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 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/m^2)	Departure (%)
West Africa	1004	18	25.9	-0.6	1139	7
South America	380	9	19.3	-0.6	955	-4
North America	477	27	20	-0.5	1111	-2
South and SE Asia	1089	2	27.1	-0.3	1045	-3
Western Europe	217	-19	17.4	1.1	1022	8
C. Europe and W. Russia	222	-4	16.5	0.7	916	6

*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 2003-2017.*

Table 2.2. July - October 2018 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	Cropping Intensity	
	Current	Departure (%)	Current	Departure (% points)	Current	Current	Departure from 5YA (%)
West Africa	1825	-2	96	0	0.93	132	3
South America	1235	25	90	1	0.68	176	5
North America	1325	13	95	2	0.91	137	10
S. and SE Asia	1574	-13	94	-1	0.89	167	3
Western Europe	971	-7	92	2	0.77	112	-8
Central Europe and W Russia	1022	2	93	-3	0.82	101	-2

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

2.2 West Africa

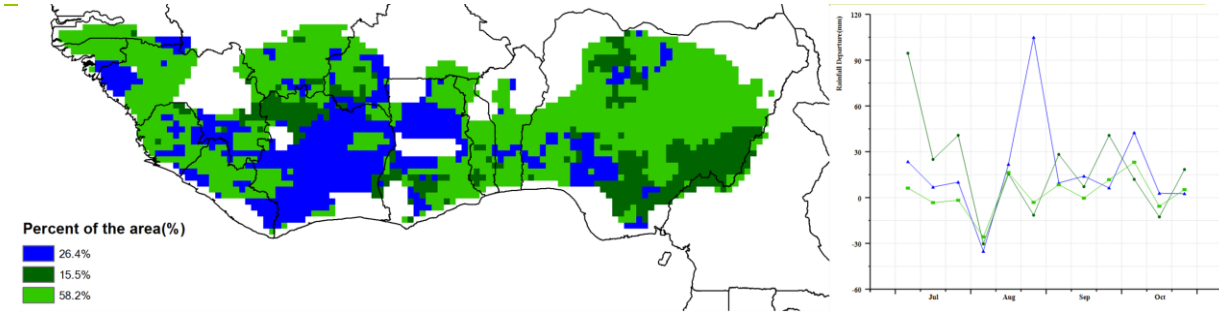
The reporting period marks the end of the main harvesting season throughout the region for maize, sorghum, millet, and yams, with cereal production expected to be above average as reflected by the cropping intensity of 132 (5YA Departure: +3%) strongly influenced by the seasonal rainfall variation. The north of the MPZ, receiving a unimodal rainy season, has most of its cultivated cereals under harvesting. In the western MPZ covering Guinea to Liberia, the rice crop harvesting extends into December and January. The MPZ area experiencing bimodal rainfall (southern Côte d'Ivoire to Nigeria) harvested its first crop in October, while the short season maize will be harvested in January 2018. Cassava, the main staple in this region is reflected in the current cropped arable land area as the crop is still in the fields growing.

The CropWatch observations indicated an average rainfall 1004 mm with an overall increase above average (+18% for RAIN), with average temperature of 25.9°C (-0.6°C departure) and sunshine (RADPAR=1139 MJ/m2, +7%), which resulted in a slight decrease in biomass production potential (BIOMSS=1825gDM/m2, 5YA Departure: -2%). However, the coastal regions of Cote I'voire, Ghana, Benin and Togo as well as parts of western Nigeria experienced a positive departure (>20%) in biomass as compared to the whole region (<20%). A more pronounced BIOMSS negative departure was observed in Guinea Bissau, Guinea, Sierra Leon and Eastern Nigeria (-20 to 0%). The increase of precipitation above average in the west of the region, resulted in improved river flow in the Niger catchment and irrigated crops in the Sahel (in Niger, the flow peaks between December and March, according to the years).

For most of the MPZ, the cropped arable land fraction (CALF) reached 96% while the VCIx map as index of crop condition showed average VCIx of 0.93. These climatic conditions were favorable across the region with northern Nigeria showing a good share of cropped arable land.

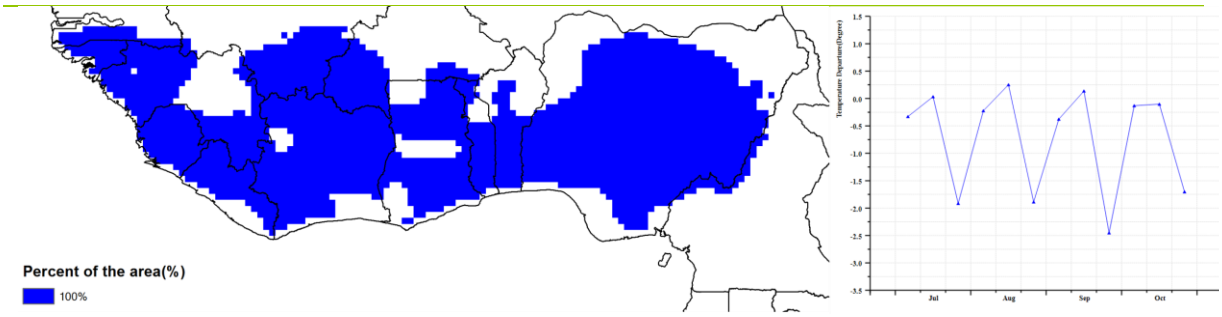
Precipitation was well distributed in time and space, temperature fluctuating within a +/-2°C margin after cessation of the rainy season. Based on these observations CropWatch indicators depict a stable and coherent climatic condition for late crop harvests.

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



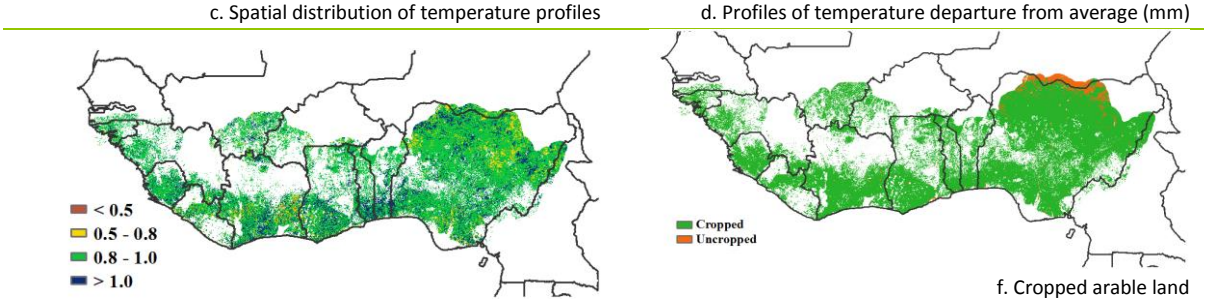
a. Spatial distribution of rainfall profiles

b. Profiles of rainfall departure from average (mm)



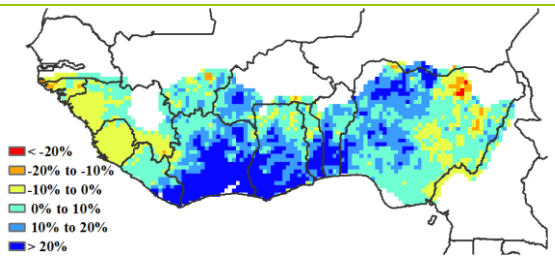
c. Spatial distribution of temperature profiles

d. Profiles of temperature departure from average (mm)

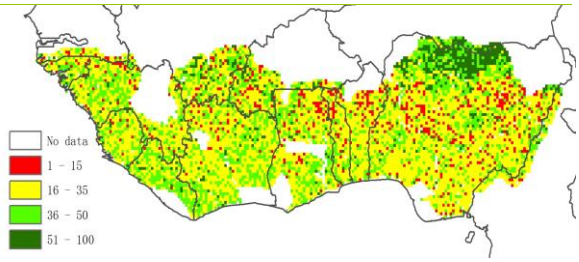


f. Cropped arable land

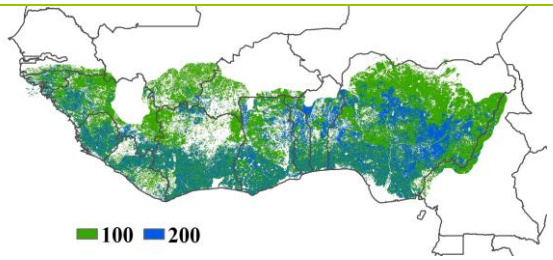
e. Maximum VCI



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

This monitoring period covers the late growth and harvesting stage of summer crops (maize, soybean, rice, and spring wheat). In general, crop condition was mixed due to abnormal below average temperature in the Canadian Prairies, abundant precipitation but below average sunshine in the Corn Belt and Northern Plain, destructive Fire and a Hurricane.

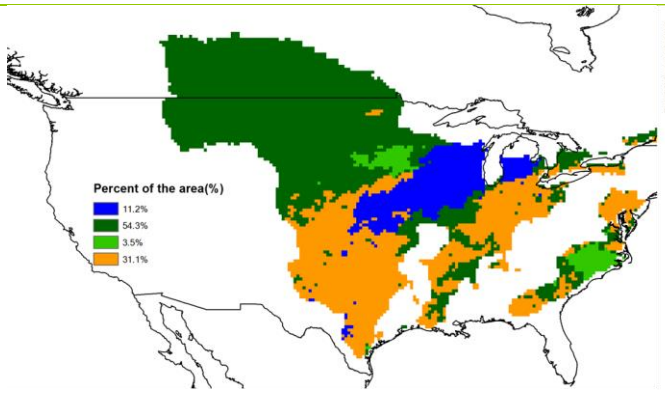
RAIN was significantly above average by 27%; it reached + 26% in United States but -3% in Canada. TEMP and RADPAR were below average by 0.5 ℃ and 2%, respectively. The West coast of North America was below average by 31%, and the extremely dry conditions favored destructive fires (Carr Fire and the Mendocino Complex Fire in California). Most other areas experienced above average precipitation, including British Columbia to Colorado (+2%), Northern Great Plains (+33%), Corn Belt (+17%), and Cotton Belt to Mexican Nordeste (+24%). The Lower Mississippi, Southeast, and Southern Plain received above average precipitation in late August and September, especially for the south-western part of Corn Belt. The maximum positive precipitation departure (above 200 mm) occurred in North Carolina in the early of September due to Hurricane Florence.

Temperature in the Corn Belt was above average by 0.3℃, while the TEMP of British Columbia to Colorado and Northern Great Plains were below average by 0.4℃ and 1.2℃. TEMP of Cotton Belt to Mexican Nordeste and West Coast was nearly average. From mid-August to the late of October, the MPZ experienced abnormal below average temperature, the maximum negative departure of temperature reached -7.0℃ in late September. The significant decrease was also observed in Northern Plain. At the same time, the core part of Corn Belt, cotton belt and Southeast regions experienced abnormal above average at temperature.

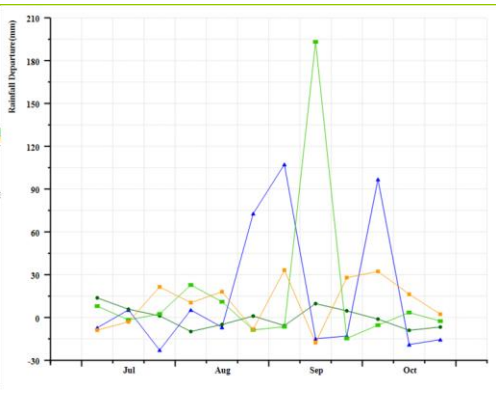
Potential Biomass of North America was above average by 10%, but in the Canadian Prairies and the Southern Plains, below average precipitation and significantly below normal temperature caused a sharp decline of potential biomass (-20%). VCIx was 0.89 and even exceeded 1 in some regions of the Northern Plains. Cropping intensity of Canada was below average by 3%.

In general, crop condition was mixed in the north-American MPZ.

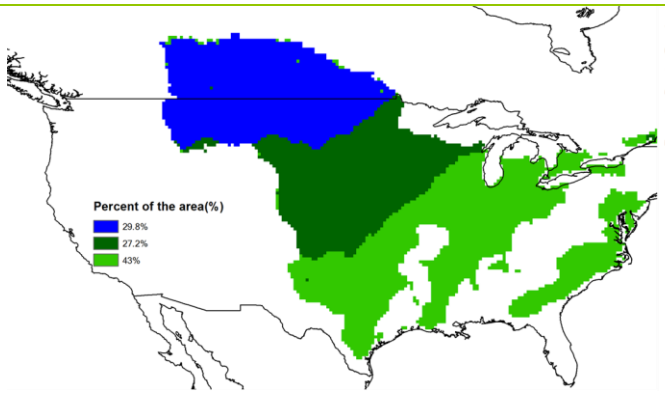
Figure 2.2. North America MPZ: Agroclimatic and agronomic indicators, July - October 2018.



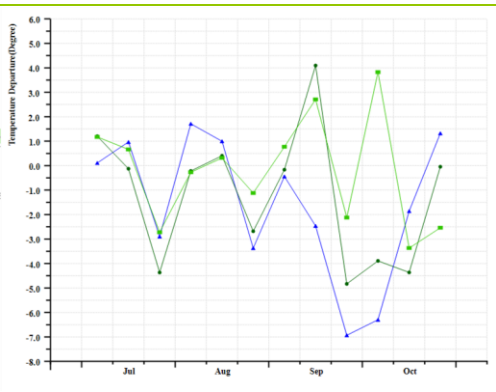
a. Spatial distribution of rainfall profiles



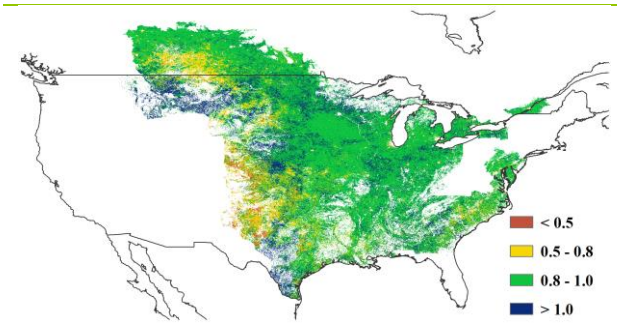
b. Profiles of rainfall departure from average (mm)



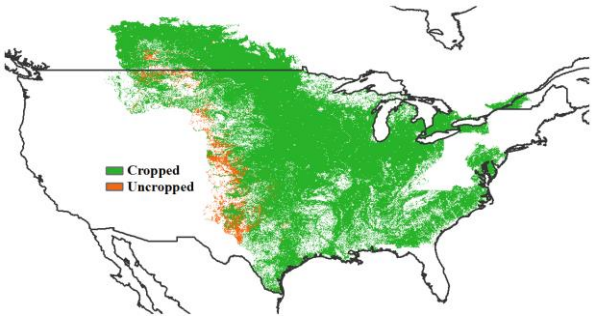
c. Spatial distribution of temperature profiles



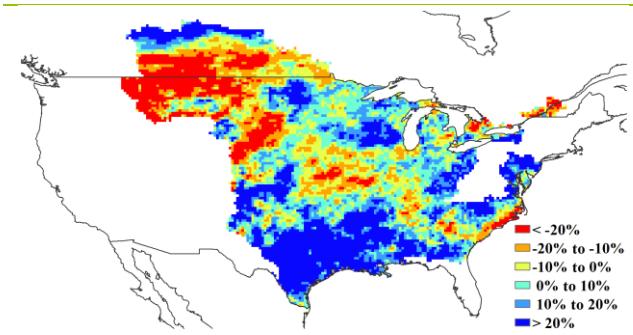
d. Profiles of temperature departure from average (mm)



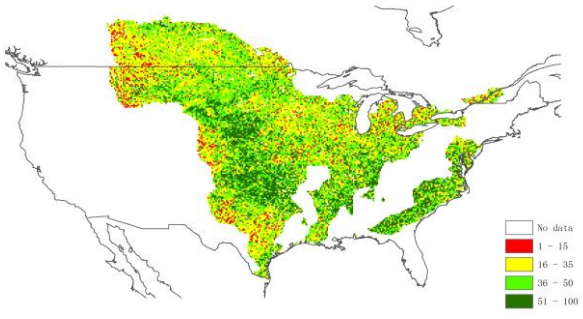
e. Maximum VCI



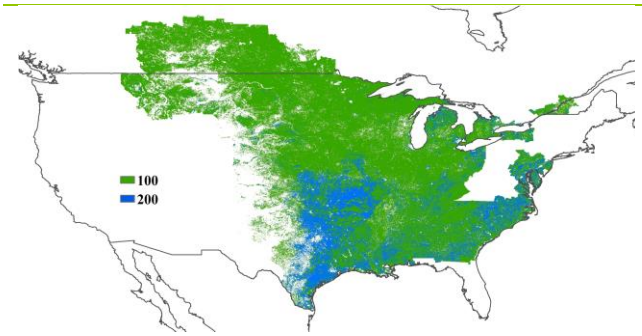
f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum



i. Cropping intensity

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

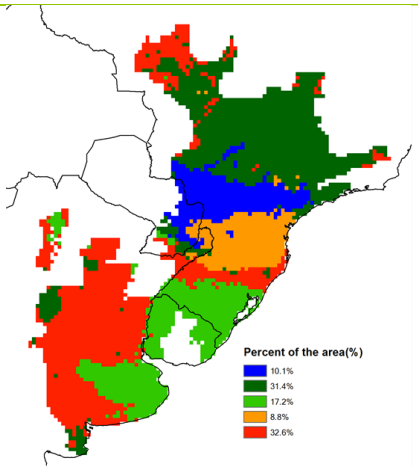
2.4 South America

The region showed generally average conditions, with above average rainfall (up 9% compared with average) which benefited winter crops. The increase is welcome after the negative anomaly of the previous reporting period. Most of the region shows a tendency to deviate positively from average conditions during the second half of the period (Figures 2.3.a and 2.3.b).

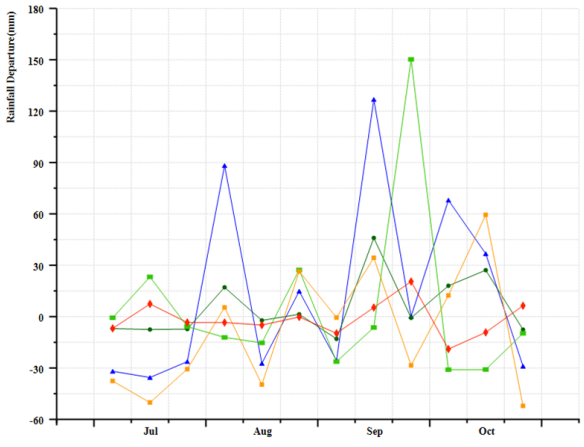
Negative anomalies were observed for RADPAR (reduction of 4 %) and for TEMP (reduction of 0.6°). The second variable fluctuated a lot but in a synchronized fashion across the region. The most extreme variations were observed over Uruguay and surrounding areas.

BIOMSS showed a marked increment of 25% compared to average conditions, nevertheless with a lot of spatial variation. Positive anomalies are observed in the northern and south-eastern parts of Brazil, center Pampas and Northern Chaco in Argentina. Negative anomalies affected remaining areas, particularly the West Pampas. The map of cropped and uncropped arable land shows that most of the area was cropped (90 %), except from a small area in the West Pampas and Chaco. Buenos Aires province, where wheat is the main crop, is fully cropped. Areas mapped as "uncropped" occur in the West Pampas are dominated by summer crops; the observation may reflect delays in planting. The area may be cultivated from November with a larger relative share of soybean or in December/January with maize. Average VCIx for the whole MPZ was 0.68, with the lowest values in West Pampas and North Chaco.

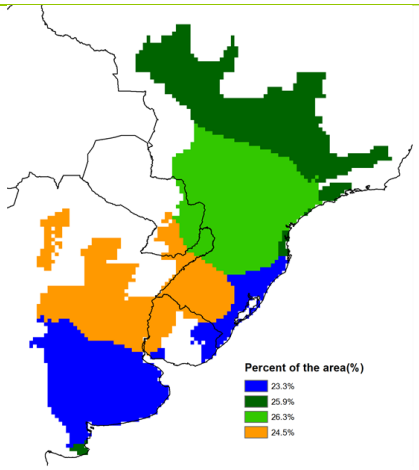
Figure 2.3. South America MPZ: Agro-climatic and agronomic indicators, July - October 2018.



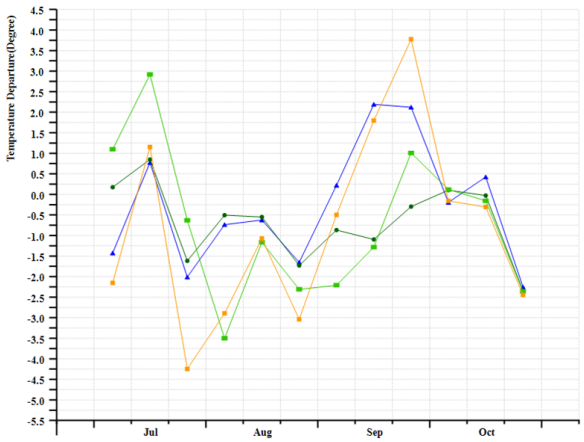
a. Spatial distribution of rainfall profiles



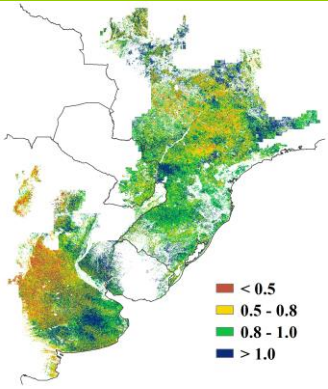
b. Profiles of rainfall departure from average (mm)



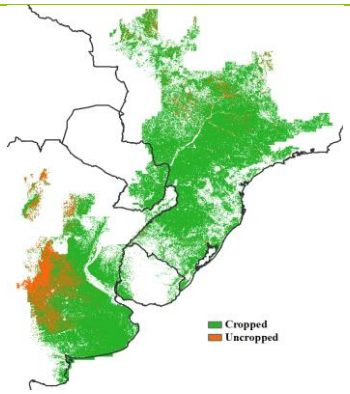
c. Spatial distribution of temperature profiles



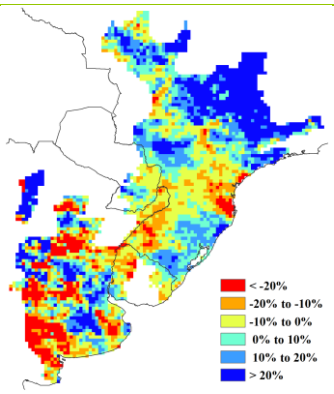
d. Profiles of temperature departure from average (mm)



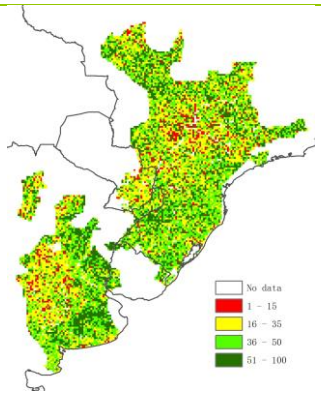
e. Maximum VCI



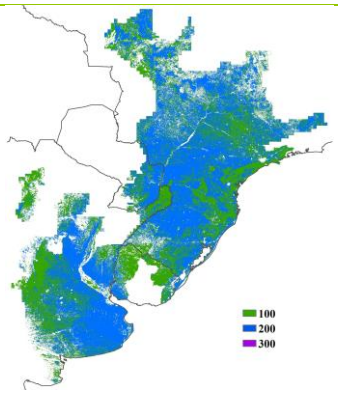
f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum



i. Cropping intensity

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

2.5 South and Southeast Asia

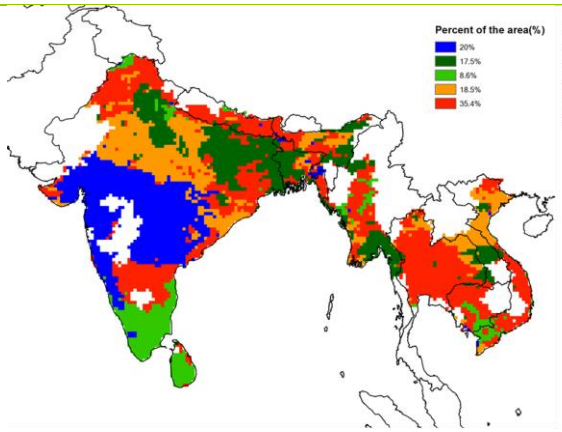
Generally satisfactory crop condition prevailed at the scale of the South and Southeast Asia MPZ during the reporting period with the maximum Vegetation Condition Index (VCIx) reaching 0.89, even if the biomass production potential (BIOMSS) was 13% lower than the 5-year average. The fraction of cropped arable land (CALF) was average. RAIN was close to average but both temperature (TEMP) and photosynthetically active radiation (RADPAR) were below average by 0.3°C and 3%, respectively.

Some national RADPAR values reached significant departure as for instance in India (-5%) and Nepal (-7). Thailand recorded a slight positive anomaly (RADPAR 3% above the average). Other countries were closer to average. TEMP stayed below the average in all countries with significantly cooler than average weather in Cambodia (-0.8°C below average) and Nepal (-1.1°C below average). For rain the largest anomalies are those of Cambodia and Nepal (-8% and -13% respectively) and Laos (+14%).

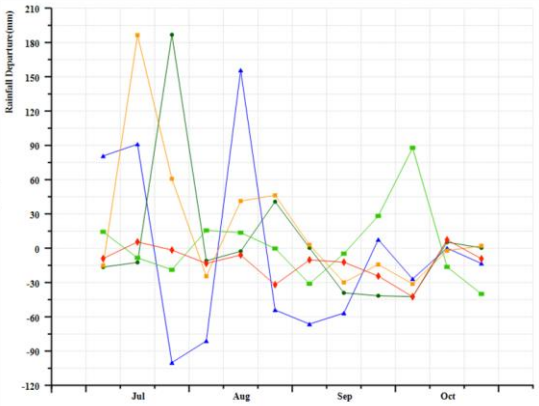
As a reflection of the agro-climatic conditions during the reporting period, BIOMSS fell below the reference of the 5YA average in all Southern and Southeast Asian countries in the MPZ. The largest departures are those in Nepal (-20%), India (-18%), Laos (-11%) and Bangladesh (-7%).

Uncropped arable land occurs mainly in India, Bangladesh, and southern Vietnam. The cropping intensity of the South and Southeast Asia MPZ was 167%, which is 3% above the average. Low values of VHI minimum were recorded mainly in India.

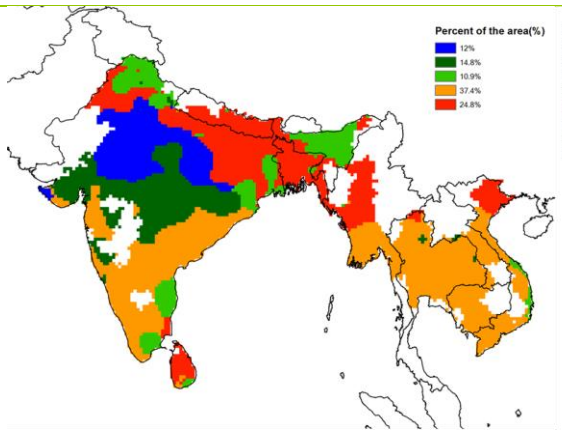
Figure 2.4. South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, July - October 2018.



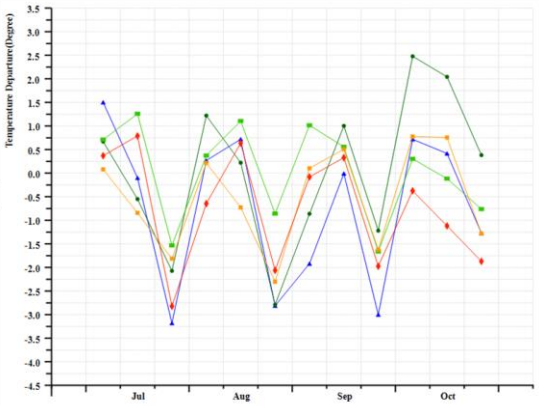
a. Spatial distribution of rainfall profiles



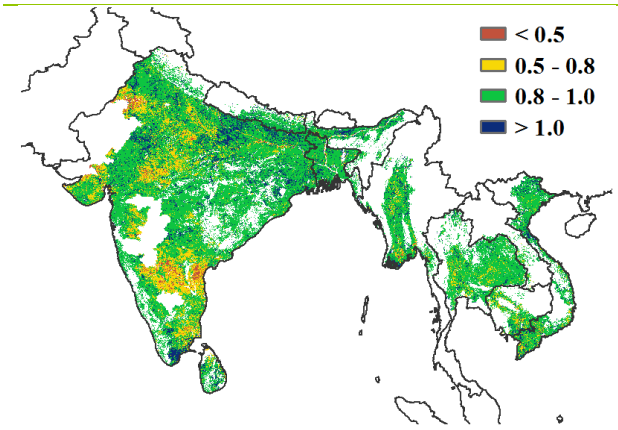
b. Profiles of rainfall departure from average (mm)



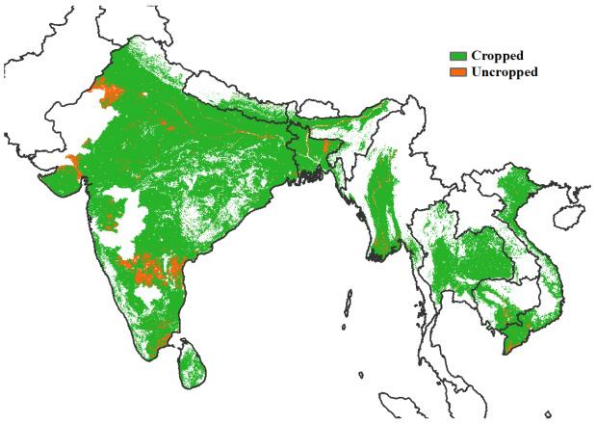
c. Spatial distribution of temperature profiles



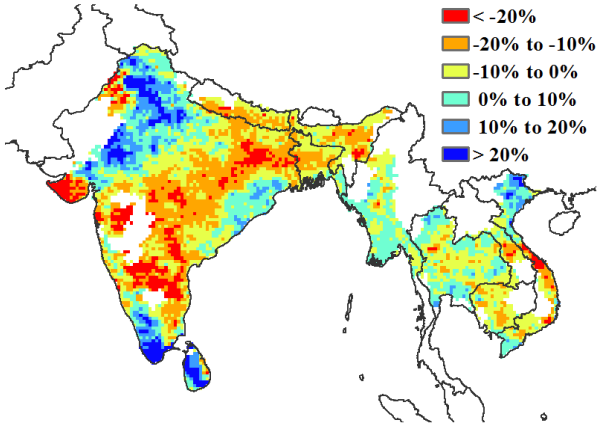
d. Profiles of temperature departure from average (mm)



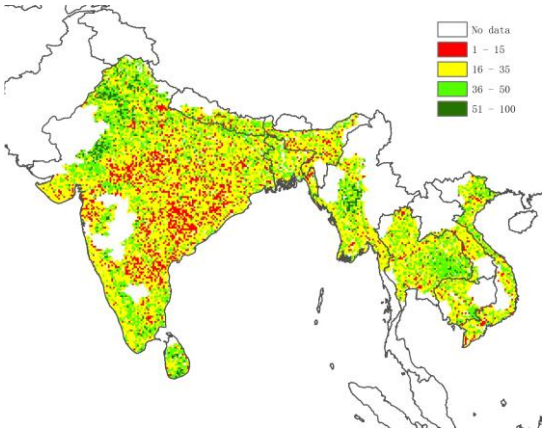
e. Maximum VCI



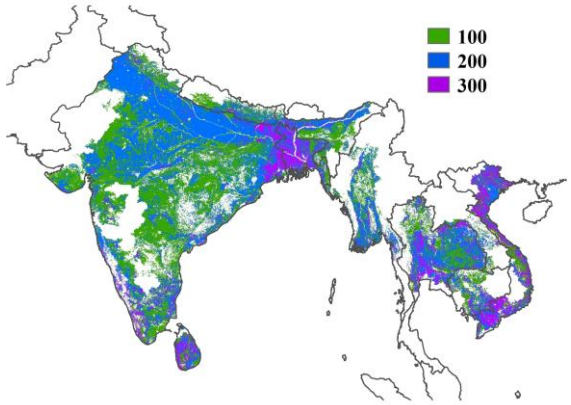
f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum



i. Cropping intensity

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

2.6 Western Europe

Crop condition was below average at the scale of the Western European MPZ during this reporting period, marked by a strong positive temperature anomaly and continuous dryer-than usual weather conditions in most areas.

Total rainfall across the MPZ (as measured with the RAIN indicator) was 19% below average, resulting from marked negative departures in large parts of the Western European MPZ including most of Germany, France, the United Kingdom, Spain, Denmark, central and eastern Italy, north-western Czech Republic, eastern Slovakia, central Austria, and east Hungary. These negative departures also cover most of the Czech Republic, eastern Austria, south-western Slovakia and western-central Hungary from July to late-August, mid-September, early-October to mid-October, and north Italy at mid-August and from mid-

September to mid-October. The most severely affected countries were Germany (RAIN, -40%), the Czech Republic (RAIN, -21%), Austria (RAIN, -19%) and France (RAIN, -18%). Exceptional positive RAIN departures were only recorded in (1) northern Italy from July to early-August, late-August to early-September and late-October, and in (2) western and southern-central Czech Republic, eastern Austria, south-western Slovakia and western-central Hungary in early September, late September and late October. Drought conditions hampered the sowing and emergence of winter crops. Almost all countries will need more rain in the coming weeks to raise soil moisture levels to allow seedbed preparation.

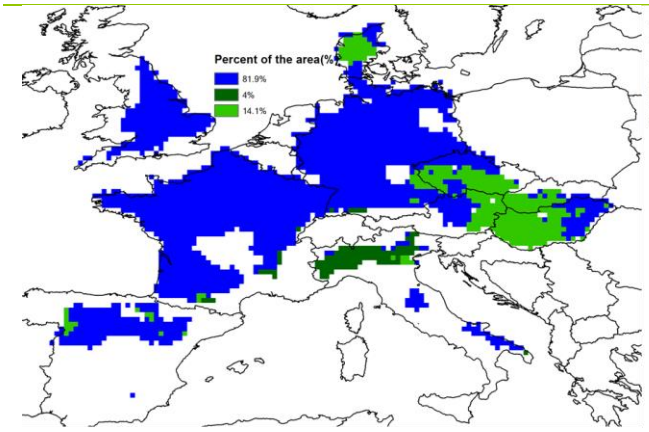
Temperature for the MPZ as a whole was above average (TEMP +1.1°C) and sunshine (RADPAR) was above average with by a very spectacular 8%.A heatwave occurred during late-July and early-August in much of Europe, with temperature exceeding 30°C, with anomalies in the range of +2°C to +4°C in different regions, for instance in the mid-September in south Spain and in the mid-October in the east of the MPZ. The dry and warm weather shortened the graining filling stage of crops and accelerated the maturity, which reduced yields.

Due to continuous drought and heatwaves, the biomass accumulation potential BIOMSS was 7% below the recent five-year average. The lowest departures (-20% and less) occurred in most of Germany, northern France, western Czech Republic, western Spain, eastern United Kingdom, western Austria, and eastern Hungary. In contrast, BIOMSS was above average (sometimes exceeding a 10% departure) over south-western France, northern and eastern Italy, and eastern Spain.

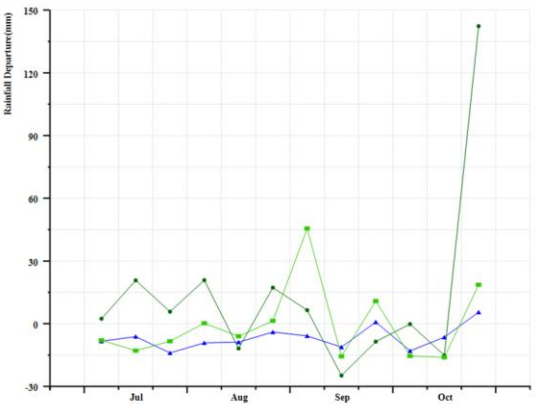
The average maximum VCI for the MPZ reached a value of 0.77 during this reporting period, indicating unfavorable crop condition. More than 92% of arable lands were cropped, which is 2% above the recent five-year average. Most uncropped arable land was concentrated in Spain, central France and south-eastern Italy. Cropping intensity (112%) was down 8% 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.

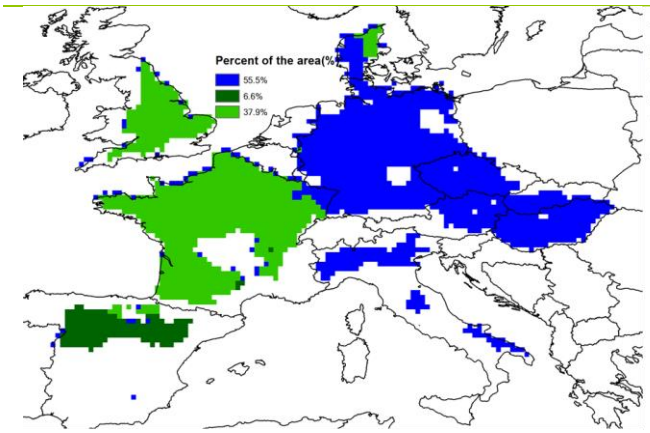
Figure 2.5. Western Europe MPZ: Agroclimatic and agronomic indicators, July - October 2018.



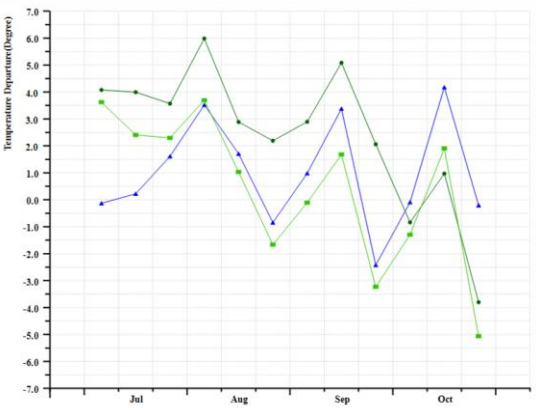
a. Spatial distribution of rainfall profiles



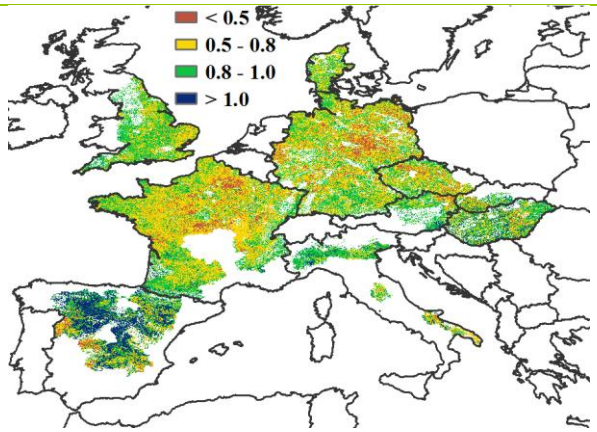
b. Profiles of rainfall departure from average (mm)



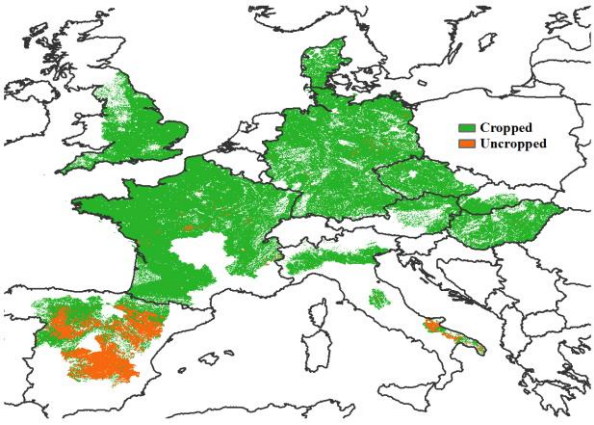
c. Spatial distribution of temperature profiles



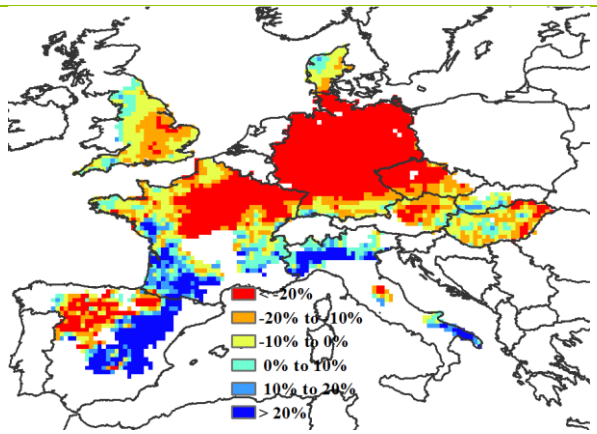
d. Profiles of temperature departure from average (mm)



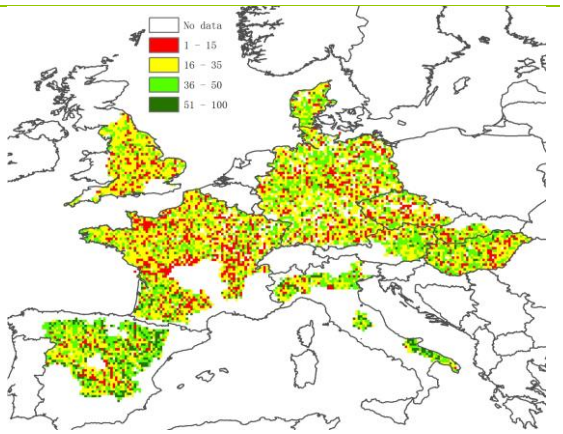
e. Maximum VCI



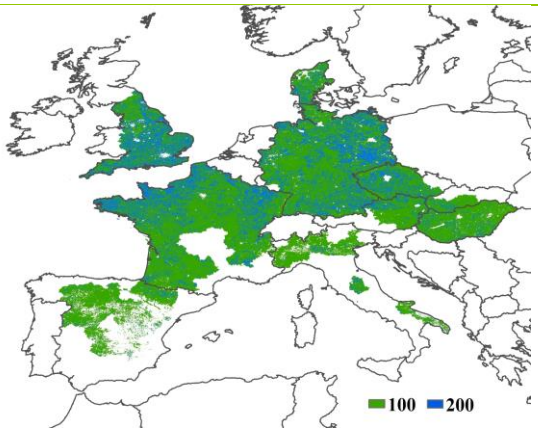
f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum



i. Cropping intensity

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

2.7 Central Europe to Western Russia

Harvesting of summer crops and sowing of winter crops was completed under warm (TEMP +0.7°C above average), very sunny (RADPAR, +6%) and dry weather (RAIN -4%).

Crop condition was generally average over the Central Europe to Western Russia MPZ, although there were some regional differences. As indicated by the rainfall profiles, rainfall was mostly above average at mid-July, especially in Poland, Belarus and the oblasts of western Bryansk, Kursk, Belgorod, Voronezh, Rostov, Volgograd and western Saratov in middle Russia with the peak of 45% above average precipitation. However, the southern part of the MPZ recorded a rainfall deficit in August and September, including Romania, Ukraine, Moldova, the oblasts of eastern Saratov, Samara, Orenburg, Ulyanovsk, Penza, Tambov, Lipetsk, Orlov and the Republics of Bashkortostan and Tatarstan in eastern Russia. At the end of October, rainfall in most regions increased to above average again (up to +30%), especially in

southeastern Ukraine and southern Russia (Krays of Krasnodar and Stavropol, Republics of Karachay-Cherkess, Kabardino-balkariya and North Ossetia-Alania, as well as southern Rostov Oblast).

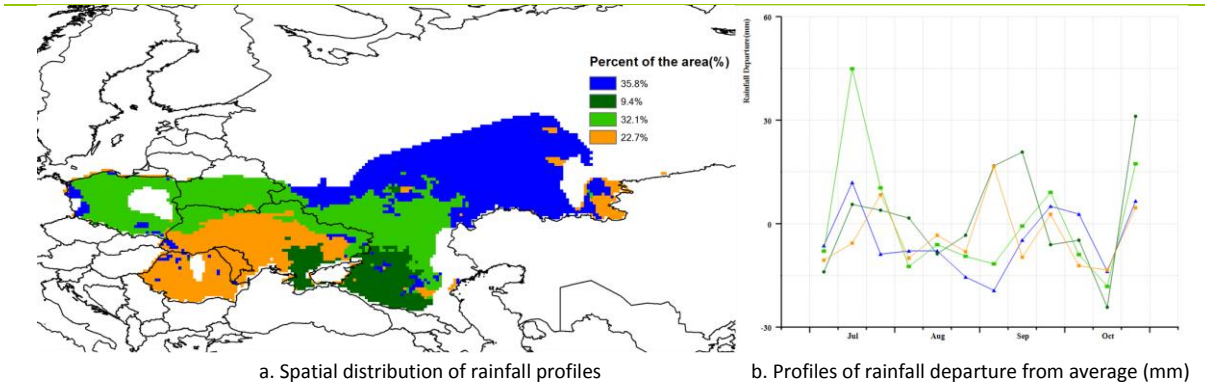
Temperature profiles show more or less synchronized variations across the whole MPZ, with the exception of the western part (Poland, Romania, Moldova, western Belarus, western and middle Ukraine) during the first half and middle August. The highest temperature departure (4.3°C above average in early and mid-September) was recorded for eastern Belarus and Ukraine, and the Russian Oblasts of Bryansk, Kursk, Belgorod, Orlov, Lipetsk and Tambov.

The agroclimatic condition led to an average biomass potential development for the MPZ as a whole (BIOMSS, +2% compared to the five-year average) with a VCIx value of 0.82. The distribution map of the potential biomass, however, showed regional differences, including a large positive biomass departure (BIOMSS more than +20%) in western Belarus, northwestern and southeastern Ukraine, and most parts in southern Russia. In contrast, northern Poland, Romania, as well as the oblasts of eastern Saratov, Samara, western and eastern Orenburg, Ulyanovsk and Penza in Russia showed significant drops in potential biomass.

Almost 93% of the arable land was actually cropped during the reporting period (with a CALF of 3% below average). Uncropped land concentrated in the oblasts of Volgograd, Astrakhan, southeastern Saratov and the Kalmykia Republic.

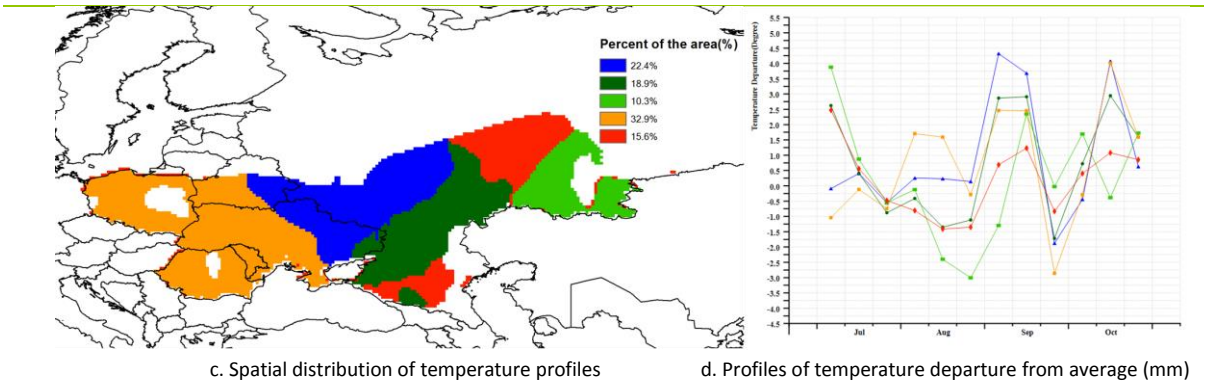
The cropping intensity decreased by 2% compared to the recent five-year average. The double cropping area is mainly distributed in western Poland, southern Ukraine and southeastern Romania. Generally, with most parts indicating average crop conditions, prospects for crop production are promising in the Central Europe to Western Russia MPZ.

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



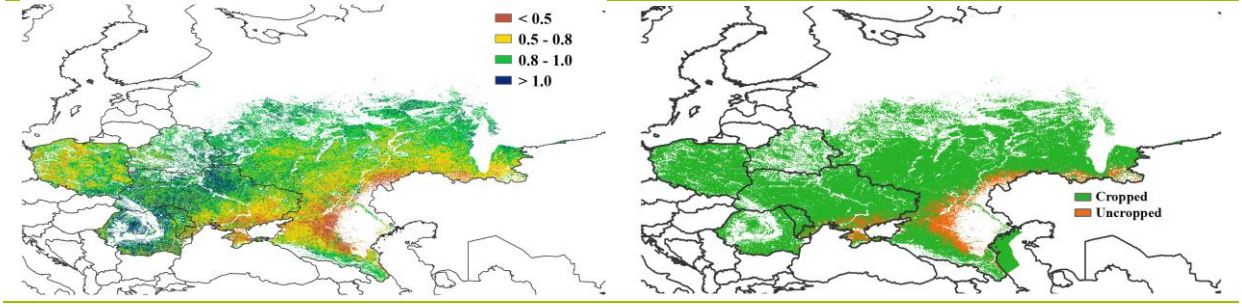
a. Spatial distribution of rainfall profiles

b. Profiles of rainfall departure from average (mm)

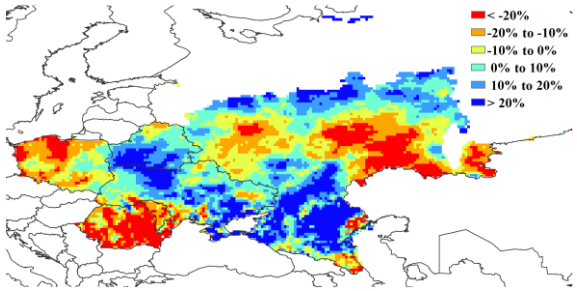


c. Spatial distribution of temperature profiles

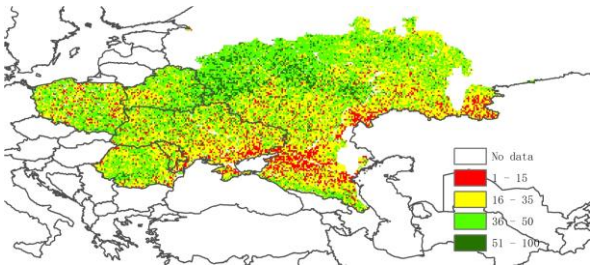
d. Profiles of temperature departure from average (mm)



e. Maximum VCI

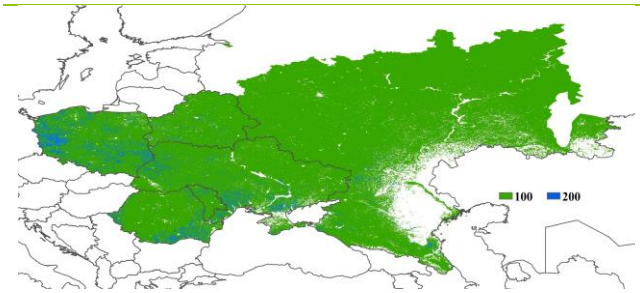


f. Cropped arable land



g. Biomass accumulation potential departure

h. VHI minimum



i. Cropping intensity

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