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), and minimum vegetation health index (VHIn)— 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 B 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-year 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 2020 to January 2021)

	RAIN		TEMP		RADPAR		BIOMSS	
	Current (mm)	Departure (%)	Current (°C)	Departure (°C)	Current (MJ/m^2)	Departure (%)	Current (gDM/m^2)	Departure (%)
West Africa	167	-21	25.4	0.4	1194	-3	402	-10
North America	268	-13	6.0	0.7	527	-1	127	-1
South America	471	-48	23.7	0.6	1346	3	810	-1
S. and SE Asia	315	10	20.7	0.1	970	-5	319	-15
Western Europe	426	20	5.8	0.2	278	-10	69	-13
C. Europe and W. Russia	233	-10	0.9	0.9	223	-3	48	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 (October-January) for 2006-2020.*

Table2.2 Agronomic indicators by Major Production Zone, current season values and departure from 5YA (October 2020 to January 2021)

	CALF (Cropped arable land fraction)		Maximum VCI
	Current (%)	5A Departure (%)	Current
West Africa	95	2	0.95
North America	61	-11	0.73

	CALF (Cropped arable land fraction)		Maximum VCI
	Current (%)	5A Departure (%)	Current
South America	98	0	0.86
S. and SE Asia	97	2	0.90
Western Europe	92	2	0.92
Central Europe and W Russia	73	1	0.84

Note: See note for Table 2.1, with reference value R defined as the five-year average (5YA) for the same period (October-January) for 2016-2020.

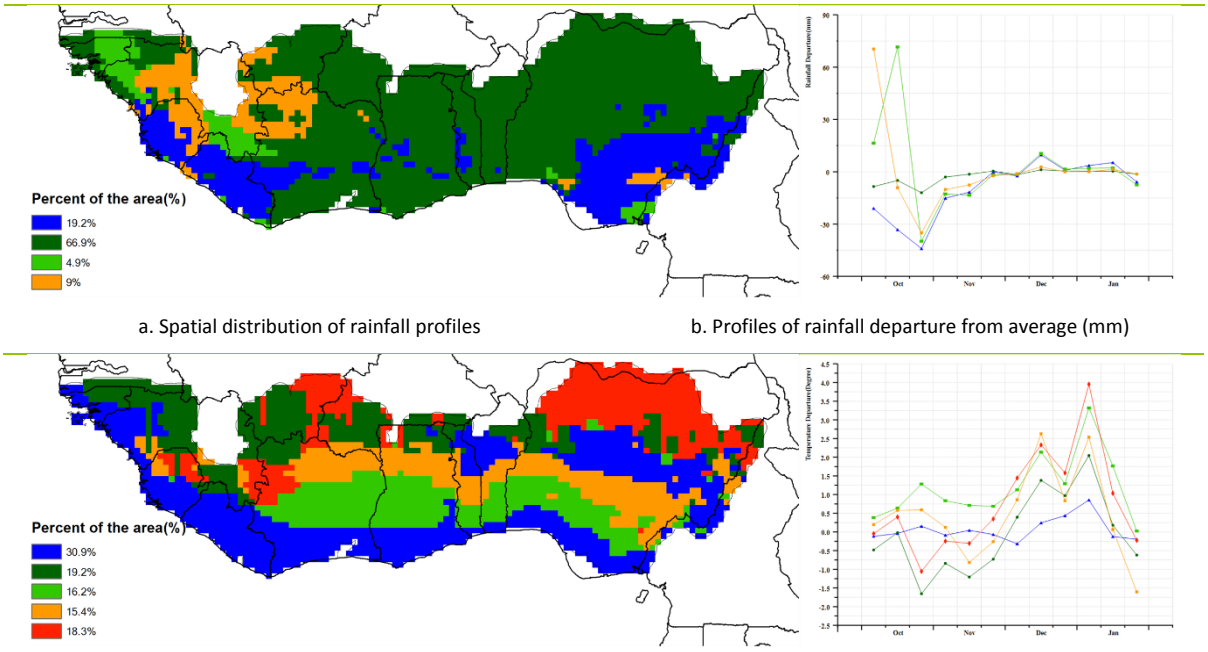
2.2 West Africa

The reporting period was characterized by harvesting activities of the major food crops in the region. In Nigeria, harvesting of irrigated rice and second maize crop was completed by end-January. The crop residues from main harvests are an important source of livestock fodder. In the coastal areas one-year-old cassava crop was still growing and harvest of second season cassava crops started in January.

Based on the climatic indicators the region (MPZ) received on deficient rainfall of 167 mm (down by 21%), with extreme rainfall received in Equatorial Guinea (1,419 mm, up by 10%) and Gabon (1,420 mm, up by 4%). Reduced average rainfall was observed in Togo (-51%), Burkina Faso (-37%), Nigeria (-34%), Ghana (-19%), Côte d'Ivoire (-16%) and Sierra Leone (-16%). The average temperature in the MPZ varied from 23.1°C to 27.1°C with a regional average of 25.4°C (up by 0.4°C) and solar radiation of 1,194 MJ/m^2, down by 3%. The accumulated biomass production potential of the region was 402 gDM/m2 (-10%). The cultivated arable cropped area (CALF) for the region was above 95% (+2%) except for Nigeria, where it was at 90% (+7%) while the regional vegetative health index (VCIx) was at 0.95, indicating good crop conditions in most parts of the region.

These CropWatch indicators showed stable climatic conditions for the MPZ and hence favourable growth for the major harvested crops.

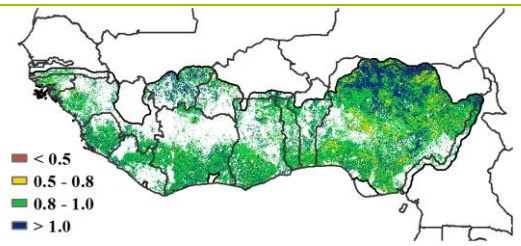
Figure 2.1 West Africa MPZ: Agroclimatic and agronomic indicators, October 2020 – January 2021.



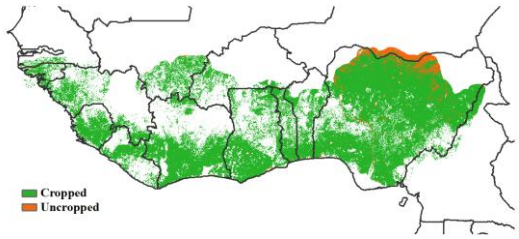
a. Spatial distribution of rainfall profiles

b. Profiles of rainfall departure from average (mm)

c. Spatial distribution of temperature profiles

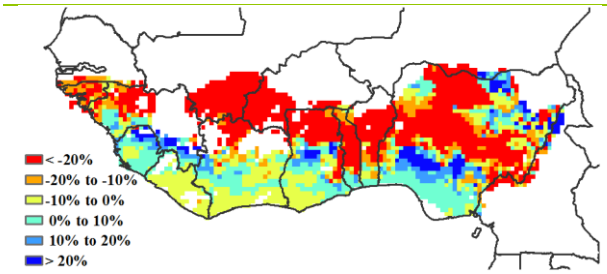


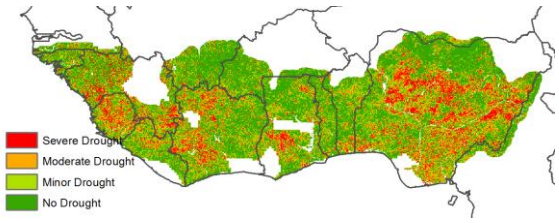
d. Profiles of temperature departure from average (mm)



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.

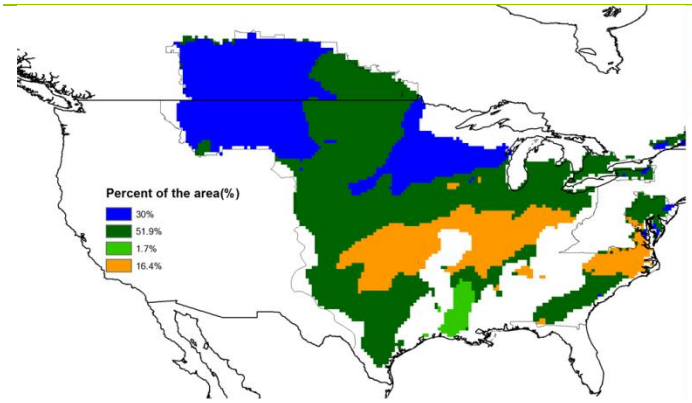
2.3 North America

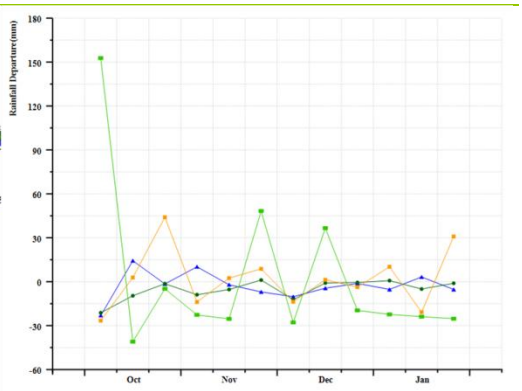
This reporting period covers the completion of maize and soybean harvest, as well as the planting and early growth phases of winter wheat. The conditions of the summer crops had been described in the previous bulletin. In general, the crop conditions for winter wheat are mixed due to large spatial variation in rainfall.

The entire region was dominated by relatively dry weather conditions. Rainfall was 13% below the 15YA (RAIN 268 mm), Temperatures were 0.7°C above average and solar radiation (RADPAR 527 MJ/m^2) was near average (-1%). Rainfall was relatively evenly distributed and fluctuated around the average. The impact of the water deficit was captured by the minimum vegetation health index (VHIx). It showed severe drought in northwestern Texas and eastern Colorado. The 20% below average potential biomass also confirmed the negative impact of drought on crops growing in both regions. A VCIx below 0.5 also reflected the poor crop conditions in the northwest of Texas.

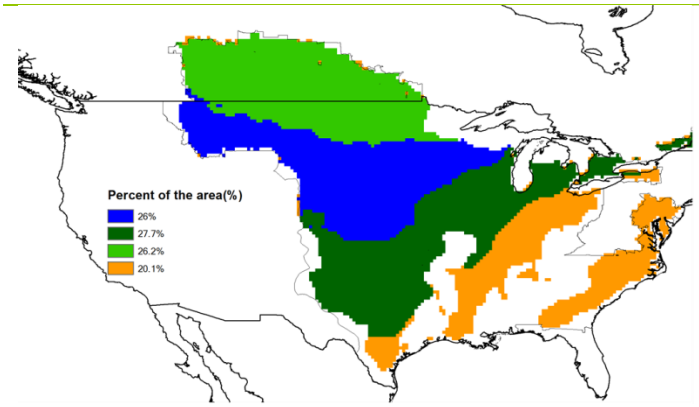
In short, the farming activities were low during this monitoring period, and the crop conditions were mixed in North America. Conditions were below average in the west because of a drought and normal in the east.

Figure 2.2 North America MPZ: Agroclimatic and agronomic indicators, October 2020 to January 2021.

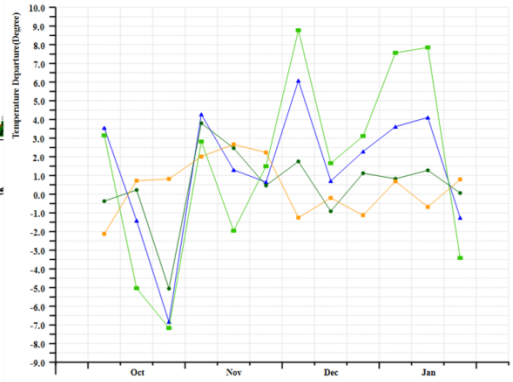




a. Spatial distribution of rainfall profiles

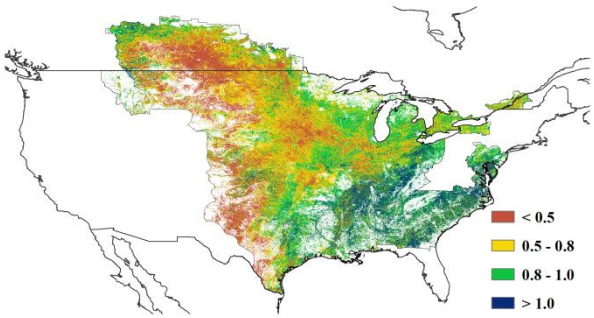


b. Profiles of rainfall departure from average (mm)

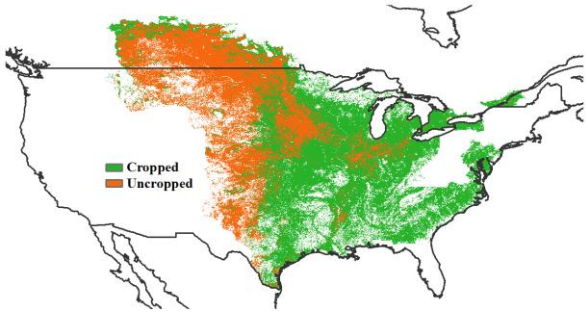


c. Spatial distribution of temperature profiles

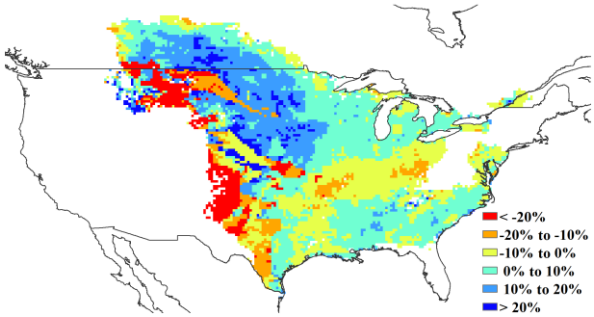
d. Profiles of temperature departure from average (mm)



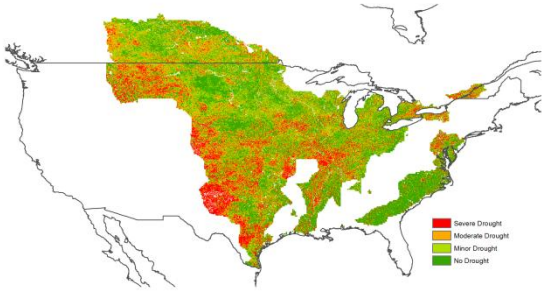
e. Maximum VCI



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

The reporting period covers the harvest of wheat, as well as the planting and main growth period of early maize, early soybean and rice. The planting of late maize and late soybean started in January.

Spatial distribution of rainfall profiles showed near-average conditions for most of Argentina. The northern part of the MPZ in Brazil was dominated by a pattern with negative anomalies since November (blue areas). Negative anomalies, but in a lower magnitude were observed in Parana and Sao Paulo in Brazil (dark green areas). Southern Brazil, part of Paraguay and Mesopotamia in Argentina showed an alternating pattern with negative (in October and late December) and positive anomalies (in early December and January).

Temperature profiles for South and Center Argentina showed an alternating pattern with positive and negative anomalies during the reporting period, with the strongest negative anomalies in early and late October and January and positive anomalies in mid-October and November. South Brazil, Paraguay and Mesopotamia showed a near-average profile with slight positive anomalies in October, November and December and negative anomalies in early

November and early December. The northeast of the MPZ showed again an alternating pattern of positive and negative anomalies with a strong positive peak at the beginning. North and Center West of the MPZ in Brazil showed positive anomalies in most of the period with peaks in October, December and January.

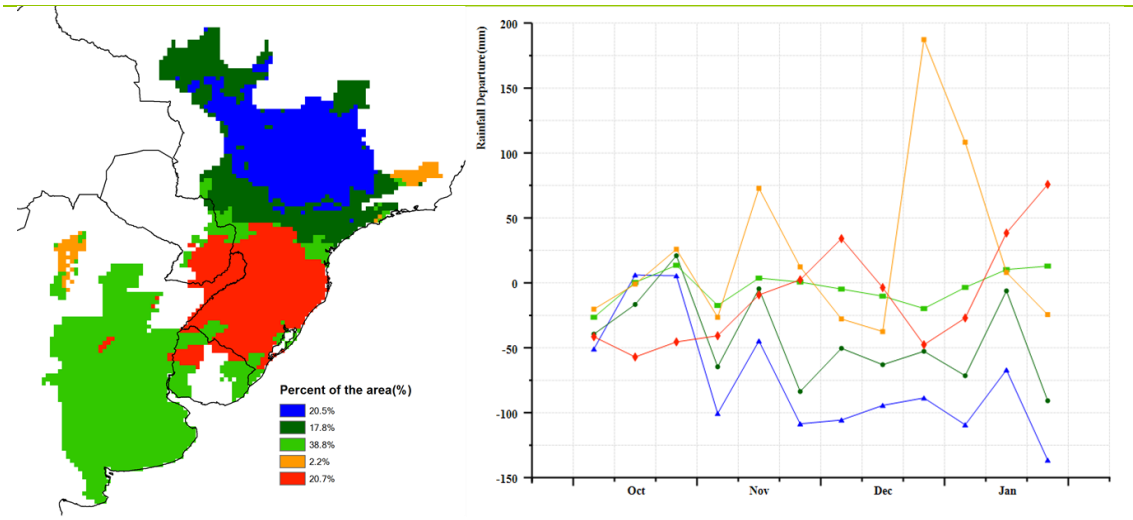
BIOMSS showed positive anomalies in North West of the MPZ, and most of Argentine Pampas and Chaco. Negative anomalies dominated the patterns in North East of the MPZ and South Brazil, Uruguay, Paraguay, as well as Subtropical highlands and Mesopotamia in Argentina.

Maximum VCI showed high values for Brazil (more than 0.8). South Brazil and Paraguay showed a similar pattern, but with scattered areas with VCIx values lower than 0.8. Argentina showed a mixed pattern along the main agricultural areas with high and low VCIx values. Areas with lower values were observed in South Mesopotamia, Chaco and North and West Pampas.

Crop Arable Land Fraction was complete in Brazil, Uruguay and Paraguay. In Argentina, despite most of the area being cropped, some areas remained uncropped in West Pampas, Chaco and Subtropical highlands.

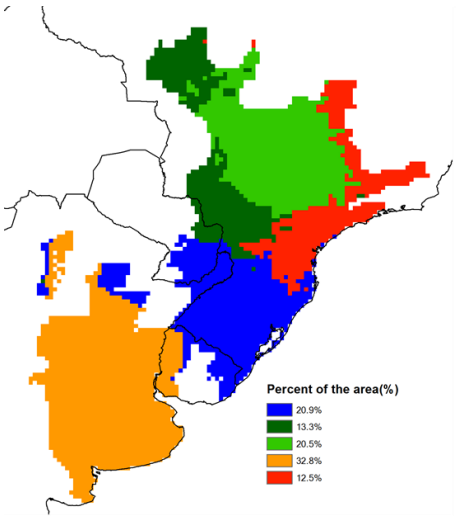
In general, the MPZ showed regular to good conditions in most of the indices, with some exceptions: strong positive anomalies in temperature in North of the MPZ, negative anomalies for BIOMSS in the North West of the MPZ and South Brazil. In Argentina, some areas showed low VCIx and some areas remained uncropped.

Figure 2.3 South America MPZ: Agroclimatic and agronomic indicators, October 2020 to January 2021

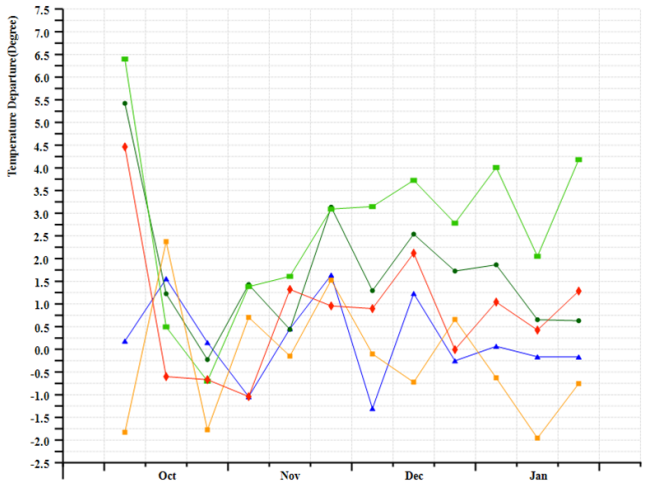


a. Spatial distribution of rainfall profiles

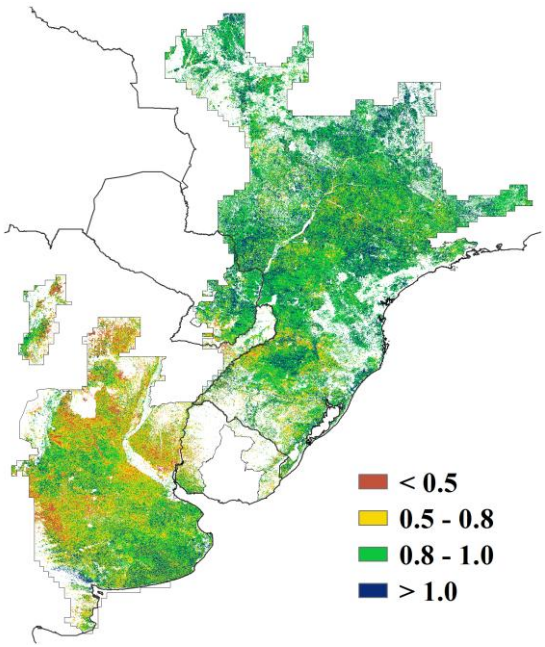
b. Profiles of rainfall departure from average (mm)



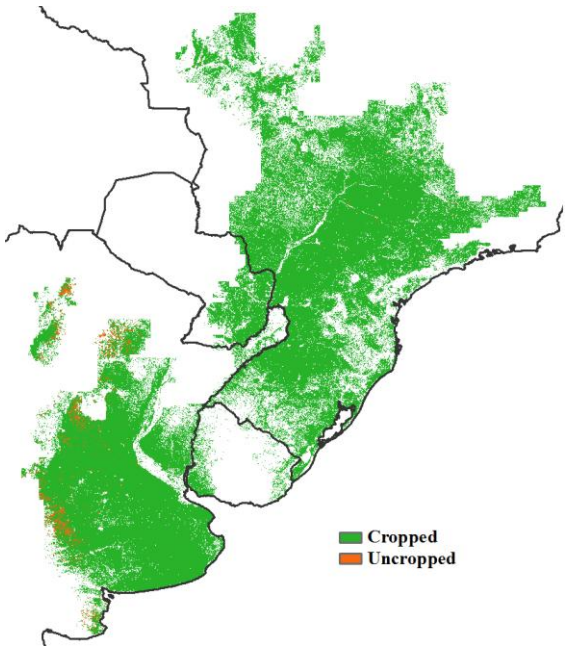
c. Spatial distribution of temperature profiles



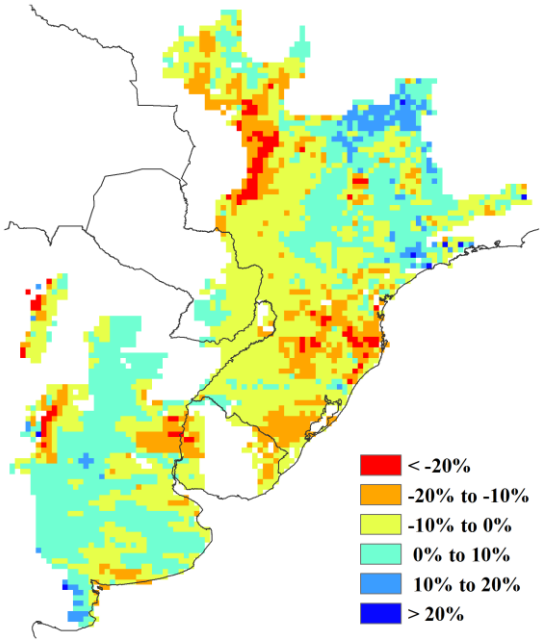
d. Profiles of temperature departure from average (mm)



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

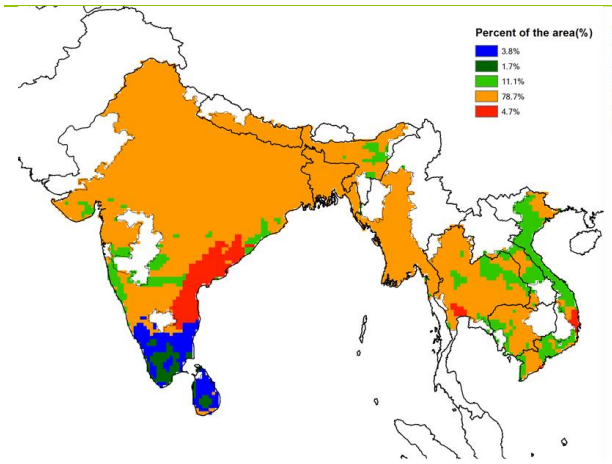
South and Southeast Asia includes India, Bangladesh, Cambodia, Myanmar, Nepal, Thailand and Vietnam. The main crops are maize, rice, wheat and soybean. In general, agroclimatic and agronomic variables demonstrated favorable conditions for rainfall (+10%) and temperature (+0.1°C), whereas RADPAR (-5%) and BIOMSS (-15%) were below the 15YA. CALF was above the 5YA (+2%). VCIx was 0.9. Above-average precipitation helped replenish soil moisture and thus benefited the growth of winter crops.

During the monitoring period, significant spatio-temporal differences in precipitation between the countries were observed. 78.7% of the region received close-to-average rainfall, including most of India, Nepal, Bangladesh, Cambodia, Thailand, southern Myanmar and southern Vietnam. Rainfall in 11.1% of the region (mainly located in most of Vietnam and eastern Thailand) was significantly above average in October and was near average in November, December and January. Other areas showed a pattern with positive and negative departures from the average. Temperature in the whole MPZ was close to average and had light fluctuations. Meanwhile, the spatial distribution of temperature profiles indicates that a warm spell swept across Bangladesh and Myanmar in early to mid-January and a cold spell swept across Thailand, Cambodia, Vietnam and Laos in early to mid-January.

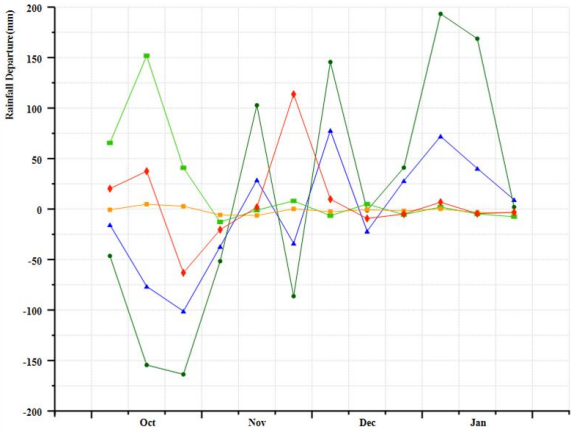
CALF in this MPZ reached 97%, and uncultivated areas were mainly located in a small part of north Rajasthan, east Bangladesh and south Vietnam. BIOMSS showed strong anomalies in north India, southeast India, Myanmar, Thailand, mid Laos and mid Vietnam. Positive anomalies were mostly observed in the west and southwest of India. The VHI minimum map shows that north and central India, regions in Myanmar, Thailand and Cambodia were most affected by periods of drought conditions.

In summary, the results of CropWatch agroclimatic and agronomic indicators during the monitoring period demonstrated that, though there was abundant precipitation in the MPZ, the decreased RADPAR cumulatively affected the crops, resulting in a below-average BIOMSS. However, the impact on yield is limited, as most winter crops will reach the grain-filling phase during the next monitoring period only. In conclusion, the growth conditions of winter crops of this MPZ are near average and normal production levels can be expected.

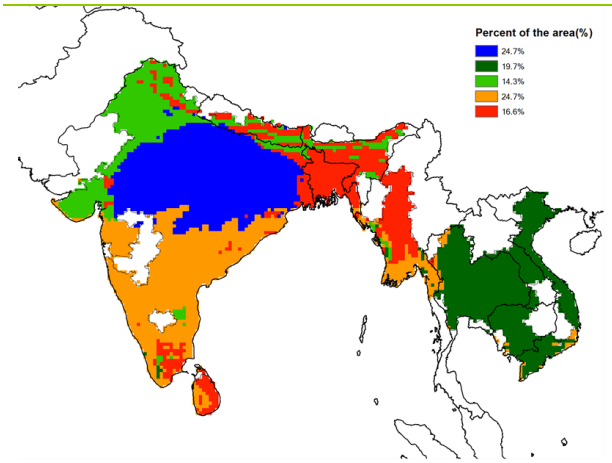
Figure 2.4 South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, October 2020-January 2021.



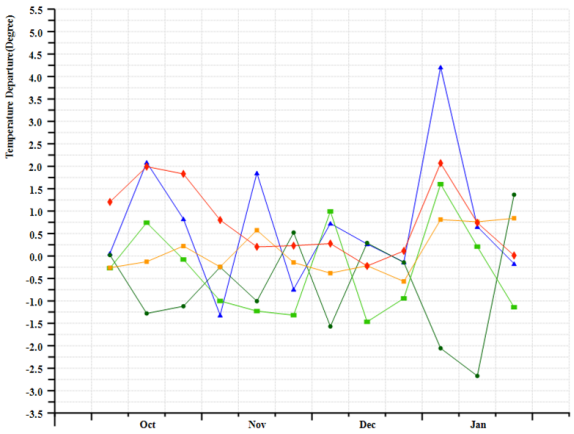
a. Spatial distribution of rainfall profiles



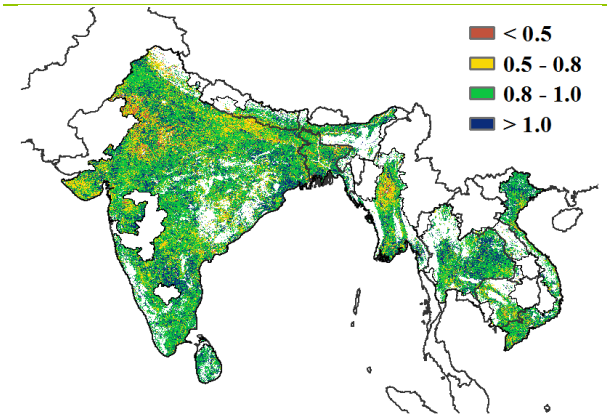
b. Profiles of rainfall departure from average (mm)



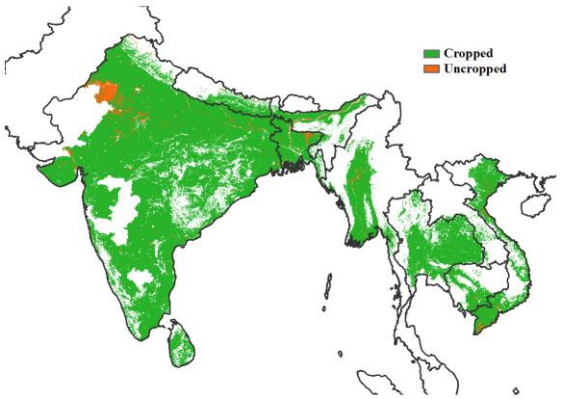
c. Spatial distribution of temperature profiles



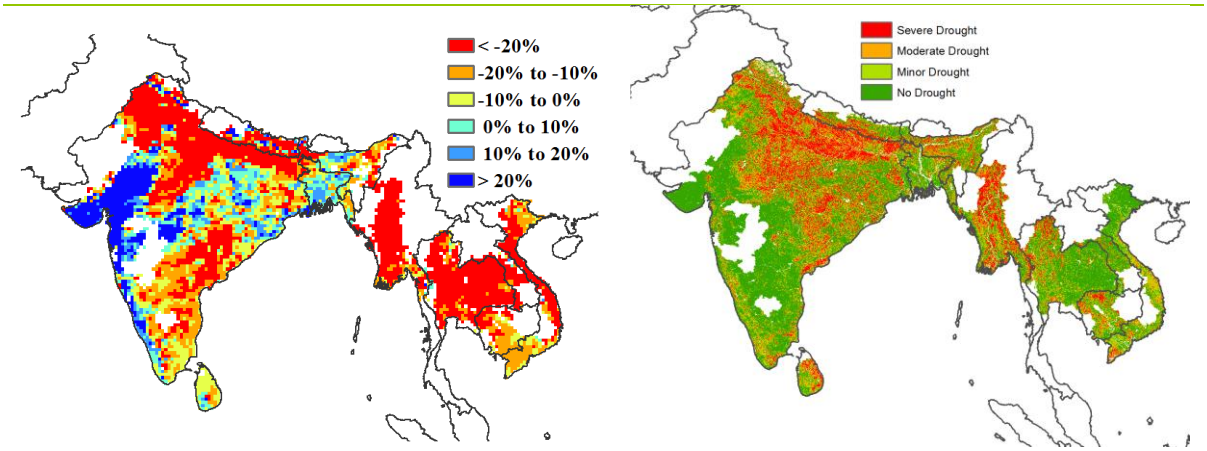
d. Profiles of temperature departure from average (℃)



e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure

h. VHI minimum

Note: See note for Table 2.1, with reference value R defined as the five-year average (5YA) for the same period (October-January) for 2016-2020.

2.6 Western Europe

This monitoring period covers the harvesting period of summer crops and the sowing as well as the growing period of winter crops. Generally, farming activies were low, and crop conditions were near average in most parts of the Western European Major Production Zone (MPZ) during this reporting period.

The MPZ as a whole recorded an above-average RAIN (+20%). Significant spatio-temporal differences in precipitation were observed between different countries: (1) 53.1 percent of the MPZ areas experienced a situation where the precipitation fluctuated around the average during the whole monitoring period, and this was the case for most of Denmark, Germany, Czech Republic, Slovakia, Austria, Hungary, southeastern Italy, northeastern UK and northern Spain. (2) In October, December and late January, abundant precipitation was observed in more than 46.9% of the areas (western Germany, northern Italy, most of France and United Kingdom). (3) A small area (4.9%), located in northern Italy and southern France, experienced much higher rainfall than usual in October and December.

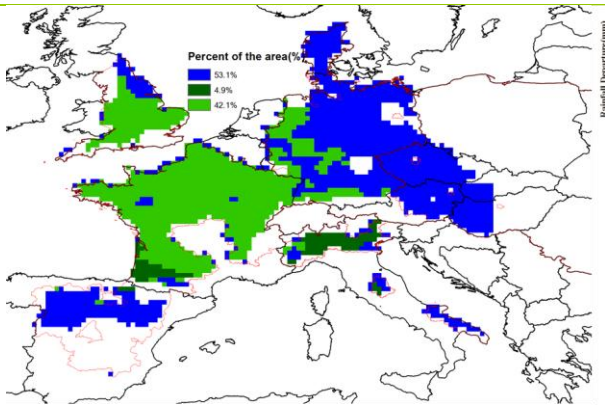
Temperature (TEMP) for the MPZ as a whole was slightly above average (TEMP +0.2°C), but radiation was significantly below average with RADPAR at -10%. During the entire monitoring period, most areas experienced warmer-than-usual or average conditions, while below-average temperature mostly occurred before mid-October, late November to early December, early January to mid-January in Denmark, Germany, United Kingdom, France, Spain and northern Italy.

Due to significantly above-average precipitation and low sunshine, the estimated biomass accumulation potential was 13% below average. The lowest BIOMSS values (-20% and less) occurred in most of United Kingdom, southwestern Germany, northeastern and southern France, and northern Italy. In contrast, BIOMSS was above average (sometimes exceeding a 10% departure) over Denmark, Austria and Spain.

The average maximum VCI for the MPZ reached a value of 0.92 during this reporting period, and more than 92% of arable land was cropped, which was 2% above the recent five-year average. Most uncropped arable land was concentrated in Spain, and scattered areas in central and eastern France, Austria and Italy.

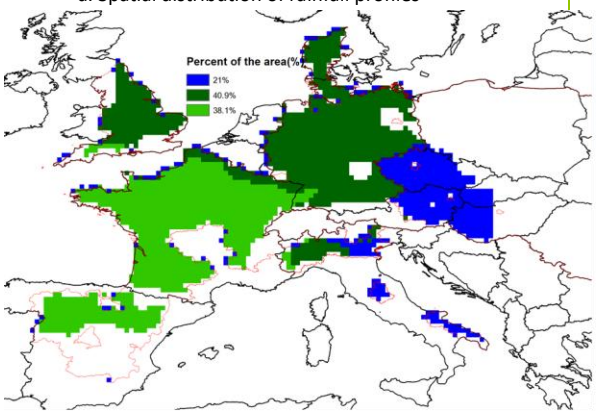
Generally, the condition of winter crops in the MPZ was near average. Sufficient moisture levels ensured proper establishment of winter wheat.

Figure 2.5 Western Europe MPZ: Agroclimatic and agronomic indicators, October 2020-January 2021

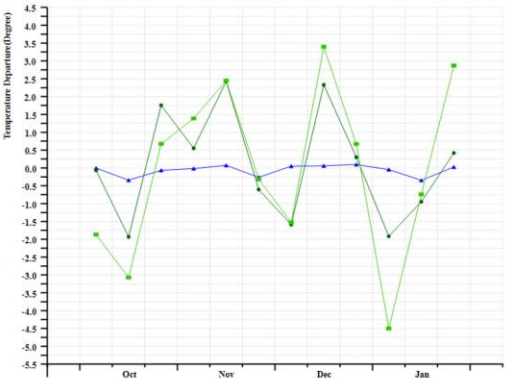


a. Spatial distribution of rainfall profiles

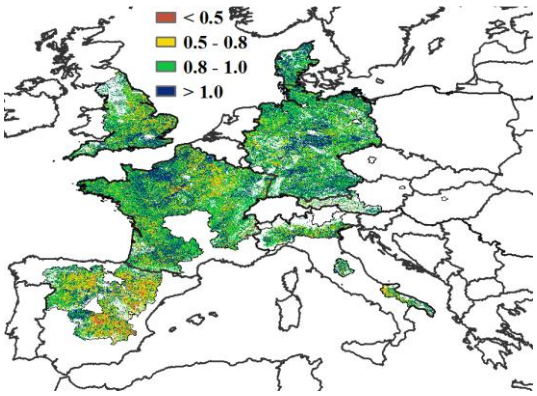
b. Profiles of rainfall departure from average (mm)



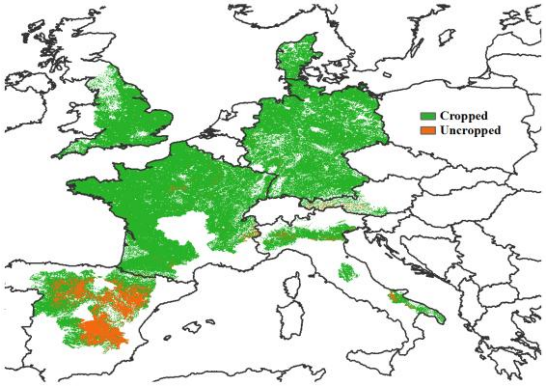
c. Spatial distribution of temperature profiles



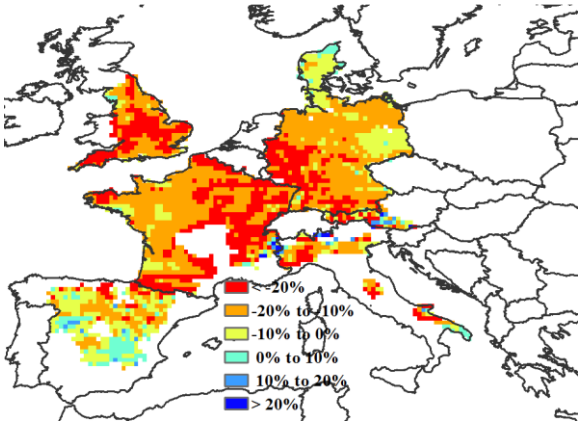
d. Profiles of temperature departure from average (mm)



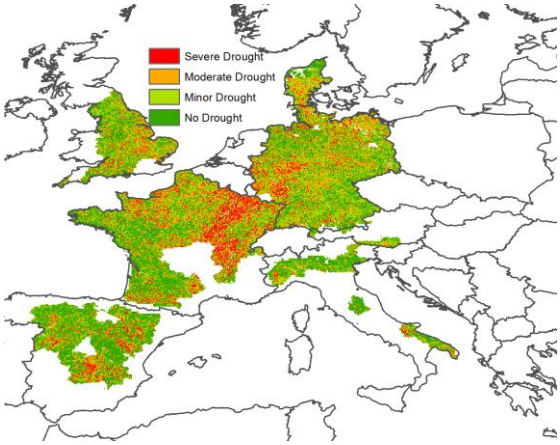
e. Maximum VCI



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 Center Europe and Western Russia, weather conditions between October 2020 and January 2021 were as follows: rainfall was 10% below average, RADPAR was 3% below average and temperatures were 0.9°C above the 15-year average.

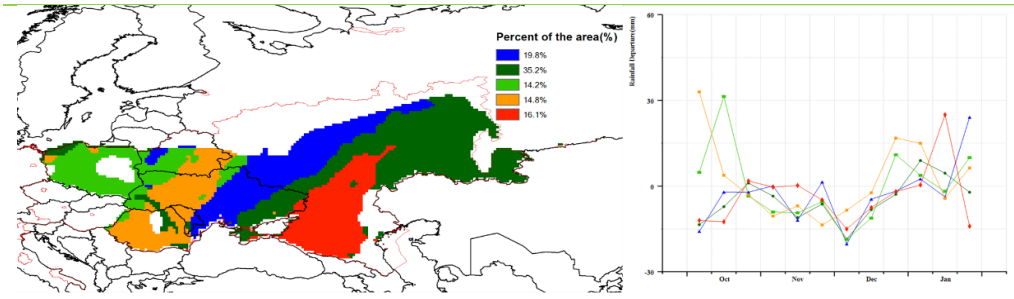
According to the Crop Watch analyses, below-average rainfall was observed for large portions of the MPZ. There were three main patterns: (1) The west part (29.0%) of the MPZ had a above average rainfall in October, followed by below average rainfall in November to mid December ; Subsequently, it received above average rainfall again, This area included southern Belarus, western Ukraine and Moldova, and most of Romania and Poland; (2) For 71.1% of the MPZ, which covered Central and Eastern Ukraine, as well as Russia, rainfall stayed below average until mid December. (3) From mid-early December to mid-early January 2021, rainfall in more than 80% of the MPZ was above average.

The temperatures of the MPZ were 0.9°C above average during this monitoring period. According to its departure map, the temperature in the MPZ fluctuated dramatically, but followed the same general pattern: Above normal temperatures in October until early November, followed by below average temperatures until early December.Subsequently, temperatures were above average, excpept for a cold spell in mid January.

The biomass production potential in the main productive areas of Moldova, southern Romania, eastern Ukraine and south-western Russia was generally higher than average (6% higher than the recent 15-year average). The spatial distribution of biomass accumulation potential departure indicated the above-average condition in most of the eastern part of MPZ, and below-average condition in Central Russia, mainly the Volga region. From October to January, the proportion of cultivated land is 73% (1.18% higher than the recent 5-year average). Uncropped arable land was mostly located in eastern Ukraine and southwestern Russia. The VCIx for the Central Europe and western Russia MPZ reached a value of 0.84, the areas with high VCI values (>0.8) were mainly distributed in the west, central and north of Russia. Areas with a VCI below 0.5 were mainly found in the southeast of the main production areas, which is consistent with the uncropped arable land map.

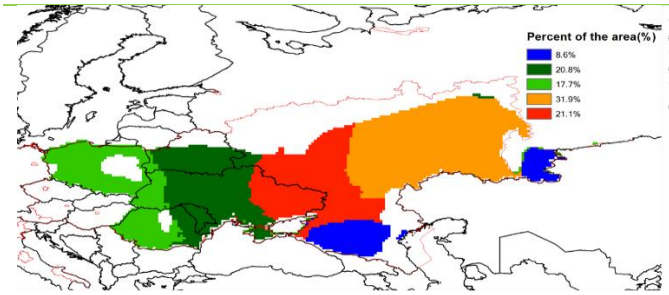
In general, the crops in the MPZ grow better than average, but more rainfall will be needed in the coming winter months to ensure vigorous crop development.

Figure 2.6 Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, October 2020-January 2021.

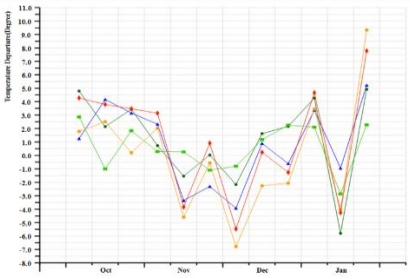


a. Spatial distribution of rainfall profiles

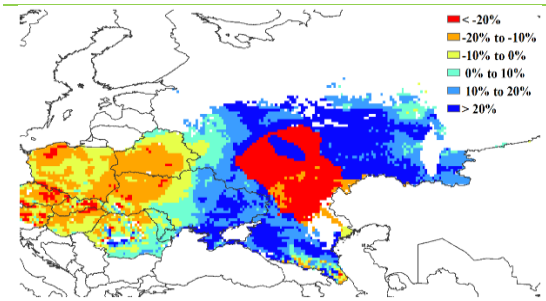
b.Profiles of rainfall departure from average(mm)



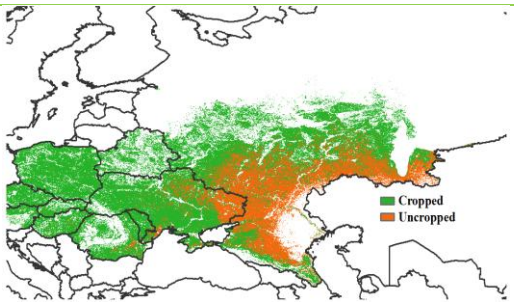
c. Spatial distribution of temperature profiles



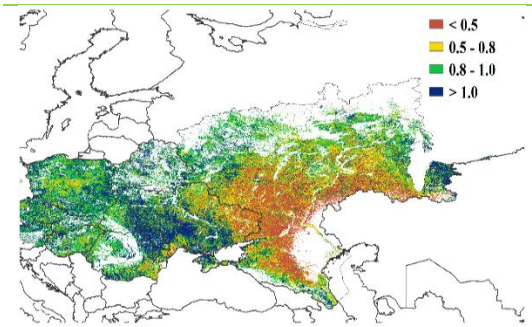
d. Profiles of temperature departure from average(°C)



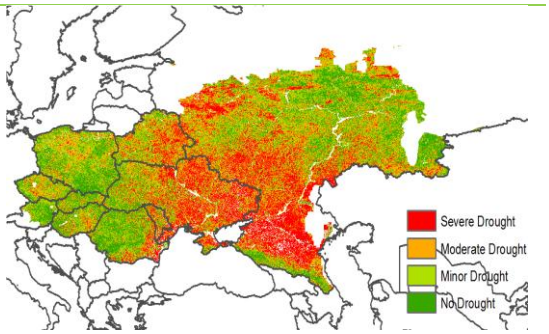
e. Biomass accumulation potential departure



f.Cropped arable land



g. Maximum VCI



h. VHI Minimum

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