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 fourteen- and five-year averages.

Table 2.1. October 2015-January 2016 agroclimatic indicators by Major Production Zone, current value and departure from 14YA

	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 14YA (%)	Current (°C)	Departure from 14YA (°C)	Current (MJ/m^2)	Departure from 14YA (%)
West Africa	227	9	26.4	-0.9	962	1
South America	782	39	23.5	-0.6	1005	-7
North America	375	56	8	1.9	432	-8
South and SE Asia	194	1	23.3	0.5	795	0
Western Europe	204	-13	8	0.2	262	-4
C. Europe and W. Russia	182	10	1.2	0.3	198	-3

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 fourteen-year average (14YA) for the same period (October-January) for 2001-14.

Table 2.2. October 2015-January 2016 agronomic indicators by Major Production Zone, current season values and departure from 5YA

	BIOMSS (gDM/m^2)		Cropped arable land fraction		Maximum VCI Intensity
	Current	Departure from 5YA (%)	Current	Departure from 5YA (%)	Current
West Africa	706	-1	83	0	0.85
South America	1944	14	98	9	0.87
North America	982	37	83	2	0.77
South and SE Asia	520	-8	85	-2	0.79
Western Europe	888	-10	91	-1	0.89
C Europe and W Russia	683	1	83	-1	0.69

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 (October-January) for 2010-2014.

2.2 West Africa

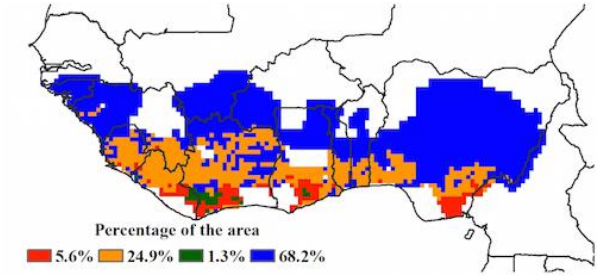
Over the reporting period of October 2015 to January 2016, cereals and tubers were harvested throughout the West Africa MPZ, with small spatial differences in harvest times conditioned by latitude and elevation (e.g. in the case of Guinea). Conditions in the MPZ as a whole were close to average with rainfall exceeding average by 9% and fluctuating but generally below average temperature (-0.9°C); the biomass production potential is close to average (-1%). CALF, at 83%, was average as well for this MPZ.

Guinea and Guinea-Bissau are the only countries in the MPZ where agroclimatic conditions significantly departed from average, both with precipitation departures reaching +32% and +126%, respectively. This was accompanied by below average temperature (close to -1.5°C) and sunshine but nevertheless an increased biomass production potential (+23% and +76%, respectively). All other countries underwent a slight drop in biomass production potential (around -10%) when compared to the most recent five years, with the exception of Sierra Leone, where expectations are approximately average.

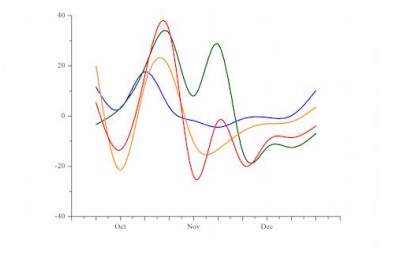
The spatial distribution of rainfall, maximum VCI and minimum VHI all concur in presenting a spatially coherent picture with favourable conditions in the north of the MPZ and some water stress increasing towards the south. This corresponds to a weakening of the final stages of the rainy season where this season is long (in the west and east of the region), or a delay and weakening of the short rainy season in the central areas (in Côte d'Ivoire and Ghana, for example). This is consistent with a slower than usual southward movement of the inter-tropical convergence zone away from the Sudano-Sahelian north.

Altogether, there is no reason for concern about the condition of cereals and the (dominant) roots and tubers in the West African MPZ. Indicators are shown in Figure 2.1.

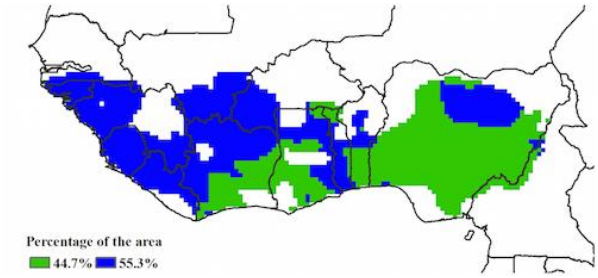
Figure 2.1. West Africa MPZ: Agroclimatic and agronomic indicators, October 2015-January 2016



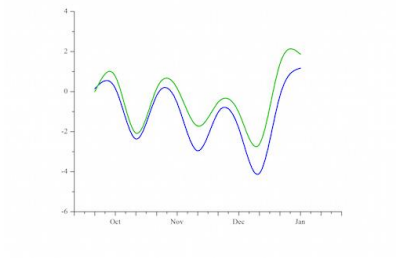
a. Spatial distribution of rainfall profiles



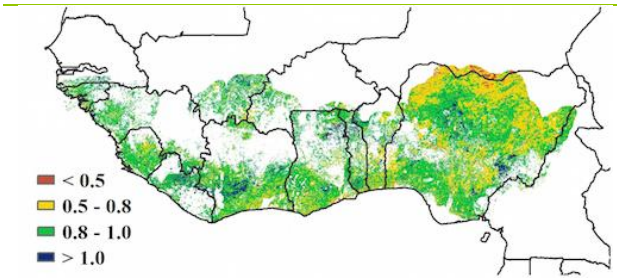
b. Profiles of rainfall departure from average (mm)



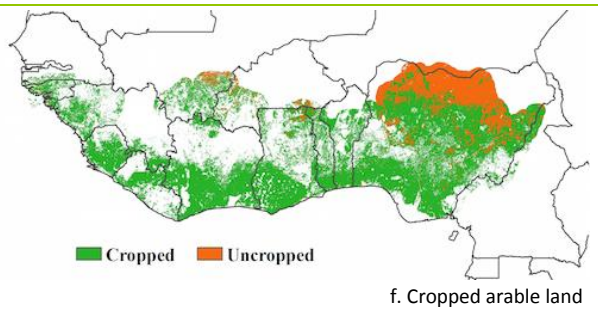
c. Spatial distribution of temperature profiles



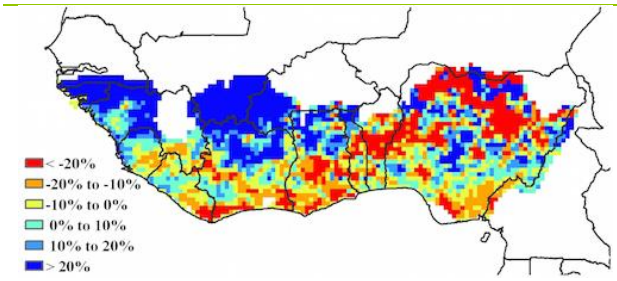
d. Profiles of temperature departure from average (°C)



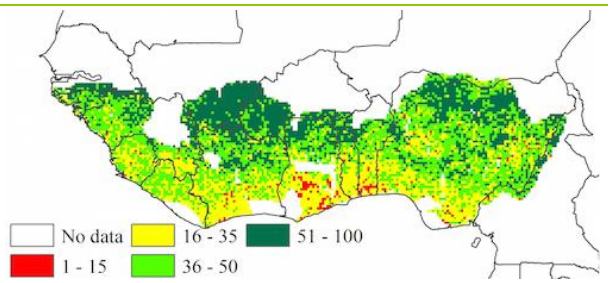
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

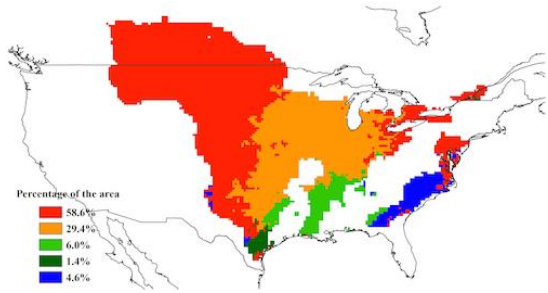
2.3 North America

In general, crop condition was average in the North American MPZ (Figure 2.2). The summer crops (maize, soybean and spring wheat) were completely harvested at this time, while winter crops have been planted and reached over-wintering stages.

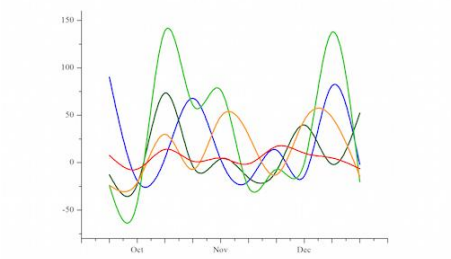
Overall, CropWatch agroclimatic indicators show warmer than average and wet weather conditions: rainfall was 56% above average and the temperature departure was +1.9°C. Actually, wet and mild agroclimatic conditions (as displayed in Figure 2.2) were common only in the United States. Canada was dominated by dry agroclimatic conditions. In the United States, excess moisture has hampered the harvest of summer crops and the planting of winter wheat while it also replenished soil moisture for the growth of winter crops and pastures in spring.

Major winter wheat production zones recorded abundant rainfall in the South Plains (RAIN: +85%, TEMP: 0.9°C), Kansas (RAIN: +35%, TEMP: 1.5°C), Oklahoma (RAIN: +99%, TEMP: 0.6°C) and Texas (RAIN: +78%, TEMP: 0.5°C). Abundant rainfall also fell in the blue grass region (+62%) and in Kentucky and Tennessee (+33% and +78%, respectively). Biomass shows a 37% positive departure compared to last five years average. The fraction of cropped arable land (CALF) was 2% above average.

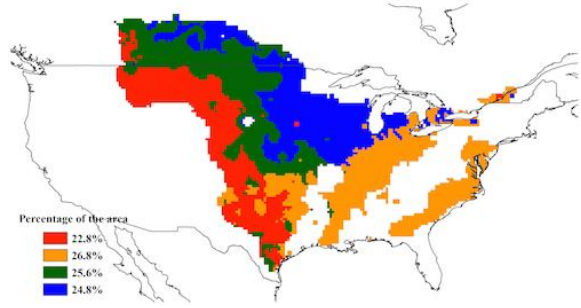
Figure 2.2. North America MPZ: Agroclimatic and agronomic indicators, October 2015-January 2016



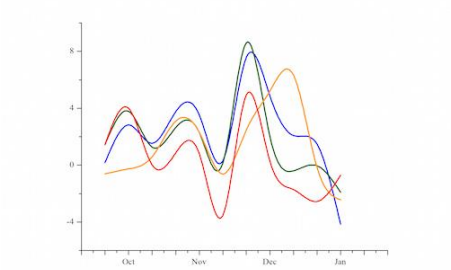
a. Spatial distribution of rainfall profiles



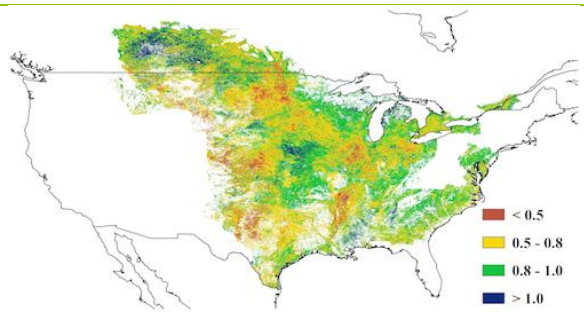
b. Profiles of rainfall departure from average (mm)



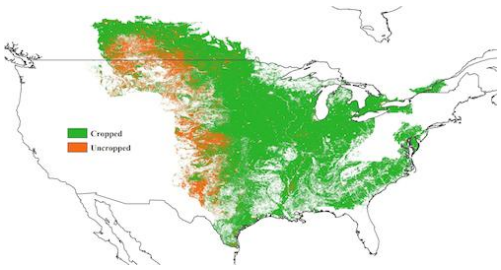
c. Spatial distribution of temperature profiles



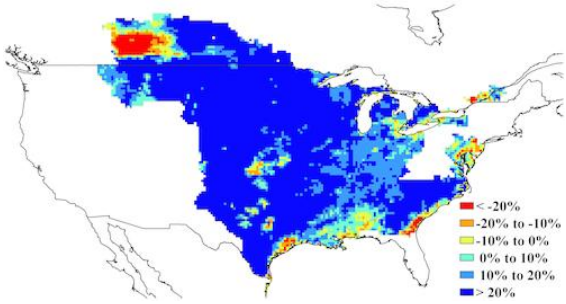
d. Profiles of temperature departure from average (°C)



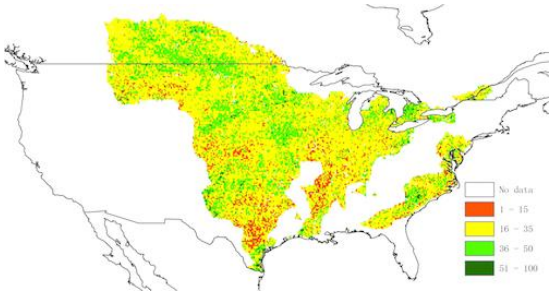
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

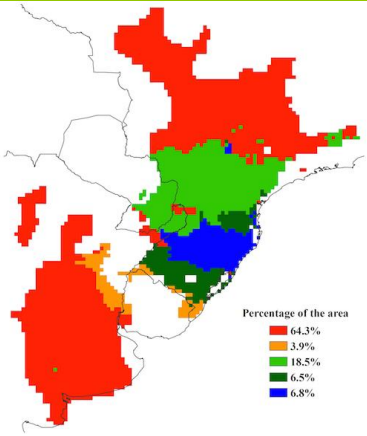
2.4 South America

Crops in the South America MPZ experienced favorable conditions from October 2015 to mid January 2016 (Figure 2.3). The winter wheat harvest was completed at the end of 2015, and currently, soybean is at its flowering stage and maize is at the silking stage. Abundant rainfall (39% above average) favoured the development of soybean and maize although temperature and RADPAR were slightly below average for this reporting period. Altogether, crops benefited from the favorable agroclimatic conditions and BIOMSS for the whole MPZ was 19% above average.

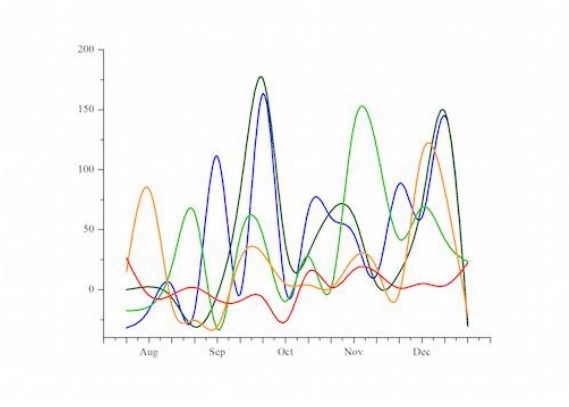
According to the spatial pattern and profiles of rainfall departure from average, rainfall was slightly above average (20mm or more) over most of Argentina as well as the northern part of MPZ. Southern Paraguay Missiones in Argentina and southern Brazil (including Rio Grande Do Sul, Parana and Santa Catarina) experienced continuously well above average rainfall. Air temperature in the MPZ was below average from October except for the most northern part covering southern Mato Grosso, Minas Gerais and Goais as shown in temperature clusters and profiles (Figure 2.3). High temperature with almost average rainfall in those areas resulted in the below average potential biomass, which is confirmed by the low value of minimum VHI: crops suffered from water stress during the monitoring period.

Although extreme weather conditions occurred in parts of the MPZ, the condition of summer crops was still comparable with five-year average as shown in the VCIx map and the high overall average VCIx value (0.87) for the MPZ. CALF for the MPZ was 98%, an increase of 9% from the previous five-year average. About 2% of the total arable land was intentionally kept fallow, mostly between Bahia Blanca and Santa Rosa, to encourage more sustainable agricultural practices. In general though, well above average rainfall provided necessary soil moisture for the development of soybean and maize.

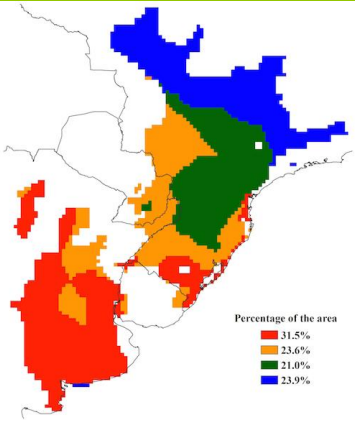
Figure 2.3. South America MPZ: Agroclimatic and agronomic indicators, October 2015-January 2016



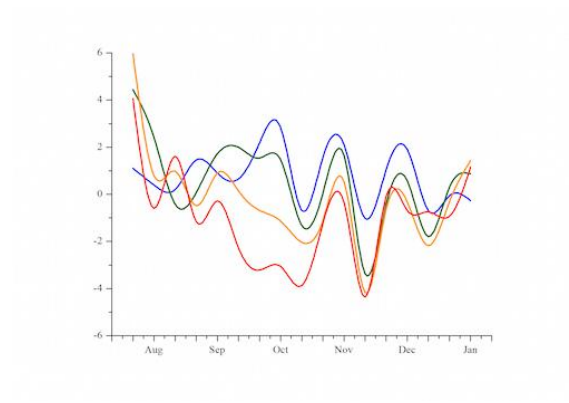
a. Spatial distribution of rainfall profiles



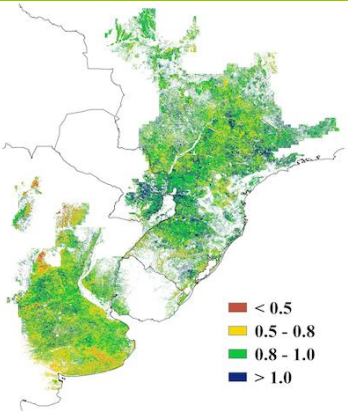
b. Profiles of rainfall departure from average (mm)



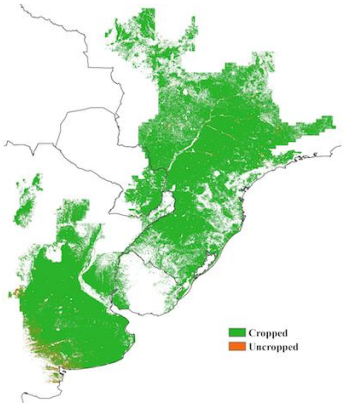
c. Spatial distribution of temperature profiles



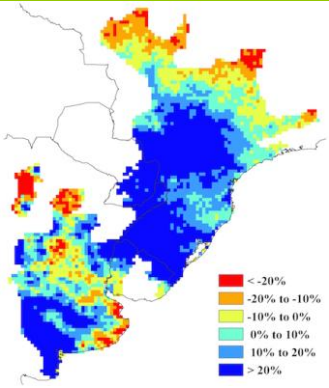
d. Profiles of temperature departure from average (°C)



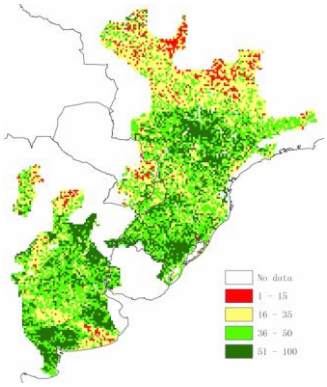
e. Maximum VCI



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

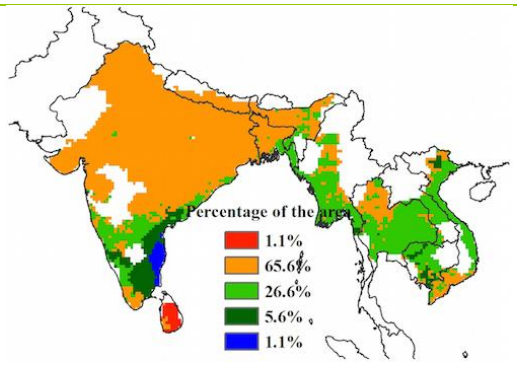
The reporting period mainly involves the growing and harvesting of wet season crops for this MPZ. The entire zone experienced a slight increase (+1%) of rainfall over average, but low rainfall was recorded for both Bangladesh (-38%) and India (-3%). The spatial distribution of rainfall profiles indicates that 65.6% of the area of the MPZ received average rainfall throughout the monitoring period while 26.6% received below average rainfall in early November 2015. Temperature (TEMP: +0.5°C) remained average and there was no change in the photosynthetically active radiation (RADPAR) for the MPZ. Temperature departure profile follows the same temporal pattern throughout the MPZ as shown in Figure 2.4c. Temperatures were above average during the first two dekads but fluctuated widely during the reporting period.

The maximum VCI values for the MPZ range from 0.5 to 1, indicating average to favorable crop conditions throughout. However, low VCI (< 0.5) was recorded for central India triggered by below average rainfall in Madhya Pradesh (-39%) and Rajasthan (-42%), pointing to poor crop condition in those areas.

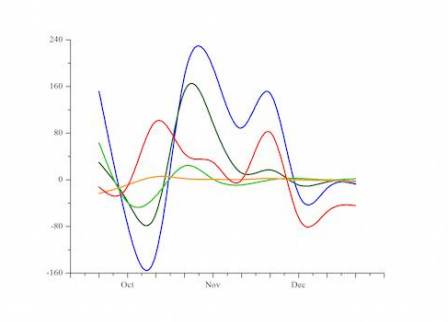
The fraction of crop arable land (CALF) was 85%, which was 2% below the average. The uncropped areas were mainly distributed in central Myanmar and in the Indian states of Haryana, Rajasthan, Maharashtra, Karnataka and Andhra Pradesh. The biomass accumulation potential for the MPZ was below average (-8%), while the spatial distribution shows below average biomass concentration in central and eastern India, the southern part of Myanmar and some scattered areas in Thailand, Cambodia and Vietnam. Except the southern part of India, the entire country recorded low values of VHI minimum indicating water stress due to the deficit rainfall.

Overall, crop condition of the MPZ is below average primarily due to the rainfall deficit in India and Bangladesh.

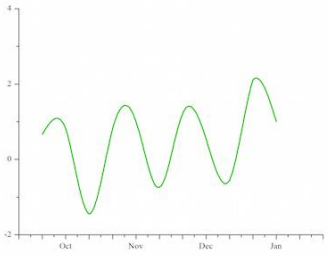
Figure 2.4. South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, October 2015-January 2016



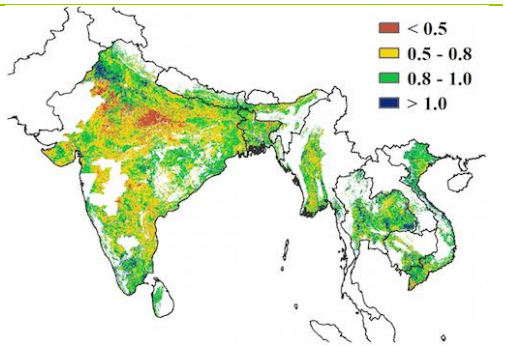
a. Spatial distribution of rainfall profiles



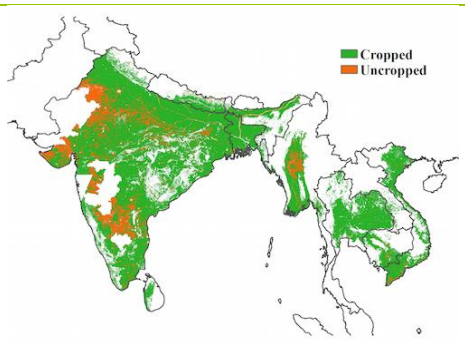
b. Profiles of rainfall departure from average (mm)



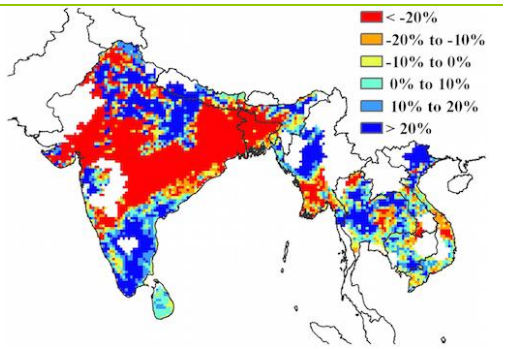
c. Profiles of temperature departure from average (°C)



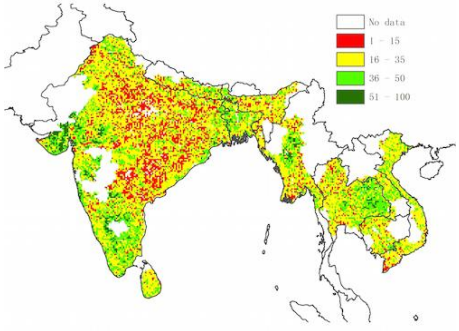
d. Maximum VCI



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

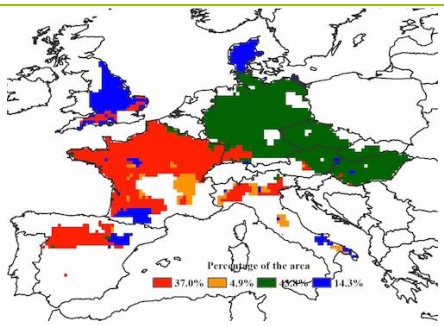
In general, environmental conditions were below average in most parts of the Western Europe MPZ during this reporting period. The summer crops were completely harvested, and winter crops were planted and reached over-wintering stages. Figure 2.5 represents an overview of CropWatch agroclimatic and agronomic indicators for this MPZ.

The agroclimatic indicators show that total rainfall was 13% below average, with exceptional positive departures over most of Germany, the Czech Republic, Austria, Slovakia and Hungary in early October and, from late October to early November over most of England and Denmark, the south of France, and in the east of Spain and Italy after late November. Temperatures over the whole MPZ were close to average (+0.2°C), and temperature profiles indicate that above average temperatures were observed in most of Western Europe from mid-October to late October, and from later November to mid-December in the south of France and the east and west of Spain. The radiation was 4% below average.

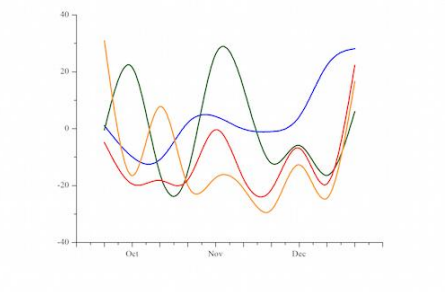
Due to the continuous rainfall deficit, especially after November, coupled with the impact of low temperature in mid-November, the biomass accumulation potential, BIOMSS, was 10% below the recent five-year average. The spatial distribution of BIOMSS shows that the lowest values (-20% and below) occur over most of France, Spain, the Czech Republic, northern Italy, the east of Austria, and the south of Hungary. The values for minimum VHI confirm the water deficit to a certain extent in those regions. In contrast, BIOMSS in most other regions was 10% above average.

91% of the arable land was cropped during this reporting period, 1% lower than the recent five-year average. Most uncropped arable land was concentrated in Spain and also scattered in the central part of Hungary. Accordingly, maximum VCI in Spain, south of France, north of Italy, west of the Czech Republic and the east of Hungary were lower compared to other regions in this MPZ. Average VCIx for the MPZ was 0.89. Crop condition is slightly below average in Western Europe.

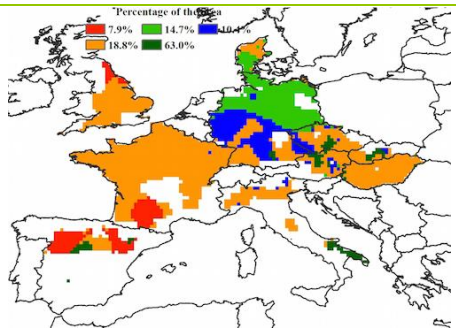
Figure 2.5. Western Europe MPZ: Agroclimatic and agronomic indicators, October 2015-January 2016



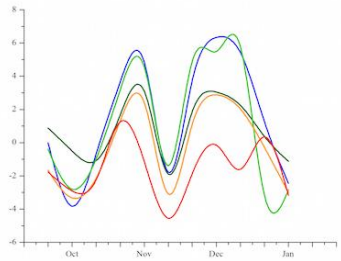
a. Spatial distribution of rainfall profiles



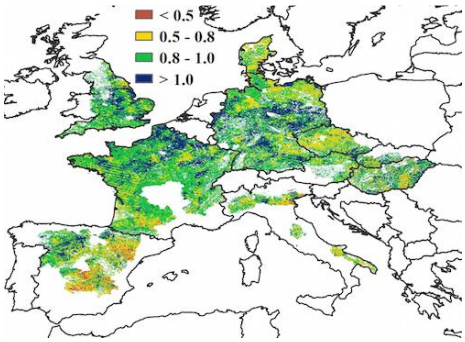
b. Profiles of rainfall departure from average (mm)



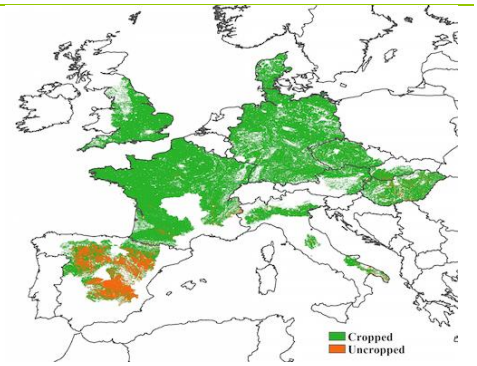
c. Spatial distribution of temperature profiles



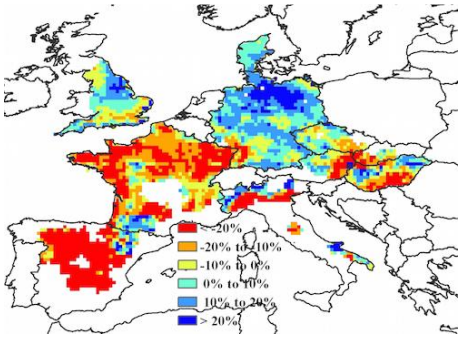
d. Profiles of temperature departure from average (°C)



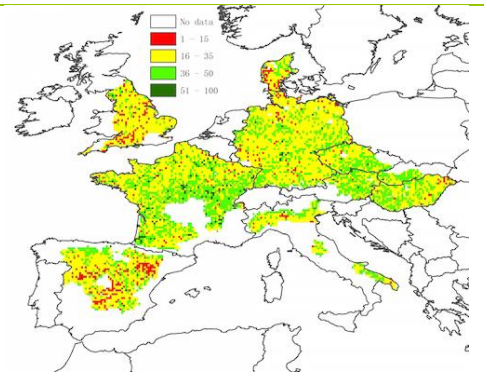
e. Maximum VCI



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, the harvest of summer crops was completed and winter crops were in the early vegetative stages under mostly favorable weather conditions. The region experienced slightly below normal thermal conditions, while rainfall increased by 10% and RADPAR dropped by 3%.

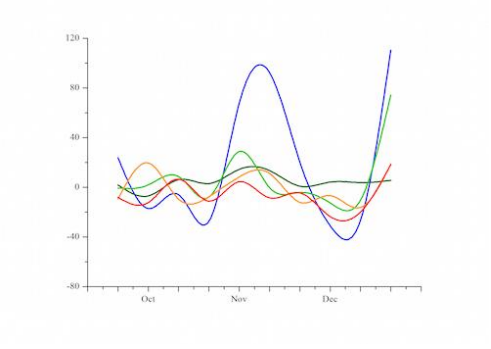
According to the rainfall profiles, almost all areas of Central Europe to Western Russia enjoyed approximately average precipitation from October through to December, while abundant rainfall was recorded in the southwest of Russia between late December and early January, including Krasnodarskiy and Stavropolskiy Krays and the Oblasts of Rostovskaya and Volgogradskaya. From November, the MPZ enjoyed warmer-than-average temperatures, including temperature departures as high as +4°C in early December in most regions. In the second and third dekad of December, remarkably below average temperatures prevailed over Central Europe, reaching 8°C below average in southern Belarus in January. As a result of bad weather conditions during the sowing stages of winter crops (see the November 2015 Bulletin), crop conditions in eastern Ukraine and many parts of southern Russia were well below average, which is confirmed by the maximum VCI distribution map (Figure 2.6).

BIOMSS is up 1% compared to the recent five-year average. 83% of the arable lands were cropped from October 2015 to January 2016. Most uncropped arable land was scattered in the south of western Russia (including the Oblasts of Volgogradskaya, Saratovskaya and Samarskaya).The maximum VCI (0.69) of this MPZ is much lower than that of other MPZs. According to the VHI map of this monitoring period, most pixels of southern Ukraine and Russia showed bad soil moisture conditions.

In conclusion, below average production is to be expected in Central Europe and Western Russia.

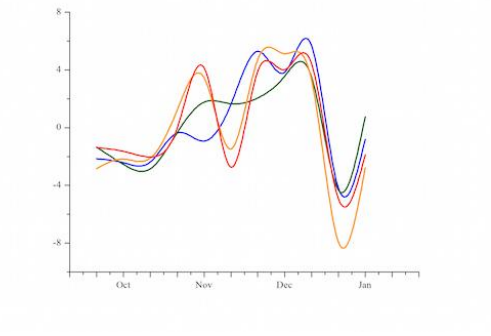
Figure 2.6. Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, October 2015-January 2016

a. Spatial distribution of rainfall profiles

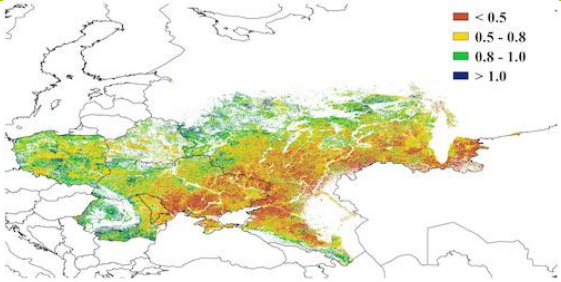


b. Profiles of rainfall departure from average (mm)

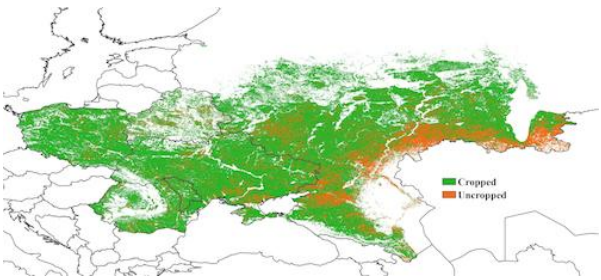
c. Spatial distribution of temperature profiles



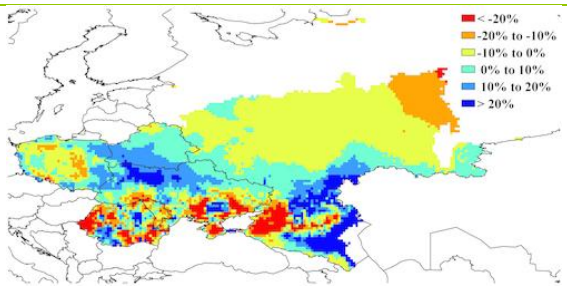
d. Profiles of temperature departure from average (°C)



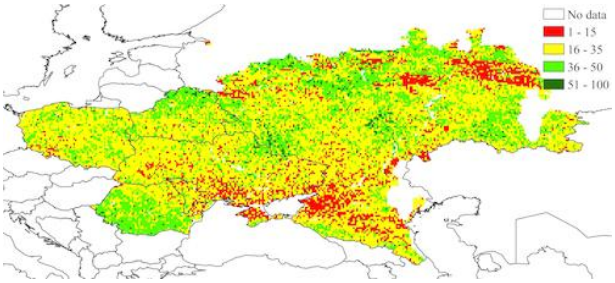
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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