Chapter 2. Crop and environmental conditions in major production zones

Chapter 2 presents the same indicators—RAIN, TEMP, RADPAR, and BIOMSS—used in Chapter 1, and combines them with the agronomic indicators—cropped arable land fraction (CALF) and maximum vegetation condition index (VCIx)—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.

Table 2.1. April-July 2016 agroclimatic indicators by Major Production Zone, current value and departure from 15YA

	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 15YA (%)	Current (°C)	Departure from 15YA (°C)	Current (MJ/m^2)	Departure from 15YA (%)
West Africa	589	-6%	28.4	-0.3	1108	-1%
South America	344	6%	20.7	1.7	766	-4%
North America	455	11%	19.3	-0.3	1300	-1%
South and SE Asia	887	15%	29.5	-0.2	1144	-1%
Western Europe	285	5%	14.8	0.1	1122	-5%
C. Europe and W. Russia	273	11%	16.1	0.1	1134	-1%

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 2001-2015.

Table 2.2. April-July 2016 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 from 5YA (%)	Current	Departure from 5YA (% points)	Current
West Africa	1655	1%	90	0	0.86
South America	848	-17%	90	-5	0.77
North America	1350	6%	95	1	0.91
South and SE Asia	1553	4%	71	-8	0.74
Western Europe	1092	5%	97	1	0.91
C Europe and W Russia	1100	12%	100	1	0.94

Note: Departures are expressed in relative terms (percentage) for all variables. 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 five-year (5YA) average for the same period (April-July) for 2011-2015.

2.2 West Africa

Most of southern West Africa is under relatively dry conditions from April to July. The planting of paddy, maize, and vegetables started from the beginning of May and June. Figure 2.1 illustrates agroclimatic and agronomic indicators for the MPZ for the reporting period.

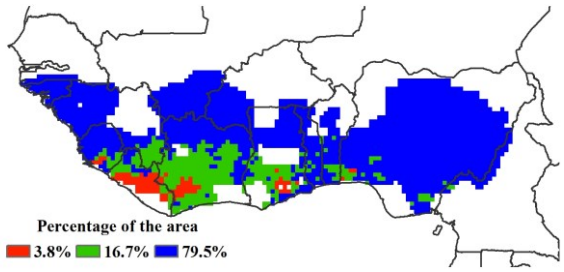
Compared with average conditions, the region suffered a minor rainfall deficit in the order of 6% accompanied by slightly below average temperature (TEMP, -0.3°C) and radiation (RADPAR, -1%). Major countries in West Africa recorded a rainfall deficit, including Ghana (RAIN, -16%), Gambia (-12%), Cote d'Ivoire (-26%), Cameroon (-10%), and Guinea Bissau (-25%). The major country with marked rainfall excess is Burkina Faso (+35%), while Nigeria (+2%) received an average amount.

The rainfall profiles and clusters show that rainfall deficits occurred throughout the region after the month of May up to the last week of June; after July, an increasing trend is observed. About 3.8% of the area in the southern part of the MPZ received excess rainfall up to 30 mm/dekad in May and deficits up to -10mm in the month of June. In 79.5% of the MPZ, in areas east, west, north and central, close to average rainfall occurred up to the last week of June, after which a positive departure (up to 30 mm) occurred. About 16.7% of the area, located in the southern part of the MPZ, underwent dekad rainfall deficits up to 20 mm in June. The whole region experienced slightly below average temperature (TEMP, -0.3°C).

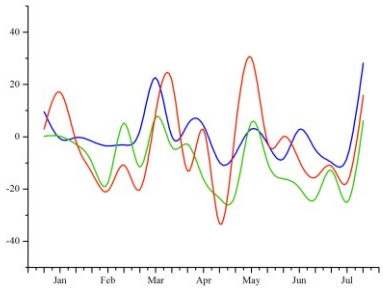
The sudden increase in rainfall in July compared with the average is confirmed by maximum VCI, for which low values occur in the small patch of northern part of Nigeria along the border with Niger. This is also where low VHI values tend to concentrate. The very high VCI values are seen in Nigeria, Ghana, Benin, and Togo. Two additional crop related indicators (fraction of cropped arable land (CALF) and biomass production potential (BIOMSS)) departures, both expressed as the departure from the average of the recent five seasons only, confirm a slight increase (1%) in average production potential. High biomass potentials occur in small patches in north, east, and central parts of Nigeria, north Ghana, and the south part of Burkina Faso (Sahel). Low biomass potential is seen in Cote d'Ivoire, southern Ghana, the southern part of Togo, southern Benin, and in Guinea Bissau.

Altogether the indicators in West Africa show that the crop production is likely to be slightly above average (that is, a 1% increase), and probably well above average in the Sahelian north, which benefited from an early start of the season.

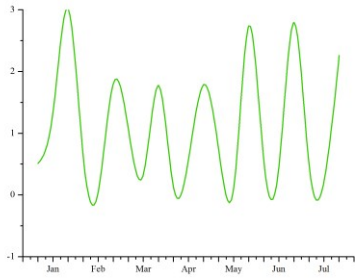
Figure 2.1. West Africa MPZ: Agroclimatic and agronomic indicators, April-July 2016



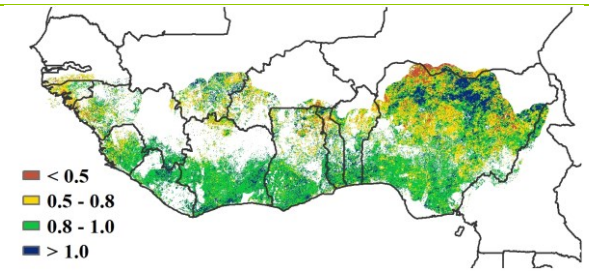
a. Spatial distribution of rainfall profiles



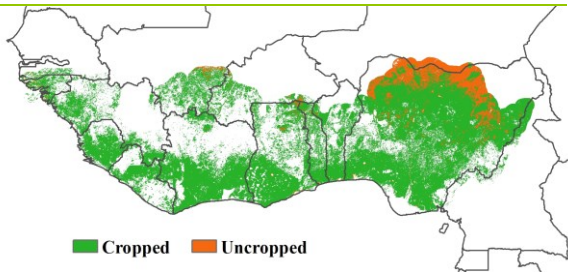
b. Profiles of rainfall departure from average (mm)



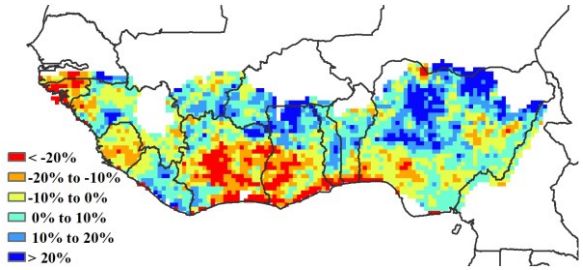
c. Profile of temperature departure from average (°C)



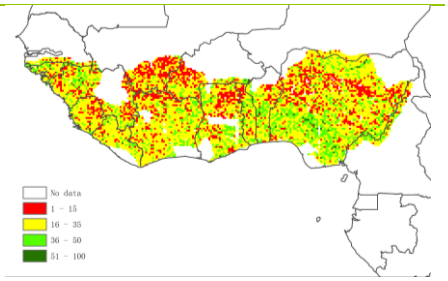
d. Maximum VCI



e. Cropped arable land



f. Biomass accumulation potential departure



g. VHI minimum

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

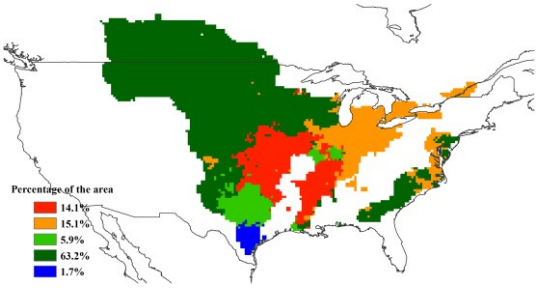
2.3 North America

In general, crop condition is above average in the North American MPZ (figure 2.2). This monitoring period was covering the harvesting season of winter crops and the beginning of the growing season of summer crops.

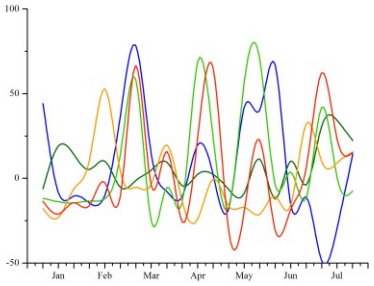
The agroclimatic indicators show that rainfall was 11% above average, while temperature was below by 0.3°C. Abundant rainfall fell over the major crop production zones, including the Canadian Prairies, Great Plains, Southern Corn Belt, and Mississippi Delta, providing sufficient soil moisture for crops. Compared to the previous year, the Canadian Prairie finally witnessed the end of a serious water deficit as a result of above rainfall in Alberta (RAIN, +16%), Manitoba (+23%), and Saskatchewan (+10%). Abundant rainfall was also recorded across the whole Great Plains, including North Dakota (+55%), South Dakota (+40%), Nebraska (+38%), Kansas (+56%), Oklahoma (+40%), and Texas (+45%), a state where excessive rainfall also caused serious flooding. In the southern Corn Belt, slightly above average RAIN was observed in Illinois (+10%), Iowa (+13%), and Indiana (+4%). In the major rice production zone, Arkansas also recorded slightly above rainfall with an 11% positive departure. Below average rainfall fell over eastern and southern states of the United States, including Georgia (-22%), Ohio (-22%), and Michigan (-27%). After a relatively warm winter, the temperature of the whole region underwent a downward trends after March and reached below average values (-2°C) in July.

The generally above average crop condition in the MPZ is supported by a high average VCIx value (0.91), while in the southern Canadian Prairie and the Corn Belt, VCIx even exceeded 1, indicating very favorable crop condition. Water deficit in the northeast Corn Belt resulted in a biomass accumulation potential drop of 20%. According to the CropWatch CALF indicator over the whole monitoring period, 91% of arable lands were cropped, which is 1 percentage point above the average of the recent five years.

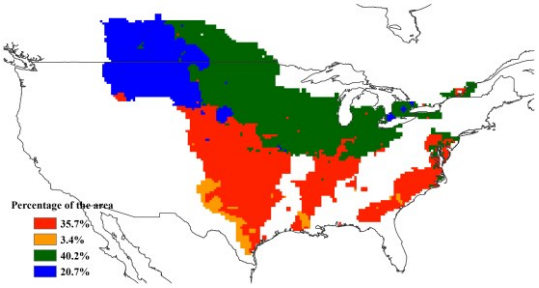
Figure 2.2. North America MPZ: Agroclimatic and agronomic indicators, April-July 2016



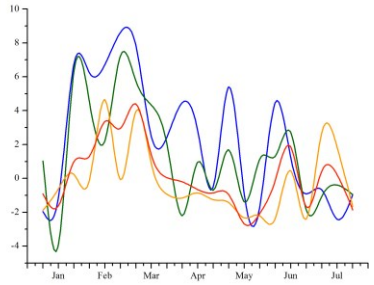
a. Spatial distribution of rainfall profiles



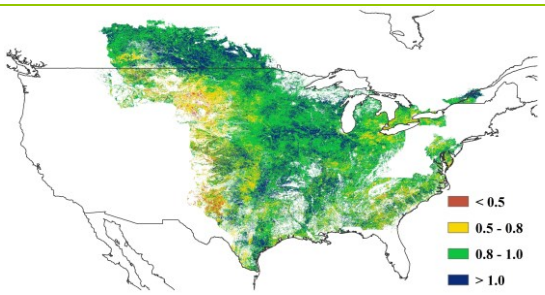
b. Profiles of rainfall departure from average (mm)



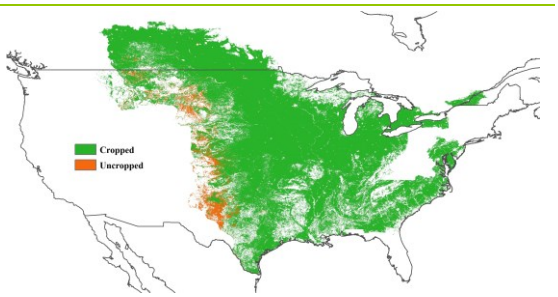
c. Spatial distribution of temperature profiles



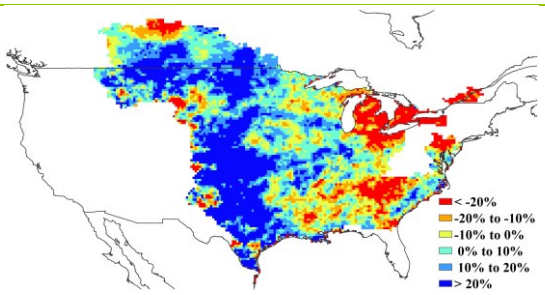
d. Profiles of temperature departure from average (°C)



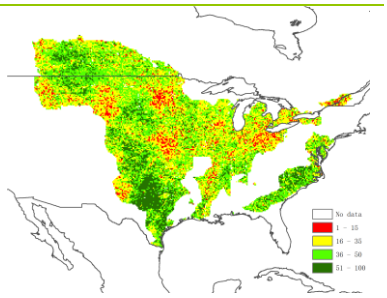
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

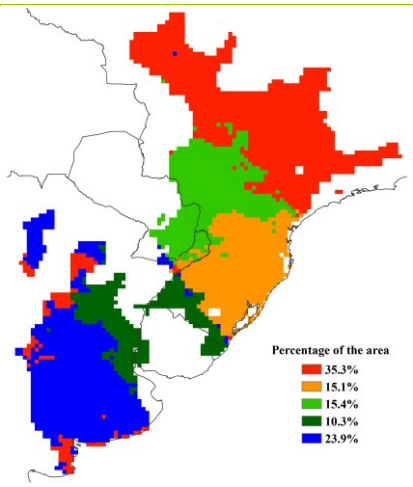
2.4 South America

Generally average agroclimatic conditions were observed in the South American MPZ from April to July. Figure 2.3 summarizes the CropWatch agroclimatic and agronomic indicators for the area.

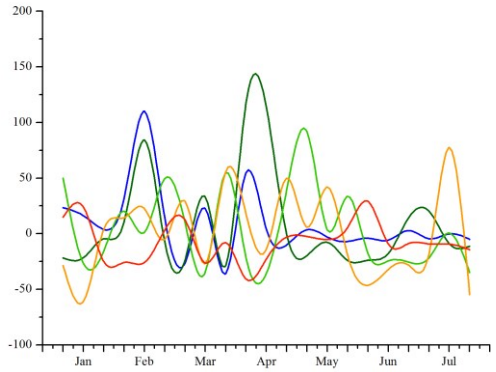
For the MPZ as a whole, rainfall was close to average (RAIN, +6%), but departures were significant for temperature (TEMP, +1.7C) and radiation (RADPAR, -4%). Estimated BIOMSS was 17% below the recent five-year average level. According to the rainfall departure clusters and graphs, rainfall departures fluctuated during the monitoring period. An excess of 50 mm of rainfall was observed in mid-July in the states of Parana, Santa Catarina, and Rio Grande do Sul, and close to 100 mm at the end of April in Mato Grosso do Sul. After relatively cold conditions from the end of April to June, temperature reached 2

degrees above average by the end of July. As a result of these continuously low temperatures from April to the end of June and a shortage of rainfall, vast areas in the northern part of the MPZ show well below average BIOMSS. The minimum VHI map indicates water stress (with VHIn below 0.35) in Goias, Mato Grosso, and Minas Gerais, resulting from both high temperature and low rainfall. The cropped arable land fraction (CALF) for the MPZ was 90% but still 5 percentage points below the five-year average. Most of the uncropped arable land is located in the Argentinian areas of southern Cordoba, southern Santa Fe, and northwestern Buenos Aires, which is one of the major wheat producing areas. Due to the high domestic price—according to national data—it is possible that farmers are still planting winter wheat where weather conditions permit. Average VCIx was 0.77 for the MPZ, with lower values in San Luis, Cordoba, and La Pampa. However, the regions with low VCIx do not coincide with the regions where VHIn is below 0.35, which means that the poor condition is not due to drought. The low VCIx in Argentina mainly resulted from the post-harvest status of the fields.

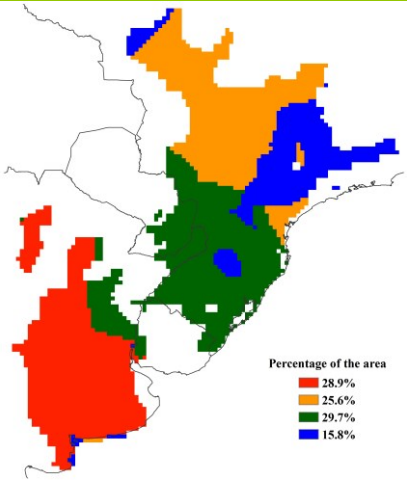
Figure 2.3. South America MPZ: Agroclimatic and agronomic indicators, April-July 2016



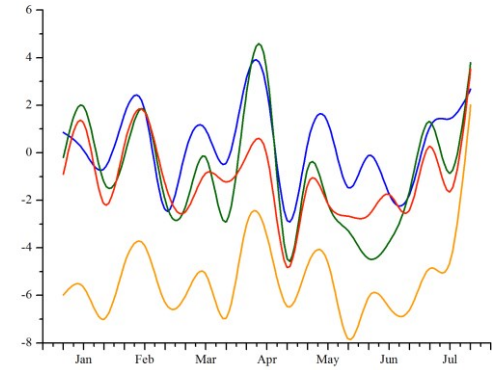
a. Spatial distribution of rainfall profiles



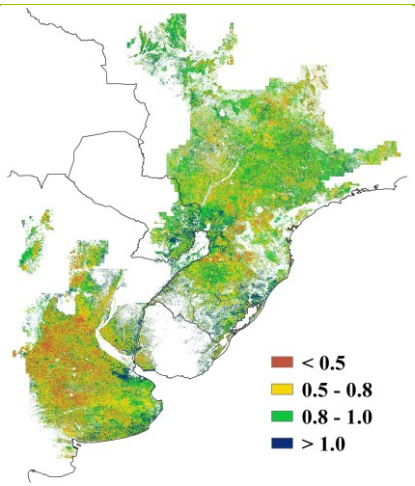
b. Profiles of rainfall departure from average (mm)



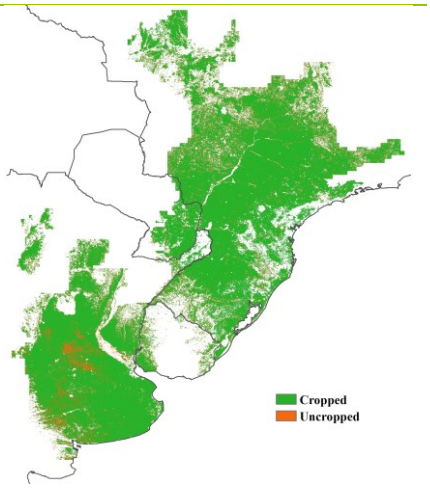
c. Spatial distribution of temperature profiles



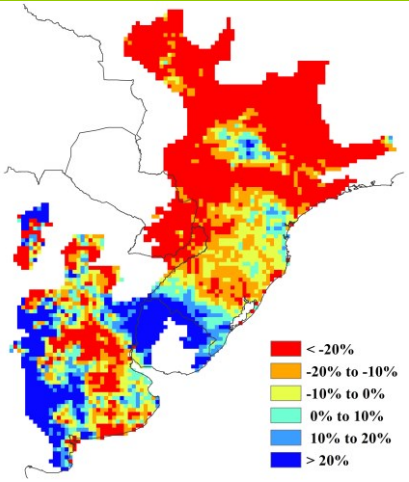
d. Profiles of temperature departure from average (°C)



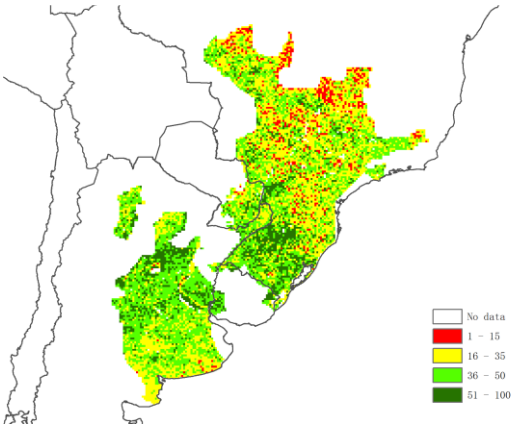
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

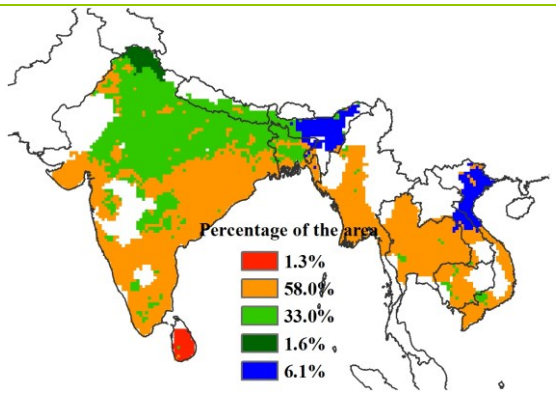
Note: For more information about the indicators, see Annex C.

2.5 South and Southeast Asia

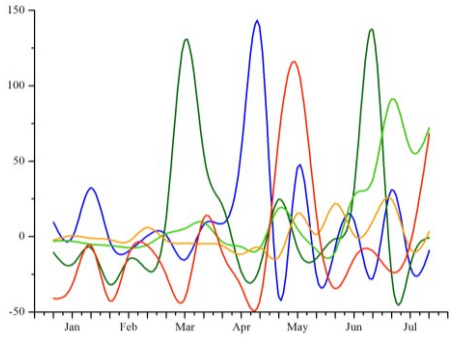
The reporting period is the planting and growing season of rice and maize in the MPZ. Overall, the CropWatch agroclimatic indicators show below average crop condition. The excess monsoon rain caused flood and damaged the standing crops mainly in India, Bangladesh, Thailand, Vietnam, and Myanmar. Rainfall (RAIN) increased 15% over average for the entire zone with individual countries recording values from 6% to 9% (Myanmar, Thailand, Cambodia, and Bangladesh), but as much as 20% in India. The spatial distribution of rainfall profiles indicate 58% of the MPZ experienced evenly distributed average rainfall during the monitoring period. However, excess rainfall occurred during July in northern India covering an area of 33% of the MPZ. Temperature for the MPZ was about average and so was radiation (RADPAR, -1%). The maximum VCI values remained below 0.5 for most of the region including central India, Myanmar, Thailand, and Cambodia, which confirms poor crop condition. Compared to the previous five seasons, the fraction of cropped arable land (CALF) dropped 8 percentage points, primarily in India (-12%), Myanmar (-2%), and Cambodia (-7%). The biomass accumulation potential for the MPZ increased by 4% compared to the previous five-year average, mainly in India (+8%) and Myanmar (+1%). The lowest biomass accumulation potential was recorded in Cambodia (-7%) and Thailand (-1%). Low values of VHI were concentrated over central India, Myanmar, Thailand, Vietnam, and Cambodia, indicating water stress or flooding resulting from excessive rainfall in these areas.

Overall, crop condition is below average. The decreased cultivated land and the damage caused by flood raises concern for the MPZ.

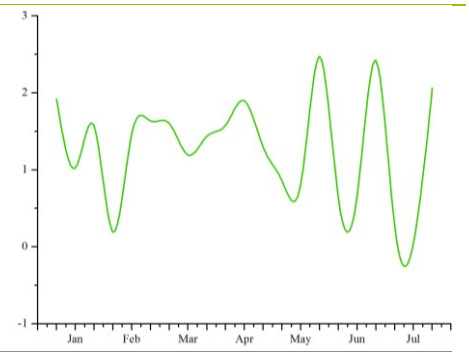
Figure 2.4. South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, April-July 2016



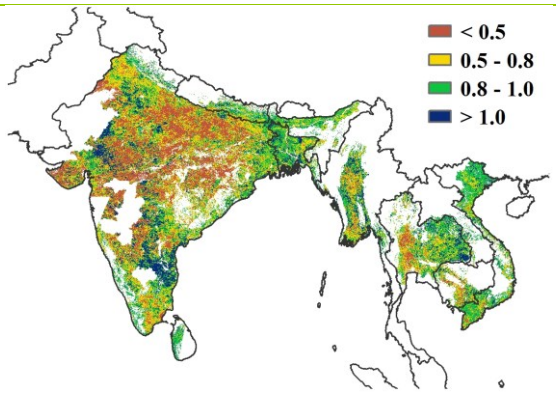
a. Spatial distribution of rainfall profiles



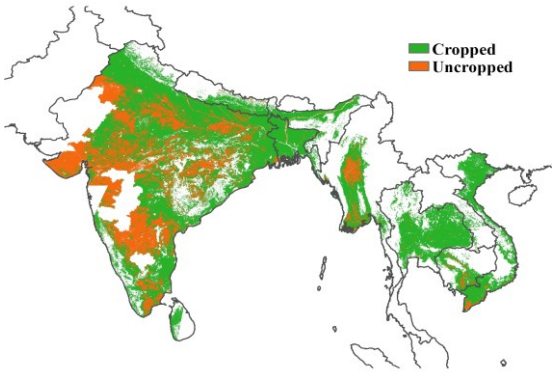
b. Profiles of rainfall departure from average (mm)



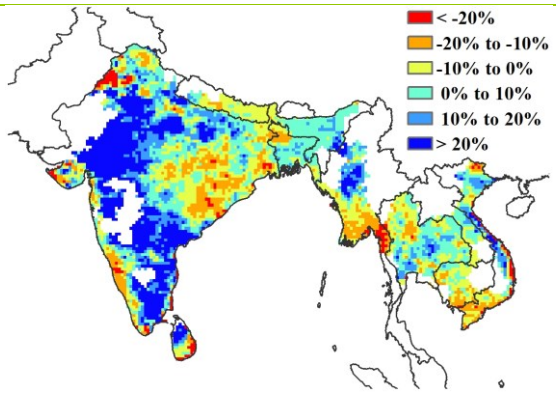
c. Profile of temperature departure from average (°C)



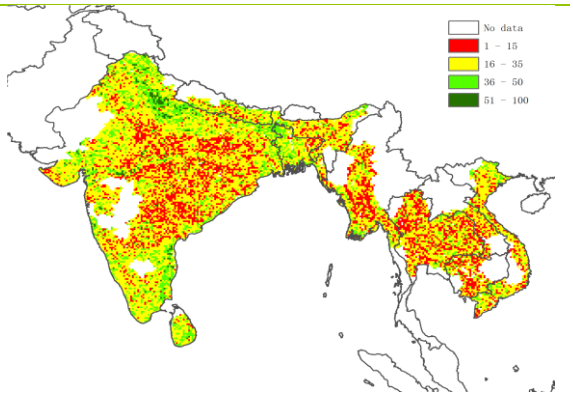
d. Maximum VCI



e. Cropped arable land



f. Biomass accumulation potential departure



g. VHI minimum

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

2.6 Western Europe

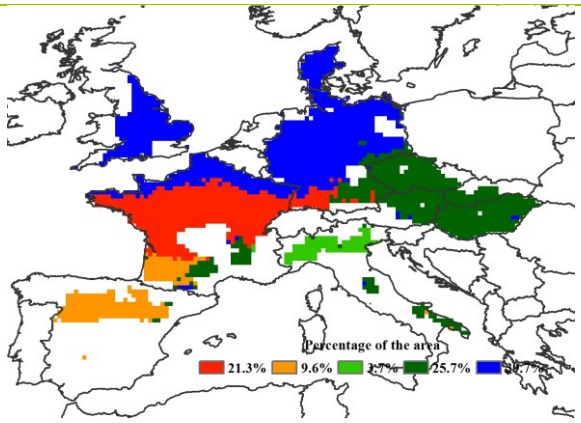
In general, crop condition was above average in most parts of the continental Western European MPZ during this reporting period, favoring winter crop grain filling and spring crops growth, especially maize flowering. Figure 2.5 presents an overview of CropWatch agroclimatic and agronomic indicators for this MPZ.

The total precipitation was 5% above average, with exceptional negative departures in RAIN over most of Spain and southwestern France from the middle of April to mid-June, northern Italy from early April to late April, and most other areas (except Spain and southwest of France) in the middle of June. TEMP was mostly average (+0.1°C departure); below average temperatures were observed in most of Italy and northeast of France from April to early June and again at late June, and in most of the Western Europe MPZ (except Spain and Italy) in the middle of April and May and late June. Sunshine was significantly below average at -5%.

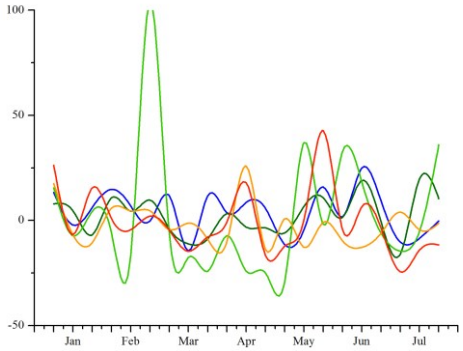
Due to the adequate rainfall and favorable temperature, the biomass accumulation potential BIOMSS was 5% above the recent five-year average. As shown in figure 2.5, the lowest BIOMSS departures (-20% and below) occur over most of Spain, northern Italy, and northeast of Germany, especially in the east of France, which was affected by floods in May. In contrast, BIOMSS in most other regions was 10 percent above average.

According to the VCIx map, crop condition was below average in the south and east of Spain, northwest France, the northern part of Italy, and north and south Germany. Average VCIx for the MPZ was 0.91. The fraction of cropped arable land was 97% across the MPZ, which is 1 percentage point above the five-year average; most uncropped arable land is concentrated in the southeast and northeast of Spain. Areas with low minimum VHI values were partially scattered in Spain, France, and Germany. Generally, crop condition in Western Europe was favorable.

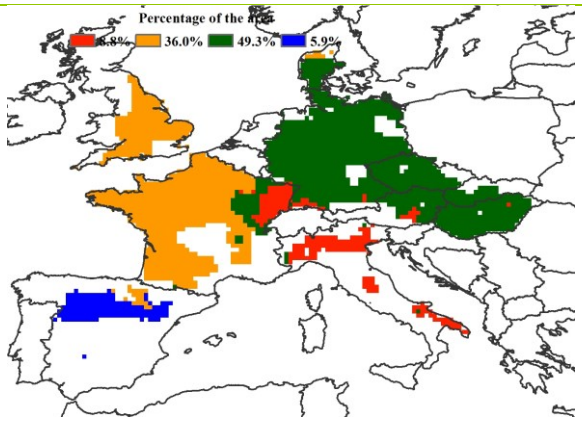
Figure 2.5. Western Europe MPZ: Agroclimatic and agronomic indicators, April-July 2016



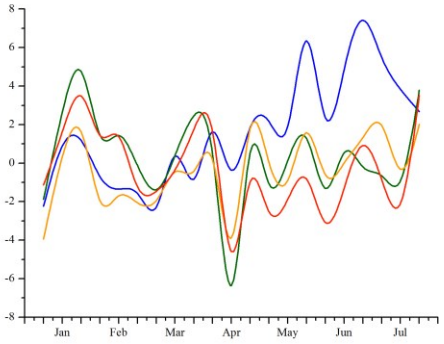
a. Spatial distribution of rainfall profiles



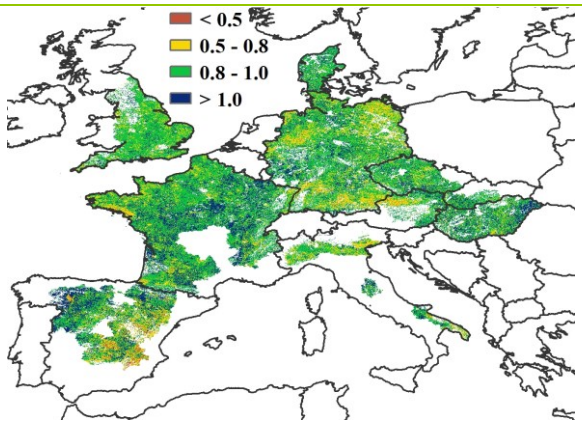
b. Profiles of rainfall departure from average (mm)



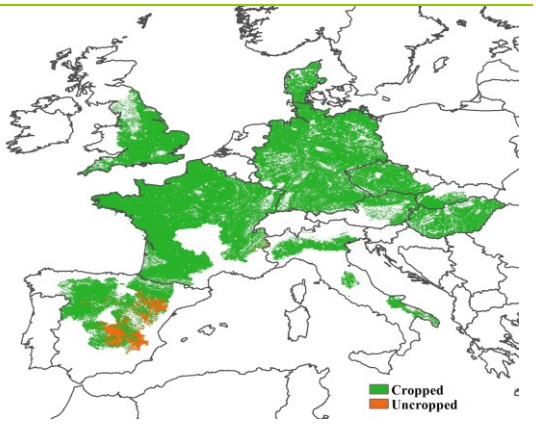
c. Spatial distribution of temperature profiles



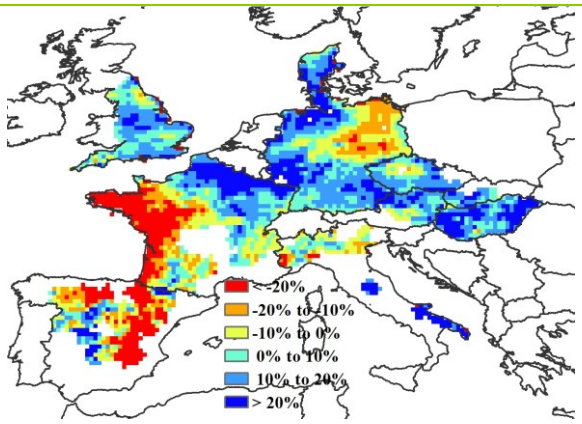
d. Profiles of temperature departure from average (°C)



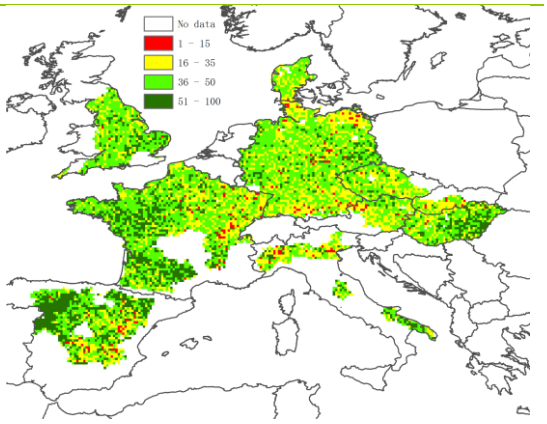
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

2.7 Central Europe to Western Russia

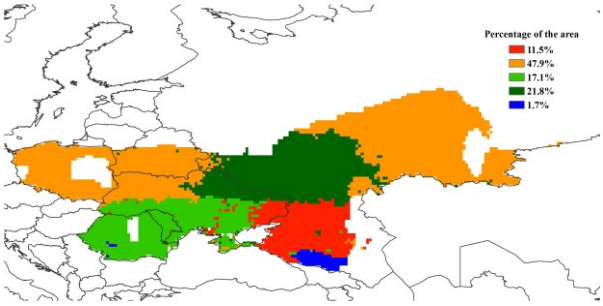
During the current monitoring period, most parts of the Central Europe to Western Russia MPZ presented favorable conditions of winter and summer crop (average VCIx=0.94). The agroclimatic indicators showed favorable condition for crop growing, with an 11% increase of rainfall and a slight 0.1°C increase of temperature compared with the average, while RADPAR was slightly below average by 1%.

As indicated by the rainfall profile analysis, the west and south of Russia and northeastern Ukraine received well above average rainfall since February, with significant rainfall peaks in May. Most regions of the MPZ presented average or below average moisture conditions from June except the southwestern part, including Romania and most parts of south Ukraine. Temperature profiles showed correlated variations among most countries of the MPZ. The whole region experienced high temperatures in

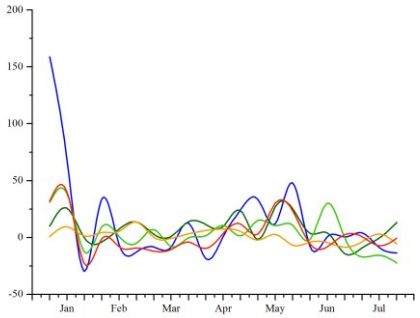
February (as much as 7°C above average in the east part in Russia). However, temperature dropped to average from April, with more than 5°C below average in across Poland in mid-April.

Almost all of the arable land was actually cropped during the reporting period. Due to the favorable moisture condition in the southeastern part of the MPZ, the accumulated potential biomass (BIOMSS) is much above the five-year average (>20%), and many pixels' maximum VCI value were greater than 1 in this region; correspondingly, the BIOMSS of the whole MPZ shows a significant increase of 12%.

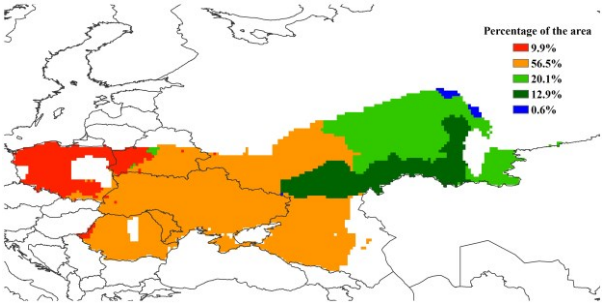
Figure 2.6. Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, April-July 2016



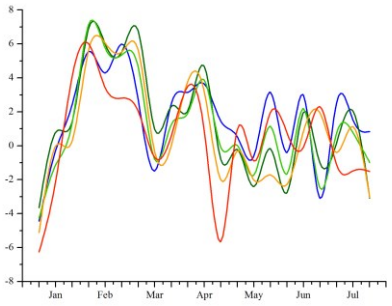
a. Spatial distribution of rainfall profiles



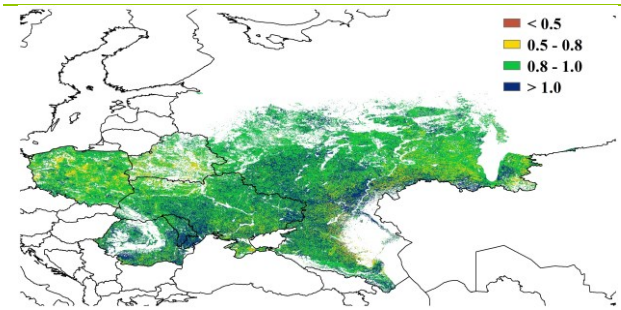
b. Profiles of rainfall departure from average (mm)



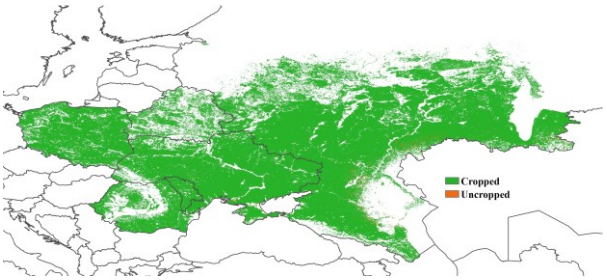
c. Spatial distribution of temperature profiles



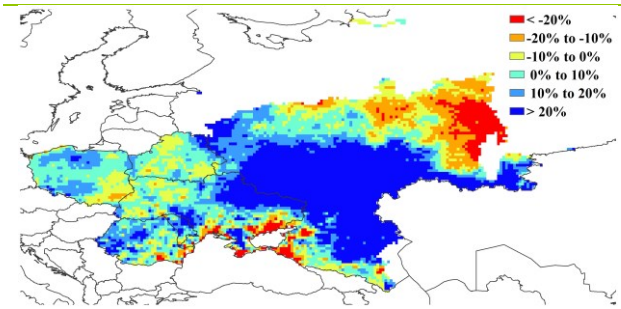
d. Profiles of temperature departure from average (°C)



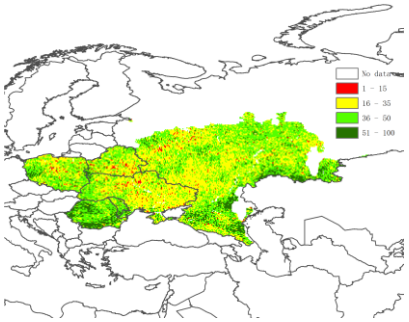
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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