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), minimum vegetation health index (VHIn), and cropping intensity index (CI)— 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. July-October 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/m²)	Departure (%)
West Africa	890	5	26.2	-0.4	974	-3
South America	336	-5	20.3	0.5	962	-4
North America	416	11	20.1	-0.4	1076	-2
South and SE Asia	1211	16	27.4	-0.1	903	-4
Western Europe	263	-3	16.3	0	866	-5
C. Europe and W. Russia	259	11	15.4	-0.3	836	-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 (July-October) for 2002-2016.*

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

	BIOMSS (gDM/m²)		CALF (Cropped arable land fraction)		Maximum VCI Intensity	Cropping Intensity	
	Current	Departure (%)	Current	Departure (% points)	Current	Current	Departure (%)
West Africa	1928	-2	96	0	0.91	103	1
South America	859	-13	91	2	0.71	117	-6
North America	1244	8	92	0	0.88	126	-1
South and SE Asia	1987	7	96	1	0.95	128	3
Western Europe	1036	-1	89	-2	0.8	158	-3
C Europe and W Russia	1033	9	97	2	0.93	166	-1

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

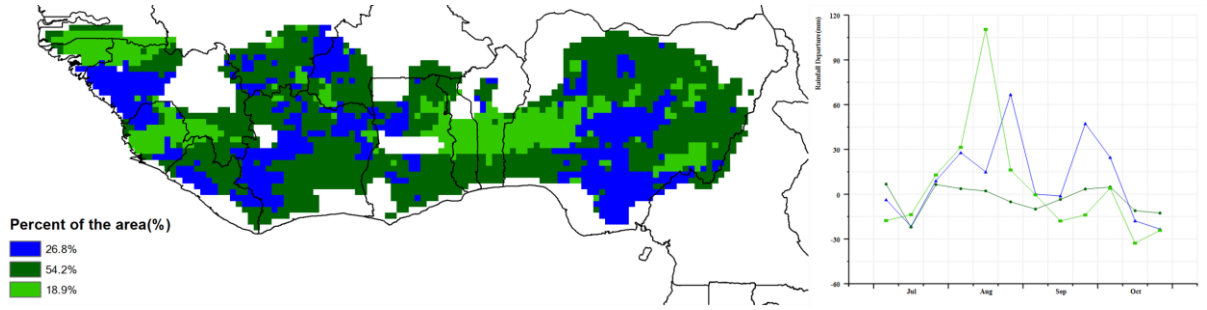
2.2 West Africa

In the north, the reporting period marks the end of the main rainy season and the harvest of main rainfed cereals (maize, sorghum, millet, and rice) and yam, as well as the sowing of irrigated rice. In the south of the MPZ (covering southern Côte d'Ivoire to Nigeria) which receives bi-modal rainfall, harvesting of yams is underway and cassava is still growing; the second maize crop was planted and is growing, as reflected in the CALF map. In the west (Guinea to Liberia), the harvest of rice extends into December and sometimes even January.

Based on CropWatch observations, average rainfall was 890 mm over croplands of the MPZ, corresponding to an increase of +5% compared to average. National values varied from 850 mm (+2% in Nigeria) and 1558 mm (+16% in Guinea Bissau. The MPZ had close to average temperature (26.2°C, -0.4°C) and sunshine (RADPAR -3%) which gave a slight decrease of the biomass production potential (BIOMSS -2%). The MPZ as a whole had a cropped arable land fraction (CALF) reaching 100% as it was the main growing season in this region. Currently precipitation has subsided, and plant growth can only be supported through irrigation. According to the VCIx map the average value was above 0.91.

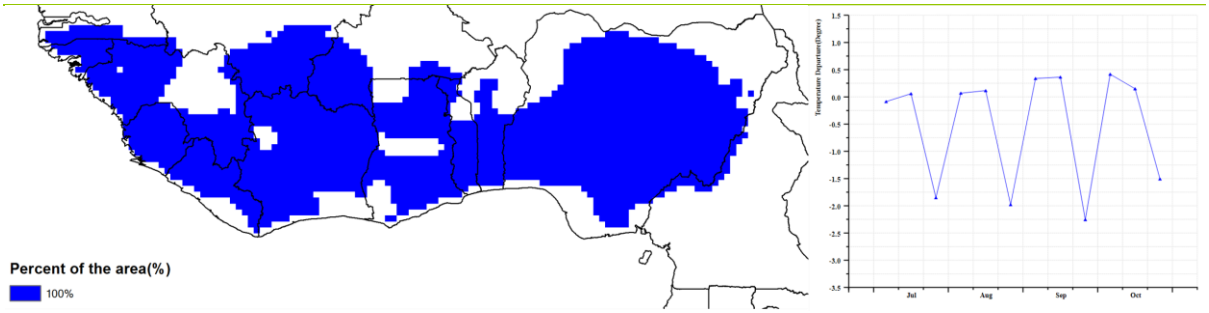
Generally, the climatic conditions were conducive for plant growth with precipitation well distributed in time throughout the region. The temperature fluctuated around average within a +/-0.4°C margin during the main rainy season. The stable and coherent climatic conditions depicted by the CropWatch indicators should lead to a good harvest for 2017.

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



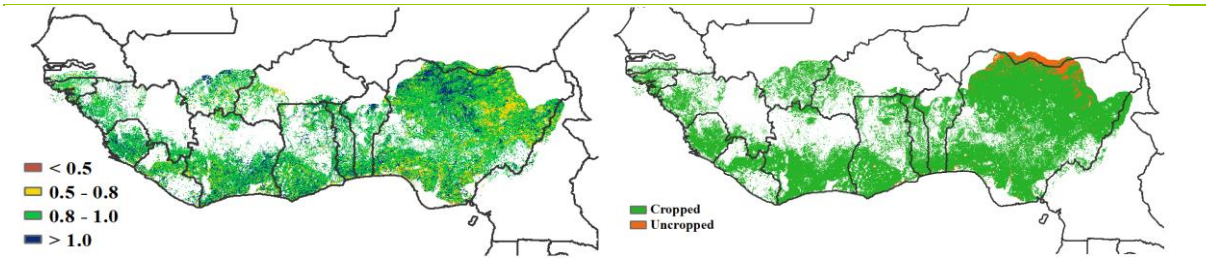
a. Spatial distribution of rainfall profiles

b. Profiles of rainfall departure from average (mm)



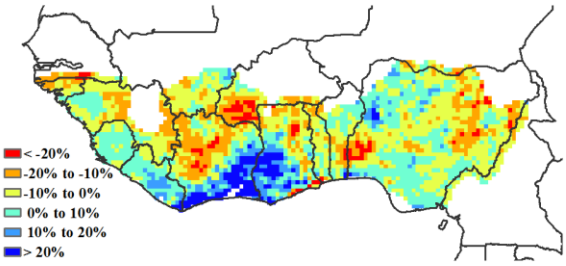
c. Spatial distribution of temperature profiles

d. Profiles of temperature departure from average (mm)

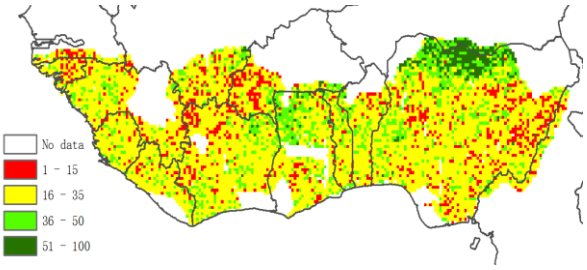


e. Maximum VCI

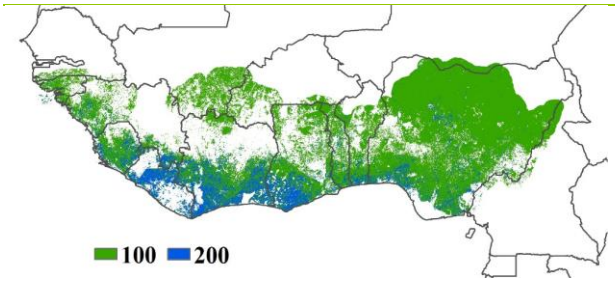
f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum



i. Cropping intensity

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

2.3 North America

The reporting period (July to October, 2017) is the harvesting season of summer crops (maize, soybean, spring wheat, and rice) and the sowing season of 2017/18 winter crops. In general, poor crop condition was recorded in the south of the Canadian Prairies and some regions of the U.S. Northern Plains, while average or above average crop condition occurred in other regions.

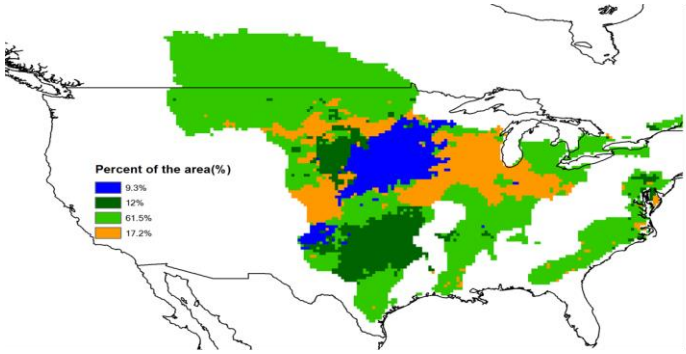
For the region as a whole, moist weather occurred in North America, where rainfall (RAIN) was 11% above average, while temperature was slightly below by 0.4°C and RADPAR by 2%, which is more significant for this indicator. Drought was confined to Manitoba (RAIN, -20%) and Saskatchewan (RAIN, -23%) where the temperature was 2°C to 3°C above average at the beginning of July and in late August, resulting in -17% and -19% decreases in the indicator for the biomass accumulation potential (BIOMSS), respectively.

Drought conditions ended in the Northern Great Plains because abundant rainfall (RAIN, +35%) occurred in mid-July and in August and October. The U.S. Corn Belt, the major maize and soybean producing area in the world, recorded average rainfall and temperature. Normal rainfall was also reported from the Cotton Belt to the Mexican Nordeste region. It is worth noting that abnormally low temperature occurred in the eastern part of North America in late August and early September.

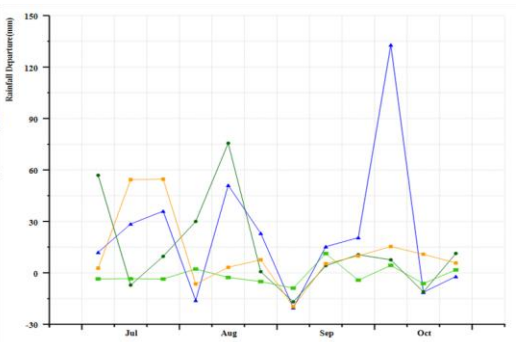
Poor crop condition in the southern Canadian Prairies and some regions of the U.S. Northern Plains is confirmed by maximum VCI (VCIx) and the BIOMSS departure map. In the south of Manitoba, Saskatchewan, and in the north of North Dakota and Montana, VCIx was even below 0.5, which indicates rather poor crops. Drought and warm weather are confirmed by the VHIn and resulted in a decrease of at least 20% for BIOMSS. Other agronomic indicators are average, in particular the Cropped Arable Land Fraction (CALF).

Altogether, CropWatch identified some poor crop condition in parts of Canada and the U.S. Northern Plains, while average and above average conditions prevail elsewhere.

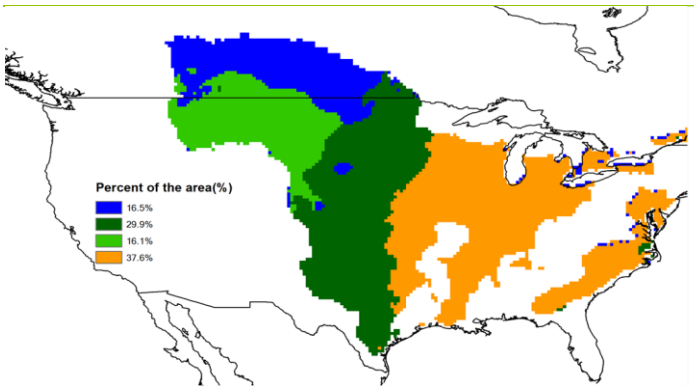
Figure 2.2 North America MPZ: Agroclimatic and agronomic indicators, July-October 2017



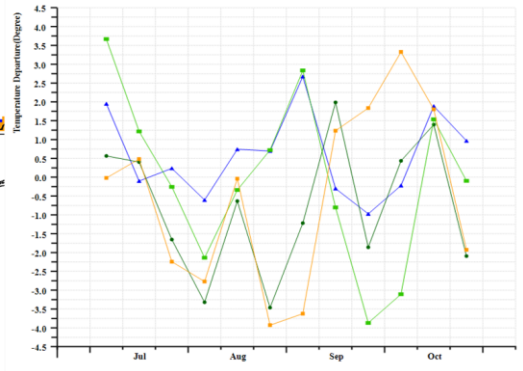
a. Spatial distribution of rainfall profiles



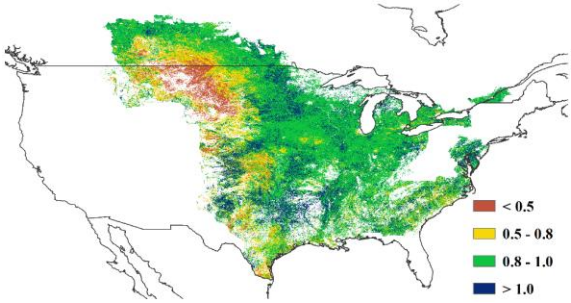
b. Profiles of rainfall departure from average (mm)



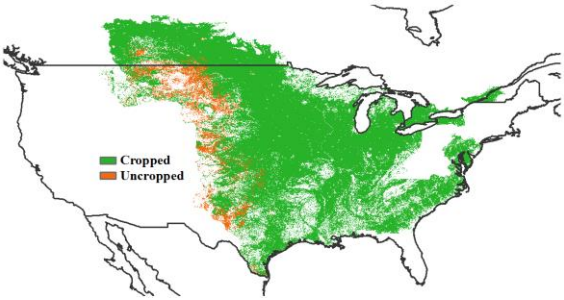
c. Spatial distribution of temperature profiles



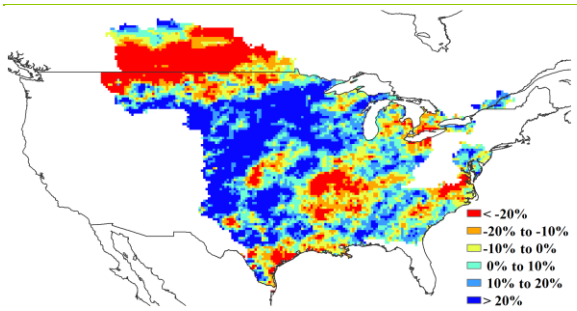
d. Profiles of temperature departure from average (mm)



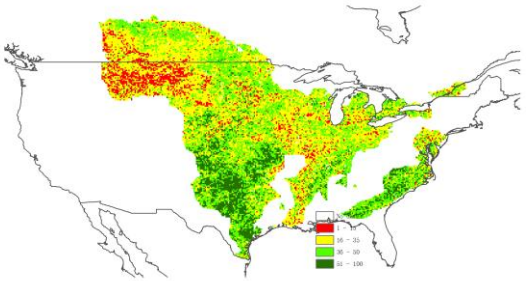
e. Maximum VCI



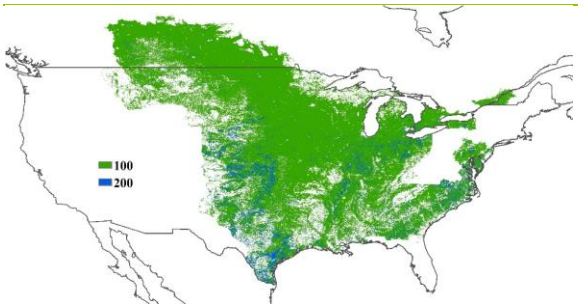
f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum



i. Cropping intensity

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

2.4 South America

Overall crop condition in this MPZ was average over the monitoring period during which wheat was approaching its maturity stage, while main summer crops were just being planted or in early vegetative stages, such as in the case of maize. Figure 2.3 summarizes the CropWatch agroclimatic and agronomic indicators for the area.

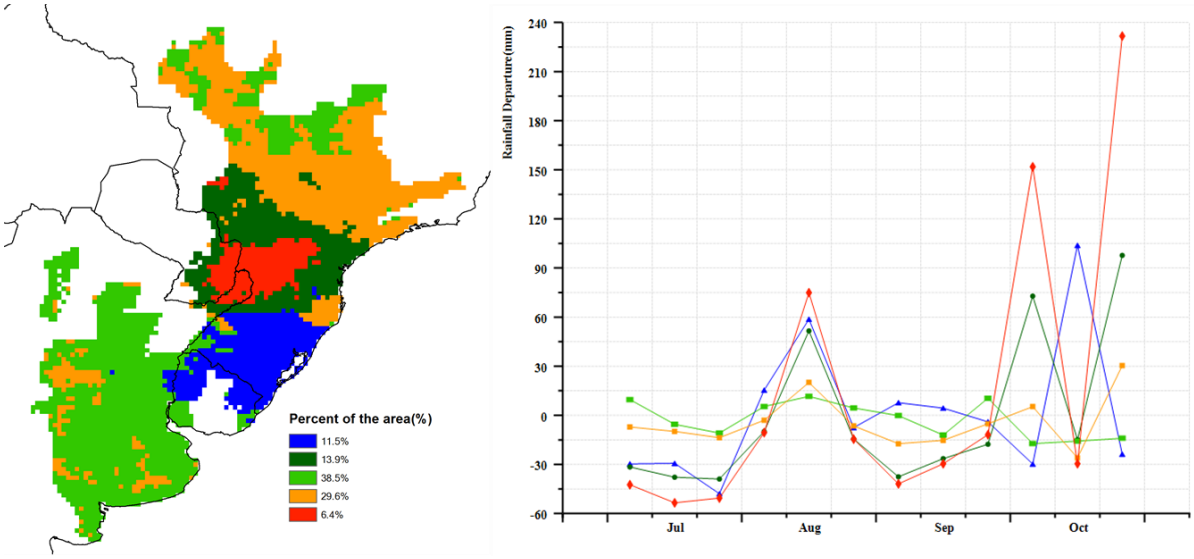
Across the MPZ, slightly below average rainfall (RAIN, -5%), warm temperatures (20.3°C, TEMP +0.5°C above average), and low radiation (RADPAR, -4%) were experienced, altogether resulting in 13% below average BIOMSS. According to the temporal and spatial patterns of rainfall departure, rainfall was slightly below average in the Pampas during July-October, while the Brazilian states of Rio Grande do Sul and Parana experienced above average rainfall in August and October and below average rainfall in July and September. The temperature generally changed from above average in July-August to well below average (-2.5°C) by the end of October. Spatially, agroclimatic conditions were generally unfavorable as indicated by well below average BIOMSS in the accumulated potential biomass departure map, with the exception of Entre Rios in Argentina, Uruguay, and southwestern Rio Grande do Sul in Brazil.

As most summer crops for the region are out of their growing season, croplands in northwestern Buenos Aires and large parts of Cordoba, as well as the northernmost part of the MPZ remained uncropped during the monitoring period; overall CALF was 91%, which was 2% above the five-year average. Accordingly, the VCIx map also presents lower values in those fallow areas. High VCIx mostly concentrates in Santa Fe. On average, VCIx for the entire MPZ is 0.71. Cropping intensity is 166%, slightly below the five-year average (-1%). Fields with a double cropping system are mainly located in Rio Grande do Sul and Parana where wheat-maize double cropping is common according to local interviews with farmers and researchers.

The VHI map presents large differences between Argentina and Brazil. High values in Argentina indicate low water stress situations, while in Brazil the states of Sao Paulo and part of Mato Grosso are suffering water stress, as indicated by VHImin values below 35. This further confirms that low VCIx in Argentina results from non-vegetation rather than unfavorable conditions.

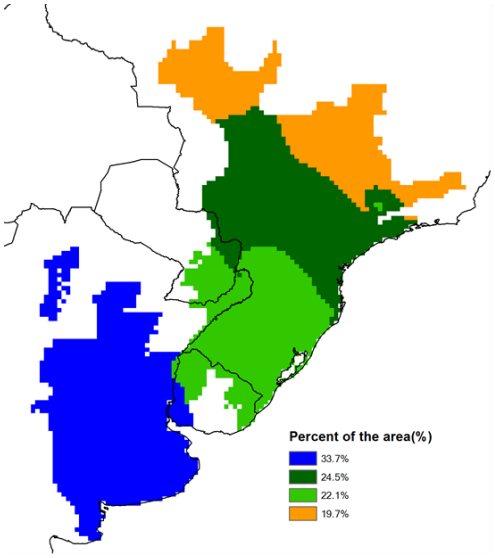
All in all, winter wheat condition in the MPZ is average in spite of lower RAIN. The low rainfall, however, could potentially hamper the sowing and early development of summer crops in the season ahead.

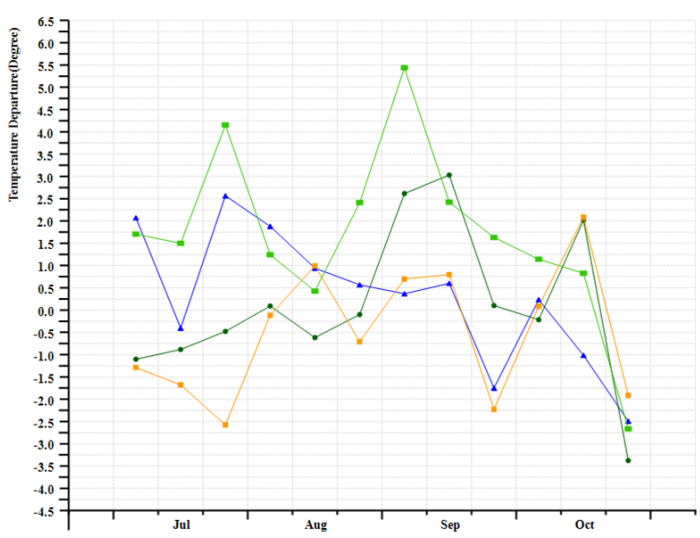
Figure 2.3: South America MPZ: : Agroclimatic and agronomic indicators, July-October 2017



a. Spatial distribution of rainfall profiles

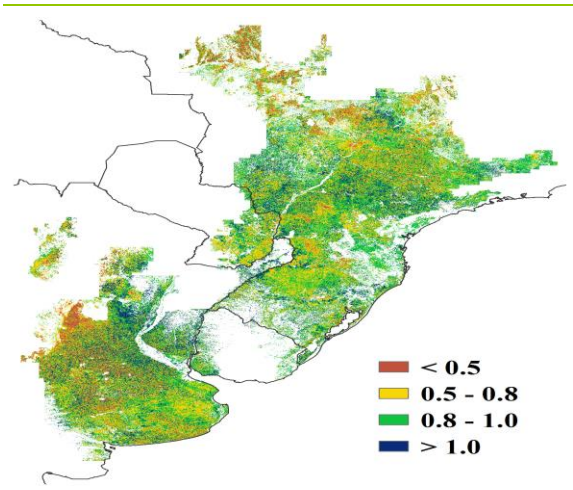
b. Profiles of rainfall departure from average (mm)

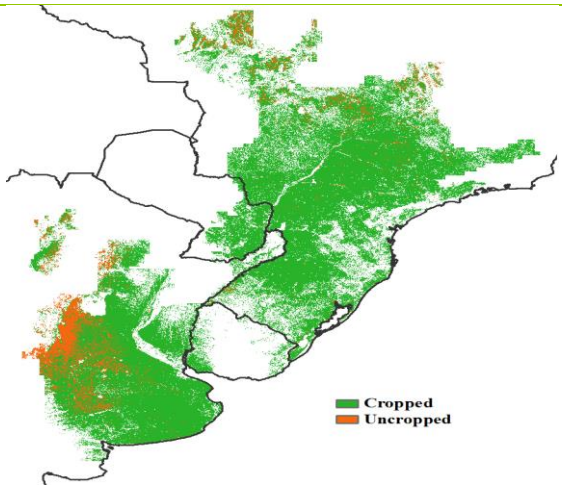




c. Spatial distribution of temperature profiles

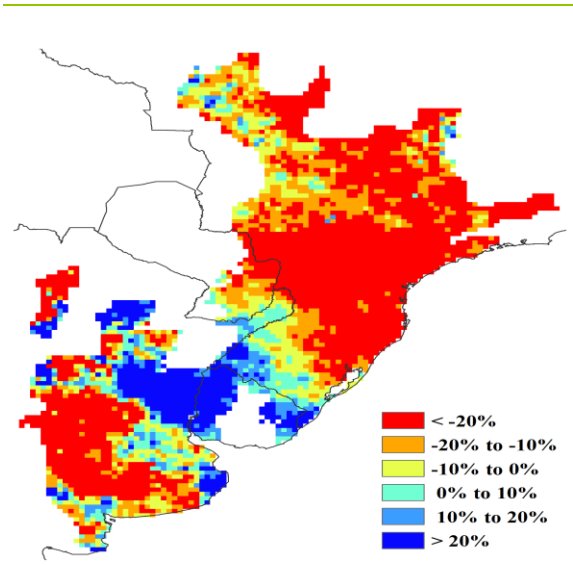
d. Profiles of temperature departure from average (mm)

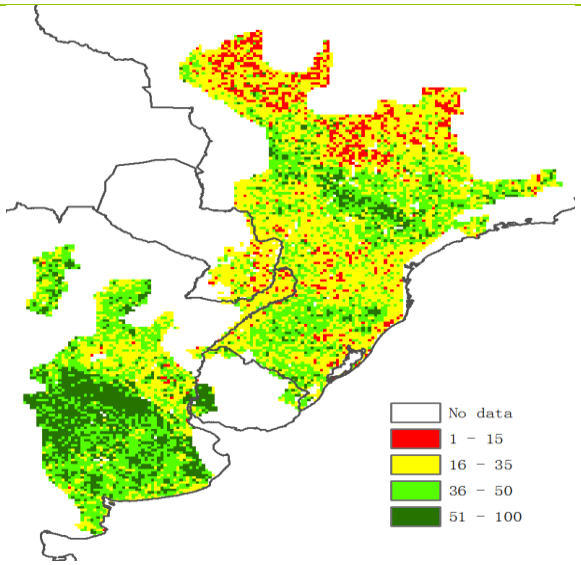




e. Maximum VCI

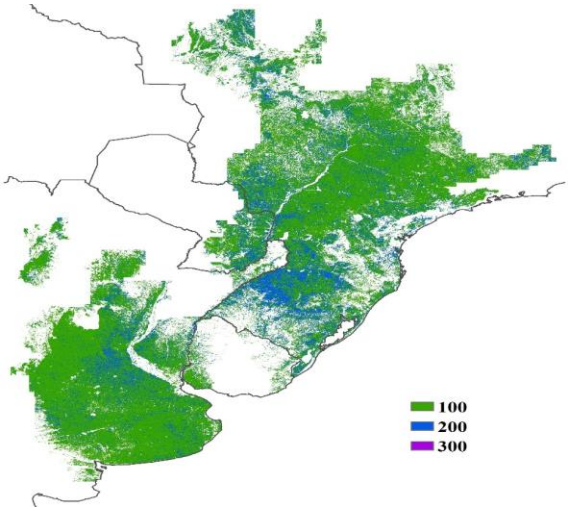
f. Cropped arable land





g. Biomass accumulation potential departure

h. VHI minimum



i. Cropping intensity

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

2.5 South and Southeast Asia

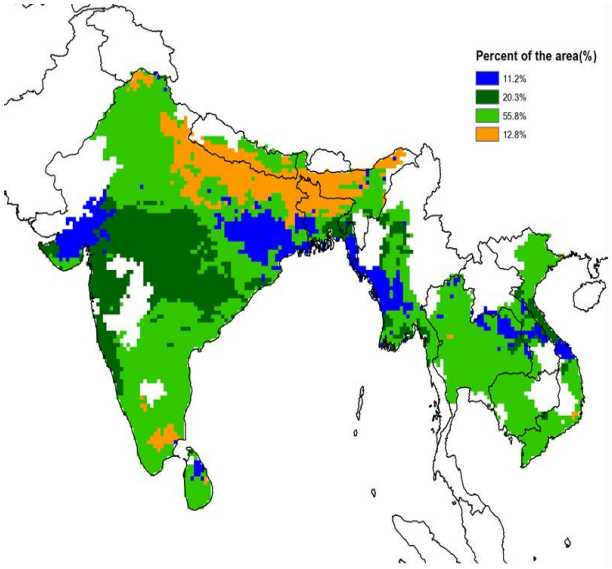
Over the recent reporting period, crops in this MPZ were at varying phenological stages. In Bangladesh for example, the period corresponds with the planting and growing stages of Aman rice and the harvesting of the Aus rice crop. In Cambodia, it was the time for planting of main wet season rice and the growing or harvesting of the maize crop. In India, the period covered Kharif season crops and in particular the planting, growth, and harvest of rice, maize, and soybean; the period also corresponded with the planting of wheat in the country. In Myanmar, it was planting time for maize and wheat, as well as the time to grow and harvest the main rice crop. Meanwhile in Thailand, the period covered the planting, growing, and harvesting of the main rice crop, as well as the harvesting of maize. It was also the major rice season for all rice types in Vietnam except spring and winter rice.

Across the MPZ, the region received 16% above average rainfall (RAIN), marginally lower than average temperatures (TEMP, -0.1°C), and a more significant shortage of sunshine as measured by RADPAR (-4%), providing mostly fair growing conditions for crops. All countries in the MPZ received higher than average precipitation, except for Cambodia where RAIN was -2%. Rainfall (RAIN) in other countries was as follows, as compared to the average for the same period of the year: Bangladesh +49%, India +16%, Lao People's Democratic Republic +9%, Myanmar 9%, Nepal +10%, Thailand +12%, and Vietnam +17%. Similarly, most of the countries had marginally lower than average temperature. RADPAR levels were rather poor in Bangladesh (-12%) and Vietnam (-8%), but closer to average in Cambodia (RADPAR, -3%), India (-3%), Lao PDR (-5%), Myanmar (-4%), Nepal (-4%), and Thailand (-3%). Higher than average BIOMSS is expected almost everywhere (with the exception of Nepal where BIOMSS is -2%) as a direct consequence of high rainfall; BIOMSS values by country are: Bangladesh +16%, Cambodia +1%, India +6%, Lao PDR 6%, Myanmar +3%, Thailand +8%, and Vietnam +9%.

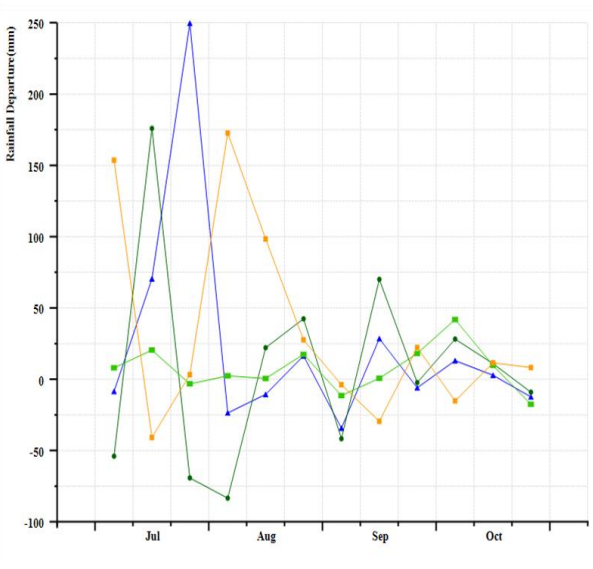
Agronomic indicators for the MPZ show mostly healthy crops when assessed with the VCIx and CALF indicators. Most of the countries had VCIx values of 0.8 or above, except for a few patches in India and the scattered occurrence of low VCIx in Thailand and Vietnam. Similarly, the CALF indicator shows that most of the agricultural land in the MPZ has been cropped during the season, except for some patches in India, one patch in Myanmar, and some scattered places in Myanmar and Thailand. The spatial distribution of BIOMSS indicates favorable conditions in Bangladesh, Lao PDR, and Thailand. Lower than average BIOMSS values are restricted to small areas in Myanmar and Vietnam, while some larger areas are affected in Cambodia and Nepal. In India, positive and negative BIOMSS values coexist, with values favorable in the south and east and unfavorable in the north and northwest. Scattered low VHI values occur throughout the MPZ. For an overview of flood impacts in the region, see the section on disasters in Chapter 5.

Overall, the MPZ presented good cropped area (0.8 and above was cultivated), favorable VCIx, and good--though sometimes excessive--rainfall, average temperature, and locally poor sunshine. Production is expected to be fair to good.

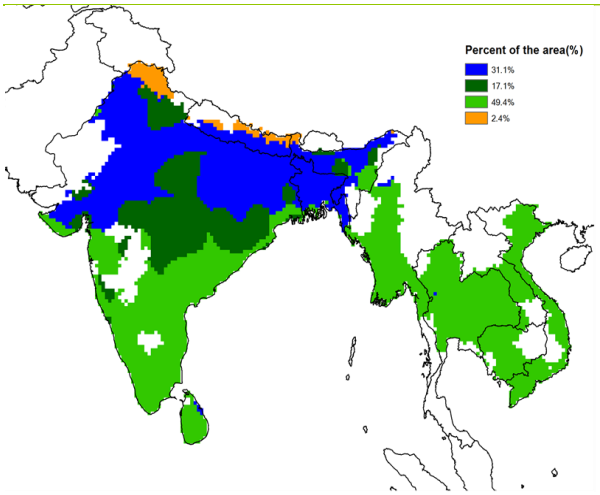
Figure 2.4 South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, July-October 2017



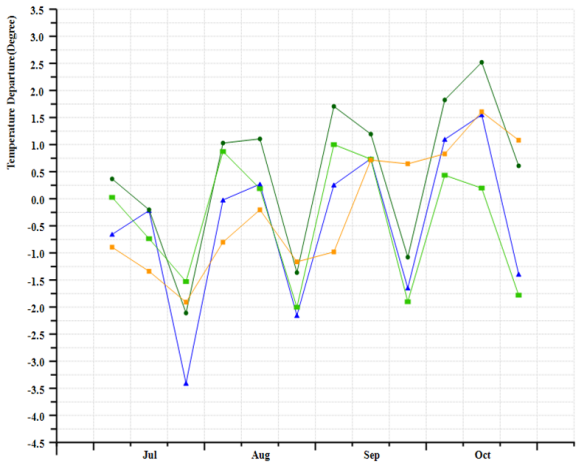
a. Spatial distribution of rainfall profiles



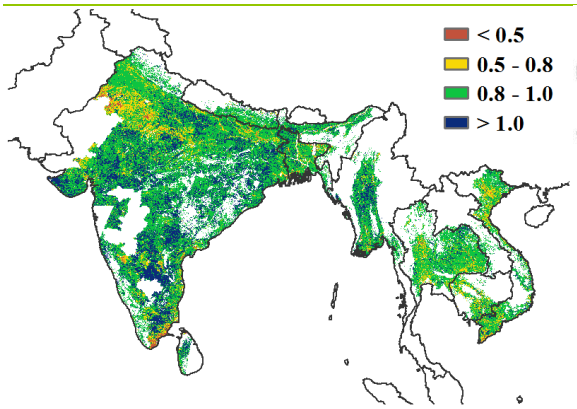
b. Profiles of rainfall departure from average (mm)



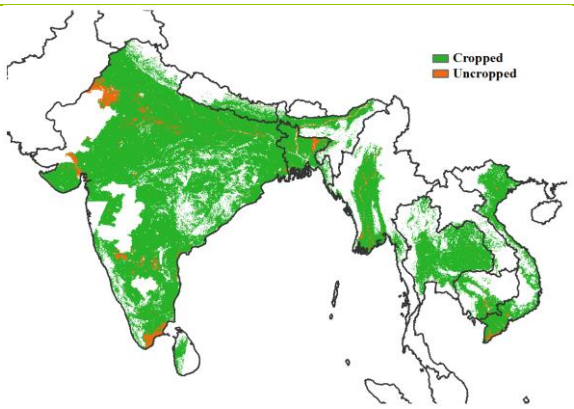
c. Spatial distribution of temperature profiles



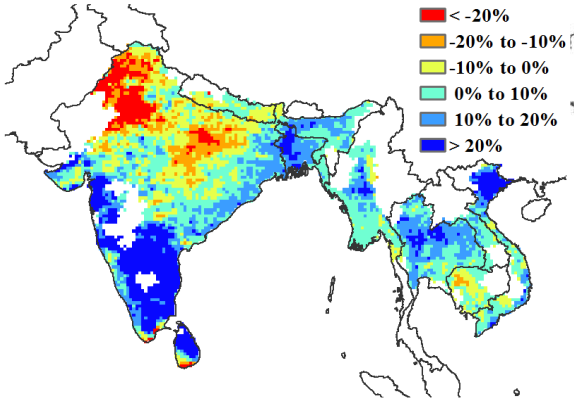
d. Profiles of temperature departure from average (mm)



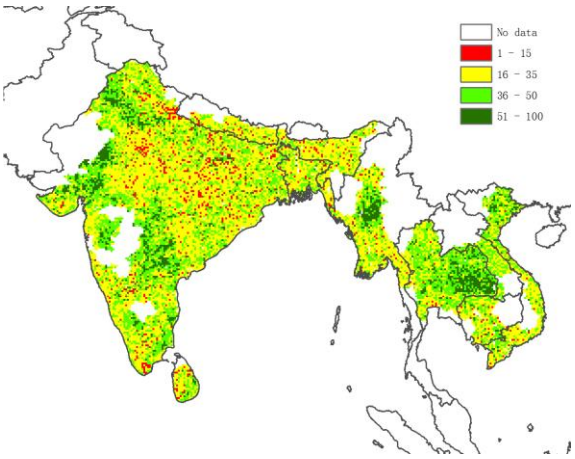
e. Maximum VCI



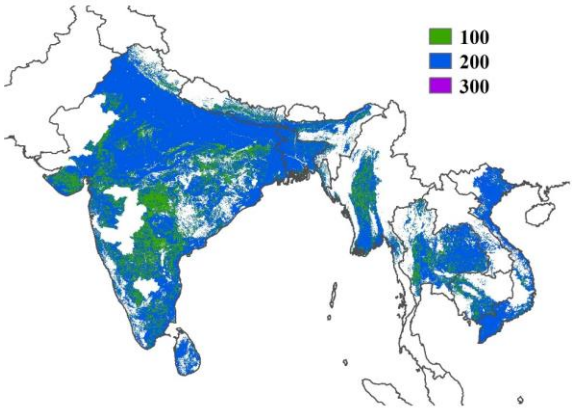
f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum



i. Cropping intensity

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

2.6 Western Europe

At the scale of the MPZ, crop condition was average in the Western European MPZ during this reporting period, with these average conditions resulting from a combination of negative and positive extremes. The figures present an overview of CropWatch agroclimatic and agronomic indicators for this MPZ.

The agroclimatic indicators show that total rainfall across the MPZ (as measured with the RAIN indicator) was 3% below average, resulting from marked negative departures in large parts of the Mediterranean region throughout the monitoring period and also including most of the United Kingdom, Germany, Denmark, the Czech Republic, Slovakia, Austria, and Hungary in late August and mid-October. The most severely affected three countries were Spain (RAIN, -53%), France (-42%), and Italy (-25%). All countries will need more rain in the coming weeks to raise soil moisture levels, allow seedbed preparation, and create favorable conditions for the germination and emergence of newly sown crops. The rainfall deficit was most severe in southern France and western Italy, where sowing activities usually start in November.

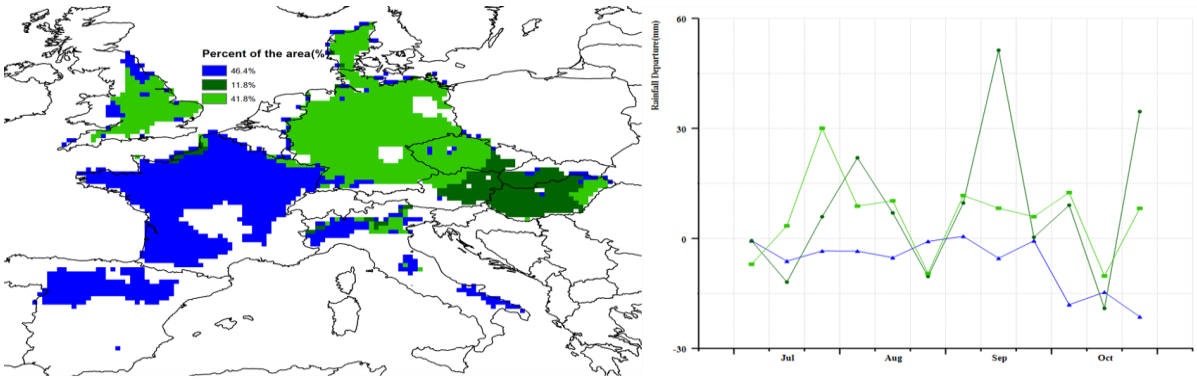
Exceptional positive RAIN departures were recorded (1) over most of the United Kingdom, Germany, Denmark, the center and west of the Czech Republic, western Austria, and eastern Hungary from mid-July to mid-August, early September to early October, and late October, and also (2) east of the Czech Republic, center and east of Austria, southwest Slovakia, and most of Hungary from late July to mid-August, early September to early October, and late October. In large parts of the northern region of this MPZ, the sowing of winter crops, already delayed by the late harvesting, was further hampered by excessively wet conditions.

Temperature (TEMP) was average for the MPZ as a whole, but radiation was below average with RADPAR at -5%. Below average temperatures were observed in most parts of the MPZ from late July to early October, with the exception of Spain. However, heatwaves in Mediterranean regions and eastern parts of the MPZ continued until the end of August.

Due to the rainfall deficit and heatwaves, the biomass accumulation potential BIOMSS was 1% below the recent five-year average.The lowest BIOMSS values (-20% and less) occurred in most of France, Spain, and Italy. In contrast, BIOMSS was above average (sometimes exceeding a 10% departure) over most of the United Kingdom, Germany, the Czech Republic, south Slovakia, northeast Austria, and most of Hungary. The average maximum VCI for the MPZ reached a value of 0.80 during this reporting period, indicating favorable crop condition. More than 89% of arable lands were cropped, which is 2% below the recent five-year average. Most uncropped arable land is concentrated in Spain and southeast Italy. Cropping intensity (117%) was down 6% compared with the five-year-average across the MPZ.

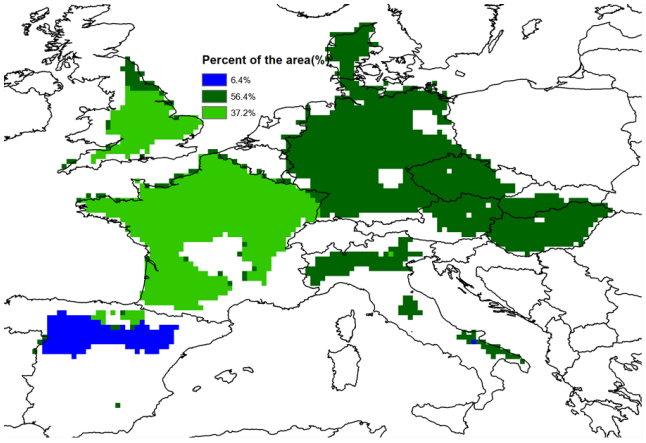
Generally, the condition of summer crops in the MPZ was below average, and more rain will be needed to ensure an adequate soil moisture supply for the ongoing winter crop season.

Figure 2.5 Western Europe MPZ: Agroclimatic and agronomic indicators July-October 2017

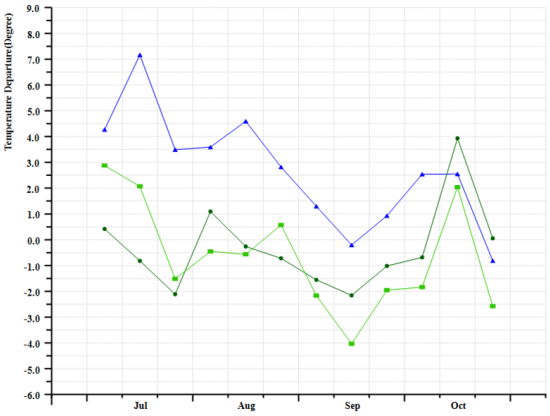


a. Spatial distribution of rainfall profiles

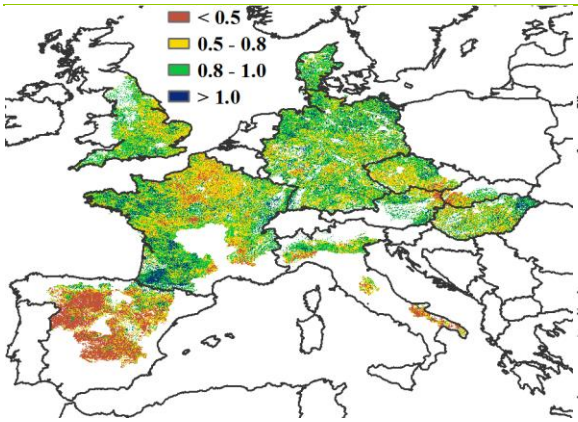
b. Profiles of rainfall departure from average (mm)



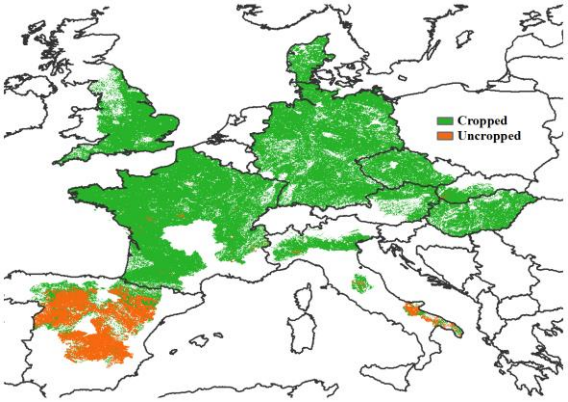
c. Spatial distribution of temperature profiles



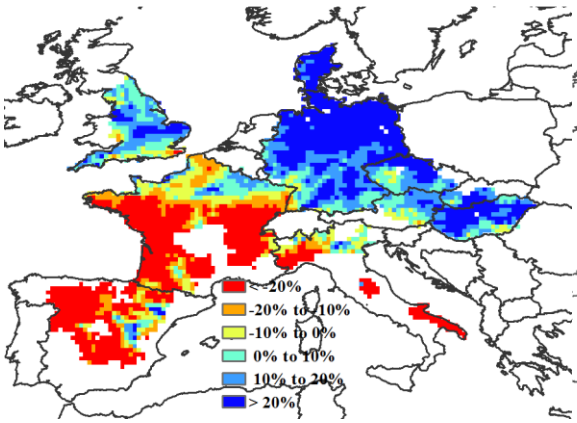
d. Profiles of temperature departure from average (mm)



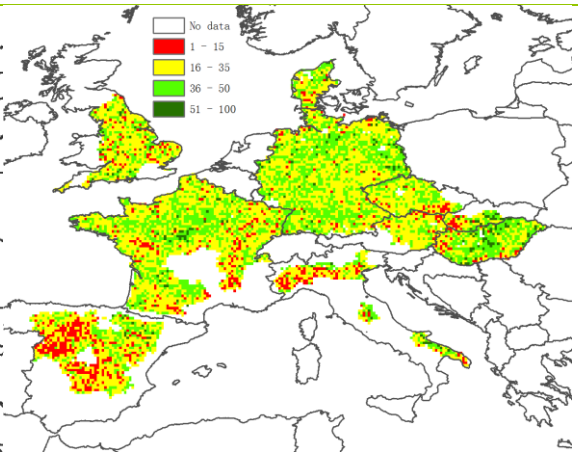
e. Maximum VCI



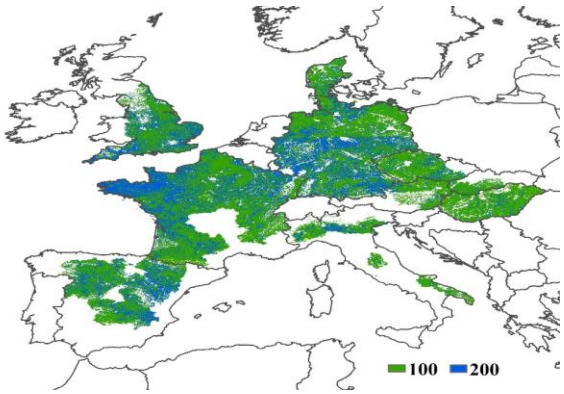
f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum



i. Cropping intensity

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

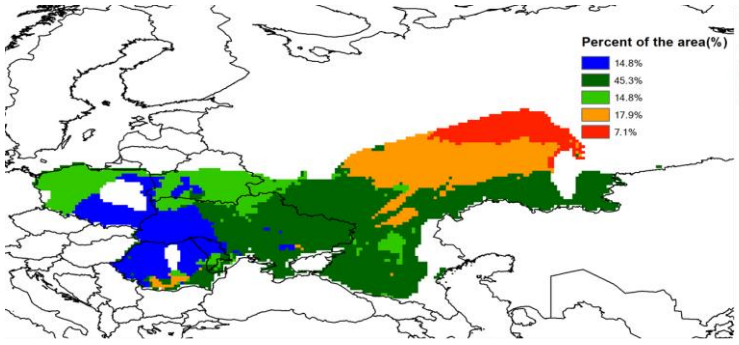
2.7 Central Europe to Western Russia

During the current monitoring period, crop condition showed significant regional disparities over the Central Europe to Western Russia MPZ. Sowing of winter crops was completed under somewhat colder (TEMP, 0.3°C below average) and less sunny (RADPAR, -1%) than average weather, while the abundant rainfall (+11%) improved the condition of soil moisture for the growing of winter crops.

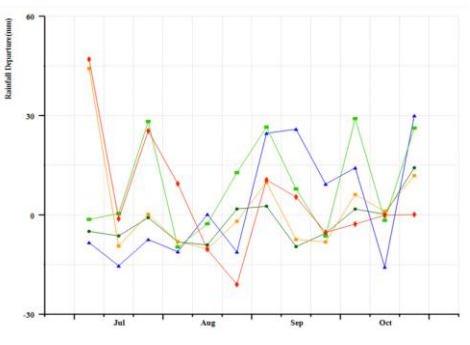
As indicated by the rainfall profiles, the southern part of the MPZ (including Romania, Ukraine, eastern Poland, and southern Russia) shows a rainfall deficit in July and August. In the following two months, rainfall in most regions increased to above average, especially in western Poland and Belarus with three peaks with almost 30% above average rainfall occurring in early September, early October, and late October. Temperature profiles show correlated variations across the whole MPZ, though with the exception of the eastern part (in Russia). The highest temperature (5.5°C above average in mid-September) was recorded for Luhans'ka and Donets'ka of Ukraine and the Oblasts of Rostovskaya and Volgogradskaya as well as the Krasnodarskiy and Stavropolskiy Krays.

The sufficient rainfall led to a significant increase in potential biomass for the whole MPZ (BIOMSS, +9% compared to the five-year average). The distribution map of the potential biomass, however, showed regional differences, including a large positive biomass departure (BIOMSS more than +20%) in Poland, Belarus, western Ukraine, northern Romania, and most parts in southwestern Russia. In contrast, the eastern Ukraine, as well as the Krasnodarskiy Kray and the Oblast of Saratovskaya showed significant drops in potential biomass. The pattern is consistent with the distribution of VHIn and VCIx. Almost 97% of the arable land was actually cropped during the reporting period (with a CALF of 1% above average). Uncropped land concentrated in Crimea, Khersons'ka, and southwestern Russia, leading to low maximum VCI values (less than 0.5) in these areas. The cropping intensity increased by 2% compared to the recent five-year average. The double cropping area is mainly distributed in southern Poland and southwestern Russia. Generally, with most parts indicating above average crop conditions, prospects for crop production are promising in the Central Europe to Western Russia MPZ.

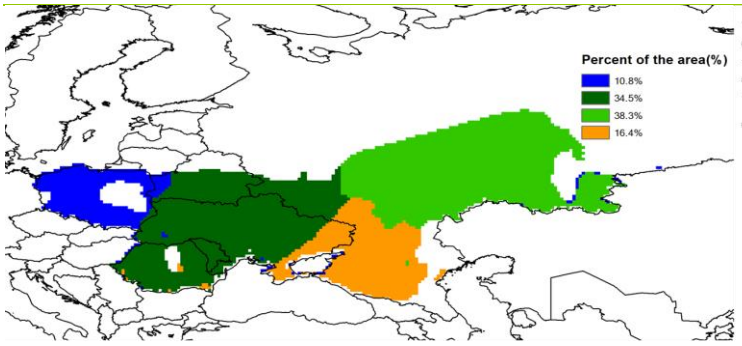
Figure 2.6 Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, July-October 2017

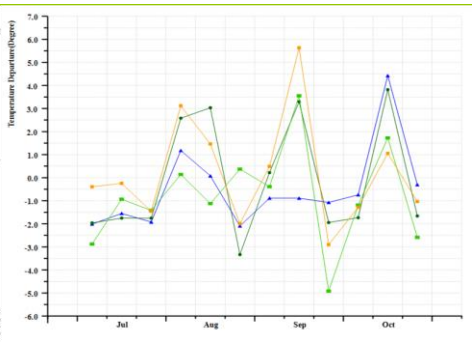


a. Spatial distribution of rainfall profiles

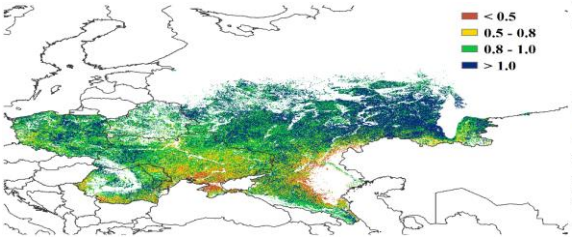


b. Profiles of rainfall departure from average (mm)

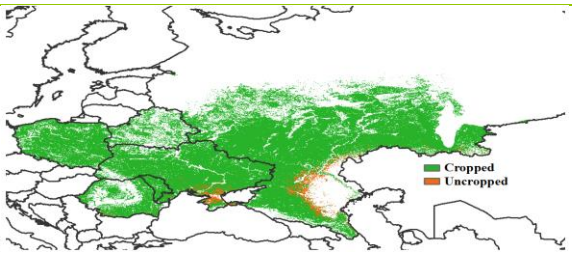




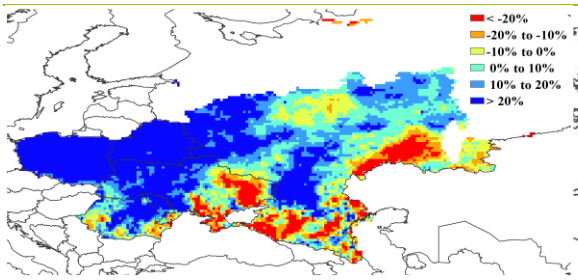
c. Spatial distribution of temperature profiles



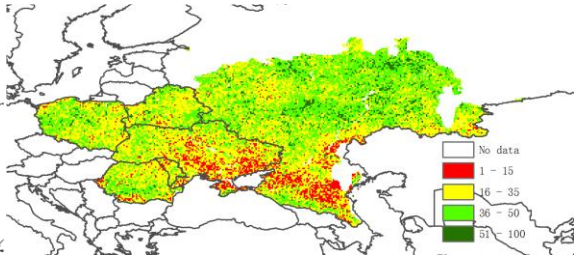
d. Profiles of temperature departure from average (mm)



e. Maximum VCI

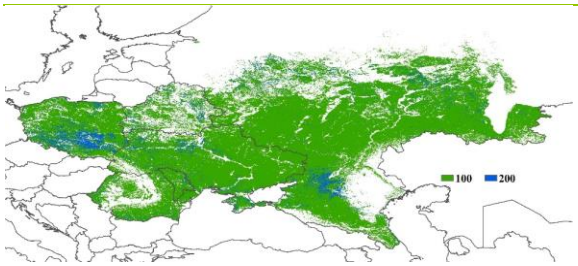


f. Cropped arable land



g. Biomass accumulation potential departure

h. VHI minimum



i. Cropping intensity

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