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 2018 agro-climatic indicators by Major Production Zone, current value and departure from 15YA

	RAIN		TEMP		RADPAR	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m²)	Departure (%)
West Africa	644	5	27.8	-0.8	1034	-7
South America	286	-13	18.9	0.0	789	0
North America	416	-2	19.3	-0.3	1293	-1
South and SE Asia	935	18	28.9	-0.7	1097	-5
Western Europe	245	-10	16.6	1.7	1204	3
C. Europe and W. Russia	242	-3	16.3	0.5	1192	4

*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 2003-2017.*

Table 2.2. April-July 2018 agronomic indicators by Major Production Zone, current season values and departure from 5YA

	BIOMSS (gDM/m²)		CALF (Cropped arable land fraction)		Maximum VCI Intensity
	Current	Departure (%)	Current	Departure (% points)	Current
West Africa	1713	3	89	-1	0.88
South America	791	-13	96	-2	0.68
North America	1281	0	94	0	0.90
S. and SE Asia	1612	8	64	-13	0.77
Western Europe	950	-10	96	0	0.91
Central Europe and W Russia	963	-6	98	-1	0.88

Note: See note for table 2.1, with reference value R defined as the five-year average (5YA) for the same period (April-July) for 2013-2017.

2.2 West Africa

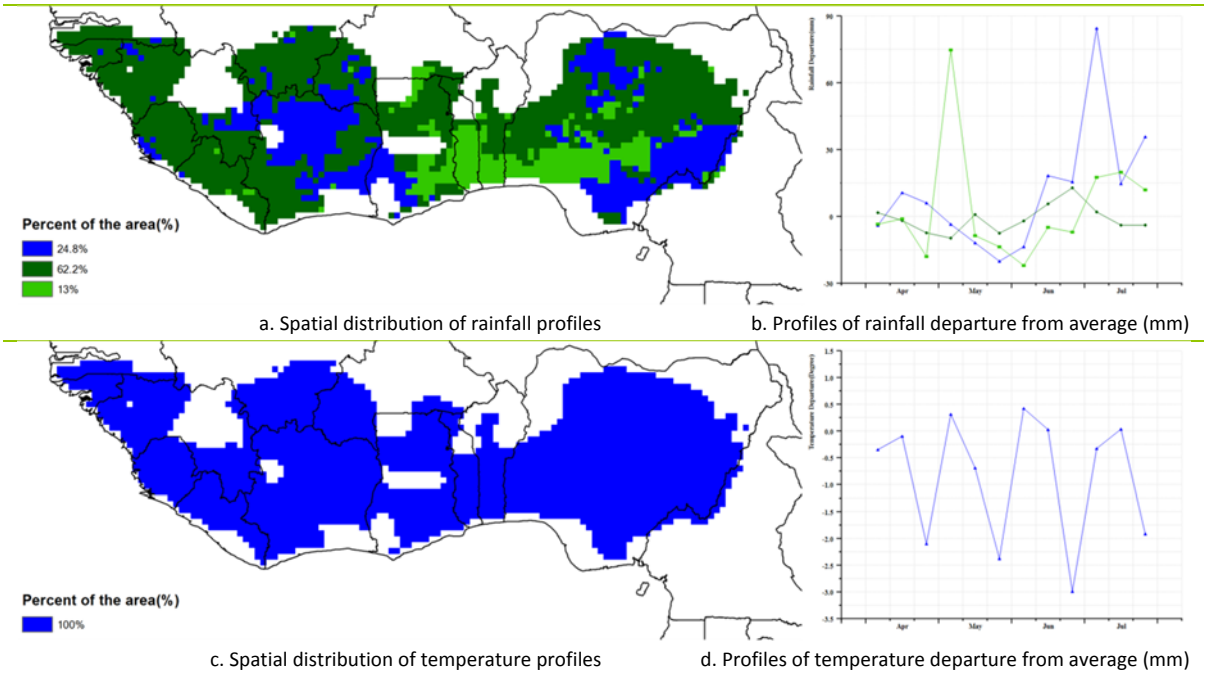
The reporting period is part of the main rainy season and covers the sowing of main cereals (maize, sorghum, millet, and rice) throughout the region. The south of the MPZ, especially a region covering southern Côte d'Ivoire to Nigeria tends to record bimodal rainfall, and harvesting of yams predominates. However in the west (Guinea to Liberia), rice plays an important role, the harvest of which extends into December. Under bimodal rainfall, the first maize crop is harvested in October, while the short season maize was harvested in early 2018. 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 644 mm over croplands of the MPZ, corresponding to an increase of +5% for RAIN. The highest rainfall was recorded in Sierra Leone (843 mm, -2%), and Liberia (804 mm, +10%). Above average rainfall peaks occurred in Côte d'Ivoire and south-west Nigeria in early July and parts of Ghana to central Nigeria during late April.

The MPZ had close to average temperature (27.8°C, -0.8%) and sunshine (RADPAR 1034 MJ/m2 with a -7.0% deviation), which gave a slight increase of the biomass production potential (BIOMSS of 1713gDM/m2, +3%). For the MPZ as a whole, the cropped arable land fraction (CALF) reached 89%. The buildup of the precipitation is indicating currently positive support of plant growth. The maximum VCI (VCIx) map was above 0.8 (BIOMSS, +2%) with these values exceeding 1.0 in most parts of northern Nigeria, thus favoring conducive condition across the northern Savannah agro-ecological zone. During this reporting period, Nigeria showed a good share of cropped arable land of agricultural production in the region.

Based on these observations from the measured indexes, the growing season intensified with climatic conditions close to average, with well distributed precipitation. The temperature fluctuated around average within a +/-0.7°C margin after onset of the main rainy season. These CropWatch indicators depict a stable and coherent climatic condition conducive for crop growth leading to harvest in late 2018, earlier in the semi-arid north.

Figure 2.1. West Africa MPZ: Agro-climatic and agronomic indicators, April to July 2018.

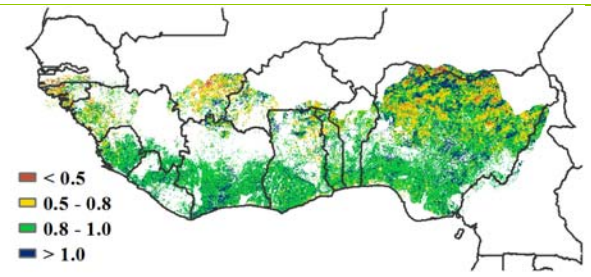


a. Spatial distribution of rainfall profiles

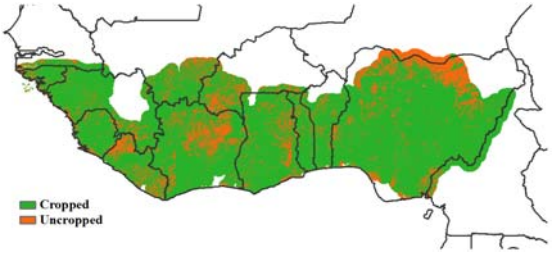
b. Profiles of rainfall departure from average (mm)

c. Spatial distribution of temperature profiles

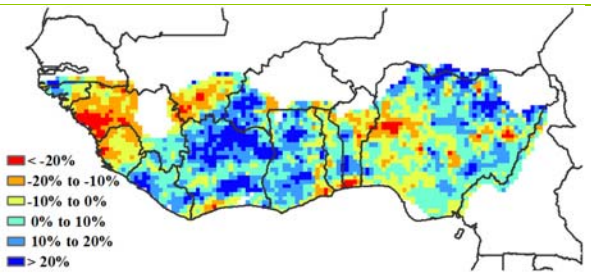
d. Profiles of temperature departure from average (mm)



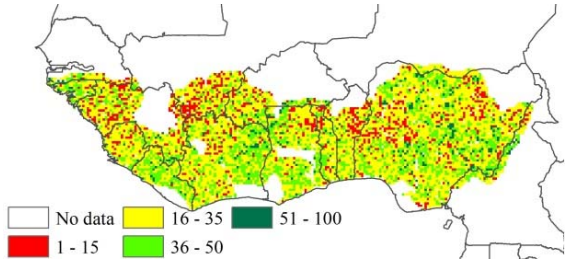
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

2.3 North America

This monitoring period covers the late growth and harvesting stage of winter crops and the planting and development of summer crops (maize, soybean, rice, and spring wheat). In general, crop condition was mixed with Northern Plains above the average, while it was poor in the Canadian Prairies.

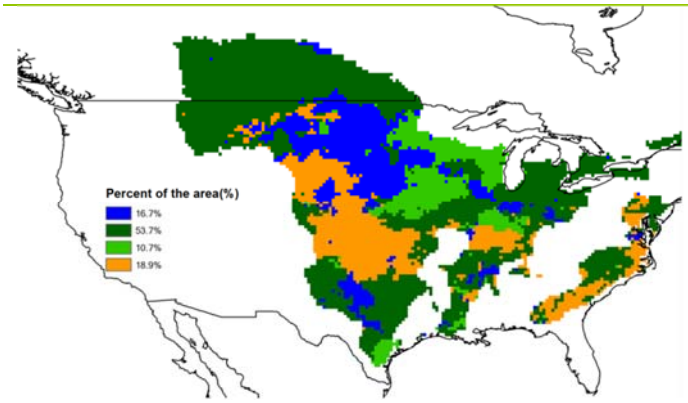
Agroclimatic variables were basically "average": RAIN, TEMP, and RADPAR were marginally below average by 2%, 0.3℃, and 1%, respectively. RAIN in Canada was significantly below average (-18%), but average in the United States (+1%). The Northern Plain, west Corn Belt, and east of the United States received abundant precipitation (60-90mm above average) in June. July precipitation was mostly average, except in the central plain and the east of the United States which recorded abundant precipitation. The Canadian Prairies suffered below average precipitation over the entire monitoring period.

It is also worth noting that most areas in the MPZ experiencing extreme temperature from late April to early June. Below average precipitation and high temperature in the Canadian Prairies affected the crop growth. The southern Plains also suffered below average precipitation in the previous reporting period (January to April). The drought continued into AMJJ in Texas and the state thus suffered prolonged drought which caused the poor crop condition in this region.

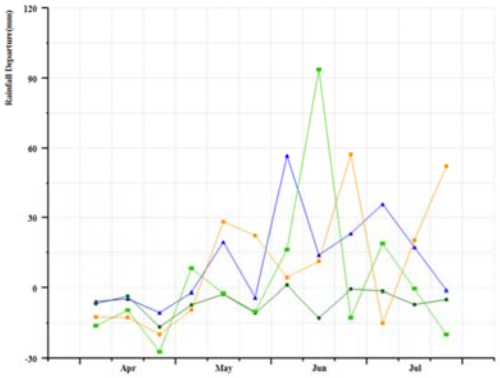
Below average precipitation and above normal temperature caused a sharp decline of potential biomass (-20%), especially for the Canadian Prairies and the Southern Plains. The Corn Belt also suffered below average precipitation (RAIN: -11%) and a reduction of the biomass production potential, especially in the eastern part of Corn Belt (e.g. the rain of Michigan was 33% below average). Severe water deficit was also caused by the decline of BIOMASS in the east part of Corn Belt.

The cropped arable land fraction (CALF) was average. In general, crop condition was mixed; it was satisfactory in the Northern plains according to the maximum vegetation condition index (VCIx) of 0.9.

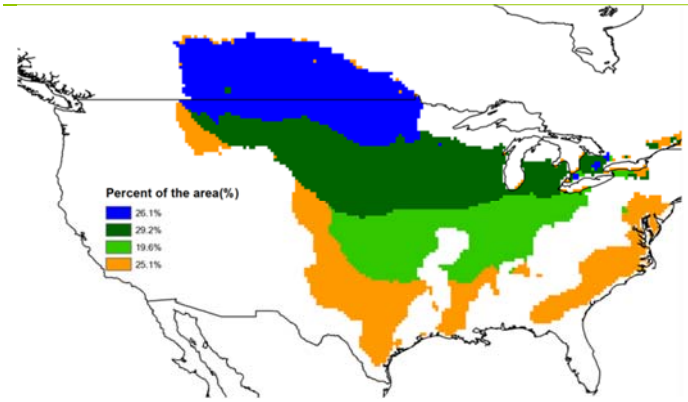
Figure 2.2. North America MPZ: Agroclimatic and agronomic indicators, April to July 2018.



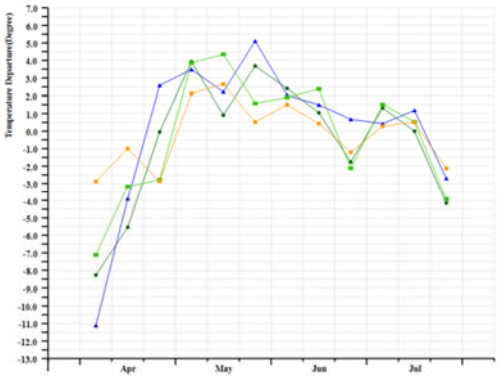
a. Spatial distribution of rainfall profiles



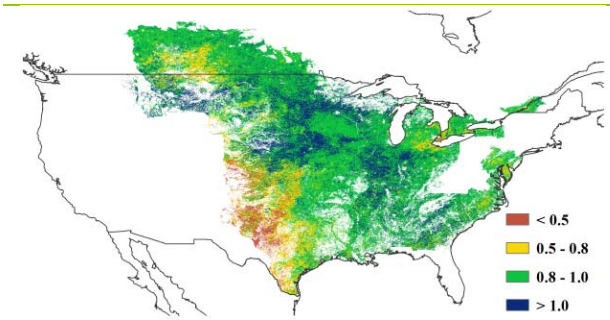
b. Profiles of rainfall departure from average (mm)



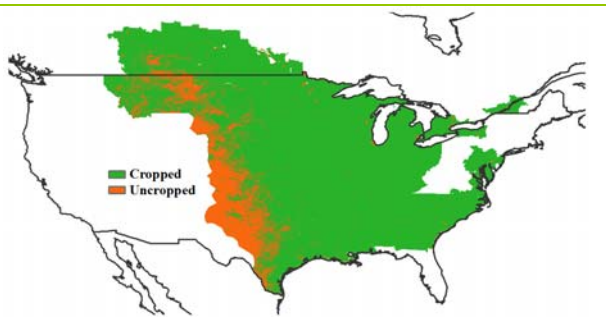
c. Spatial distribution of temperature profiles



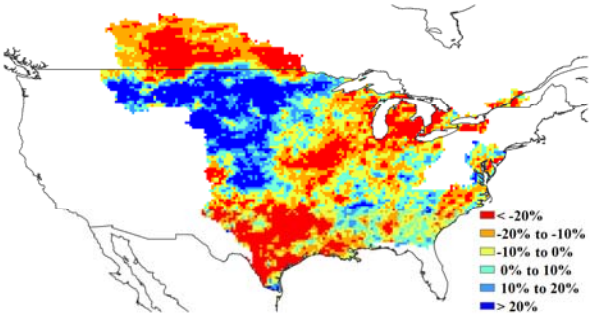
d. Profiles of temperature departure from average (mm)



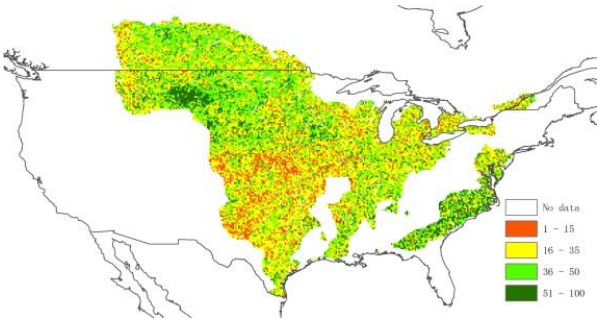
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

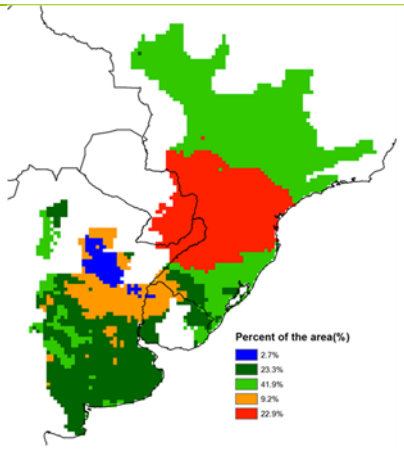
2.4 South America

The region showed in general better conditions for crop growing in the South than in the North. In addition, excessive rainfall could have generated problems for soybean harvesting.

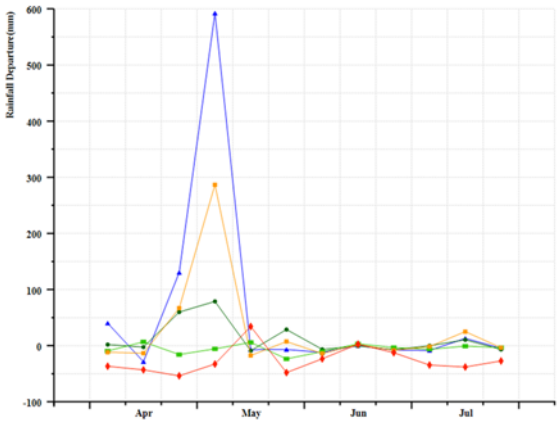
A reduction in rainfall compared to average was observed (13% on average). It particularly affected an area located in South Brazil, East Paraguay and Misiones province in Argentina which suffered an almost continuous negative anomaly. Two relatively small areas located in East Chaco and North of the Argentinian Pampas showed strong positive anomalies of rainfall during April and beginning of May when the main harvest period of soybean occurs. Extreme rainfall hampered the harvest of soybean but only with limited and localized impacts. TEMP and RADPAR showed no anomalies for the whole region. TEMP temporal profiles show in general positive anomalies at the beginning of May, negative anomalies in late May and positive anomalies at mid July. Main differences among regions were observed between Central (Figure b - Orange) and Northern agricultural regions of Brazil (Figure b - Dark green) showing more and less positive anomalies respectively.

Average VCIx for the whole MPZ was 0.68. VCIx values for most of the areas were between 0.8 and 1, and showed the highest values (higher than 1) in the Flooding Pampas. Lower values were observed in the West Pampas. The map of cropped and uncropped arable land shows that most of the area was cropped, except for small regions located in the West Pampas and in Northern parts of Brazilian agricultural areas. BIOMSS showed a contrasting behavior between North and South, presenting strong negative anomalies (-20 % or more) in most of Northern areas and strong positive anomalies in most of the South (+20 % or more). Minimum VHI shows discontinuous patterns along the MPZ. Dominance of higher values is observed in Uruguay and Northern areas of Brazil. Low values occur mostly in the Central regions of Brazil and Paraguay, and part of the Pampas in connection with negative rainfall anomalies.

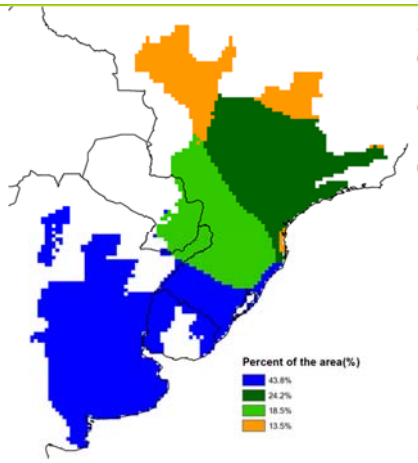
Figure 2.3. South America MPZ: Agro-climatic and agronomic indicators, April to July 2018.



a. Spatial distribution of rainfall profiles

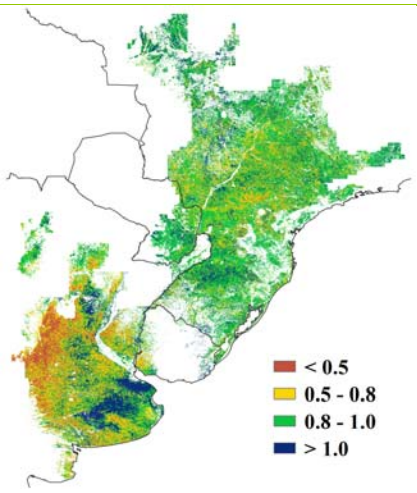


b. Profiles of rainfall departure from average (mm)

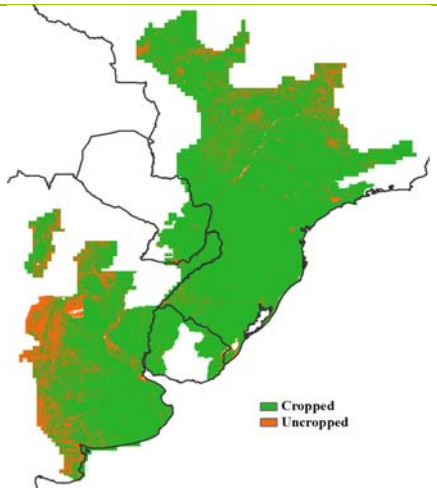


c. Spatial distribution of temperature profiles

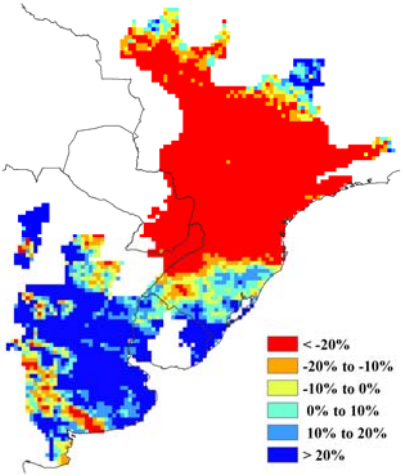
d. Profiles of temperature departure from average (mm)



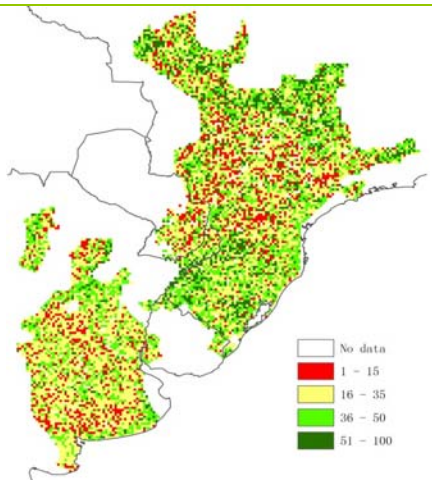
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

2.5 South and Southeast Asia

South and Southeast Asia is a region with very diverse climates, topogra?phy and crop phenology. Rice,maize, wheat, and soybean are common crops. The reporting period covers a variety of phenological conditions in the region and country-specific phenology during the reporting period is detailed hereafter; (1) in Bangladesh, Aman rice planting, Aus rice planting and harvesting, rice (Boro) and wheat crops are harvested during the reporting period, (2) Cambodia, maize planting, dry season rice harvesting, and wet season rice planting, (3) India, planting of Kharif rice, maize, and soybean, as well as harvesting of Rabi rice and wheat, (4) Myanmar and Nepal, planting of rice and maize and harvesting for wheat, (5) Thailand, rice and maize crops planting and harvesting, and (6) Vietnam, rice planting and harvesting, which continues here almost year-round.

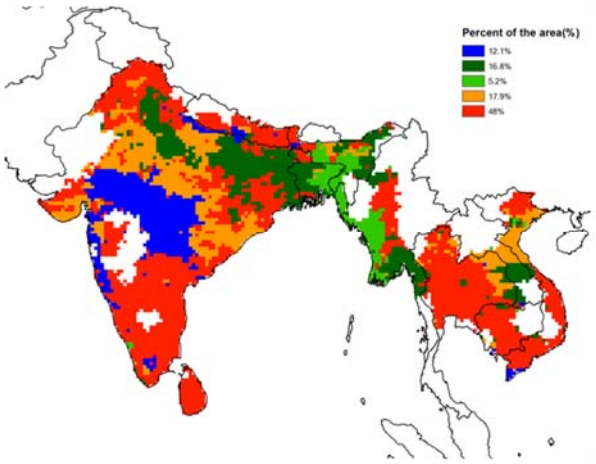
Overall,the South and Southeast Asia MPZ received about 18% above average rainfall (RAIN), rather cool temperature (TEMP, -0.7°C below average) and low radiation (RADPAR, -5%). All countries had above average RAIN except Cambodia, which recorded a slight decrease (-1%): Bangladesh +23%, India +17%, Thailand +11%, Vietnam +11%, Nepal +2% and Myanmar +20%. The TEMP was below average in all countries; Bangladesh -1.3°C, Cambodia -1.4°C, India -0.4°C, Myanmar -0.8°C, Nepal -1.5°C, Thailand -1.2°C and Vietnam -0.8°C. RADPAR recorded low values relative to average in all countries as well: Bangladesh -7%, Cambodia -6%, India -4%, Myanmar -5%, Nepal -6%, Thailand -5% and Vietnam -6%. As a

direct consequence of high moisture supply the prevailing biomass accumulation potential (BIOMSS) was above average average for most countries by values between 1% (Vietnam) and 13% (Bangladesh)

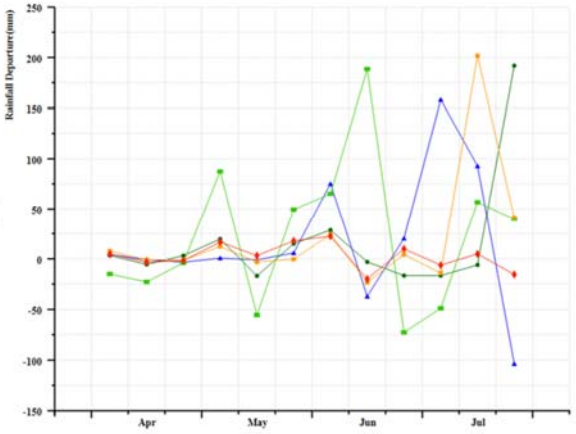
Among the agronomic indicators, the average of VCIx was 0.77. All countries were in the range between 0.83 and 0.94, except for India (0.70). The average Cropped Arable Land Fraction (CALF) indicates a reduction in cultivated by 13%, which is significant considering the size of the region. In general, all countries recorded slight changes in CALF except India, where the drop reached 21%.

The overall situation in South and continental Southeast Asia MPZ is currently mostly favorable, with the exception of India where contradictory indicators need to be monitored closely.

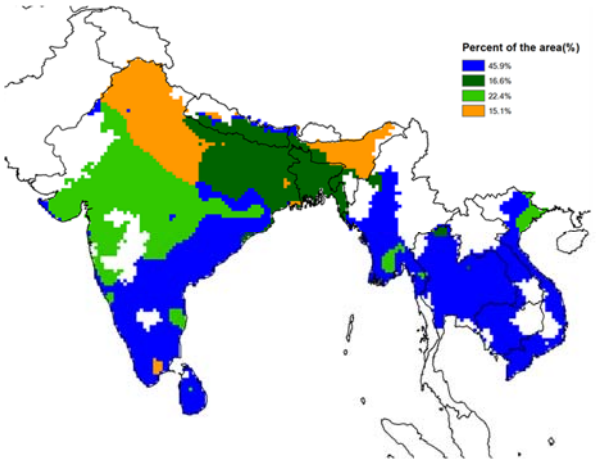
Figure 2.4. South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, April to July 2018.



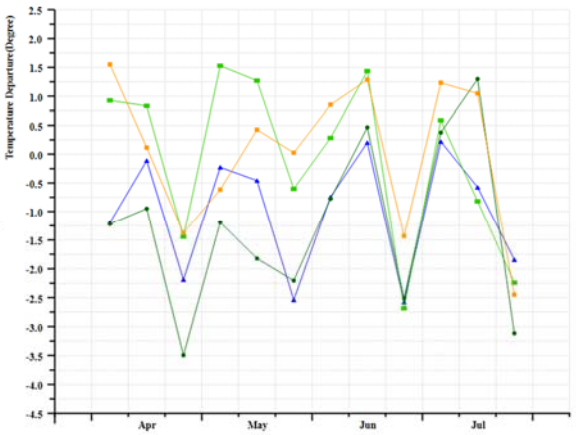
a. Spatial distribution of rainfall profiles



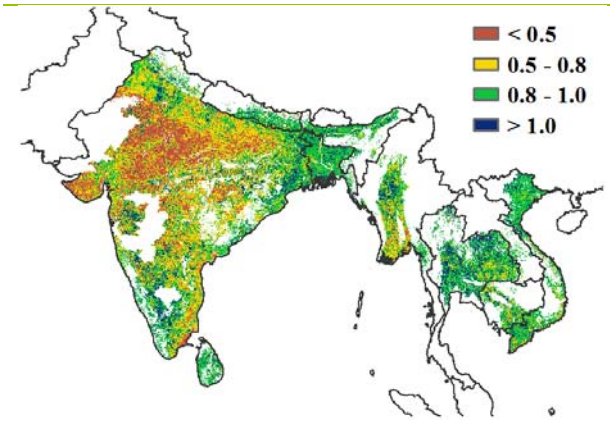
b. Profiles of rainfall departure from average (mm)



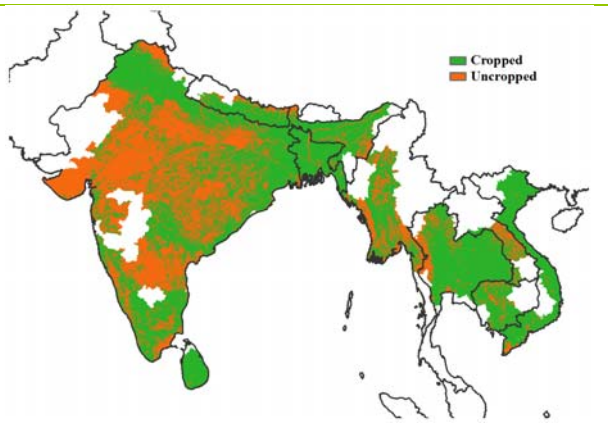
c. Spatial distribution of temperature profiles



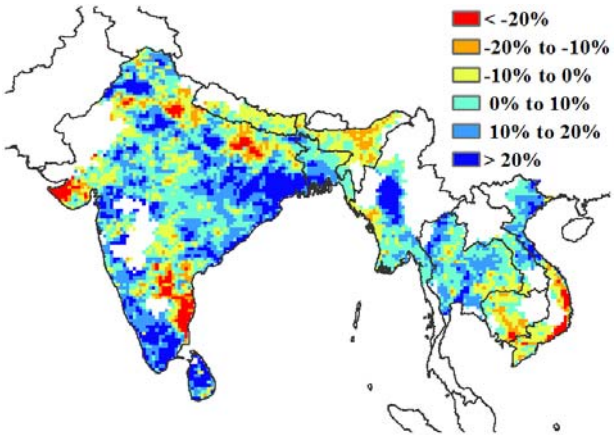
d. Profiles of temperature departure from average (mm)



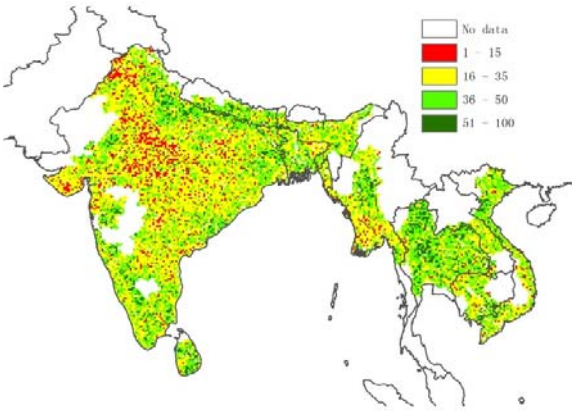
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

2.6 Western Europe

In general, crop condition was below average at the scale of the Western European MPZ, resulting from a combination of negative and positive extremes. The figures present an overview of CropWatch agroclimatic and agronomic indicators for this MPZ.

Total rainfall was 10% below average over the region, resulting from marked negative departures in the Czech Republic, most of Germany, northeast Austria, northeast Hungary, south-central Slovakia, western and northern France, southeast Italy, England,Denmark. The most severely affected four countries were Denmark (-48%), Germany (-33%), the Czech Republic (-23%) and England (-15%). In these regions, water stress affected the flowering and grain filling of winter crops and spring cereals. Exceptional positive departures, however, were recorded (i) in early-April, late-May, and late June over most of England, Denmark and northern France and (ii) from mid-May to mid-June in Spain, most of France, Italy, Hungary, southeast Austria, southwest Slovakia, southwest Germany. More rain is needed in some Northern European countries for summer crops. Abundant and locally very intense rainfall in North-central Italy, France and Spain caused lodging and water logging. Radiation for the MPZ as a whole was above average with RADPAR at +3%.

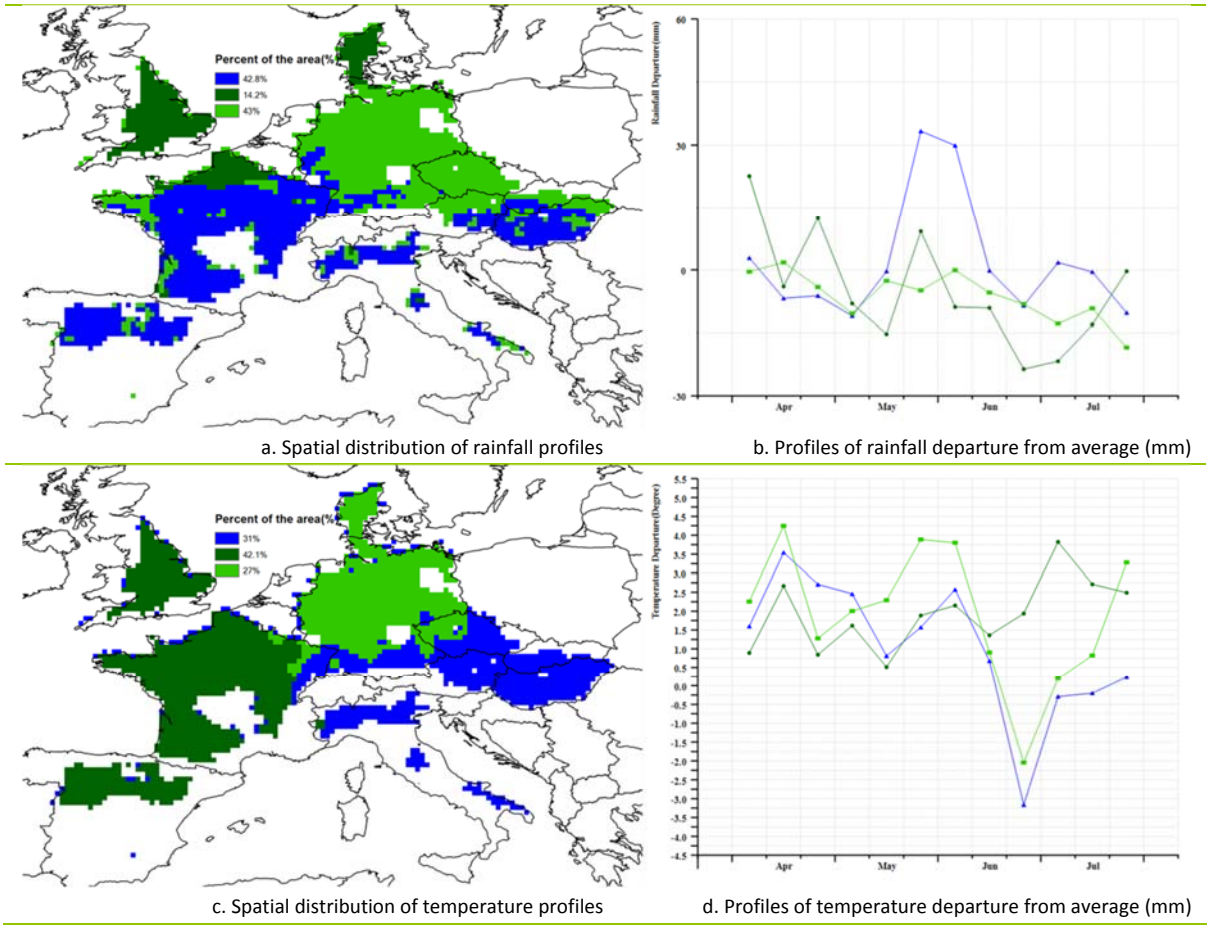
Temperature for the MPZ as a whole was above average (+1.7°C). Warm weather was observed in the whole MPZ before mid-June; coupled with a persistent rainfall deficit it affected winter crops flowering or grain filling in large parts of Northern and east-central Western European MPZ. Warmer-than-usual weather conditions continued to prevail throughout in England, France and Spain from mid-June to July, and throughout in Denmark and Germany in July. According to national source of climatic information, June and July was the warmest in large parts of the England, Denmark since 1975. High temperature shortened the graining filling stage of crops and accelerated the maturity which reduced crop

yields. Below average temperatures were observed from late-June to early July in most of the Czech Republic, Hungary, Slovakia, Austria, Italy and southern Germany.

The agroclimatic conditions mentioned above resulted in a drop of the biomass accumulation potential BIOMSS, which was 10% below the recent five-year average. The lowest BIOMSS values (-20% and less) occurred in Denmark, most of Germany, West-central of the Czech Republic, Northeast Austria, Northeast France and most of England. In contrast, BIOMSS was above average (sometimes exceeding a 10% departure) in the southwest Slovakia, most of Hungary, Italy, southwest France and Spain. The average maximum VCI for the MPZ reached a value of 0.91 during this reporting period. 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, with more patchy distribution in other counties.

Generally, crop condition in the Western Europe MPZ was mixed: unfavorable in the north and favorable in the south. The overall situation is expected to be below average considering the persistent high temperature.

Figure 2.5. Western Europe MPZ: Agroclimatic and agronomic indicators, April to July 2018.

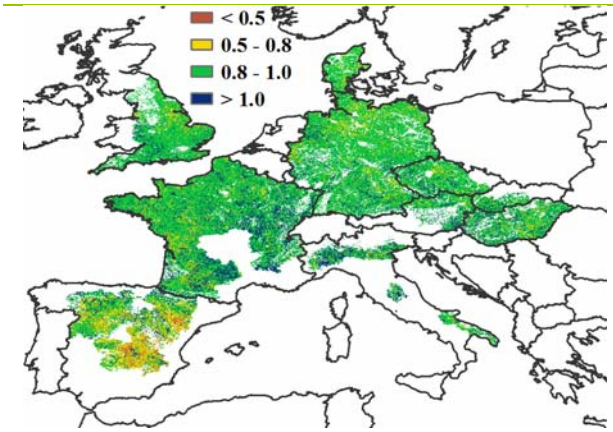


a. Spatial distribution of rainfall profiles

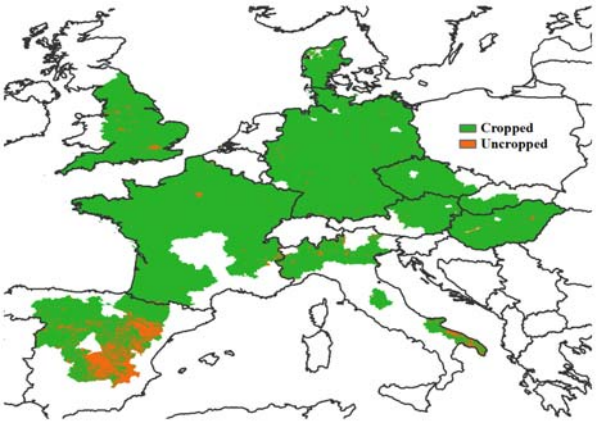
b. Profiles of rainfall departure from average (mm)

c. Spatial distribution of temperature profiles

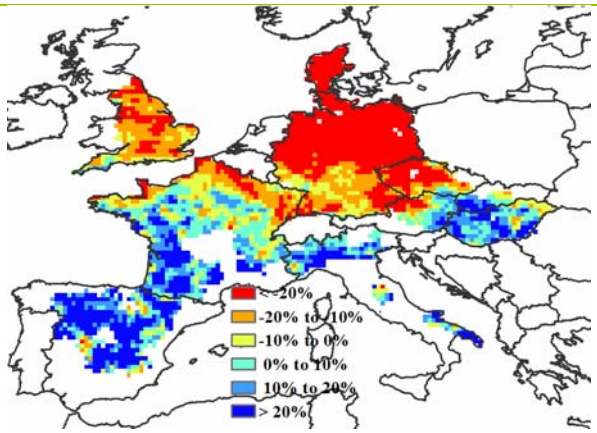
d. Profiles of temperature departure from average (mm)



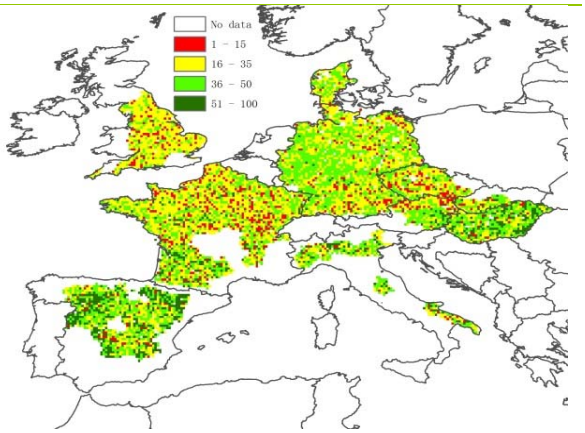
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

2.7 Central Europe to Western Russia

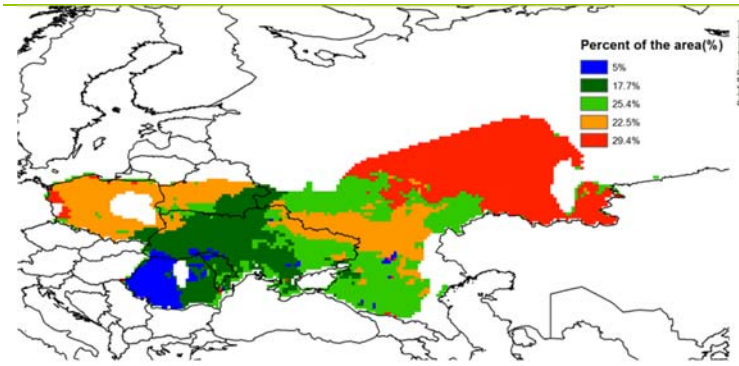
During the present monitoring period, most parts of the Central Europe to Western Russia MPZ displayed average conditions of winter and summer crop (average VCIx=0.88). Compared to average, the MPZ was globally somewhat warmer (TEMP +0.5°C), slightly drier (RAIN -3%) and more sunny (RADPAR 4%).

As indicated by the rainfall profiles, western Romania received well above average rainfall from May to June, with around 60% above average in middle June. Another 22.5% of arable lands in the MPZ received over 50% above average rainfall in July, including Poland, Belarus and the southern part of West Russia covering the following Oblasts: Kursk, Belgorod, Voronezh and Volgograd. The temperature profiles show that the lowest temperatures (about 4.8°C below average in late May) influenced mainly the eastern part of the MPZ, which is western Russia, including the Oblasts of Chelyabinsk, Orenburg, Samara and the Republics of Bashkortostan and Tatarstan. In Belarus, Poland, West Ukraine, Moldova and Romania, the temperature dropped by more than 3°C below average in late June, but then recovered to average in late July.

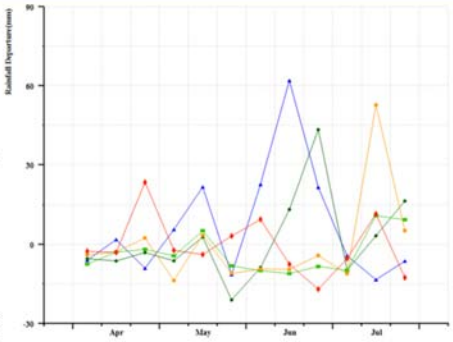
Almost all the arable land was cropped in the monitoring period (with a CALF of -1 % below average). Due to the average agroclimatic condition across the whole MPZ, the accumulated potential biomass (BIOMSS) is slightly (6%) below average, indicating an overall average level. However, Poland and some southern part of Western Russia (the Krays of Krasnodar and western Stavropol and the Rostov Oblast), showed a BIOMSS drop exceeding 20%, with low VHIn values, which should be paid attention to in the following months.

On the whole, with most parts indicating average crop conditions and agroclimatic factors, prospects for crop production are still promising in Central Europe to Western Russia.

Figure 2.6. Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, April to July 2018.

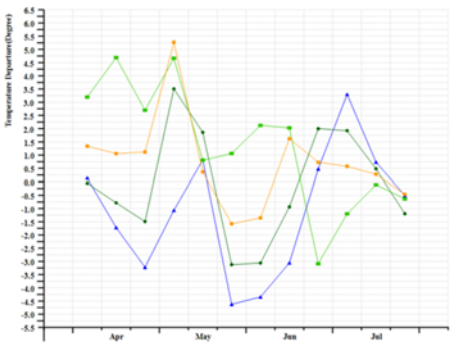


a. Spatial distribution of rainfall profiles

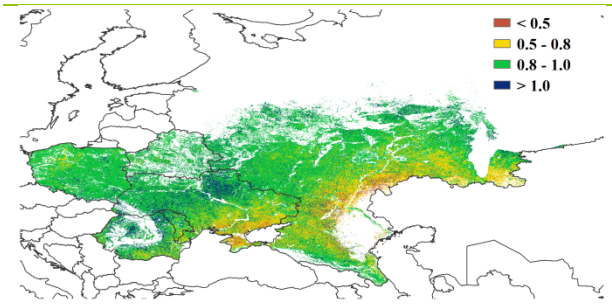


b. Profiles of rainfall departure from average (mm)

c. Spatial distribution of temperature profiles

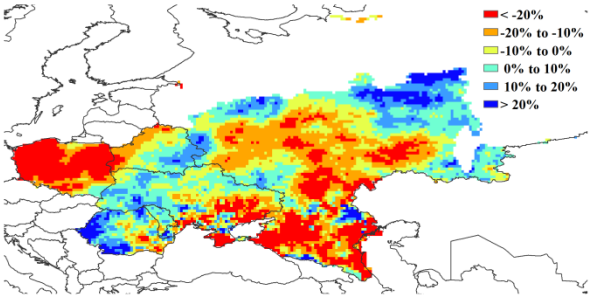


d. Profiles of temperature departure from average (mm)

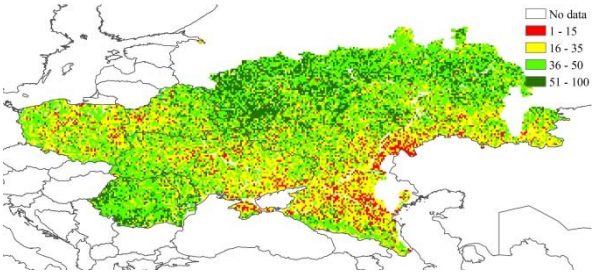


e. Maximum VCI

f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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