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 http://www.cropwatch.com.cn/htm/en/bullAction!showBulletin.action#.

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. The text mostly refers simply to "average" with the averaging period implied.

Table2.1 Agroclimatic indicators by Major Production Zone, current value and departure from 15YA (July to October 2019)

	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m²)	Departure (%)	Current (gDM/m²)	Departure (%)
West Africa	1058	12	24.6	-0.3	1086	1	724	3
North America	436	30	20.3	-0.3	1134	0	609	0
South America	292	-19	18.4	0.0	1018	3	437	5
S. and SE Asia	1534	21	25.4	-0.1	1044	-3	676	1
Western Europe	308	3	16.4	0.6	977	3	455	8
C. Europe and W. Russia	256	-2	14.6	-0.7	867	-1	376	-7

*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 2004-2018.*

Table2.2 Agronomic indicators by Major Production Zone, current season values and departure from 5YA (July to October 2019)

	CALF (Cropped arable land fraction)		Maximum VCI	CI (Cropping Intensity)	
	Current (%)	5A Departure (%)	Current	Current (%)	5A Departure (%)
West Africa	97	1	0.96	126	-2
North America	96	2	0.93	103	8
South America	89	-2	0.65	130	2
S. and SE Asia	97	2	0.99	141	6

Western Europe	90	0	0.87	133	3
Central Europe and W Russia	94	-2	0.84	108	0

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 2014-2018.

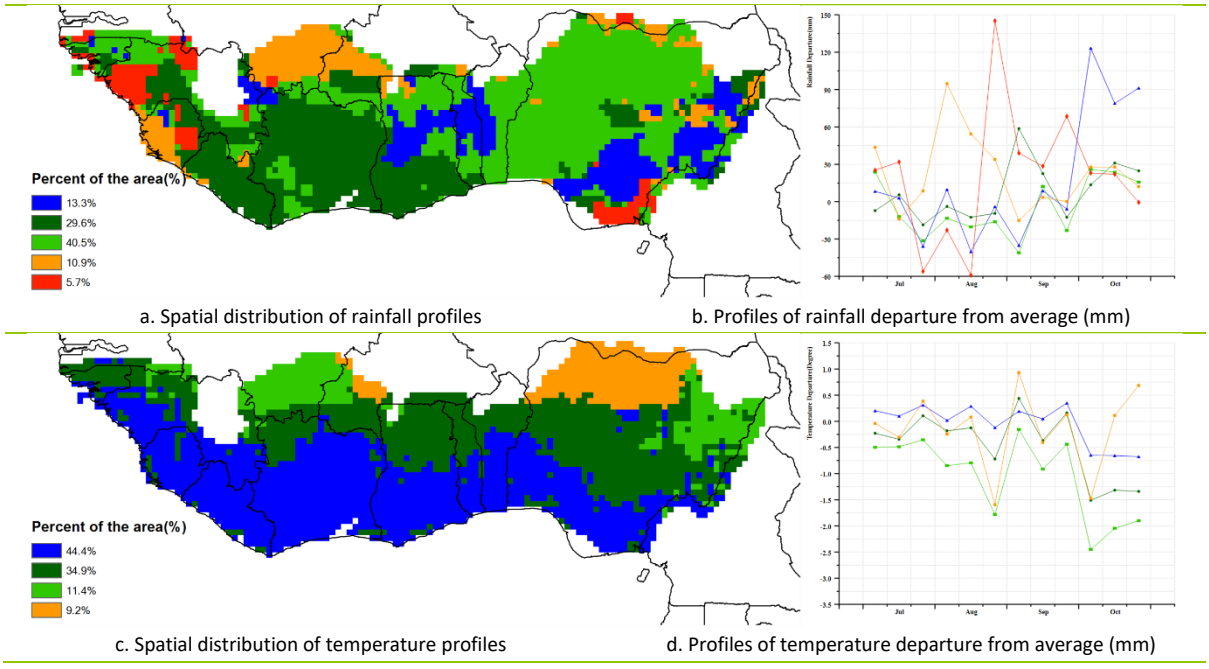
2.2 West Africa

The reporting period covers the onset of the main rainy season throughout south of the region and the end of the rainy season in the northern Sahelian areas. The main activities include the sowing of main cereals (maize, sorghum, millet, and rice) under both rainfed and irrigated conditions. Tuber crops like yam are being harvested while rice harvest extends into December and January. In the south with bimodal rainfall, the first maize crop was harvested in October; however cassava is still growing hence contributing to the cropped arable land as reflected by the CALF (97%).

Indicators show close to but above average rainfall of 1058 mm (+12%), average temperature (TEMP 24.6°C, down 0.3°C) and sunshine (RADPAR 1086 MJ/m2, up 1%), leading to a marginal increase in biomass production potential (BIOMSS 724 gDM/m2, +3%) with larger departures observed in south-eastern Nigeria bordering Cameroon. The cropped arable land fraction (CALF) reached 97% for the region (1% above 5YA). The maximum VCI (VCIx) map as an index of crop condition shows an average value of 0.96 exceeding 1.0 in some areas of northern Nigeria, indicating generally favorable condition for crop growth.

These CropWatch indicators, show stable climatic conditions for the MPZ and mostly favorable prospects for 2019 crops due to adequate cumulative rainfall amounts.

Figure 2.1 West Africa MPZ: Agroclimatic and agronomic indicators, July to October 2019.

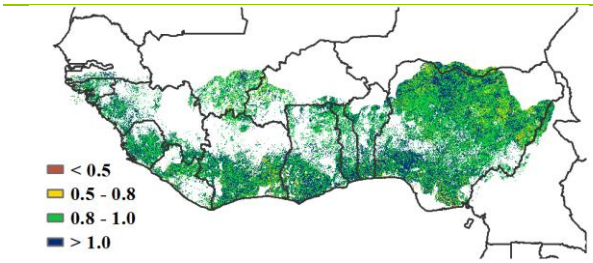


a. Spatial distribution of rainfall profiles

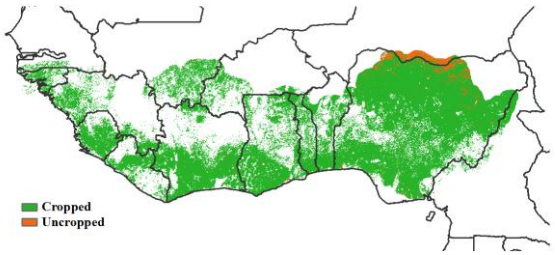
b. Profiles of rainfall departure from average (mm)

c. Spatial distribution of temperature profiles

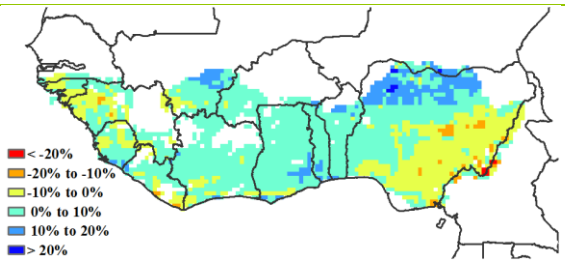
d. Profiles of temperature departure from average (mm)



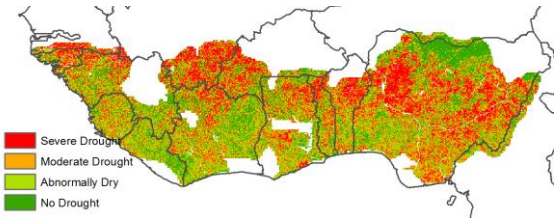
e. Maximum VCI



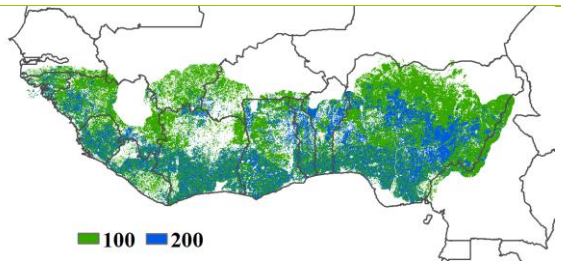
f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum



i. Cropping intensity

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

2.3 North America

This reporting period was the critical growth season of summer crops in North America, including maize, rice, spring wheat and soybeans. The agro-climatic condition was extremely wet: rain was significantly above (+30%), and temperature was below (by 0.3°C) average, however with significant spatial differences across the region. Sunshine as measured by the RADPAR indicator was average.

The Great Plains and Canadian Prairie were dominated by above average precipitation, especially in the north and east of the Great Plains. Large variations in precipitation were observed over time in the lower Mississippi, where the departure reached to -30 mm in late August but +75 mm in late October. Above average temperature was observed up to late September, but since then temperature declined rapidly in the Great Plains the Prairies, reaching -7.0°C in late October.

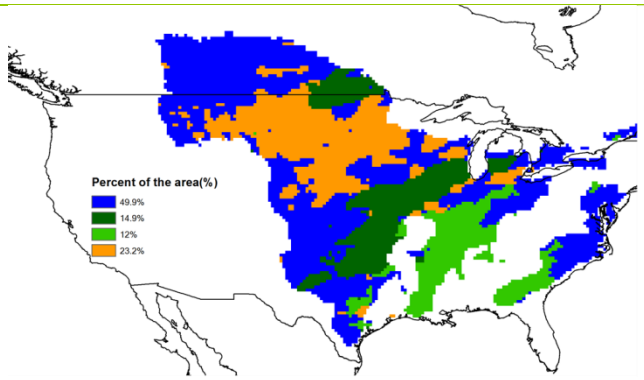
As a whole, potential biomass in the region was close to average, but a marked north-south gradient characterizes the variable: negative departures in excess of 20% in the Prairies and the northern Great Plains, but positive departures between 10% and 20% in other regions, from Texas to the East Coast.

The cropped arable land fraction (CALF) was up 2% compared to the average of the last 5 years and the cropping intensity reached 103%, up 8% over average.

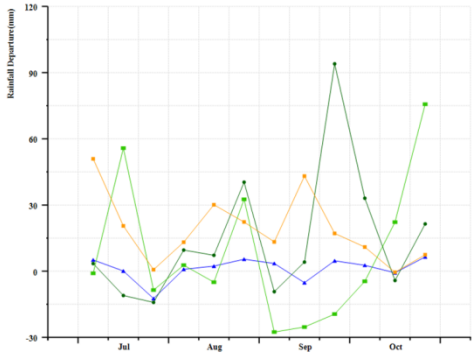
According to VCIx favorable crop conditions were observed in northern Canada and northern Great Plain, with average crop condition in the Corn Belt, and unfavorable conditions in the southern Great Plains where WHIn identifies drought conditions.

Overall, CropWatch assesses the situation in North America as close to average.

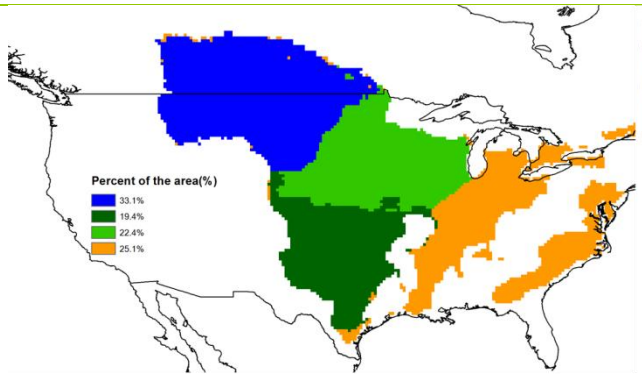
Figure 2.2 North America MPZ: Agroclimatic and agronomic indicators, January to April 2019.



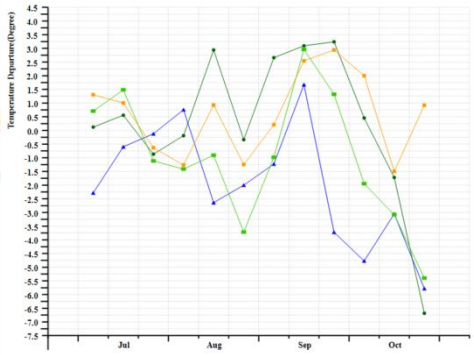
a. Spatial distribution of rainfall profiles



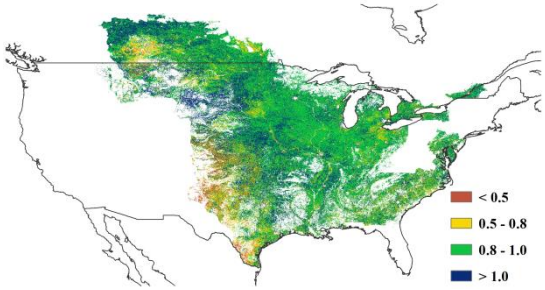
b. Profiles of rainfall departure from average (mm)



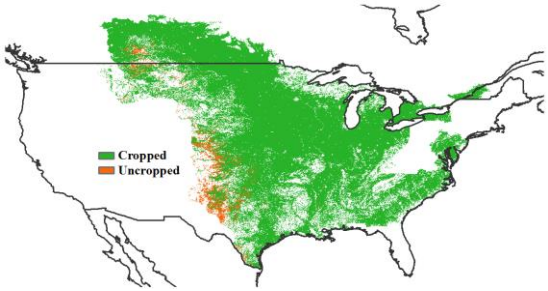
c. Spatial distribution of temperature profiles



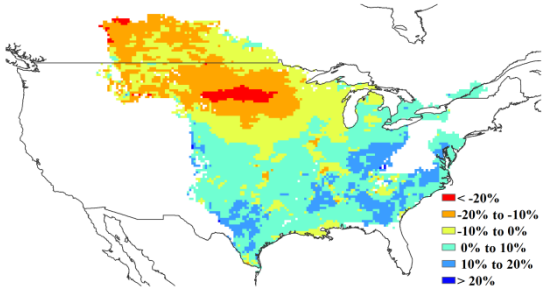
d. Profiles of temperature departure from average (mm)



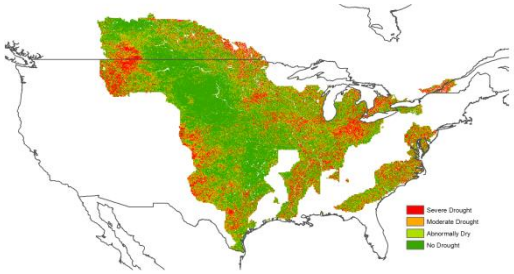
e. Maximum VCI



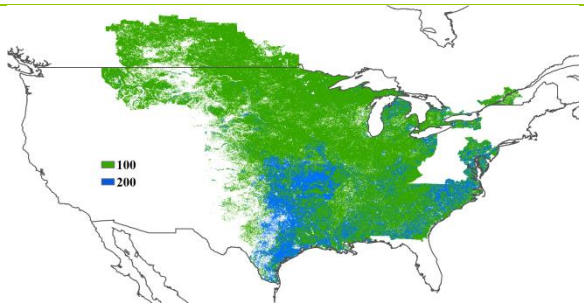
f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum



i.Cropping intensity

Note: For more information about the indicators, see Annex B

2.4 South America

High temporal and spatial variability of agro-climatic and agronomic indices was observed over the region. Globally, the region showed a strong negative anomaly in RAIN of about 19 %. Uruguay and Rio Grande do Sul in Brazil showed significant periods of excess during July and October and negative anomalies in August and September. South-east Paraguay, Misiones Province in Argentina and Paraná State in Brazil showed a near 45 mm precipitation shortfall in September, followed by a positive anomaly of similar magnitude at the beginning of October and a strong negative anomaly again at the end of October. Other areas showed mostly quite stable patterns during the first 3 months covered in this report but larger anomalies in October.

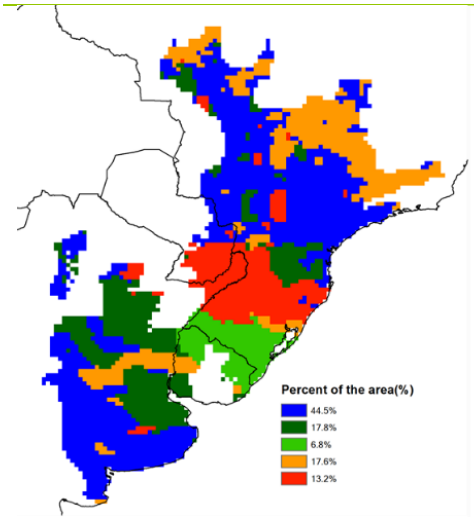
TEMP showed no anomaly on average for the whole MPZ; nevertheless, temporal and spatial variability was observed with positive and negative anomalies along the period. A clear North-South pattern is observed in temperature profiles. All regions showed a large negative anomaly and positive anomaly at the beginning and end of July respectively. Southern areas, including Santa Catarina State in Brazil and the regions further south showed negative anomalies in August and September, while Northern areas (north of and including Parana State) showed light positive anomalies in August and strong positive anomalies in September. Most of Argentina and the western third of Uruguay also displayed a marked positive anomaly at the end of September and a negative anomaly in October. Central areas (Parana, eastern Paraguay and northern Uruguay) showed positive temperature anomalies in October.

BIOMSS showed on average a 4.6 % positive anomaly. Larger positive departures were observed in most of Brazil. The largest BIOMSS deficits were in the Chaco and North of Argentine Pampas, as well as in the northern part of Brazilian agricultural area. CALF showed a reduction of 2%. Un-cropped areas were located mainly in western Argentinian Pampas and to some extent in central western and north-western Brazil. The cropping intensity of South America was 130% which is 2% above 5YA.

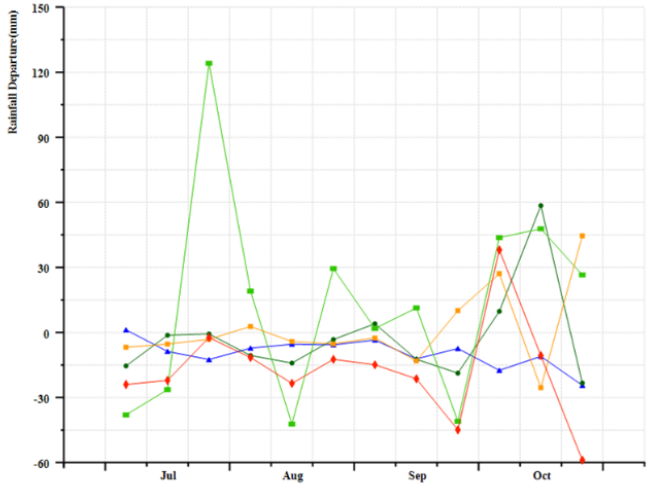
For the whole region VCIx was 0.65, a lower value than registered during the previous AMJJ reporting period. Low values were observed in southern and western Argentinian Pampas. Low values were also observed in Argentina Pampas and north-western Brazil. Scattered drought conditions were identified all over the MPZ. In particular, low minimum VHI values occurred in the south-western Pampas, central eastern Brazil and in Paraguay. Better conditions were found in the North of the Pampas and Mesopotamia in Argentina and South and East Brazil.

Although the fact is not clearly reflected in RAIN anomalies, some indices show poor conditions for crops in South and West Argentine Pampas.

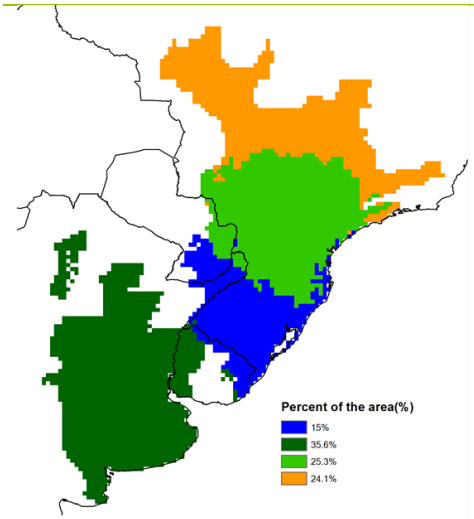
Figure 2.3 South America MPZ: Agroclimatic and agronomic indicators, July to October 2019.



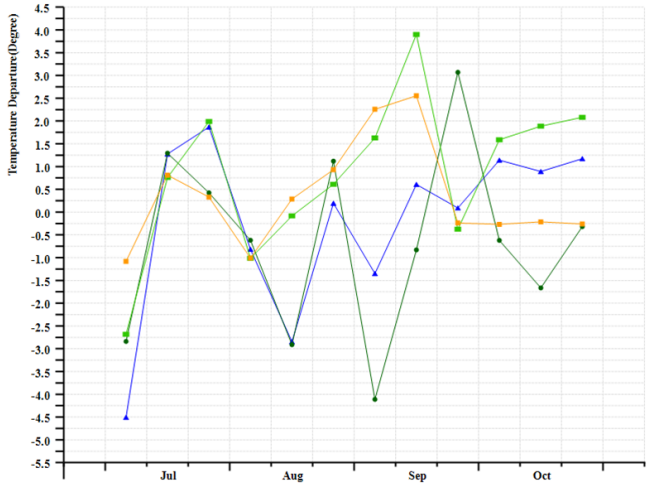
a. Spatial distribution of rainfall profiles



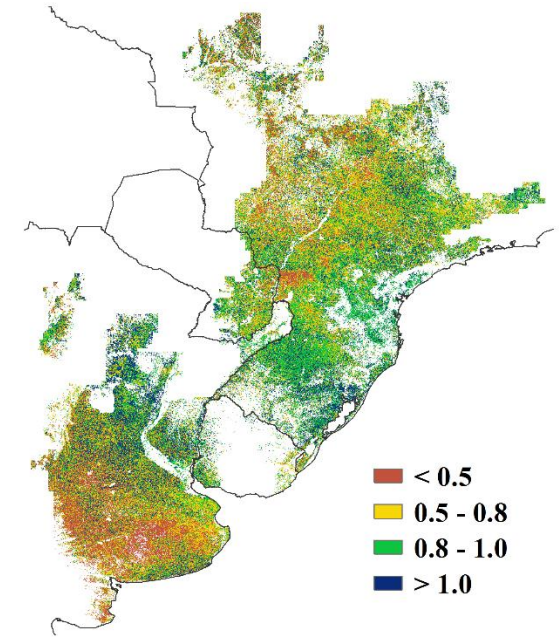
b. Profiles of rainfall departure from average (mm)



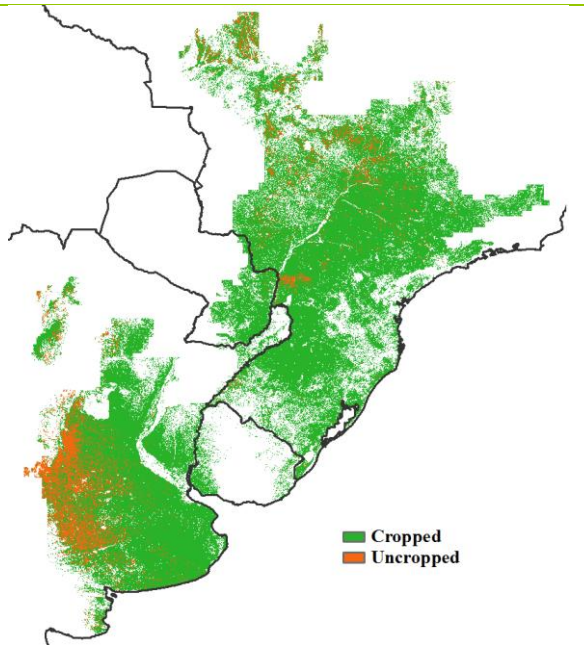
c. Spatial distribution of temperature profiles



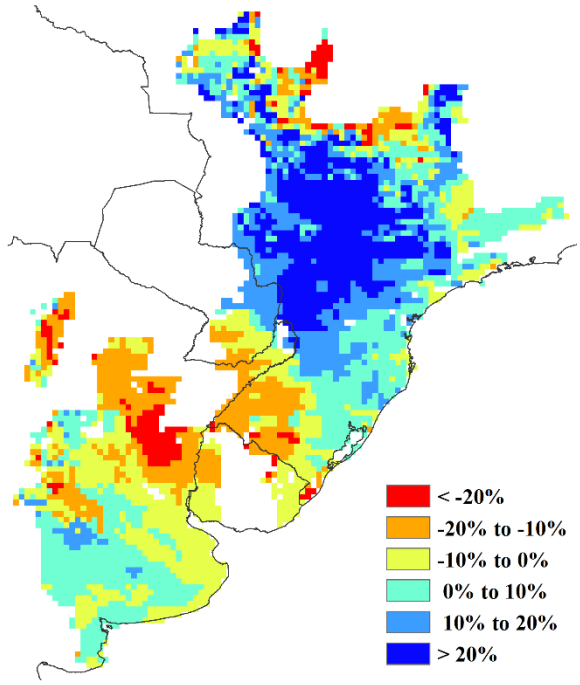
d. Profiles of temperature departure from average (mm)



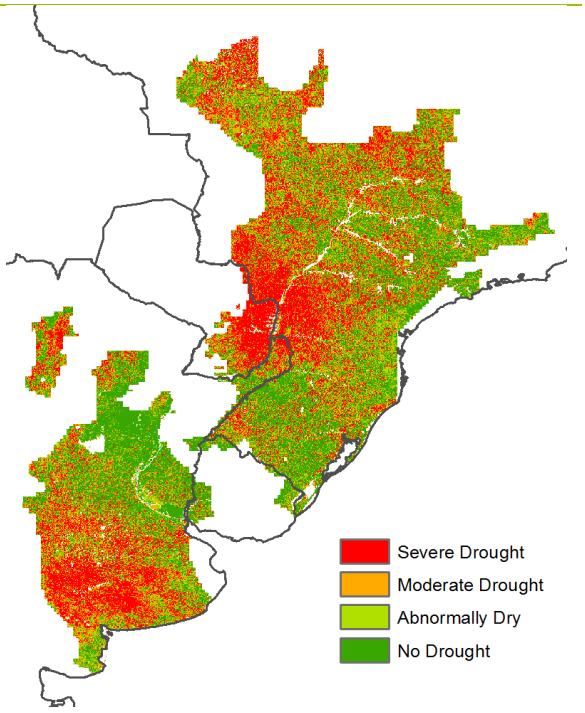
e. Maximum VCI



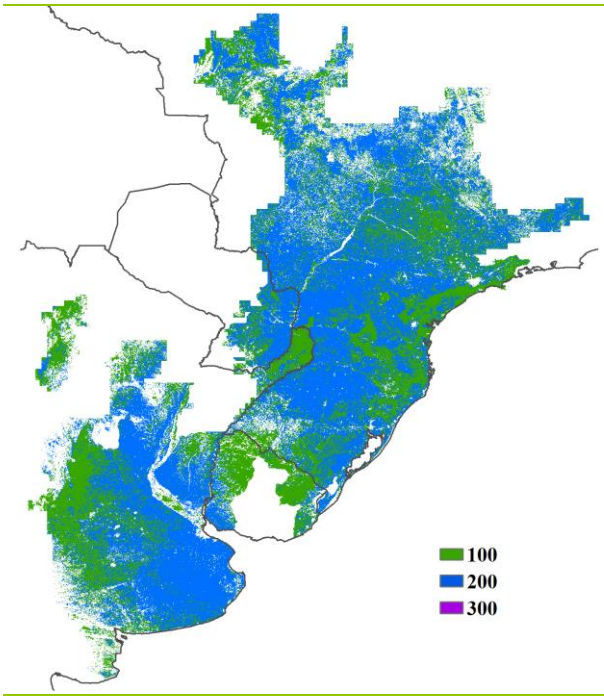
f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum



i. Cropping intensity

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

2.5 South and Southeast Asia

The South and South-east Asia MPZ includes India, Sri Lanka, Nepal, Bangladesh, Myanmar, Thailand, Cambodia, Laos and Vietnam, a region with very diverse climates, topography and phenology. The main cereals are maize and particularly rice, which were mostly planted during the monitoring period. In the case of long seasons and multiple cropping, one of the rice crops often reached maturity during the second half of the reporting period.

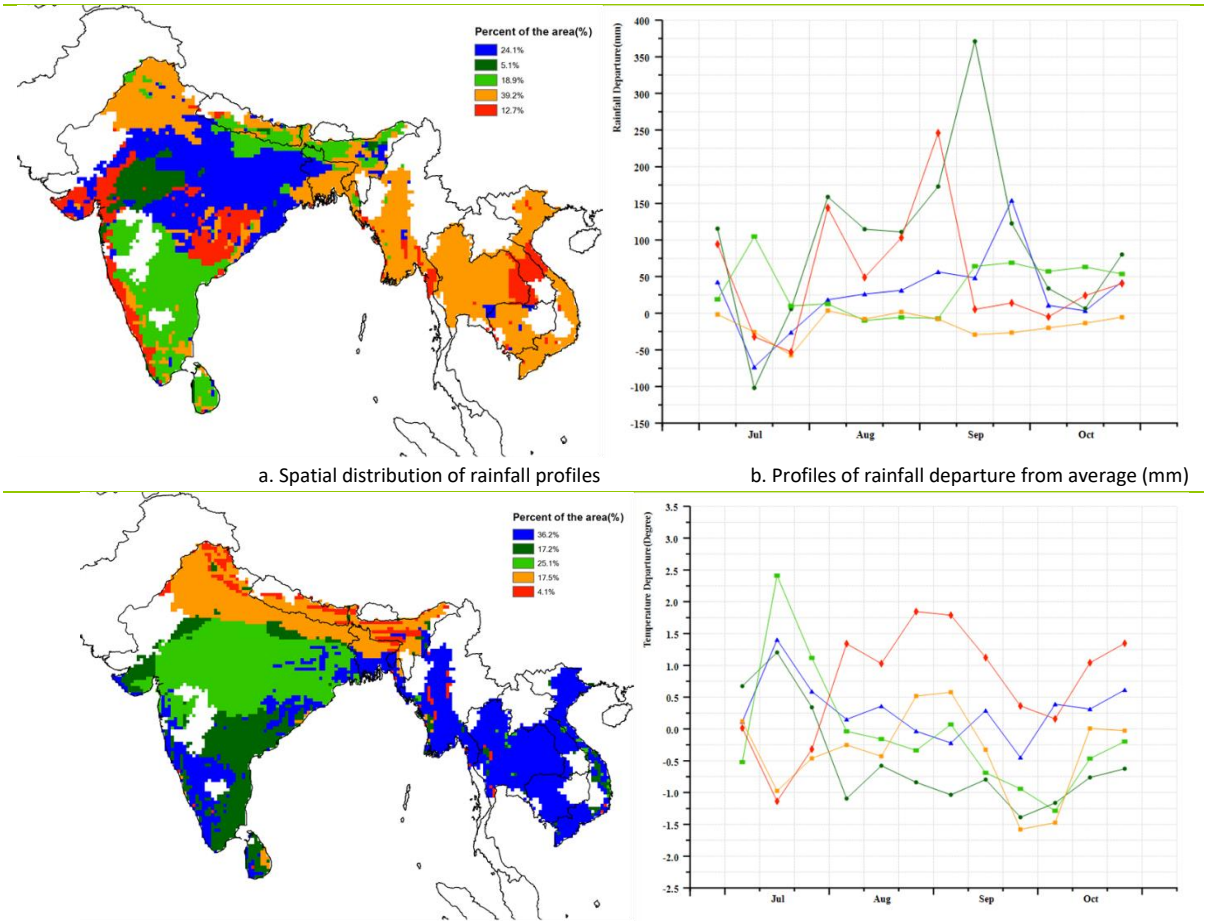
The agro-climatic conditions were favorable for the development of crops planted during the JASO period, in particular due to abundant precipitation (RAIN 1534 mm, +21%). The largest amounts were recorded in India (1616 mm, +40%). Rainfall exceeded average by 400 mm in early September in 18.9% of the area, mostly in central-eastern and southern India, Sri Lanka and the border area between India and Nepal. Low rainfall with negative departures was observed in Thailand (948mm, -17%), Cambodia (1181mm, -8%) and Vietnam (1130mm, -5%). Temperature was normal (25.4°C, -0.1°C), especially in most of the south-eastern region (Cambodia, Thailand, Vietnam, Laos and Myanmar). During mid-July heat wave conditions affected central and northern India with temperature more than 2.5 degrees above average and RAIN down by 100 mm; this is consistent with the low VHI values over the area.

Cropping intensity (CI) varied from 100% (single cropping) to 300% (three crops per year on the same land). The average CI from November 2018 to October 2019 was 141%. Most triple cropping is concentrated in Vietnam, south Thailand and Bangladesh while double cropping takes place mainly in the southern foothills of the Himalayas in India and the lower Irrawaddy River region in Myanmar. Potential biomass was mostly average (BIOMSS, 676 gDM/m2) but low values occurred between north-east and southwest India while higher values are noted in north-western India and northern Myanmar (departures larger than 20%).

Nearly all cropland was cultivated: average CALF value reached 96%. VCIx in most of the MPZ was above 0.8, locally reaching values as high as 1.0.

In general, in spite of localized floods and droughts, the production of the MPZ is assessed as fair.

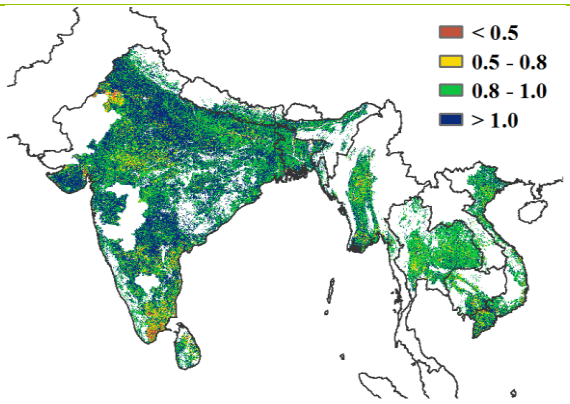
Figure 2.4 South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, July to October 2019



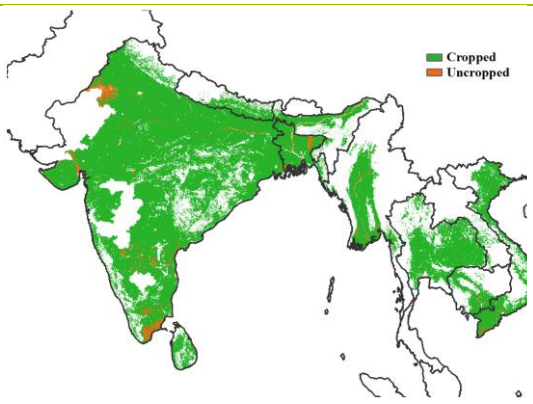
a. Spatial distribution of rainfall profiles

b. Profiles of rainfall departure from average (mm)

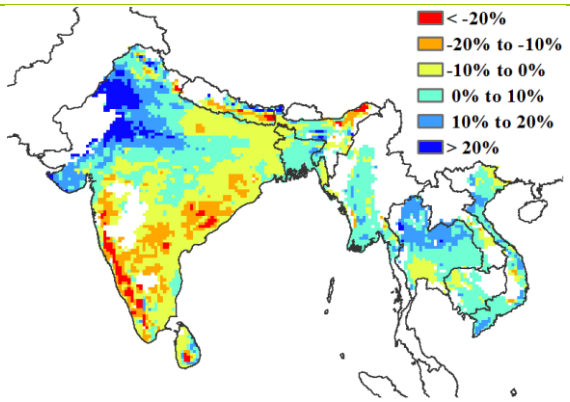
c. Spatial distribution of temperature profiles



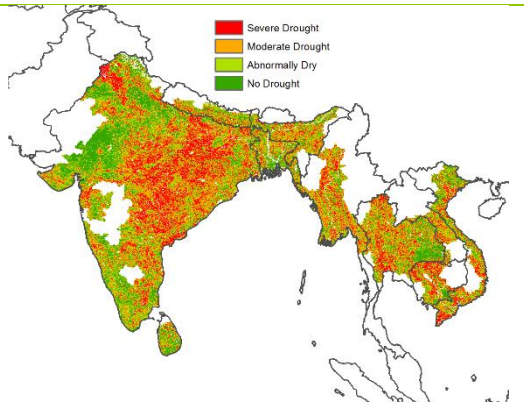
d. Profiles of temperature departure from average (mm)



e. Maximum VCI

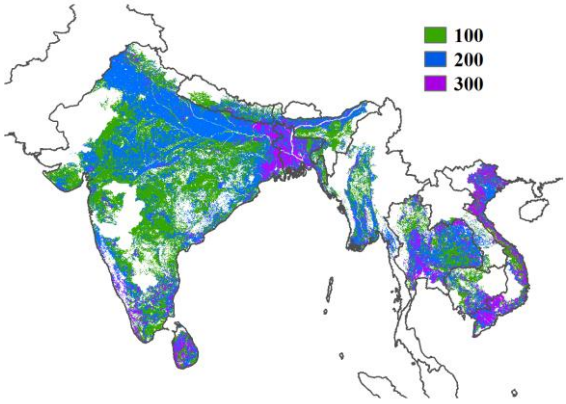


f. Cropped arable land



g. Biomass accumulation potential departure

h. VHI minimum



i.Cropping intensity

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

2.6 Western Europe

Crop condition was generally above average in the western European MPZ during this reporting period, resulting from a combination of positive temperature anomalies and overall above-average precipitation in most areas.

Significant differences in precipitation were observed between different countries but the MPZ as a whole recorded slightly above average RAIN (up 3%). Before mid-September, more than 90% of the MPZ suffered a deficit in rain; over the entire monitoring period, poor precipitation was observed in more than 60% of the areas (Germany, Austria, Slovakia, Czech Republic, and Hungary) with the most severe shortfalls in Slovakia (RAIN -33% compared with average), Hungary(-26%), Austria (-9%) and the Czech Republic (-5%). However, frequent and abundant rainfall was observed

in the UK, France, and west-Germany, which benefited summer crops to some extent in those regions. RAIN deficit conditions persisted after September in Slovakia, Hungary Austria and the Czech Republic where they affected the sowing and emergence of winter crops: more rain is needed in those regions in the coming months to improve soil moisture and create favorable conditions for the winter crops.

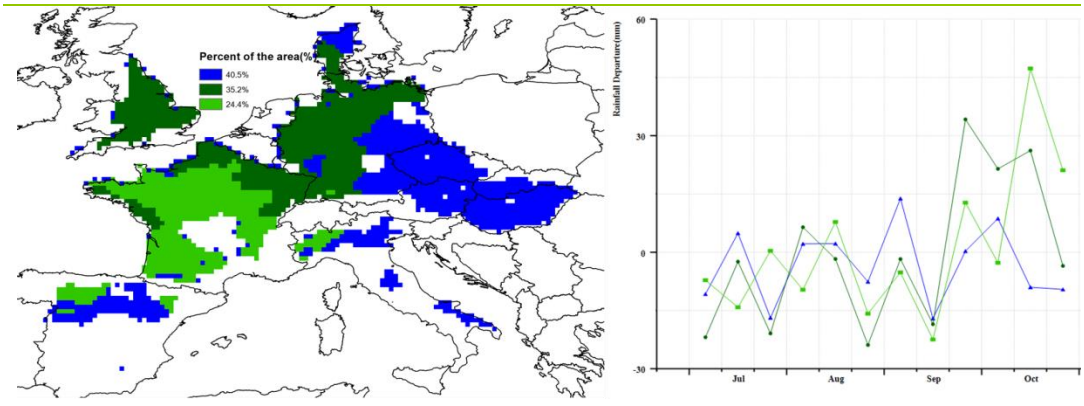
Temperature for the MPZ as a whole was slightly above average (TEMP +0.6°C), and sunshine was well above average with RADPAR up +3%. Most areas experienced warmer-than-usual conditions, while below the average temperature mostly occurred in early-September and early-October. The spatial distribution of temperature profiles indicates that three heat waves swept across Europe in late August, mid-September and mid-October. High temperature shortened the grain filling stage of crops and accelerated the maturity, which may reduce crop yields and - combined with rain deficit - may cause a reduction of sown area of winter crops in the North and East of the MPZ.

Due to warmer-than-usual conditions and favorable sunshine, the biomass accumulation potential was 8% above average. The lowest BIOMSS departures (-20% and less) occurred in Denmark and north of Germany, and scattered in other countries. In contrast, BIOMSS was above average (sometimes exceeding a 20% departure) over central France, south-eastern Italy, and central Spain.

The average maximum VCI for the MPZ reached a value of 0.87, indicating mostly favorable crop condition. More than 90% of arable land was cropped, which is the same as the recent five-year average. Most un-cropped arable land was concentrated in Spain, and south-eastern Italy. Cropping intensity (133%) was up 3% compared with the five-year-average across the MPZ.

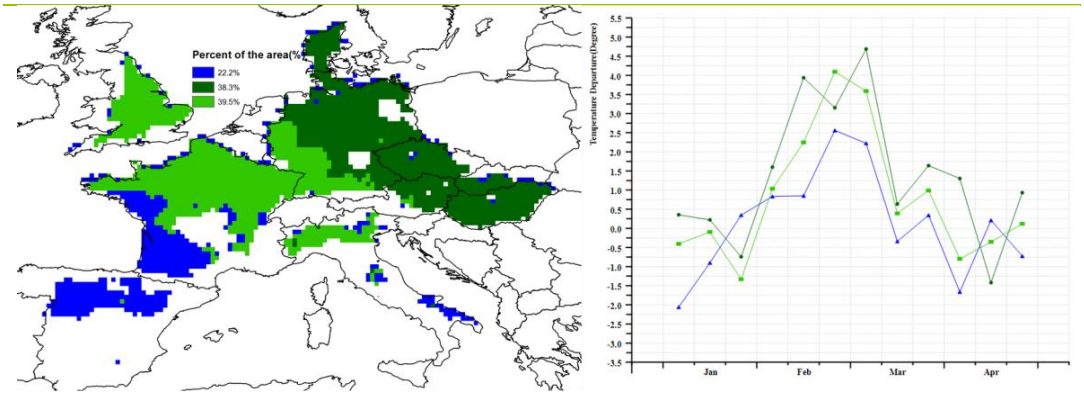
Altogether, the condition of harvested winter crops was above average during this reporting period, while the condition of summer crops was mixed, with large spatial differences. More rain is needed to ensure an adequate soil moisture for the ongoing winter crop season.

Figure 2.5 Western Europe MPZ: Agroclimatic and agronomic indicators, July to October 2019.

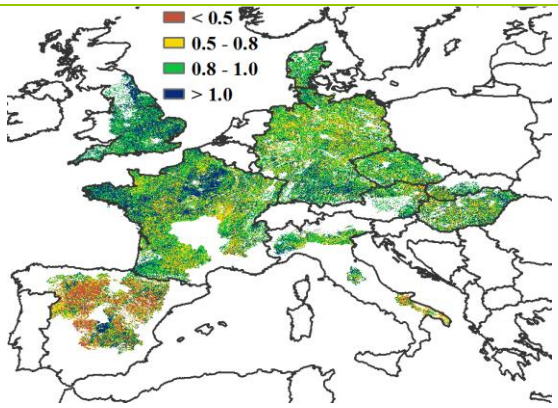


a. Spatial distribution of rainfall profiles

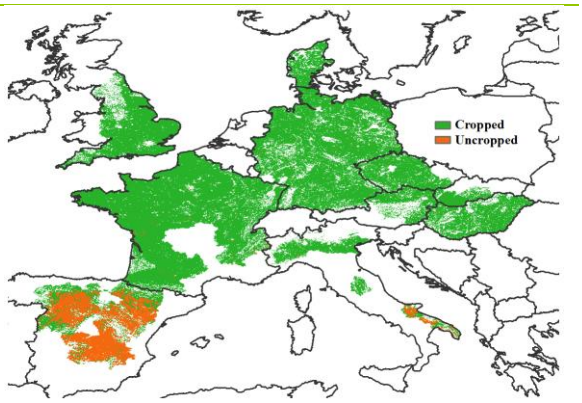
b. Profiles of rainfall departure from average (mm)



c. Spatial distribution of temperature profiles

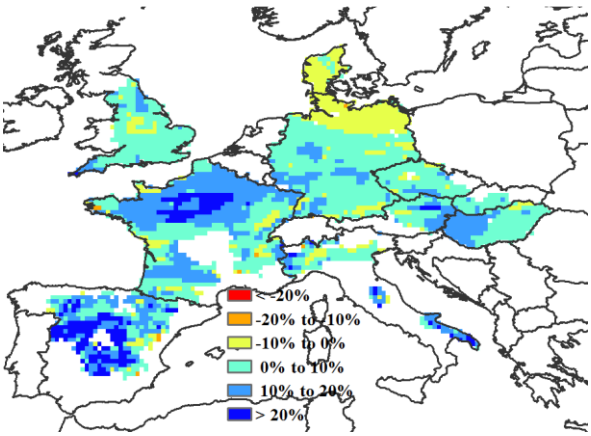


d. Profiles of temperature departure from average (mm)

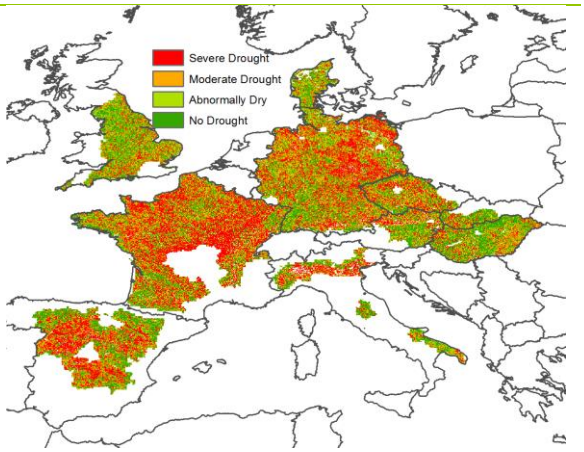


e. Maximum VCI

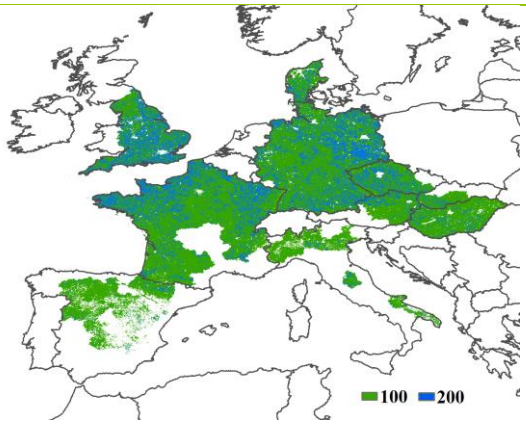
f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum



i.Cropping intensity

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

2.7 Central Europe to Western Russia

Harvesting of summer crops and sowing of winter crops took place, for the MPZ as a whole, under cool weather conditions (TEMP 0.7°C below average) with close to average radiation and rainfall (RADPAR -1%, RAIN -2%).

Crop condition was generally somewhat below average over the MPZ, but with regional differences. As indicated by the rainfall profiles, 64.9% of the region experienced below average precipitation throughout this monitoring period, including Poland, southern Belarus, Ukraine, Romania, Moldova, and the Russian Oblasts of Bryansk, Kursk, Orlov, Lipetsk, and Belgorod.

However, RAIN was mostly above average in mid-July and August, with a peak nearly 80% above average in the eastern part of West Russia, including the Orenburg and Perm Oblasts, and the Bashkortostan Republic.

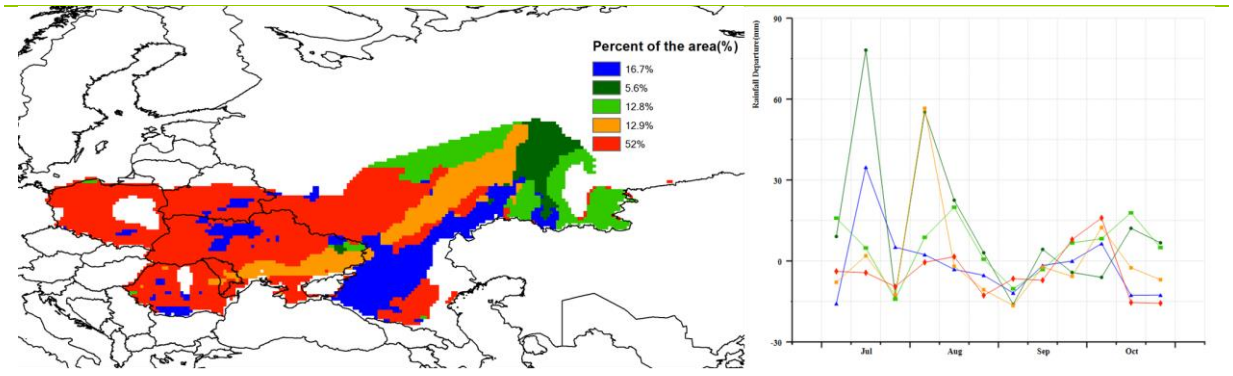
Temperature profiles show different patterns between the western and the central and eastern parts of the MPZ. While temperature varied from about average in July to well above average (4.5°C above average) in October in the West, it suffered from significant drops below average in in August (down 6.0°C) and September (up to 6.5°C) over central and eastern Belarus, eastern Ukraine, and the Oblasts of Bryansk, Kursk, Belgorod, Voronezh, Saratov, Orenburg and Rostov, and the Krays of Krasnodar and Stavropol in Russia. The lowest temperature departure (a 6.5°C drop) was recorded for the Orenburg Oblast. However, generally warm weather was recorded during late August and early September in Poland, western Belarus, Ukraine, Romania and Moldova.

The agro-climatic condition led to an average biomass potential drop for the MPZ as a whole (BIOMSS, -7% compared to the five-year average) with a VCIx value of 0.84. The distribution map of the VCIx index, however, shows regional differences and values below 0.8 in southern and eastern Ukraine, parts of Poland, the Krays of Stavropol and Krasnodar and the Oblasts of Rostov and Orenburg. VHIn basically follows the same spatial pattern.

Almost 94% of the arable land was actually cropped during the reporting period (with CALF just 2% below average). Un-cropped land concentrated in southern Ukraine, eastern Orenburg Oblast, and northeastern Stavropol Kray. The cropping intensity remained stable compared to the recent five-year average. The double-cropping area was mainly distributed in the eastern Krasnodar Kray.

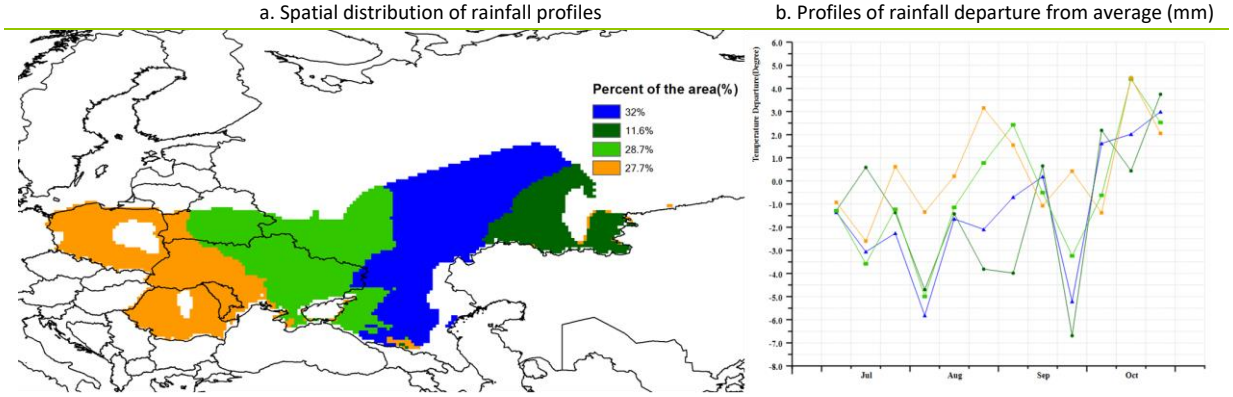
Generally, with most areas showing below average conditions, current prospects of crop production are not promising in the Central Europe to Western Russia MPZ.

Figure 2.6 Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, July to October 2019.



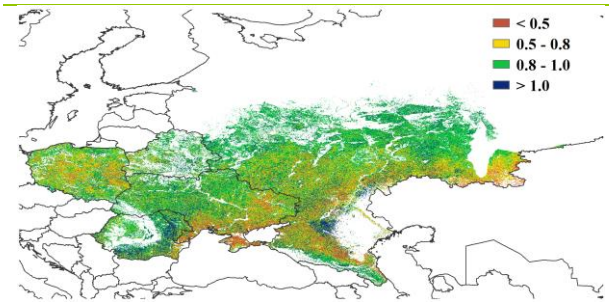
a. Spatial distribution of rainfall profiles

b. Profiles of rainfall departure from average (mm)

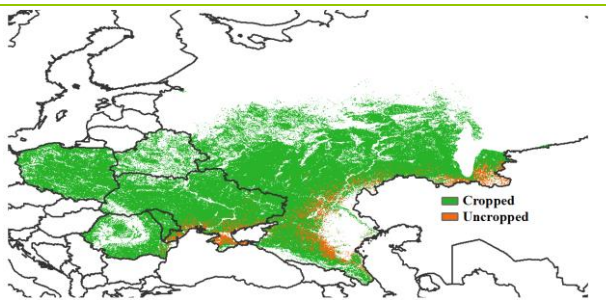


c. Spatial distribution of temperature profiles

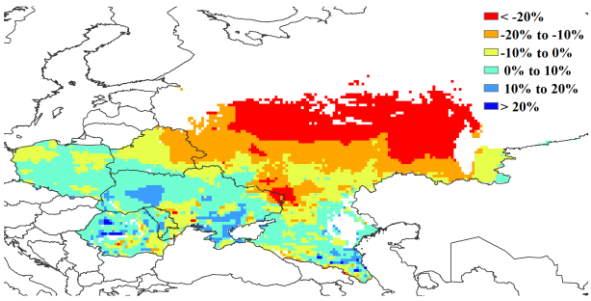
d. Profiles of temperature departure from average (mm)



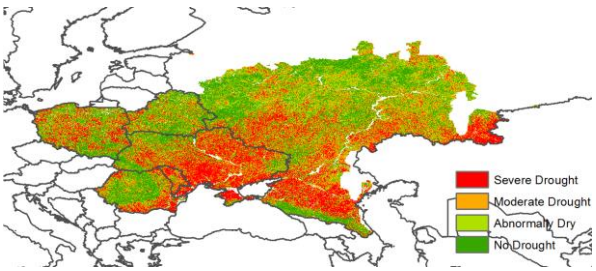
e. Maximum VCI



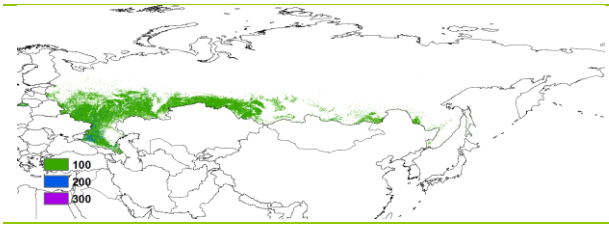
f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum



i.Cropping intensity

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