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 (October 2019 to January 2020)

	RAIN		TEMP		RADPAR	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m^2)	Departure (%)
West Africa	288	41	24.9	-0.3	1221	-1
North America	379	24	5.2	-0.2	508	-5
South America	781	-2	22.9	0.2	1371	2
S. and SE Asia	312	14	20.6	-0.1	1007	-2
Western Europe	412	20	6.4	0.9	291	-5
C. Europe and W. Russia	220	-16	2.5	2.7	232	2

*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 (October to January) for 2005-2019*

Table2.2 Agronomic indicators by Major Production Zone, current season values and departure from 5YA (October 2019 to January 2020))

	BIOMSS (gDM/m^2)		CALF (Cropped arable land fraction)		Maximum VCI Intensity
	Current	15A Departure (%)	Current	5A Departure (%)	Current
West Africa	407	-11	96	2	0.98
North America	121	-5	76	13	0.93
South America	833	0	98	0	0.74
S. and SE Asia	428	16	98	4	1.02
Western Europe	73	-7	93	3	0.94
Central Europe and W Russia	51	17	79	16	0.92

Note: See note for Table 2.1, with reference value R defined as the five-year average (5YA) for the same period (October to January) for 2015-2019.

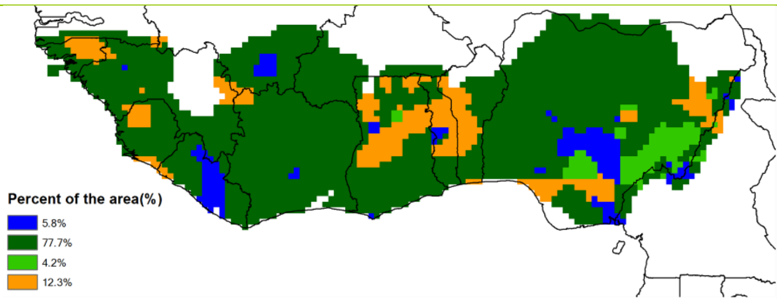
2.2 West Africa

The reporting period covers the harvesting of major food crops in the region except for the second maize and cassava growing in northern Nigeria which are harvested later in the reporting period. Cassava in its first year was still growing in the fields. The aggregated cereal output in 2019 was forecasted at 27.3 million tones for Nigeria, 4 percent higher than the previous five-year average.

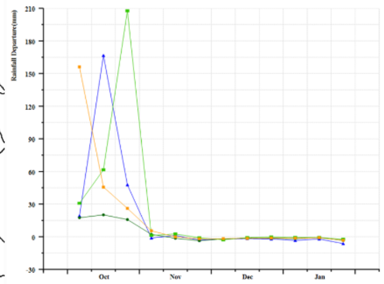
The rainfall was well distributed in the MPZ averaging 288 mm (41% above the 15 year average) with extreme amounts recorded in Equatorial Guinea (1257 mm, -2% Departure) and Gabon (1420 mm, +1% Departure). The average temperature of the region was 24.7°C (down by 0.3%) and average solar radiation (RADPAR = 1221 MJ). It was slightly below average by 1%. The accumulated biomass potential of the MPZ was at 407 gDM/m2, down by 11%. Also the MPZ showed a marginal increase in cultivated area (CALF: 96%, +2% above average) and a high VCIx (0.98) indicating potentially good yields for most parts of the region.

These CropWatch indicators showed a stable climatic condition for the MPZ resulting from adequate cumulative rainfall amounts.

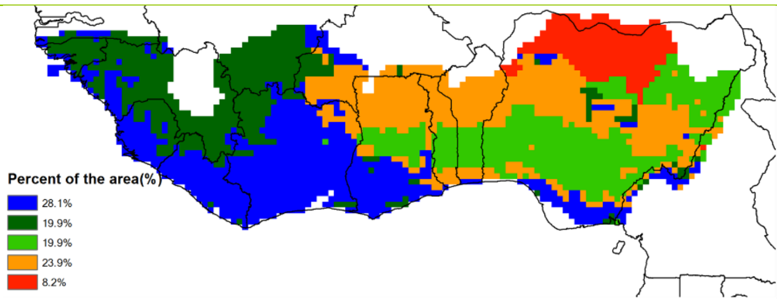
Figure 2.1 West Africa MPZ: Agroclimatic and agronomic indicators, October 2019 to January 2020.



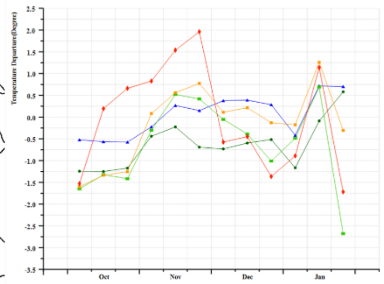
a. Spatial distribution of rainfall profiles



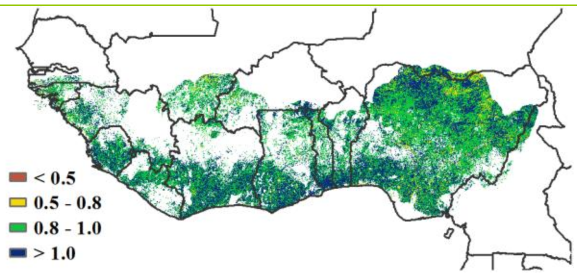
b. Profiles of rainfall departure from average (mm)



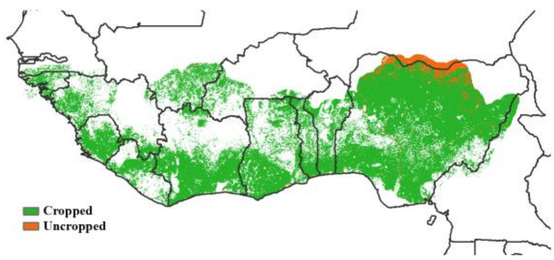
c. Spatial distribution of temperature profiles



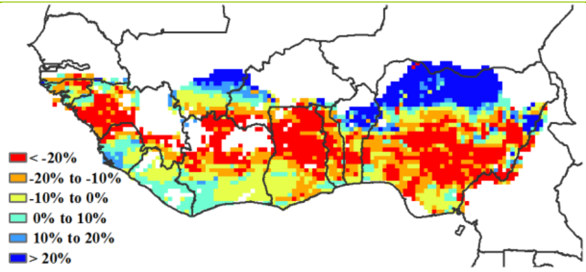
d. Profiles of temperature departure from average (mm)



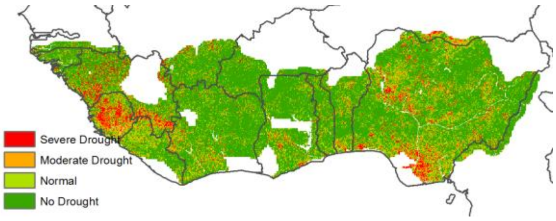
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

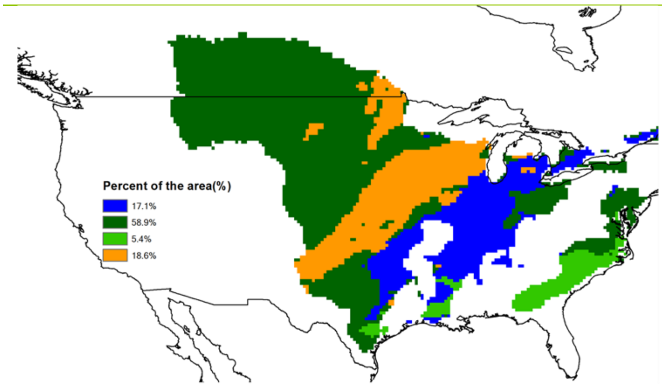
2.3 North America

This report covers the end of the harvest season of summer crops and the sowing period of winter crops. Cloudy and rainy weather dominated the agro-climatic conditions. As compared to the long-term average, precipitation was 24% higher, temperature 0.2℃ lower, and RADPAR 5% lower. Above average precipitation helps replenish soil moisture and thus benefits growth of winter crops. Temperature deviations varied greatly over time. It was much colder than normal in late October, and then the temperatures bounced back to average in the middle of November. In late December, above average temperatures were observed.

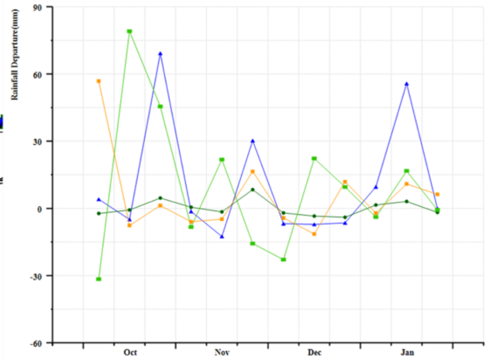
For all of North America, the potential biomass was 5% below average as compared to the last 15 years. However, above average potential biomass was observed in the central and southern plains, the most important winter wheat zone of the United States. This region benefitted most from the abundant precipitation. Due to the noise from harvest, the maximum VCI index in this monitoring period did not reflect the growing condition of winter crops in 2020. We therefore omitted the analysis of this parameter. It is noteworthy that the cropped land fraction was 13% above the previous 5 years, which restored from the low CALF in 2019 summer.

In summary, the agro-climatic conditions were favorable for the growth of winter crops between October 2019 and January 2020.

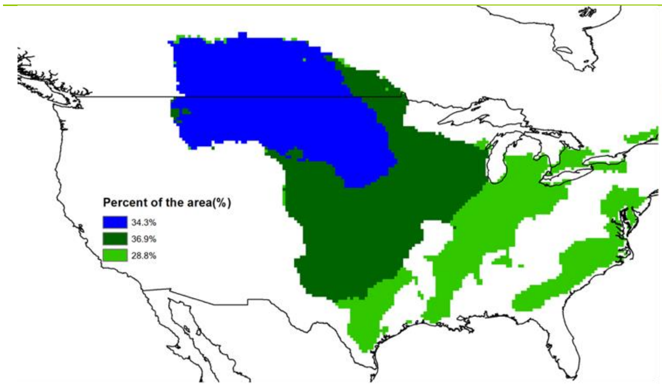
Figure 2.2 North America MPZ: Agroclimatic and agronomic indicators, October 2019 to January 2020..



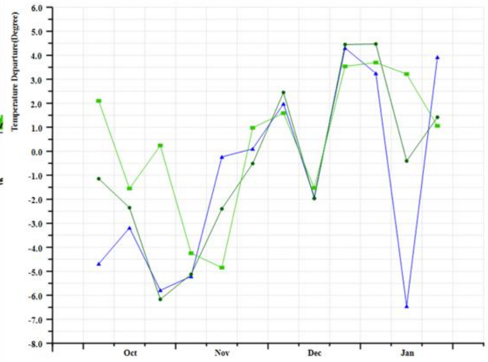
a. Spatial distribution of rainfall profiles



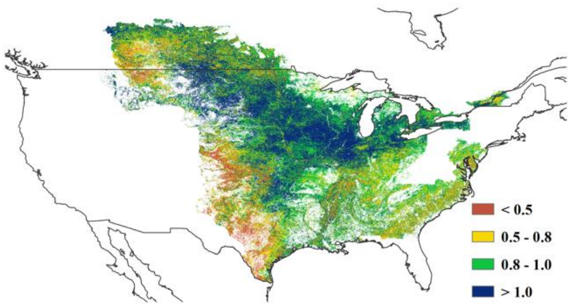
b. Profiles of rainfall departure from average (mm)



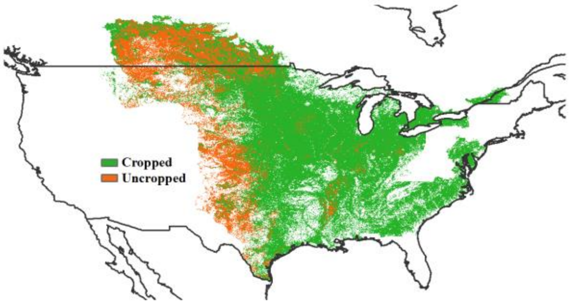
c. Spatial distribution of temperature profiles



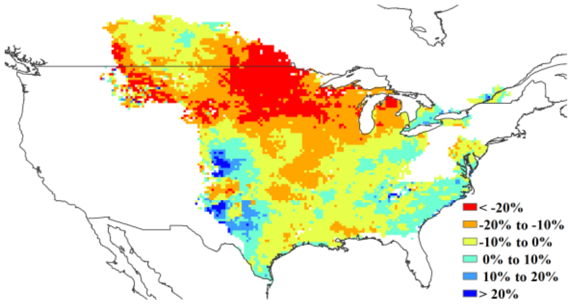
d. Profiles of temperature departure from average (mm)



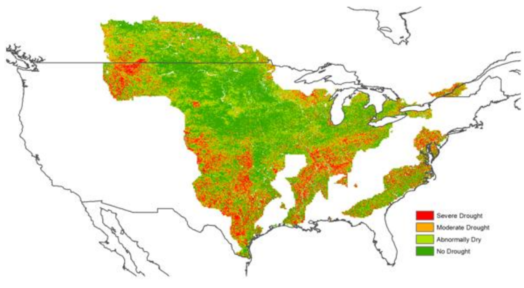
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

2.4 South America

This monitoring period covers the harvest of winter crops and the sowing and early growth stages of summer crops in the Major Production Zones (MPZ) of South America. The overall situation in South America during the monitoring period was slightly above average.

For RAIN, althought it is not enough, the Southern Area (including most of the Pampas) was dominated by a normal pattern with different characteristics at different times. In the North East Pampas there existed a region with several positive anomalies (Figure 2.3.a - blue area). The northern part of the MPZ showed a variable pattern with negative anomalies at the beginning and end of the period and a high positive anomaly during part of November and December. Areas around Mato Grosso Do Sul, Parana and Sao Paulo showed a similar pattern, but with a highly positive anomaly only in December. Southern Brazil and South Chaco in Argentina (Figure 2.3.a- light green area) showed a pattern with slightly positive and negative anomalies.

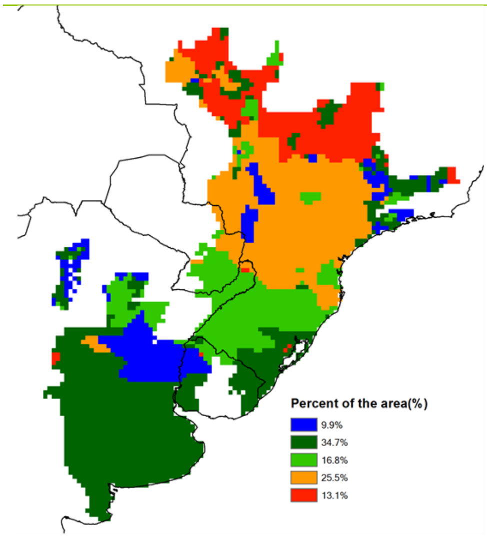
For TEMP, Argentina and West of Uruguay showed a variable pattern with positive and negative anomalies (Figure 2.3.c - red and orange areas). In particular, a high positive anomaly was observed in November. The Center of the Pampas area (Figure 2.3.c - red area) showed differences during December with lower or no negative anomalies. Other areas showed less variability, with dominance of negative anomalies in the North of the MPZ and positive anomalies in the Center.

BIOMSS revealed few anomalies. The Southern and Northern areas showed some positive anomalies, while the Center and the Coastal area of Brazil showed negative anomalies. CALF was almost complete, covering 98 % of the area. Uncropped areas were limited to the agricultural border in the southwest of the Pampas.

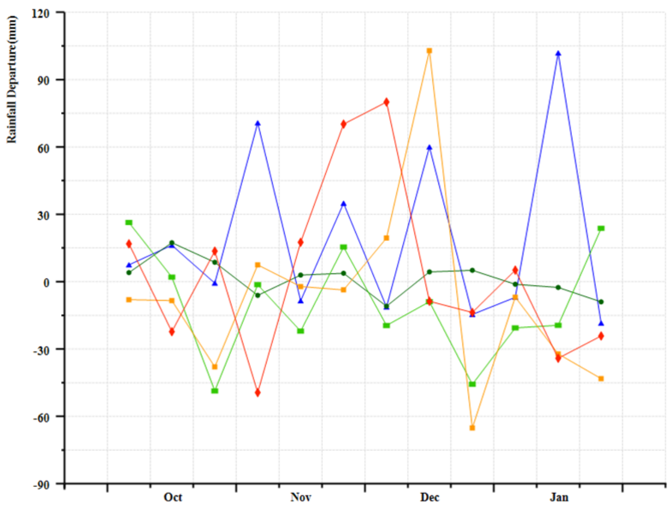
For the whole region, VCIx was 0.91, higher than during the last reporting period. Most of the region showed values higher than 0.8. Areas with lower values were observed in the South of the Pampas which coincided with the spatial pattern of uncropped farmlands. Also, the low VCIx values in south of Pampas probably still reflected the poor vegetation conditions that were due to the drought impacts observed during the last reporting period.

For this reporting period several indices showed rather good conditions (BIOMSS, VCIx), with the exception of areas with quite high positive anomalies in precipitation or TEMP.

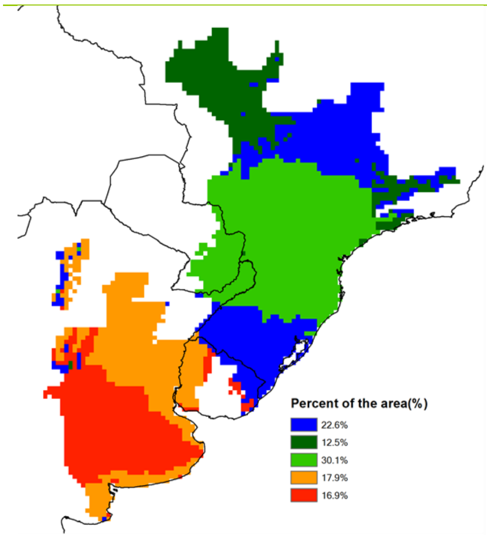
Figure 2.3 South America MPZ: Agro-climatic indicators, October 2019 - January 2020



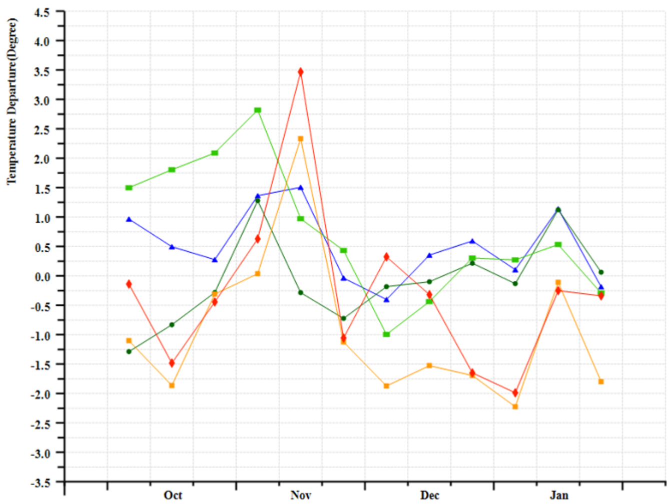
a. Spatial distribution of rainfall profiles



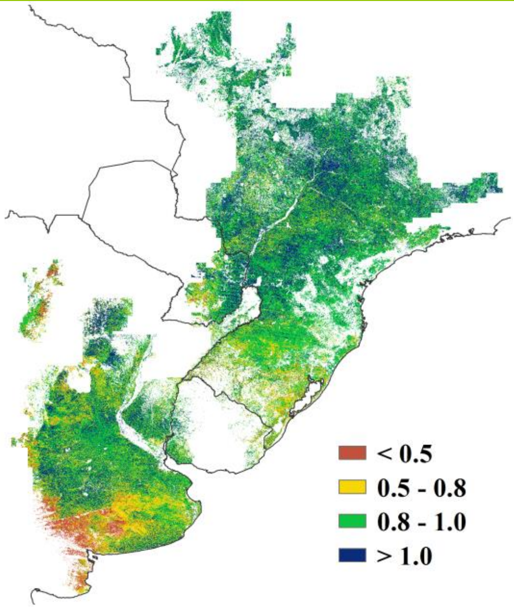
b. Profiles of rainfall departure from average (mm)



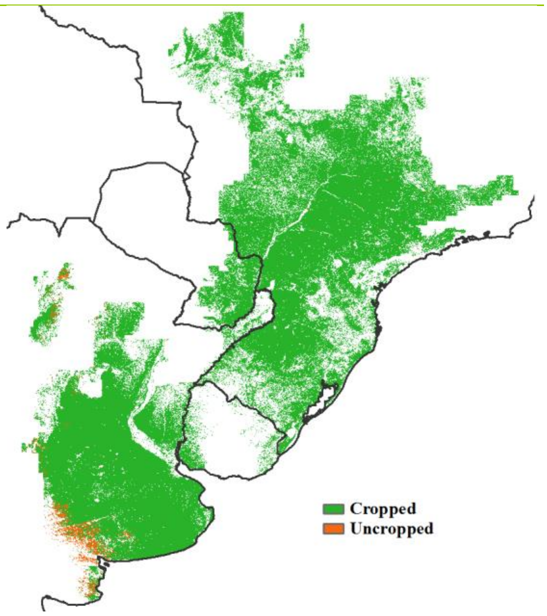
c. Spatial distribution of temperature profiles



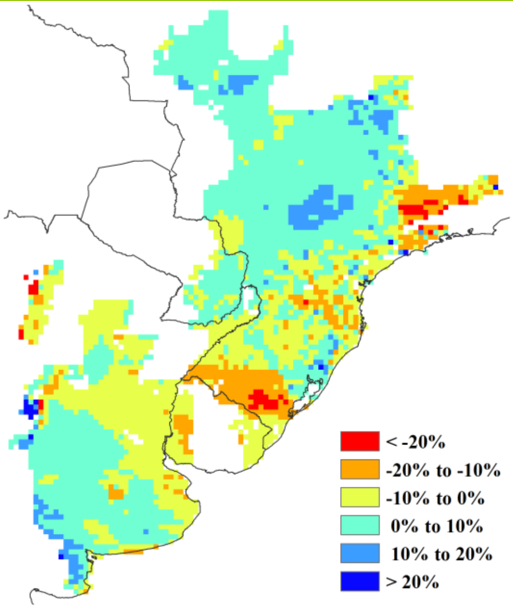
d. Profiles of temperature departure from average (mm)



e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure

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

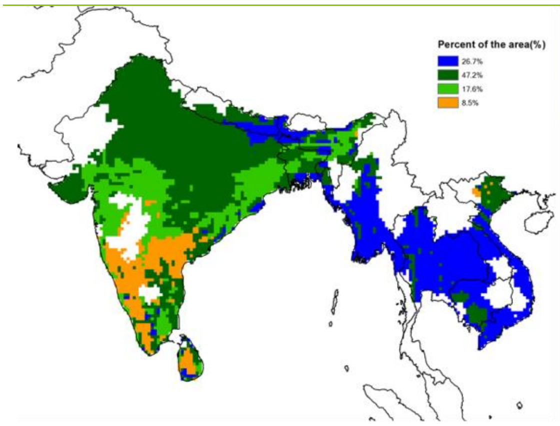
2.5 South and Southeast Asia

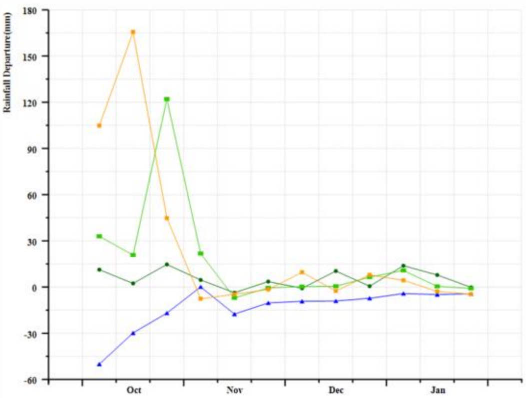
South and Southeast Asia includes India, Bangladesh, Cambodia, Myanmar, Nepal, Thailand and Vietnam. The main crops are maize, rice, wheat and soybean.

During this monitoring period, rainfall was 14% above average. Abnormally high rainfall was observed in India in October, but it has obviously regional differences. With sufficient precipitation and another normal agro-climatic indicator (RADPAR -1%), conditions during the grain filling period of rice in India and the sowing of wheat were favorable. Starting from November, rainfall was close to average in all regions. Temperature was normal (20.5 ° C, -0.1 ° C) on the whole, but there were some fluctuations in December and January in Southeast Asian countries such as Thailand, Cambodia and Laos, where the temperatures were 2.5° C above average. This is consistent with the low VHI values in this area.

CALF reached 98% in the MPZ, 4% above the five-year average. Uncropped areas mainly occurred in India. VCIx reached 1.0 and the VCIx map shows that high values (>1.0) were concentrated in India and low values (0.5-0.8) mainly in southeast Asian countries. BIOMASS had the same trend as the VCIx map. It showed a marked discrepancy between South Asia and Southeast Asian countries. It was higher in India than in the Southeast Asian countries, where the lower biomass was also reflected on the VHI map. The VHI map shows that those countries experienced stress, presumably in October. In general, crops in south Asia had a better growing environment. Conditions are generally favorable.

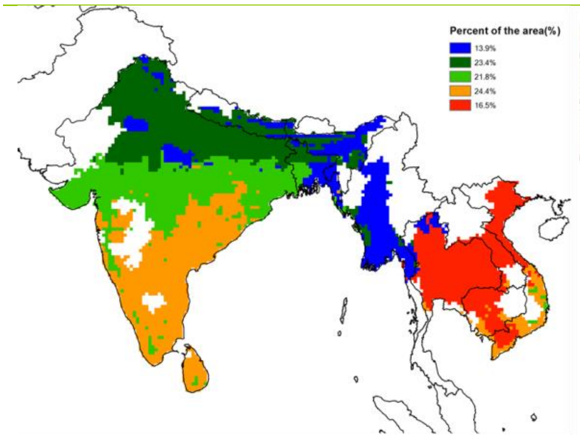
Figure 2.4 South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, October 2019 - January 2020

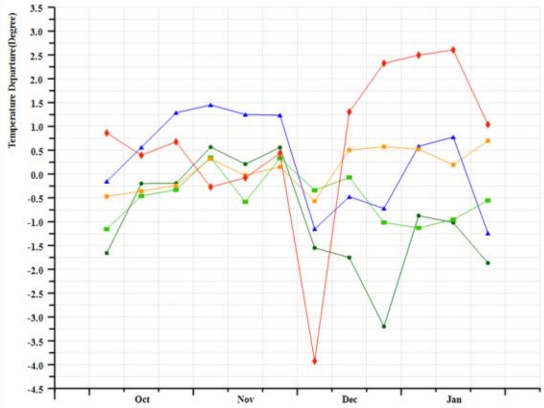




a. Spatial distribution of rainfall profiles

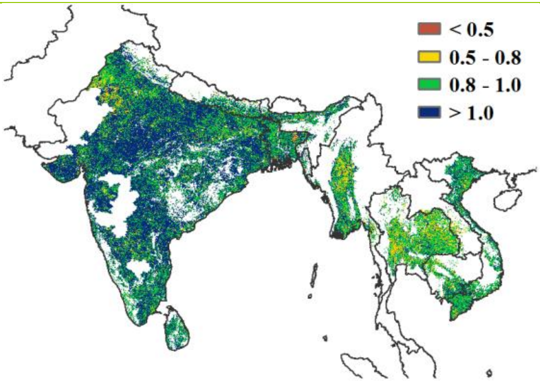
b. Profiles of rainfall departure from average (mm)

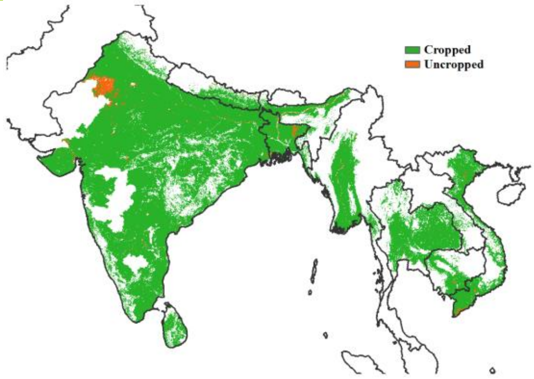




c. Spatial distribution of temperature profiles

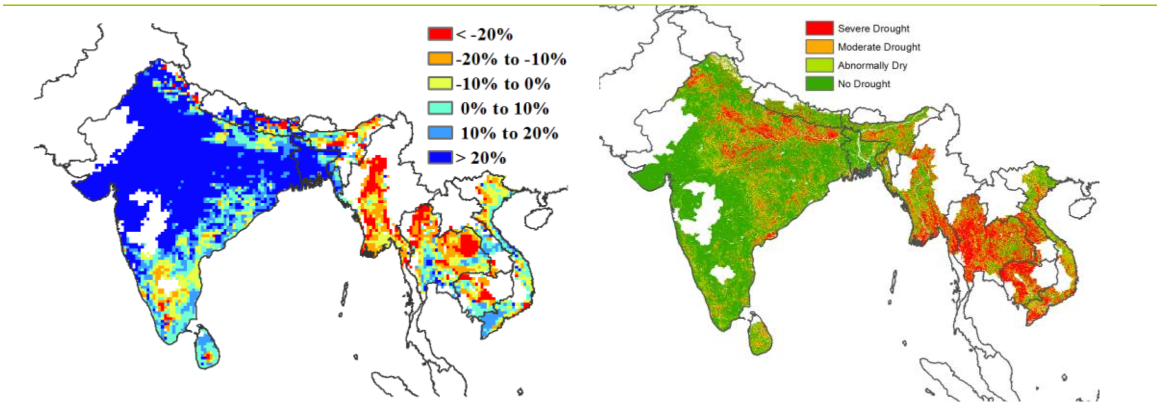
d. Profiles of temperature departure from average (mm)





e. Maximum VCI

f. Cropped arable land



g. Biomass accumulation potential departure h. VHI minimum

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

2.6 Western Europe

Generally, Crop condition was generally above average in most parts of the Western European Major Production Zone (MPZ) during this reporting period, resulting from a combination of positive temperature anomalies and overall significantly above-average precipitation in most areas. The harvest of summer crops was completed, and winter crops were planted and reached over-wintering stages.

The MPZ as a whole recorded above average RAIN (+20%). However, there were differences in precipitation between the countries. Over the entire monitoring period, rainfall in the western MPZ is above average, while rainfall in the eastern MPZ fluctuated around the mean, and the most severe shortfalls were observed in the Czech Republic (-21%), Hungary(-16%) and Germany (-5%). However, frequent and abundant rainfall was observed in France (+39%), Spain (+37%), Italy (+20%) and Denmark (+17%), which benefited summer crops to some extent in those regions. In addition, northern Italy and southwest France experienced two significantly higher precipitations in November and mid-December. RAIN deficit conditions were observed in Germany, the Czech Republic, Slovakia, Hungary and Austria in late-October, from late-November to early-December and January, where they affected the sowing and emergence of winter crops.

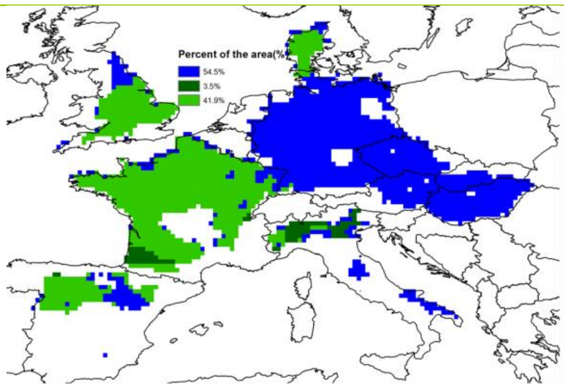
Temperature (TEMP) for the MPZ as a whole was above average (TEMP +0.9°C), but radiation was below average with RADPAR at -5%. During the entire monitoring period, most areas experienced warmer-than-usual conditions, while below-average temperature mostly occurred in (1) United Kingdom, western coastal region of France and Spain in October; (2) Spain, France, Germany, Denmark, the western Czech Republic and Austria, and northern Italy from early-November to mid-November; (3) Eastern part of the Czech Republic and Austria, Southern Slovakia, Hungary, northern and eastern Italy from early-January to mid-January; (4) most parts of the Western European MPZ in the early-December. No severe frost damage occurred during this monitoring period.

Due to low sunshine, the biomass accumulation potential was 7% below the recent 15-year average. The lowest BIOMSS values (-20% and less) occurred in most of Spain, northern Italy, western Germany and northeast Hungary. In contrast, BIOMSS was above average (sometimes exceeding a 10% departure) over eastern Germany, the Czech Republic, west-south Slovakia and Hungary, northern and eastern Italy.

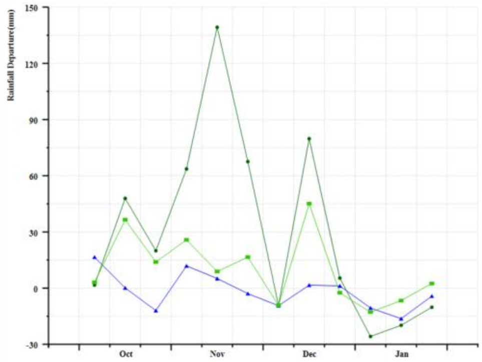
The average maximum VCI for the MPZ reached a value of 0.94 during this reporting period, indicating favorable crop condition in spite of low values in some regions. More than 93% of arable land was cropped, which was 3% above the recent five-year average. Most uncropped arable land was concentrated in Spain, and scattered areas in France, Italy, Hungary and east coast of UK.

Generally, the condition of winter crops in the MPZ was above average. However, more rain will be needed to ensure adequate soil moisture supply when the winter crops resume vegetative growth in spring.

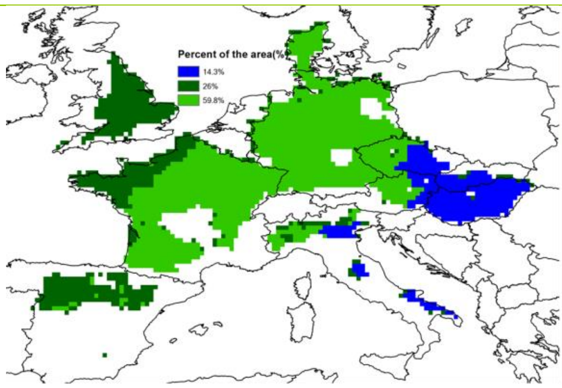
Figure 2.5 Western Europe MPZ: Agroclimatic and agronomic indicators, October 2019-January 2020.



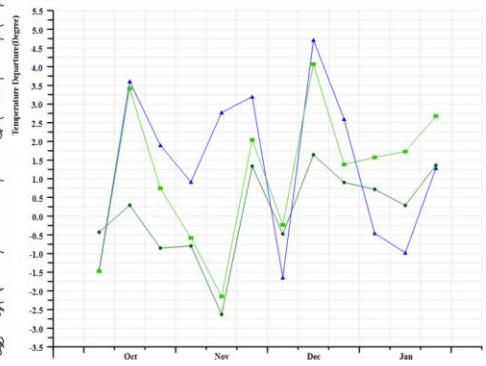
a. Spatial distribution of rainfall profiles



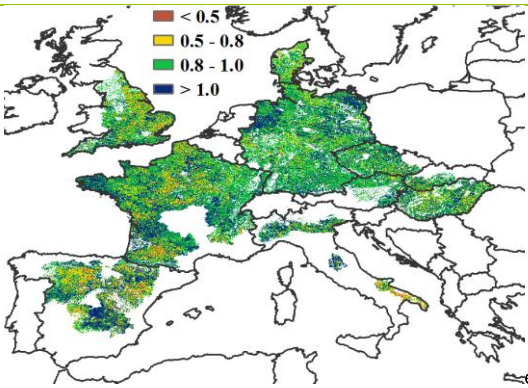
b. Profiles of rainfall departure from average (mm)



c. Spatial distribution of temperature profiles

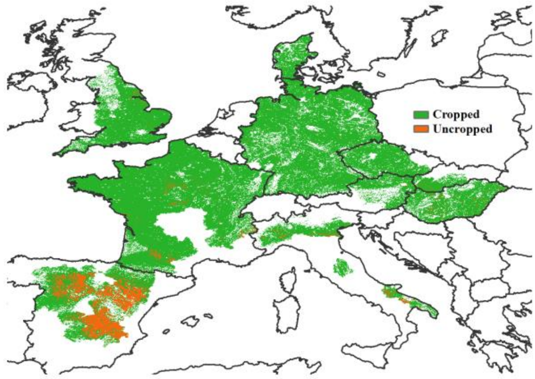


d. Profiles of temperature departure from average (mm)

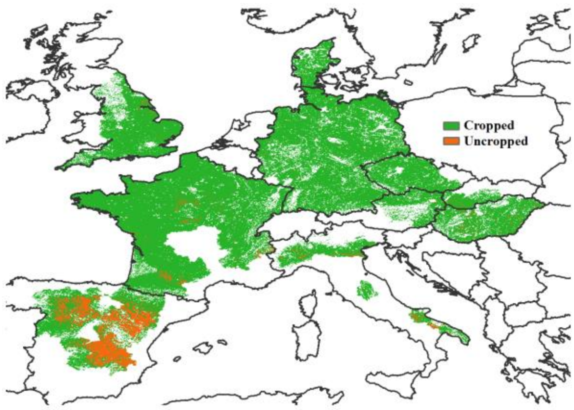


e.

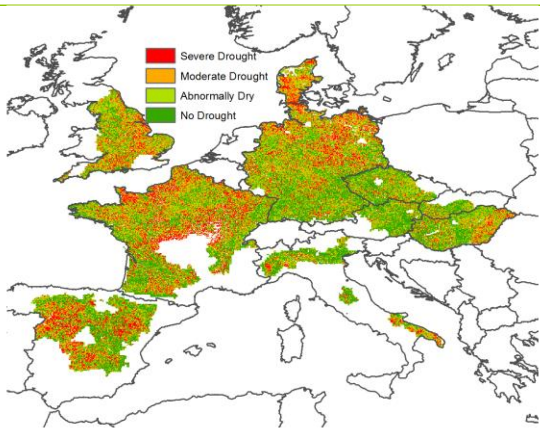
Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

2.7 Central Europe to Western Russia

For Central Europe and Western Russia, weather conditions between October 2019 and January 2020 were as follows: RADPAR increased 2%, rainfall was 16% below and temperatures were 2.7°C above the 15 year average.

According to the results of CropWatch, below-average rainfall was observed for large portions of the MPZ. The central part (33.7% of the MPZ) had a deficit from mid-October to early January. For the western part (almost 40.7% of the MPZ), below-average rainfall was observed from mid-October to mid-December. Regions affected were southern Poland, southern Belarus, central and western Ukraine, Romania and Moldova. Above-average rainfall was observed from mid-October 2019 to mid-November, early December and late-January 2020 in northern Poland and eastern Russia (25.6% of the MPZ). However, crop water use was relatively small during this period. In some areas, wheat was hibernating. Moreover, solar radiation and temperatures were generally low and evapotranspiration was minimal.

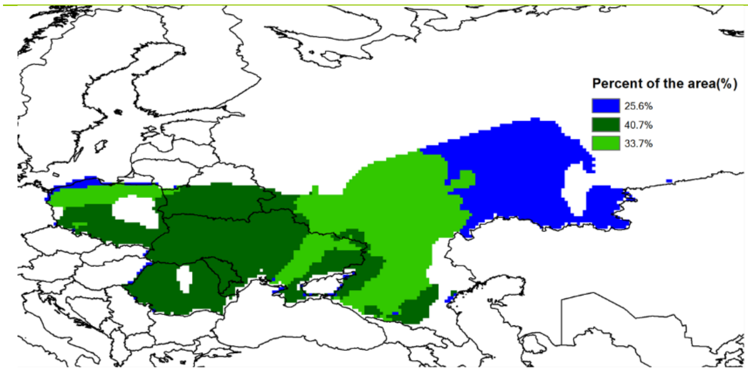
The temperatures of the MPZ were 2.7°C above average during monitoring period. From early October to late October, temperatures in Poland, Romania, Moldova, Ukraine, Belarus and western Russia were above average. From early November to late-November, the temperatures in the MPZ began to drop, and the minimum temperature departure from average reached -3°C. After December, the temperature departures of the MPZ began to rise and reached the maximum in late January. While the temperatures in southern Poland, Romania and southwestern Ukraine were relatively low, large positive temperature departures (+9°C) for western Russia were observed.

The biomass production potential in central Europe and western Russia was generally higher than average (17% higher than the recent 5-year average), and the spatial distribution of biomass accumulation potential departure indicated the above-average condition in the southern MPZ, and below-average condition in the northern and western MPZ. From October 1, 2019 to January 31, 2020, the proportion of cultivated land was 79% (16% higher than the recent 5-year average). Uncropped arable land was mostly located in southern Ukraine, Yevpatoria, Simferopol and surrounding areas as well as southwestern Russia (including Orenburg, Soliylitsk, Volsk and the south of Saratov).

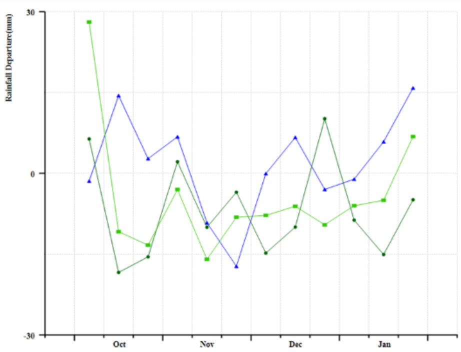
The maximum VCI for the Central Europe and western Russia MPZ reached a value of 0.92. The areas with high VCI values (>0.8) were mainly distributed in the west, central and northeast of the MPZ. Regions where the maximum VCI was below 0.5 were mainly found in the southeast MPZ, which was in agreement with the uncropped arable land map.

In general, with most parts indicating above-average crop conditions, prospects for crop production are promising in Central Europe to Western Russia.

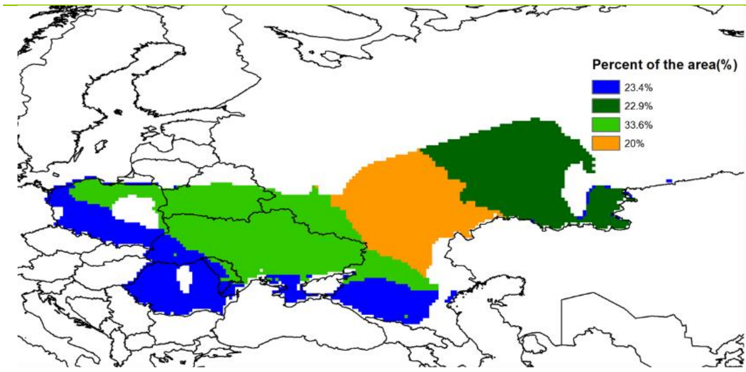
Figure 2.6 Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, October 2019-January 2020.



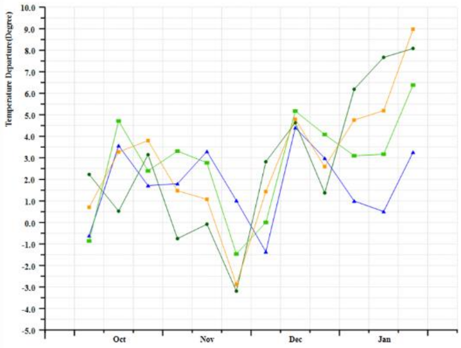
a. Spatial distribution of rainfall profiles



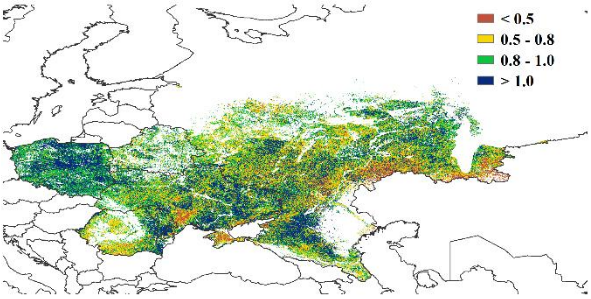
b. Profiles of rainfall departure from average (mm)



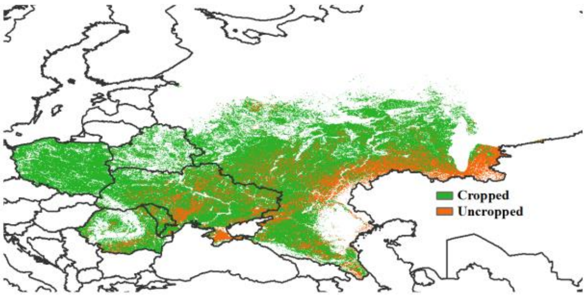
c. Spatial distribution of temperature profiles



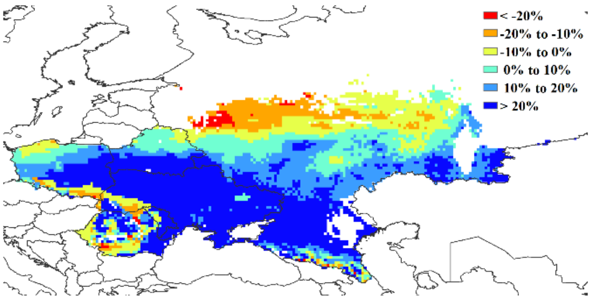
d. Profiles of temperature departure from average (mm)



e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure

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