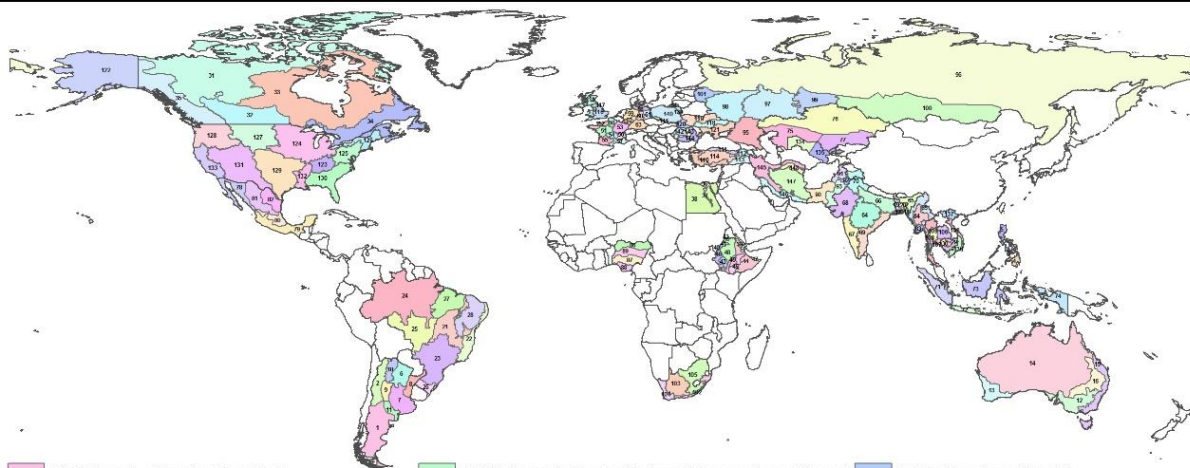
Sub-national regions for 31 key countries

Overview

148 sub-national regions for the 31 key countries across the globe

Description

31 key agricultural countries are divided into 148 sub-national regions based on cropping systems, climatic zones, and topographic conditions. Each country is considered separately. A limited number of regions (e.g., region 001, region 031, and region 122) are not relevant for the crops currently monitored by CropWatch but are included to allow for more complete coverage of the 31 key countries. Some regions are more relevant for rangeland and livestock monitoring, which is also essential for food security.



- | | | |
|-----------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------|
| 001. Patagonia arid region (Argentina) | 051. Western mixed maize_Barley and Rapessed zone (France) | 101. Northwest area (Russia) |
| 002. Andes Mountain region (Argentina) | 052. Westnorth mixed maize and Barley zone (France) | 102. Humid subtropical zone (South Africa) |
| 003. Hilly Agriculture Region (Philippines) | 053. Rapeseed zone (France) | 103. Arid desert zone (South Africa) |
| 004. Forest Region (Philippines) | 054. Middle arid zone (France) | 104. Mediterranean zone (South Africa) |
| 005. Lowland Agriculture Region (Philippines) | 055. Southwest maize zone (France) | 105. Semi-arid steppe zone (South Africa) |
| 006. Chaco region (Argentina) | 056. Eastern highland (France) | 106. Single-cropped rice area (Thailand) |
| 007. Pampas (Argentina) | 057. Mediterranean climate zone (France) | 107. Horticulture area (Thailand) |
| 008. Mesopotamia (Argentina) | 058. Northern wheat zone (Germany) | 108. Mountains area (Thailand) |
| 009. Pampas Mountains (Argentina) | 059. Northwest mixed wheat and sugarbeets zone (Germany) | 109. Double_triple-cropped rice area (Thailand) |
| 010. Tropical highland (Argentina) | 060. Central wheat zone (Germany) | 110. Marmara_Agean_Mediterranean (Thailand) |
| 011. Semi-arid Pampas (Argentina) | 061. Eastern sparse crop area (Germany) | 111. Black Sea (Turkey) |
| 012. Southeastern wheat zone (Australia) | 062. Western sparse crop area (Germany) | 112. North East (Turkey) |
| 013. Southwestern wheat zone (Australia) | 063. Southern highland (Germany) | 113. South East (Turkey) |
| 014. Arid and semiarid zone (Australia) | 064. Central India | 114. Central Turkey |
| 015. Wet temperate and subtropical zone (Australia) | 065. North eastern region (India) | 115. Northern Barley area (UK) |
| 016. Subhumid subtropical zone (Australia) | 066. Gangatic plain (India) | 116. Southern mixed wheat and Barley zone (UK) |
| 017. Coastal region (Bangladesh) | 067. Western coastal region (India) | 117. Central sparse crop area (UK) |
| 018. Hill region (Bangladesh) | 068. Western dry region (India) | 118. Central wheat area (Ukraine) |
| 019. Gangatic plain (Bangladesh) | 069. Eastern coastal region (India) | 119. Northern wheat area (Ukraine) |
| 020. Sylhet basin (Bangladesh) | 070. Western Himalayan region (India) | 120. Mountains regions (Ukraine) |
| 021. Central Savanna (Brazil) | 071. Sumatra (Indonesia) | 121. Southern wheat and maize area (Ukraine) |
| 022. East coast (Brazil) | 072. Java (Indonesia) | 122. Alaska and Hawaii (USA) |
| 023. Parana River (Brazil) | 073. Kalimantan and Sulawesi (Indonesia) | 123. Blue Grass (USA) |
| 024. Amazon (Brazil) | 074. Irian Jaya (Indonesia) | 124. Corn Belt (USA) |
| 025. Mato Grosso Region (Brazil) | 075. SouthWest zone (Kazakhstan) | 125. Middle Atlantic (USA) |
| 026. Subtropical rangeland (Brazil) | 076. Northern zone (Kazakhstan) | 126. Northeast (USA) |
| 027. Mixed forest and farmland (Brazil) | 077. SouthEast zone (Kazakhstan) | 127. North Plains (USA) |
| 028. Nordeste (Brazil) | 078. Northwestern mixed wheat and maize area (Mexico) | 128. Northwest (USA) |
| 029. Main cropping area (Cambodia) | 079. Southern maize zone (Mexico) | 129. South Plains (USA) |
| 030. Lake plains (Cambodia) | 080. Centre temperate zone (Mexico) | 130. Southeast (USA) |
| 031. Arctic Ocean (Canada) | 081. Northern mixed cotton and wheat area (Mexico) | 131. Southwest (USA) |
| 032. Canadian Prairies (Canada) | 082. Northeastern mixed sorghum and maize area (Mexico) | 132. Lower Mississippi (USA) |
| 033. Hudson Bay (Canada) | 083. Coastal region (Myanmar) | 133. California (USA) |
| 034. Atlantic Ocean (Canada) | 084. Central plain (Myanmar) | 134. Cotton zone (Uzbekistan) |
| 035. Pacific Ocean (Canada) | 085. Hill region (Myanmar) | 135. Maize and Cereals zone (Uzbekistan) |
| 036. Cropping area of Nile Delta (Egypt) | 086. Soudano-sahelian (Nigeria) | 136. South of Vietnam |
| 037. Cropping area of Nile Valley (Egypt) | 087. Derived savanna zone (Nigeria) | 137. North of Vietnam |
| 038. Sparse or no crop area (Egypt) | 088. humid forest zone (Nigeria) | 138. Middle of Vietnam |
| 039. Northern Arid (Ethiopia) | 089. Guinean savanna (Nigeria) | 139. Cold and mesic forest zone (Poland) |
| 040. North-western sesame irrigated lowlands (Ethiopia) | 090. Balochistan non-agricultural region (Pakistan) | 140. Cool temperate and dry zone (Poland) |
| 041. North-western cereal-root-sesame lowlands (Ethiopia) | 091. Northern highland (Pakistan) | 141. Cool temperate and moist zone (Poland) |
| 042. North-western semi-arid lowlands (Ethiopia) | 092. Northern Punjab (Pakistan) | 142. West Region (Romania) |
| 043. South-western coffee-enset highlands (Ethiopia) | 093. Lower Indus river basin (Pakistan) | 143. Middle Region (Romania) |
| 044. Semi-arid pastoral (Ethiopia) | 094. Kaliningrad (Russia) | 144. South&East Plain (Romania) |
| 045. South-eastern mixed maize zone (Ethiopia) | 095. Caucasian (Russia) | 145. West&North Region (Iran) |
| 046. Western mixed maize zone (Ethiopia) | 096. North Subarctic area (Russia) | 146. South Coast Region (Iran) |
| 047. Eastern arid (Ethiopia) | 097. Volga (Russia) | 147. Central&Eastern Region (Iran) |
| 048. Central-northern maize-teff highlands (Ethiopia) | 098. Central area (Russia) | 148. Semnan&Khorasan Region (Iran) |
| 049. South-eastern Mendebo highlands (Ethiopia) | 099. South Urals area (Russia) | |
| 050. Northern Barley zone (France) | 100. South Siberian area (Russia) | |

CropWatch indicators

The CropWatch indicators are designed to assess the condition of crops and the environment in which they grow and develop; the indicators—RAIN (for rainfall), TEMP (temperature), and RADPAR (photosynthetically active radiation, PAR)—are not identical to the weather variables, but instead are value-added indicators computed only over crop growing areas (thus for example excluding deserts and rangelands) and spatially weighted according to the agricultural production potential, with marginal areas receiving less weight than productive ones. The indicators are expressed using the usual physical units (e.g., mm for rainfall) and were thoroughly tested for their coherence over space and time. CWSU are the CropWatch Spatial Units, including MRUs, MPZ, and countries (including first-level administrative districts in select large countries). For all indicators, high values indicate "good" or "positive."

INDICATOR			
BIOMSS			
Biomass accumulation potential			
Crop/ Ground and satellite	Grams dry matter/m ² , pixel or CWSU	An estimate of biomass that could potentially be accumulated over the reference period given the prevailing rainfall and temperature conditions.	Biomass is presented as maps by pixels, maps showing average pixels values over CropWatch spatial units (CWSU), or tables giving average values for the CWSU. Values are compared to the average value for the last five years (2012-2016), with departures expressed in percentage.
CALF			
Cropped arable land and cropped arable land fraction			
Crop/ Satellite	[0,1] number, pixel or CWSU average	The area of cropped arable land as fraction of total (cropped and uncropped) arable land. Whether a pixel is cropped or not is decided based on NDVI twice a month. (For each four-month reporting period, each pixel thus has 8 cropped/ uncropped values).	The value shown in tables is the maximum value of the 8 values available for each pixel; maps show an area as cropped if at least one of the 8 observations is categorized as "cropped." Uncropped means that no crops were detected over the whole reporting period. Values are compared to the average value for the last five years (2012-2016), with departures expressed in percentage.
CROPPING INTENSITY			
Cropping intensity Index			
Crop/ Satellite	0, 1, 2, or 3; Number of crops growing over a year for each pixel	Cropping intensity index describes the extent to which arable land is used over a year. It is the ratio of the total crop area of all planting seasons in a year to the total area of arable land.	Cropping intensity is presented as maps by pixels or spatial average pixels values for MPZs, 31 countries, and 7 regions for China. Values are compared to the average of the previous five years, with departures expressed in percentage.
NDVI			
Normalized Difference Vegetation Index			
Crop/ Satellite	[0.12-0.90] number, pixel or CWSU average	An estimate of the density of living green biomass.	NDVI is shown as average profiles over time at the national level (cropland only) in crop condition development graphs, compared with previous year and recent five-year average (2012- 2016), and as spatial patterns compared to the average showing the time profiles, where they occur, and the percentage of pixels concerned by each profile.
RADPAR			
CropWatch indicator for Photosynthetically Active Radiation (PAR), based on pixel based PAR			
Weather /Satellite	W/m ² , CWSU	The spatial average (for a CWSU) of PAR accumulation over agricultural pixels, weighted by the production	RADPAR is shown as the percent departure of the RADPAR value for the reporting period compared to the recent fifteen-year average (2002-2016),

INDICATOR			
		potential.	per CWSU. For the MPZs, regular PAR is shown as typical time profiles over the spatial unit, with a map showing where the profiles occur and the percentage of pixels concerned by each profile.
RAIN			
CropWatch indicator for rainfall, based on pixel-based rainfall			
Weather /Ground and satellite	Liters/m ² , CWSU	The spatial average (for a CWSU) of rainfall accumulation over agricultural pixels, weighted by the production potential.	RAIN is shown as the percent departure of the RAIN value for the reporting period, compared to the recent fifteen-year average (2002-16), per CWSU. For the MPZs, regular rainfall is shown as typical time profiles over the spatial unit, with a map showing where the profiles occur and the percentage of pixels concerned by each profile.
TEMP			
CropWatch indicator for air temperature, based on pixel-based temperature			
Weather /Ground	°C, CWSU	The spatial average (for a CWSU) of the temperature time average over agricultural pixels, weighted by the production potential.	TEMP is shown as the departure of the average TEMP value (in degrees Centigrade) over the reporting period compared with the average of the recent fifteen years (2002-16), per CWSU. For the MPZs, regular temperature is illustrated as typical time profiles over the spatial unit, with a map showing where the profiles occur and the percentage of pixels concerned by each profile.
VCIx			
Maximum vegetation condition index			
Crop/ Satellite	Number, pixel to CWSU	Vegetation condition of the current season compared with historical data. Values usually are [0,1], where 0 is "NDVI as bad as the worst recent year" and 1 is "NDVI as good as the best recent year." Values can exceed the range if the current year is the best or the worst.	VCIx is based on NDVI and two VCI values are computed every month. VCIx is the highest VCI value recorded for every pixel over the reporting period. A low value of VCIx means that no VCI value was high over the reporting period. A high value means that at least one VCI value was high. VCI is shown as pixel-based maps and as average value by CWSU.
VHI			
Vegetation health index			
Crop/ Satellite	Number, pixel to CWSU	The average of VCI and the temperature condition index (TCI), with TCI defined like VCI but for temperature. VHI is based on the assumption that "high temperature is bad" (due to moisture stress), but ignores the fact that low temperature may be equally "bad" (crops develop and grow slowly, or even suffer from frost).	Low VHI values indicate unusually poor crop condition, but high values, when due to low temperature, may be difficult to interpret. VHI is shown as typical time profiles over Major Production Zones (MPZ), where they occur, and the percentage of pixels concerned by each profile.
VHIn			
Minimum Vegetation health index			
Crop/ Satellite	Number, pixel to CWSU	VHIn is the lowest VHI value for every pixel over the reporting period. Values usually are [0, 100]. Normally, values lower than 35 indicate poor crop condition.	Low VHIn values indicate the occurrence of water stress in the monitoring period, often combined with lower than average rainfall. The spatial/time resolution of CropWatch VHIn is 16km/week for MPZs and 1km/dekad for China.

Note: Type is either "Weather" or "Crop"; source specifies if the indicator is obtained from ground data, satellite readings, or a combination; units: in the case of ratios, no unit is used; scale is either pixels or large scale CropWatch spatial units (CWSU). Many indicators are computed for pixels but represented in the CropWatch bulletin at the CWSU scale.

CropWatch spatial units (CWSU)

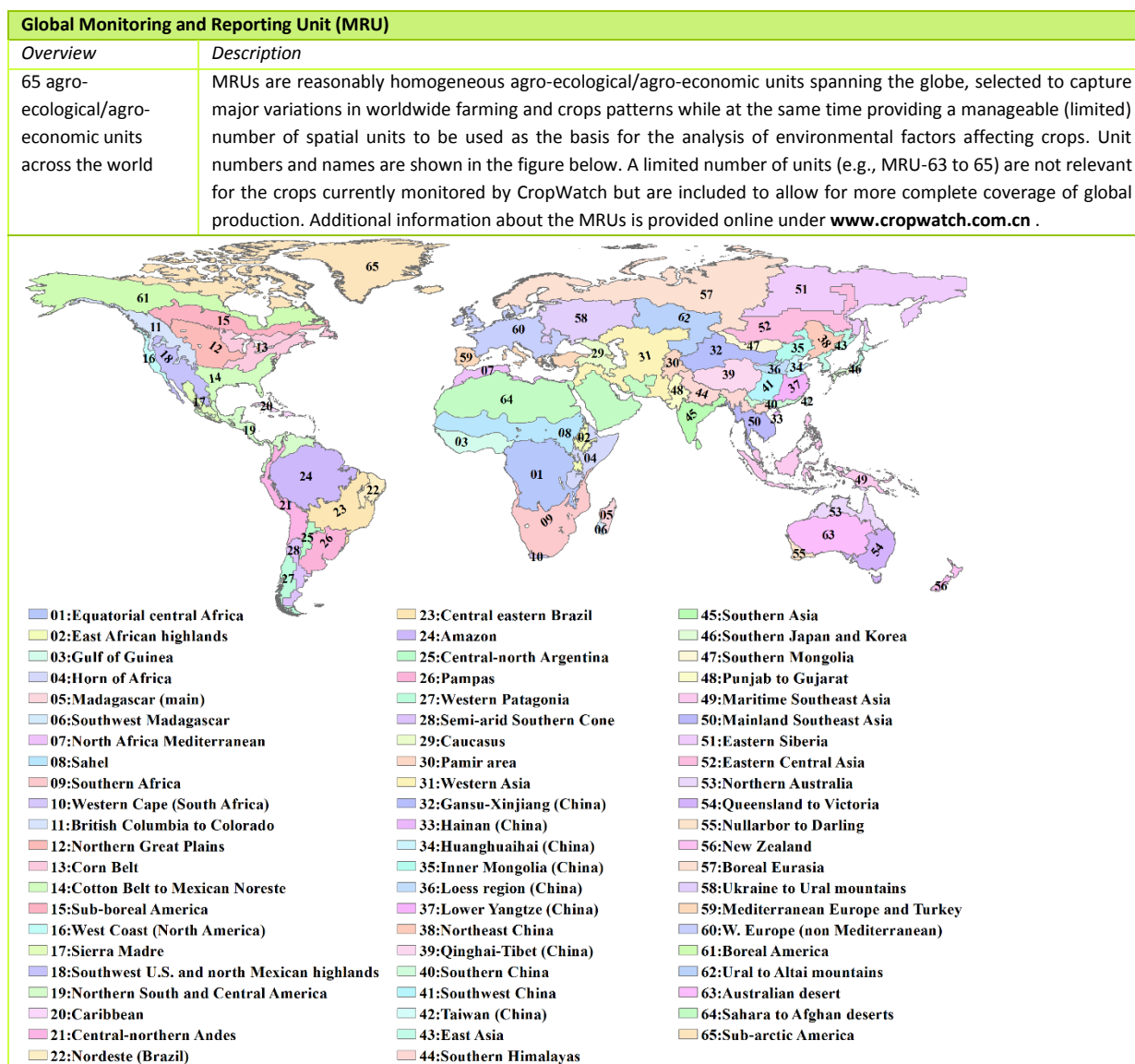
CropWatch analyses are applied to four kinds of CropWatch spatial units (CWSU): Countries, China, Major Production Zones (MPZ), and global crop Monitoring and Reporting Units (MRU). The tables below summarize the key aspects of each spatial unit and show their relation to each other. For more details about these spatial units and their boundaries, see the CropWatch bulletin online resources.

SPATIAL UNITS

CHINA

Overview	Description
Seven monitoring regions	The seven regions in China are agro-economic/agro-ecological regions that together cover the bulk of national maize, rice, wheat, and soybean production. Provinces that are entirely or partially included in one of the monitoring regions are indicated in color on the map below.





Production estimation methodology

The main concept of the CropWatch methodology for estimating production is the calculation of current year production based on information about last year's production and the variations in crop yield and cultivated area compared with the previous year. The equation for production estimation is as follows:

$$Production_i = Production_{i-1} * (1 + \Delta Yield_i) * (1 + \Delta Area_i)$$

Where i is the current year, $\Delta Yield_i$ and $\Delta Area_i$ are the variations in crop yield and cultivated area compared with the previous year; the values of $\Delta Yield_i$ and $\Delta Area_i$ can be above or below zero.

For the 31 countries monitored by CropWatch, yield variation for each crop is calibrated against NDVI time series, using the following equation:

$$\Delta Yield_i = f(NDVI_i, NDVI_{i-1})$$

Where $NDVI_i$ and $NDVI_{i-1}$ are taken from the time series of the spatial average of NDVI over the crop specific mask for the current year and the previous year. For NDVI values that correspond to periods after the current monitoring period, average NDVI values of the previous five years are used as an average expectation. $\Delta Yield_i$ is calculated by regression against average or peak NDVI (whichever yields the best regression), considering the crop phenology of each crop for each individual country.

A different method is used for areas. For China, CropWatch combines remote-sensing based estimates of the crop planting proportion (cropped area to arable land) with a crop type proportion (specific type area to total cropped area). The planting proportion is estimated based on an unsupervised classification of high resolution satellite images from HJ-1 CCD and GF-1 images. The crop-type proportion for China is obtained by the GVG instrument from field transects. The area of a specific crop is computed by multiplying farmland area, planting proportion, and crop-type proportion of the crop.

To estimate crop area for wheat, soybean, maize, and rice outside China, CropWatch relies on the regression of crop area against cropped arable land fraction of each individual country (paying due attention to phenology):

$$Area_i = a + b * CALF_i$$

where a and b are the coefficients generated by linear regression with area from FAOSTAT or national sources and CALF the Cropped Arable Land Fraction from CropWatch estimates. $\Delta Area_i$ can then be calculated from the area of current and the previous years.

The production for "other countries" (outside the 31 CropWatch monitored countries) was estimated as the linear trend projection for 2014 of aggregated FAOSTAT data (using aggregated world production minus the sum of production by the 31 CropWatch monitored countries).

Classification of pests and diseases

The criteria for the classification of pests and diseases in this report are based on industry standards and plant protection survey and evaluation specifications issued by the Chinese Ministry of Agriculture, combined with crop growth information and conditions obtained through remote sensing.

Table C.1 presents the criteria for determining the level of wheat yellow rust occurrence, which is based on the "Rules for the investigation and forecast of wheat yellow rust" (GB/T15795-2011). Based on this standard, a disease index model was established, integrating the remote sensing disease data and in-field survey disease data. The term "mildly severe" used in this report to describe the occurrence of wheat yellow rust corresponds with levels 1 and 2, while "moderately severe" refers to level 3, and "severe" comprises levels 4 and 5.

Table C.1. Criteria for wheat yellow rust occurrence level

Index	Level				
	1	2	3	4	5
Disease index	0.001<Y≤5	5<Y≤10	10<Y≤20	20<Y≤30	Y>30
Disease field rate/%	1<R≤5	5<R≤10	10<R≤20	20<R≤30	R>30

Note: In the table, Y is the disease index; it shows the impact of the disease and is defined as: $Y=F*D*100$, in which F is the rate of disease leaves and D is the average of the severity level of disease leaves. R is the disease field rate, which means the rate of disease field in the whole region.

Source: Standardization Administration of China, Rules for the investigation and forecast of wheat yellow rust (GB/T 15795-2011), 2011. <http://doc.mbalib.com/view/2e0ae53c7f397af70deb37edb07c5a12.html>

Tables C.2 and C.3 respectively list the criteria for wheat sheath blight (table C.2 and based on the "Rules for the investigation and forecast of wheat sheath blight" (NY/T614-2002)) and wheat aphid (table C.3, following "Rules for the investigation and forecast of wheat aphid" (NY/T612-2002)). The terms mildly severe, moderately severe, and severe—as used in this report—again refer to levels 1-2, 3, and 4-5 in the table.

Table C.2. Criteria for wheat sheath blight occurrence level

Index	Level				
	1	2	3	4	5
Disease index	$Y \leq 5$	$5 < Y \leq 15$	$15 < Y \leq 25$	$25 < Y \leq 35$	$Y > 35$

Source: Standardization Administration of China, Rules for the investigation and forecast of wheat sheath blight (NY/T614-2002), 2002. <http://doc.mbalib.com/view/4c9d23d380f36d038af855fcd089f93.html>

Table C.3. Criteria for wheat aphid occurrence level

Index	Level				
	1	2	3	4	5
Aphid (heads/ hundred plants, Y)	$Y \leq 500$	$500 < Y \leq 1500$	$1500 < Y \leq 2500$	$2500 < Y \leq 3500$	$Y > 3500$

Source: Standardization Administration of China, Rules for the investigation and forecast of wheat aphid (NY/T612-2002), 2002. <http://www.doc88.com/p-7708315673411.html>

Data notes and bibliography

Notes

- [1] Although Yemen is not part of the Horn of Africa (HoA), it is geographically close and maintains close links to the region. The countries of the HoA are grouped in the regional development association IGAD (Inter-governmental Authority on Development, with headquarters in Djibouti). IGAD has recently established the IGAD Drought Disaster Resilience and Sustainability Initiative (IDDRSI, 2016).
- [2] Under-investment in agriculture was one of the main drivers of the 2008 crisis of high food prices (Mittal 2009, ATV 2010), even if several other local and global triggering factors can be identified (Evans 2008).
- [3] Previous large humanitarian crises were those of the West African Sahel (from the early sixties to the mid eighties), the Ethiopian droughts of the mid-eighties, the Indian Ocean tsunami of 2004, several large earthquakes (for example, Haiti, 2010), and floods and medical emergencies (such as the West African Ebola outbreak, 2013-16).
- [4] <http://www.agrhymet.ne/eng/index.html>
- [5] <http://www.icpac.net/>
- [6] Belg is harvested before or during July.
- [7] "Purely man-made disasters" is, however, a concept that deserves a closer look, as many wars and insurgencies are partially triggered by shortages of natural resources, including land. As such, most "man-made disasters" do have an environmental component.

References

- LamFlood_1 <http://reliefweb.int/report/peru/temporada-de-lluvias-reporte-de-situacion-no-09-al-27-de-abril-2017>
- FightingCongo_1: <http://reliefweb.int/report/democratic-republic-congo/r-publique-d-mocratique-du-congo-haut-katanga-haut-lomami-et-6>; <http://reliefweb.int/report/angola/unicef-angola-refugee-crisis-situation-update-07-june-2017>
- FightingIraq_1 <http://reliefweb.int/report/iraq/iraq-mosul-humanitarian-response-situation-report-no-31-24-april-30-april-2017-enarku>
- syrianrefugeesjordan_1 <http://reliefweb.int/report/jordan/registered-syrians-jordan-30-april-2017>
- Europerefugees_1 <http://reliefweb.int/report/italy/mediterranean-update-migration-flows-europe-arrivals-and-fatalities-28-april-2017>
- DroughtTimorLeste_1 <https://www.acaps.org/country/timor-leste/special-reports#container-878>
- OCHA 2017a <http://reliefweb.int/report/world/ocha-regional-office-latin-america-and-caribbean-year-review-2016>
- OCHA 2017b <https://ocharoap.exposure.co/falling-through-the-cracks>
- unaccompaniedItaly_1 <http://reliefweb.int/report/italy/situation-overview-unaccompanied-and-separated-children-dropping-out-primary-reception>
- Burundi_1 <https://www.acaps.org/country/burundi>
- ColdPeru_1 reliefweb.int/sites/reliefweb.int/files/resources/20170515151447.pdf
- Venezola_1 <https://www.acaps.org/country/venezuela/special-reports#container-881>
- RussiaFloods_1 <http://reliefweb.int/report/russian-federation/russia-floods-emergency-plan-action-epoa-dref-operation-nmdrru021>
- FloodsLanka_1 <https://www.docdroid.net/file/download/g5fUzhO/sri-lanka-red-cross-preliminary-report-on-floods-2017-print.pdf>; http://reliefweb.int/report/sri-lanka/un-and-partners-sri-lanka-appeal-resources-receding-floods-reveal-extent-damage-mudslides-bangladesh_1
- mudslidesBangladesh_1 <http://reliefweb.int/report/bangladesh/office-un-resident-coordinator-flash-update-no-2-bangladesh-mudslides-chittagong>
- FiresPortugal_1 <http://reliefweb.int/report/portugal/portugal-forest-fires-information-bulletin-no-1>; <http://reliefweb.int/report/canada/canada-forest-fires-information-bulletin-no-1>
- FloodsHaiti_1 <http://reliefweb.int/report/haiti/ha-ti-bulletin-humanitaire-num-ro-64-mai-2017>
- FloodChina_1 <http://reliefweb.int/report/bangladesh/asia-and-pacific-weekly-regional-humanitarian-snapshot-20-27-june-2017>; http://news.xinhuanet.com/english/2017-08/11/c_136518801.htm; http://news.xinhuanet.com/english/2017-07/03/c_136414216.htm
- FloodAssam_1 <https://www.acaps.org/country/india/special-reports#container-920>; <http://reliefweb.int/report/bangladesh/bangladesh-flood-situation-july-18-2017>; <http://reliefweb.int/report/philippines/asia-and-pacific-weekly-regional-humanitarian-snapshot-11-17-july-2017>

- Drought DPRK_1 <http://reliefweb.int/report/philippines/asia-and-pacific-weekly-regional-humanitarian-snapshot-27-june-3-july-2017>; <http://www.fao.org/news/story/en/item/1025100/icode/>
- Talas_1 [https://en.wikipedia.org/wiki/Tropical_Storm_Talas_\(2017\)](https://en.wikipedia.org/wiki/Tropical_Storm_Talas_(2017)); <http://reliefweb.int/report/philippines/asia-and-pacific-weekly-regional-humanitarian-snapshot-11-17-july-2017>
- FloodGhana_1 <http://reliefweb.int/sites/reliefweb.int/files/resources/MDRGH014do%5B1%5D.pdf>
- Weblinks_1(Overview)
http://reliefweb.int/sites/reliefweb.int/files/resources/ERC_USG%20Stephen%20%27Brien%20Statement%20to%20the%20SecCo%20on%20Missions%20to%20Yemen%2C%20South%20Sudan%2C%20Somalia%20and%20Kenya%2C%20and%20update%20on%20Oslo%20Conference%20-%2010%20March%202017.pdf;
http://www.liberation.fr/planete/2017/03/07/pourquoi-assiste-t-on-au-retour-des-famines-en-afrique-orientale_1553652;
<http://www.aljazeera.com/news/2017/03/famine-united-nations-170310234132946.html>
- Weblinks_2 (Food as weapon) <http://www.globaltimes.cn/content/673755.shtml>;
<http://www.nytimes.com/2011/08/02/world/africa/02somalia.html>; https://www.washingtonpost.com/world/africa/south-sudans-people-are-starving-and-fighters-are-blocking-aid/2017/03/31/69ef31c2-0f60-11e7-aa57-2ca1b05c41b8_story.html;
<http://www.aljazeera.com/news/2017/03/south-sudan-blocks-desperately-needed-aid-170306193711077.html>;
<http://www.aljazeera.com/news/2016/12/ethnic-cleansing-south-sudan-161201042114805.html>;
<http://allafrica.com/view/group/main/main/id/00049716.html>; <https://midnimo.com/2017/03/17/somalia-somali-islamists-let-drought-hit-civilians-roam-search-food/>
- Weblinks_3 (Cattle) <http://allafrica.com/stories/200005150044.html>; <http://edition.cnn.com/2017/03/16/africa/gallery/kenya-and-sudan-drought/index.html>; <https://goobjoog.com/english/drought-has-cost-somalia-1-7-billion-in-livestock-and-crop-loss-world-bank>; <http://www.caritas.org/2017/05/hunger-hits-cattle-herders-in-somaliland/>
- ACAPS 2017a Uganda briefing note, Influx of South Sudanese refugees straining resources.
http://reliefweb.int/sites/reliefweb.int/files/resources/20170628_acaps_briefing_note_uganda_south_sudanese_displacement.pdf
- ACAPS 2017b Ethiopia Fall Armyworms infestation in Sidama zone, SNNP.
http://reliefweb.int/sites/reliefweb.int/files/resources/20170703_acaps_start_briefing_note_ethiopia_fall_armyworms_infestation.pdf
- ACAPS 2017c Sudan Briefing Note, Conflict in Darfur.
http://reliefweb.int/sites/reliefweb.int/files/resources/20170706_acaps_briefing_note_darfur_armed_conflict_.pdf
- All-Africa 2017 <http://allafrica.com/stories/201707170515.html>
- ATV 2010 Recommendation report: food for all forever. Danish academy of technical sciences (ATV), Copenhagen,
http://sites.psu.edu/businesswritingslesliemateer/wp-content/uploads/sites/7885/2014/02/Danish_food_for_all_forever_report.pdf
- CPC 2017 Climate Prediction Center's Africa Hazards Outlook August 10 – August 16 2017.
http://www.cpc.ncep.noaa.gov/products/fews/africa_hazard.pdf.
- Evans A 2008 Rising Food Prices: Drivers and implications for development. London: Chatham House.
http://arcocarib.com/assets/files/knowledge_center/society/rising-food-prices-drivers-and-implications-for-development.pdf
- FAO 2017a Rapid results Drought response plan Somalia 2016/17. FAO, Rome.
<http://www.fao.org/emergencies/resources/documents/resources-detail/en/c/463179/> and <http://www.fao.org/3/a-i6769e.pdf>
- FAO 2017b June 2017 crop prospects and food situation quarterly global report. FAO, Rome. <http://www.fao.org/3/a-i7402e.pdf>.
 Also consult <http://www.fao.org/giews/country-analysis/external-assistance/en/>.
- FAO 2017c <http://www.fao.org/giews/food-prices/price-warnings/en>
- FAOSTAT 2017 <http://www.fao.org/faostat/en/#data/OA>
- FEWSNET 2017a Djibouti remote monitoring update.
http://www.fews.net/sites/default/files/documents/reports/Djibouti_RMU_062017.pdf
- FEWSNET 2017b East Africa Food Security Alert of July 6, 2017. <http://www.fews.net/east-africa/alert/july-6-2017> or
http://www.fews.net/sites/default/files/documents/reports/EA_Alert_06_2017_final.pdf
- FEWSNET 2017c June 2017 to January 2018 Kenya Food Security Outlook
- FEWSNET 2017d Ethiopia food security alert 3 August 2017.
http://www.fews.net/sites/default/files/documents/reports/FEWS%20NET%20Ethiopia%20Alert_20170803.pdf
- FEWSNET/WFP 2017 Ethiopia Food Security Outlook June 2017 to January 2018.
http://www.fews.net/sites/default/files/documents/reports/ET_OL_June%202017_Final.pdf
- FSNAU 2017a Food Security & Nutrition Quarterly Brief - Focus on Post Gu 2017 Season Early Warning.
<http://www.fsnau.org/downloads/FSNAU-Quarterly-Brief-June-2017.pdf>
- IDDRSI 2016 IGAD Drought Disaster Resilience and Sustainability Initiative.
<http://resilience.igad.int/index.php/knowledge/technologies/documents/41-4th-ga-communique/file>

- IPC 2017 Integrated food security phase classification, the republic of South Sudan, Projection Period for Most Likely Scenarios: June-July 2017. http://reliefweb.int/sites/reliefweb.int/files/resources/IPC_South_Sudan_AcuteFI_May2017_June-July2017.pdf
- KLIP 2017 Kenya Livestock Insurance Programme <http://www.worldbank.org/en/news/press-release/2016/03/12/kenyan-farmers-to-benefit-from-innovative-insurance-program>
- Mittal A 2009 The 2008 Food price crisis: rethinking food security policies. G-24 Discussion Paper No. 56. http://unctad.org/en/docs/gdsmdpg2420093_en.pdf
- OCHA 2017a Global humanitarian overview, June 2017 status Report. UN New York. <https://www.unocha.org/sites/unocha/files/GHO-JuneStatusReport2017.pdf>
- OCHA 2017b <http://interactive.unocha.org/publication/globalhumanitarianoverview>
- OCHA 2017c Horn of Africa. A call for action. http://reliefweb.int/sites/reliefweb.int/files/resources/HOA_CALL_FOR_ACTION_Leaflet_Feb2017_1.pdf
- OCHA 2017d Weekly humanitarian overview 24 July 2017. http://reliefweb.int/sites/reliefweb.int/files/resources/humanitarian_bulletin_24_july_2017.pdf and <http://reliefweb.int/report/ethiopia/ethiopia-weekly-humanitarian-bulletin-24-july-2017>.
- OCHA 2017e Sudan humanitarian snapshot 30 June 2017 https://www.humanitarianresponse.info/system/files/documents/files/sudan_humanitarian_snapshot_a3_30_jun_2017.pdf
- OXFAM 2017 Horn of africa drought response, Issue 2, 31st July 2017. OXFAM. <http://reliefweb.int/sites/reliefweb.int/files/resources/Oxfam%20Horn%20of%20Africa%20Drought%20Response%20External%20Sitrep-%20July%202017.pdf>
- UN 2016 Somalia 2016-2018 humanitarian strategy. http://reliefweb.int/sites/reliefweb.int/files/resources/2016_2018_humanitarian_strategy.pdf
- UNICEF 2017b https://www.unicef.org/appeals/south_sudan.html
- UNHCR 2017a South Sudan regional refugee response plan – Revised, January – December 2017. <http://www.unhcr.org/partners/donors/589497987/2017-south-sudan-regional-refugee-response-plan-january-december-2017-23.html>
- UNHCR 2017b Somalia drought displacements in period 1 Nov 2016 to 30 Jun 2017. <http://reliefweb.int/sites/reliefweb.int/files/resources/58534.pdf>
- UNICEF 2017a 1 January – 20 July 2017: South Sudan SITREP #111. https://www.unicef.org/appeals/files/UNICEF_South_Sudan_MidYear_Humanitarian_SitRep_20_July_2017.pdf
- WFP 2017a The R4 Rural Resilience Initiative <https://www.wfp.org/climate-change/initiatives/r4-rural-resilience-initiative>
- WFP 2017b http://dataviz.vam.wfp.org/economic_explorer/prices
- WFP 2017c http://dataviz.vam.wfp.org/seasonal_explorer
- Wikipedia_1 https://en.wikipedia.org/wiki/Syrian_Civil_War
- Wikipedia_2 https://en.wikipedia.org/wiki/Boko_Haram consulted on 20170807
- WSD 2017 WASH Sector Dash board Kenya drought 1 January 15 June 2017. http://reliefweb.int/sites/reliefweb.int/files/resources/20170623_wash_sector_kenya_dashboard_june2017.pdf

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Online resources



Online Resources posted on www.cropwatch.com.cn

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CropWatch bulletins introduce the use of several new and experimental indicators. We would be very interested in receiving feedback about their performance in other countries. With feedback on the contents of this report and the applicability of the new indicators to global areas, please contact:

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