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 and five-year averages, respectively. The text mostly refers simply to "average" with the averaging period implied.

Table2.1 January to April 2019 agroclimatic 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	192	1	28.7	-0.4	1317	0
North America	357	15	3.8	-1.1	730	-5
South America	676	2	24.0	-0.3	1184	1
S. and SE Asia	124	-3	24.7	0.0	1214	1
Western Europe	196	-9	6.3	0.3	608	5
C. Europe and W. Russia	238	-2	0.6	1.5	483	-1

*Note: Departures are expressed in relative terms (percentage) for all variables, except for temperature, for which absolute departure in degrees Celsius is given. Zero means no change from the average value; relative departures are calculated as (C-R)/R*100, with C=current value and R=reference value, which is the fifteen-year average (15YA) for the same period (January-April) for 2004-2018.*

Table2.2 January to April 2019 agronomic indicators by Major Production Zone, current season values and departure from 15YA/5YA

	BIOMSS (gDM/m^2)		CALF (Cropped arable land fraction)		Maximum VCI Intensity
	Current	15A Departure (%)	Current	5A Departure (%)	Current
West Africa	602	0	53	-2	0.89
North America	753	-2	42	-2	0.86
South America	1713	2	99	0	0.85
S. and SE Asia	415	6	72	-1	0.87
Western Europe	740	-6	94	-1	0.91
Central Europe and W Russia	680	6	51	-20	0.75

Note: See note for Table 2.1, with reference value R defined as the fifteen-year average (15YA) for the period (January-April) for 2004-2018 or five-year average (5YA) for the same period (January-April) for 2014-2018.

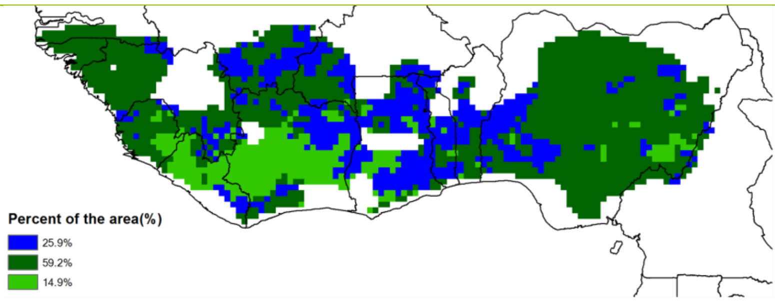
2.2 West Africa

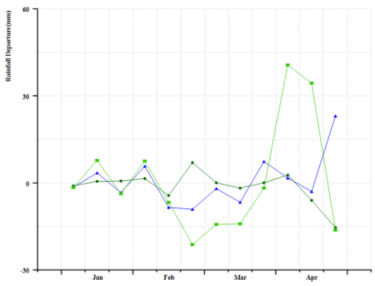
The reported period covers the onset of the main growing season for the main crops (cereals: maize, sorghum, millet; tubers: yam and cassava) that are important components of food security in the West African region. Most of the cropped land is along the coastal areas while the northern drier parts are currently uncropped. Dry conditions in most parts of the north are important for the crop harvest April, while onset of the rains in the south (February/March) created conducive environments for land preparation and planting of maize and yams.

The West African region received cumulative rainfall of 192 mm (+1% above average) covering 59.2% of the region with highest amounts in Equatorial Guinea (640mm, +1%). However we expect precipitation to build up starting with the southern coastal areas into the northern areas. The regional average temperature was 28.7°C (-0.4°C departure) and RADPAR reached 1317 MJ/m², an insignificant from the average). The observed fraction of cropped arable land (CALF) is predominantly relevant for the wet coastal areas while northern areas of the West African region are still uncropped. Consequently, the observed biomass production potential was 602 gDM m-2 with low departures (<-20%) covering mostly uncropped northern areas (except for some irrigated winter crops) and coastal parts which experience bimodal rainfall. The observed VCIx for the MPZ was 0.89 predominantly resulting from the coastal areas and northern Nigeria. The VHI minimum map, a proxy characterizing vegetation health or a combined estimation of moisture and thermal conditions showed stresses from mid to northern areas of the MPZ affecting most parts of the country in this regions.

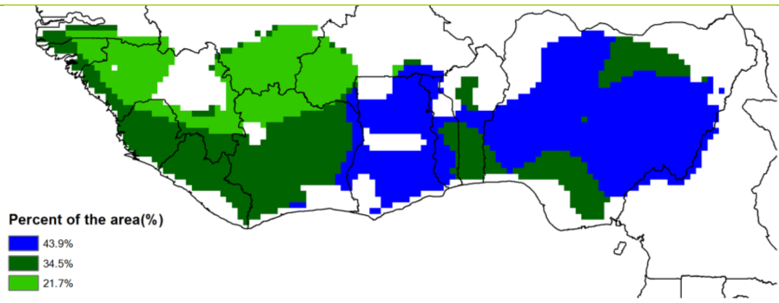
Based on these CropWatch indicators, stable climatic conditions favorable onset of the main long growing season are expected in the MPZ.

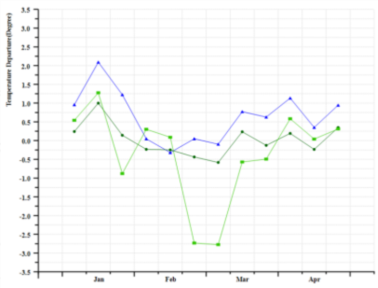
Figure 2.1 West Africa MPZ: Agroclimatic and agronomic indicators, January to April 2019.



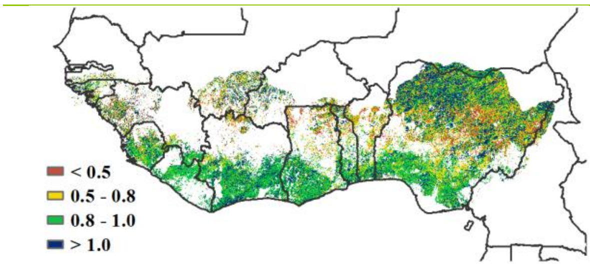


a. Spatial distribution of rainfall profiles b. Profiles of rainfall departure from average (mm)

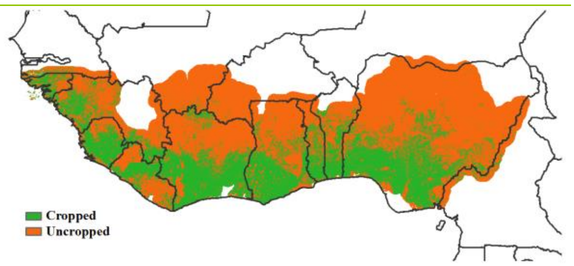




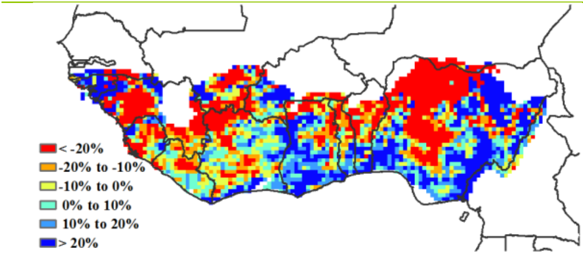
c. Spatial distribution of temperature profiles d. Profiles of temperature departure from average (mm)



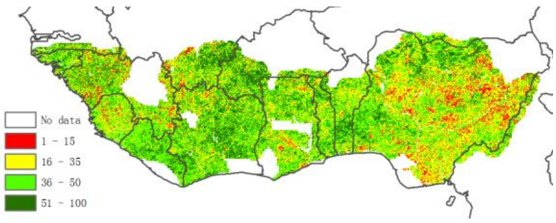
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

2.3 North America

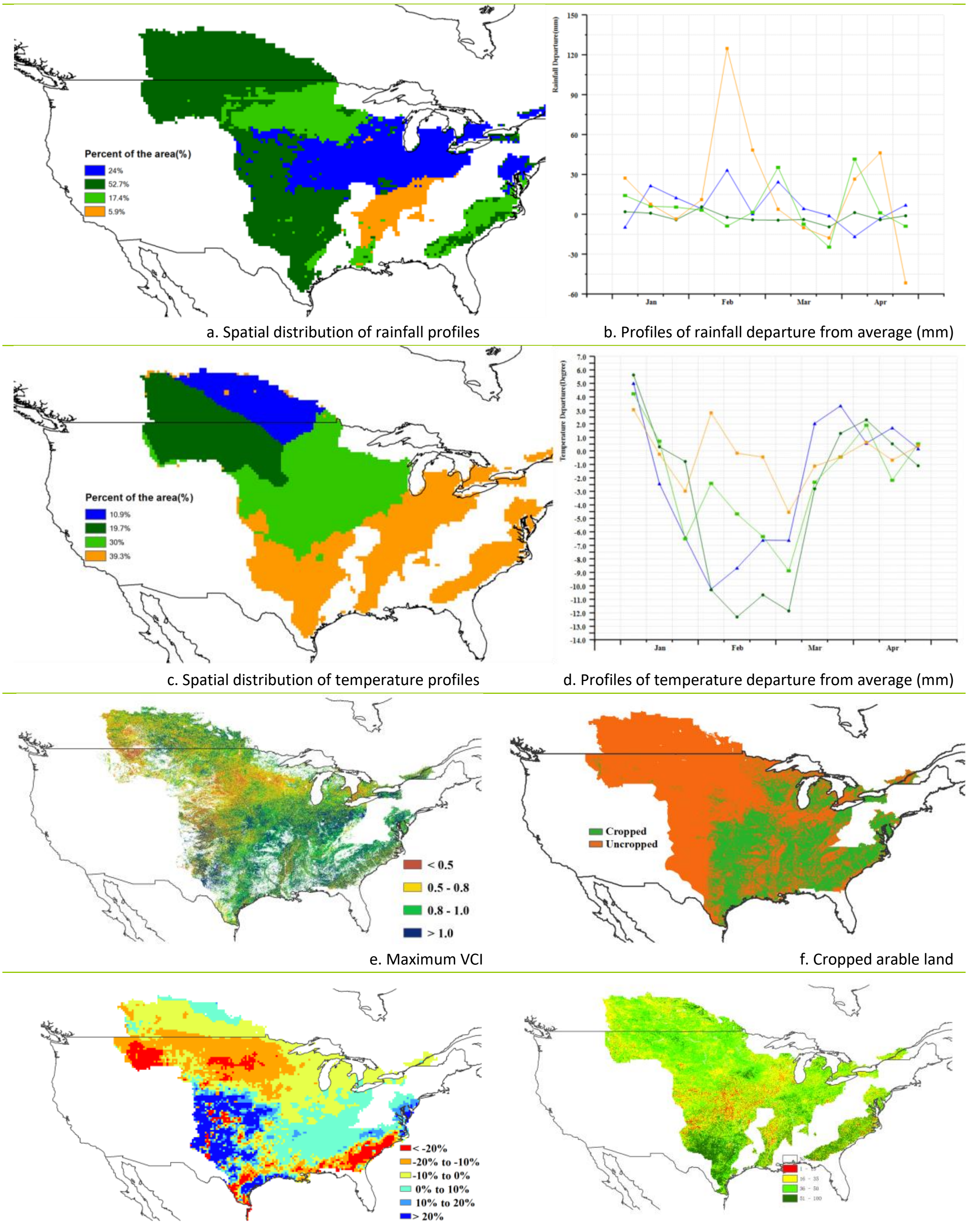
This reporting period covers the major growing season of winter crops, including winter wheat, rye, oats, and rapeseed (canola). Crop condition in major winter crop zones is above average.

Compared to average, precipitation was up 15% while temperature was below by 1.1°C. The photosynthetically active radiation in the MPZ was significantly lower than the average by 5% due to increased cloudiness. A severe cold wave occurred in February and caused the temperature in the Canadian Prairies and Northern Plains to be below average by more than 10°C. Precipitation in the middle and lower Mississippi River was 150 mm higher than average in late February, which led to floods. Fortunately, because most spring crops had not yet been sown in February, the abnormal weather did not directly impact agricultural production.

Due to the cold wave, sowing was, however, delayed, which caused the cropped area land to drop 2% below the 5-year average. Above average precipitation and low temperature reduced the risk of drought, as confirmed by VHIn, except for scattered areas in the Great Plains. As to the major winter crops producing zone, potential biomass in Central and southern Great Plains was 20-30% higher than average due to adequate soil moisture. High VCIx also confirms the good crop condition in Central and southern Great Plains.

In summary, the condition of winter crops is above average and CropWatch estimates that winter crop production is likely to above average as well.

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

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

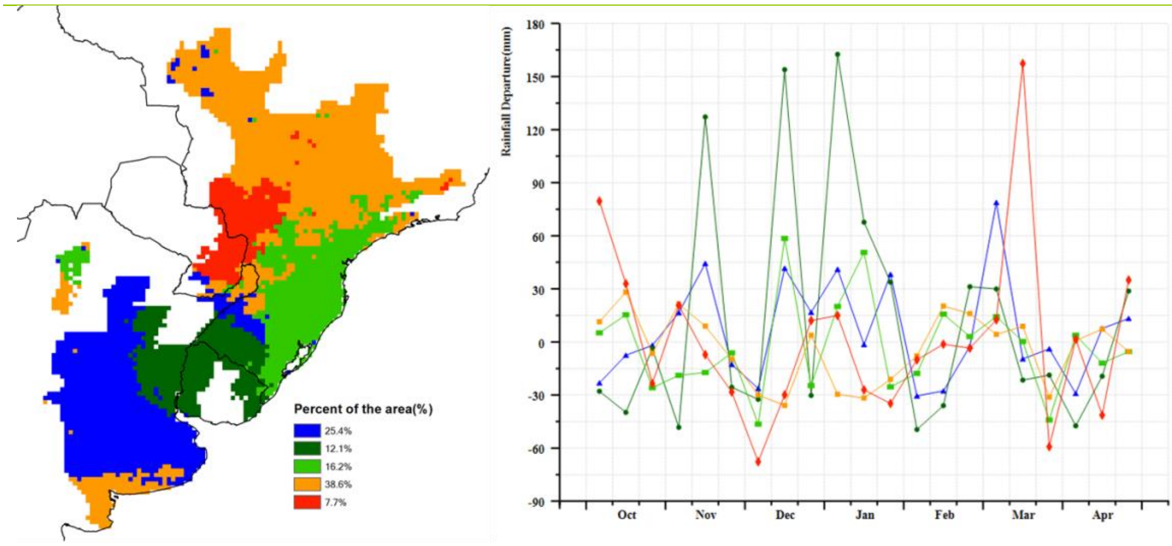
2.4 South America

The current Bulletin covers the peak vegetative development and maturity of summer crops in the MPZ. The harvest of maize, soybean and other summer crops will be concluded in May. Overall crop condition in South America was average during the monitoring period.

The region showed close to average rainfall (+2% above average). However, according to rainfall departure clusters (Figure 2.3a) spatial variability was large. Some areas experienced large precipitation excesses, such as the north-eastern Pampas, Uruguay and South Brazil. In East Paraguay and the border area between the Paraná region of Brazil and Paraguay, precipitation deficit had occurred in November 2018 during the previous CropWatch reporting period. TEMP showed a slight reduction of 0.3°C. All of the areas illustrated in Figure 2.3b showed high variability in temperature anomalies during the period with a range of change of 3°C or larger. Central Mato Grosso in North-west Brazil suffered abnormally warm weather from February to early April. Other areas showed lower values around March and positive anomalies at the beginning and end of this reporting period. Argentina and Uruguay recorded negative anomalies in March at a time when almost no anomalies occurred in Brazil. RADPAR showed an increment of 1 % over average.

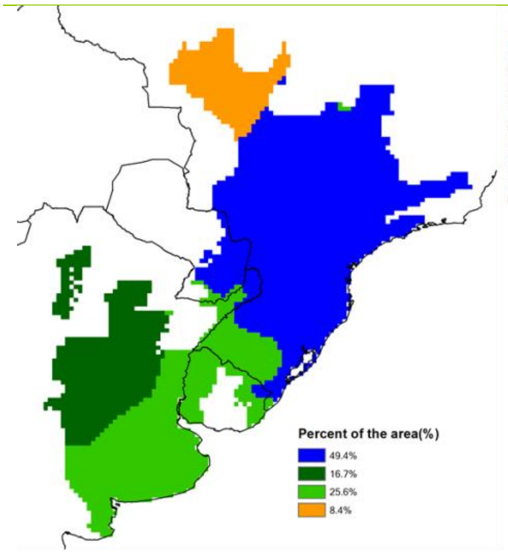
BIOMSS was 2 % above average, again with a lot of spatial variability (Figure 2.3g). Negative anomalies were observed in the South of the Pampas, Chaco and Center of Brazilian agricultural area, while positive anomalies where observed in North-east Argentina, as well as in Northern and Southern Brazil. As was also observed during the previous reporting period, all arable land was cropped (Cropped Arable Land Fraction of 100 %), which represents a 3 % increment compared to 5 years average (Figure 2.3f). Maximum VCI showed on average values of 0.75. Values higher than 0.8 were observed in most of the region, with the exception of some places in South-west and North-west Argentina and some patches in Brazil (Figure 2.3e), including southern Rio Grande do Sul and eastern Paraná States. Minimum VHI showed in general values lower than 50 (Figure 2.3h). In particular quite low values (less than 15) were dominant over some of the main agricultural subregions like Paraná in Brazil and the Argentinian Pampas, where crops suffered from short-term water stress during the rainfall deficit period.

Figure 2.3 South America MPZ: Agroclimatic and agronomic indicators, January to April 2019.

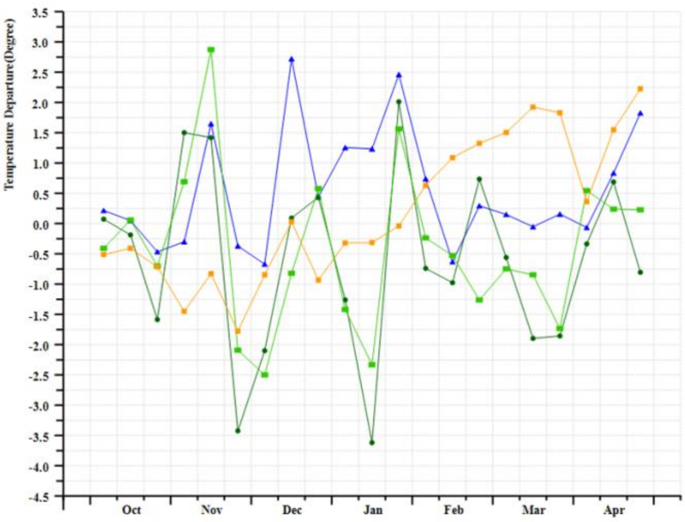


a. Spatial distribution of rainfall profiles

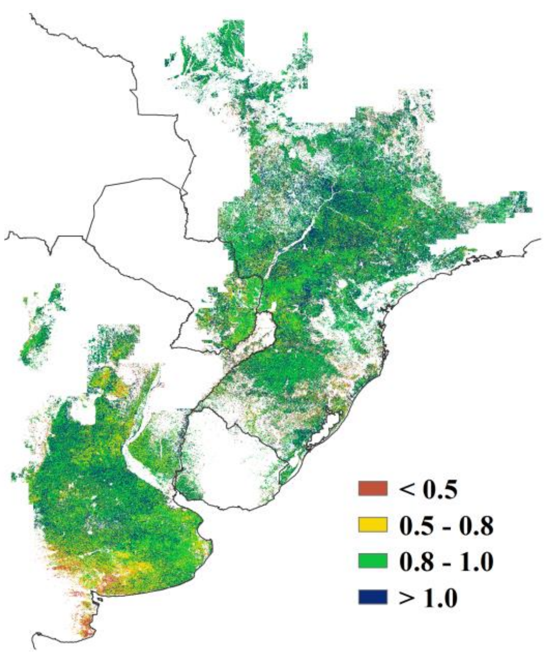
b. Profiles of rainfall departure from average (mm)



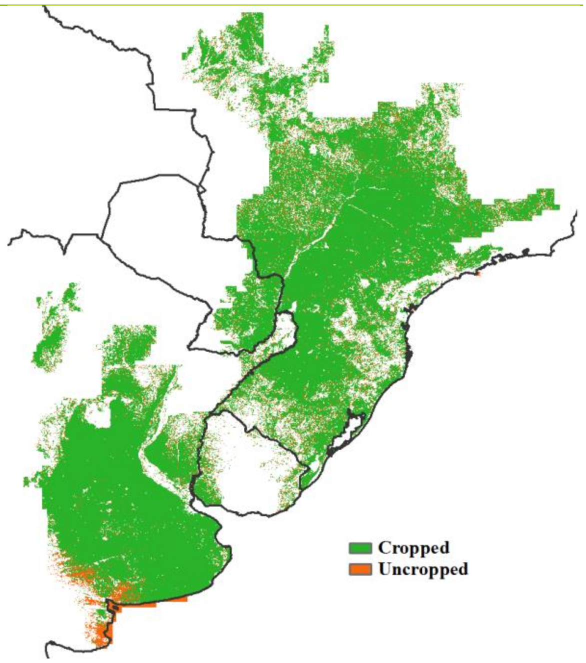
c. Spatial distribution of temperature profiles



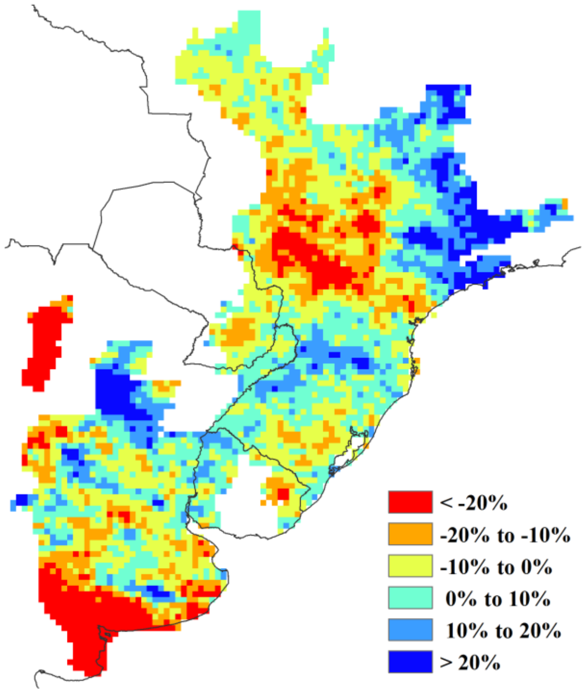
d. Profiles of temperature departure from average (mm)



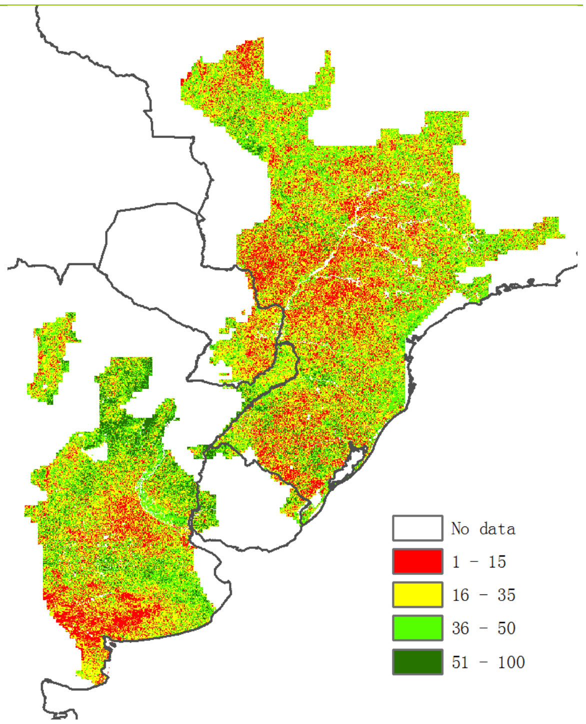
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

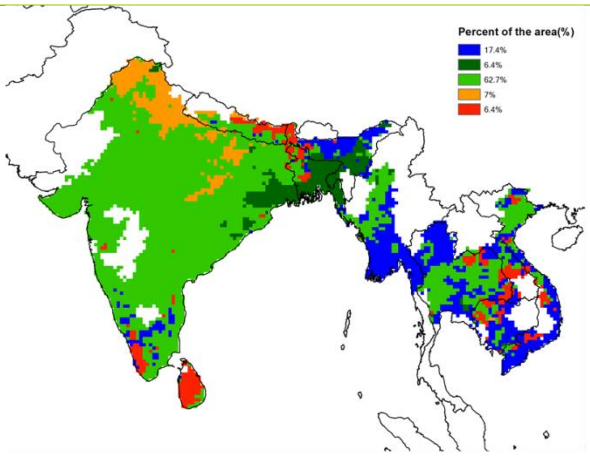
2.5 South and Southeast Asia

Overall crop condition was favorable in South and South-east Asia over the reporting period, as indicated by both above-average BIOMSS (+6%) and a relatively high value for VCIx (0.87). This derives directly from average agroclimatic conditions (RAIN -3%, TEMP 0.0°C, RADPAR +1%, all compared to their respective averages).

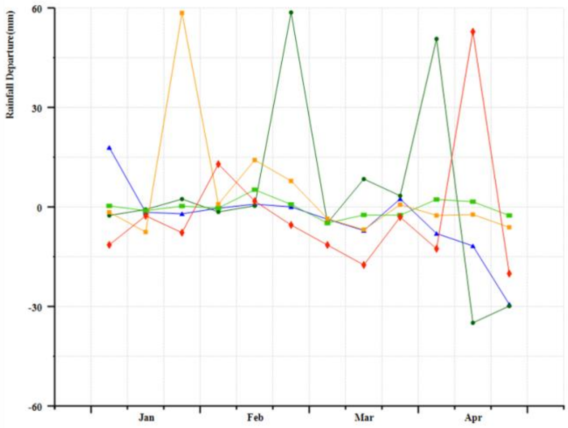
62.7% of cultivated areas experienced average rainfall throughout the monitoring period; they are mainly located in the western part of the MPZ, covering most regions of India. In contrast, rainfall fluctuated largely over time in other parts of the MPZ. Temperatures profiles were generally above average in the north-west, central and eastern parts of the MPZ, including southern India, Bangladesh, Myanmar, Thailand, Cambodia, Laos and Vietnam (59.3% of the arable areas). Remaining areas (making up 40.7% of crop land) showed more significant variations in temperature, with the values consistently below average especially in northern India and Nepal.

Most of the MPZ was actually cropped but uncropped areas occurred in southern and central India, Myanmar and Thailand. According to the map of VCIx patterns, favorable crop condition, with the values greater than 0.8, developed in the north-western and eastern parts of the MPZ, including northern India, Nepal, Bangladesh and Vietnam; moderate values between 0.5 and 0.8 were common in central and southern India, Myanmar and Thailand. The poorest crops (VCIx below 0.5) appeared in southern and western India. Consistent with the pattern of VCIx, above-average BIOMSS was located in the north-western and eastern parts of the MPZ, especially northern India, southern Myanmar, Vietnam and southern Thailand. On the contrary, below-average BIOMSS occurred in central and southern India, northern Thailand and Sri Lanka, probably due to drought. This is confirmed by the spatial patterns of VHIn, as the lowest values (below 15) also occurred in southern India, northern Thailand, Sri Lanka, Cambodia and Laos.

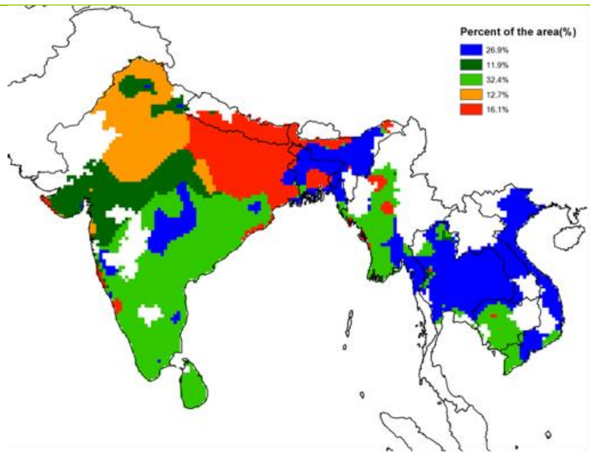
Figure 2.4 South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, January to April 2019



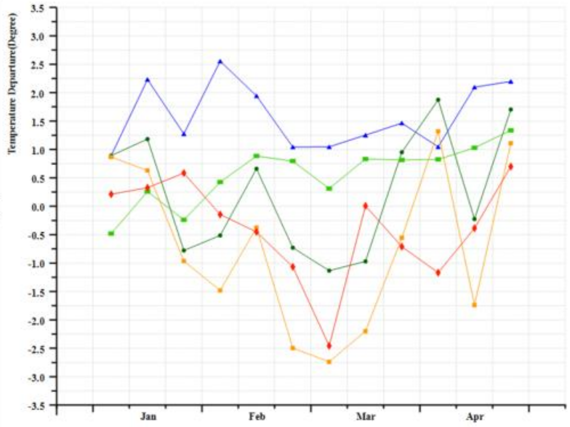
a. Spatial distribution of rainfall profiles



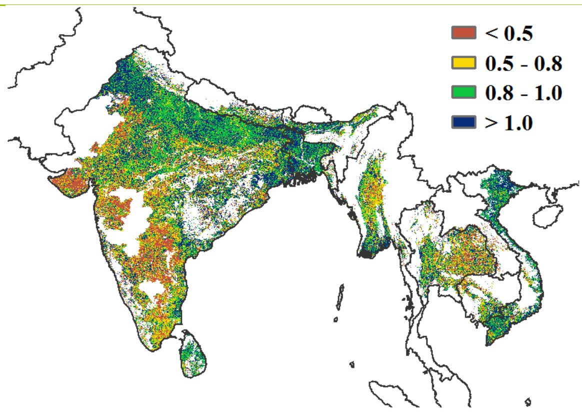
b. Profiles of rainfall departure from average (mm)



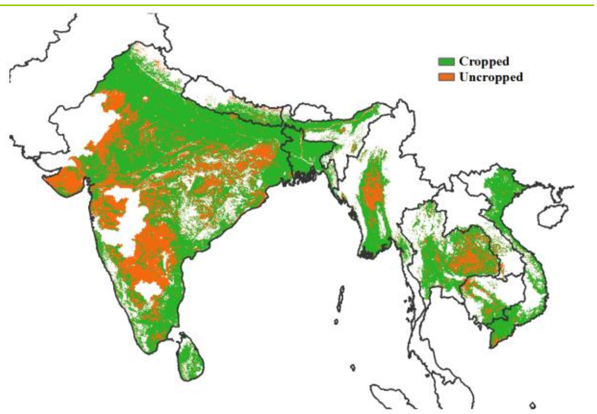
c. Spatial distribution of temperature profiles



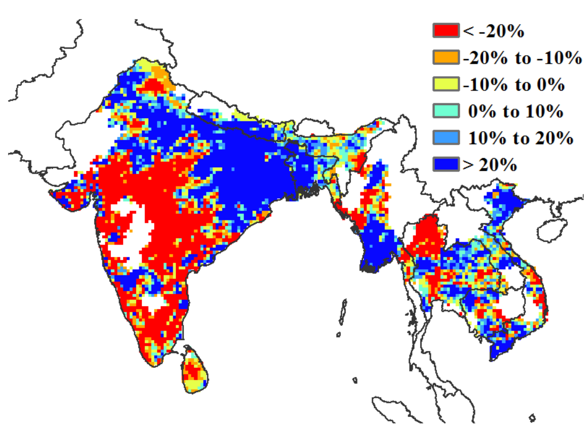
d. Profiles of temperature departure from average (mm)



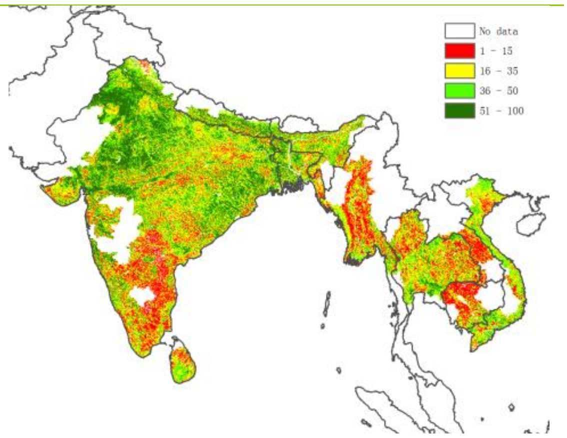
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

2.6 Western Europe

The reporting period covers the core of the winter crops season of the continental Western European MPZ: winter crops were overwintering or beyond dormancy and summer crops have been planted, and will continue to be planted in the cooler areas. Crop condition was generally above average in most parts of MPZ based on the integration of agroclimatic and agronomic indicators (Figure 2.5).

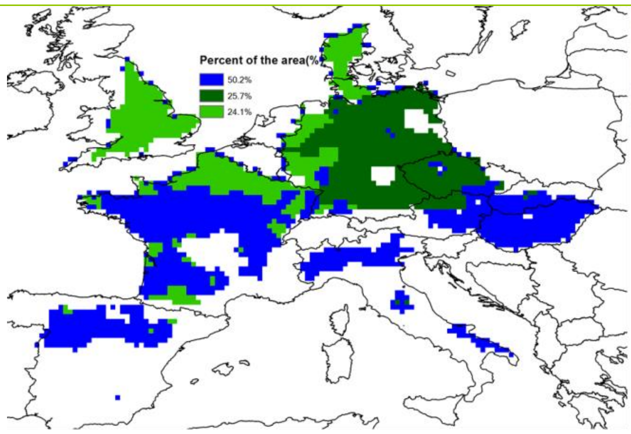
A large contrast is observed among countries in relation to rain. The whole MPZ showed a large drop in RAIN (9% below average), quite larger than in the other major agricultural zones in the world (Table 2.1). The spatial distribution of rainfall profiles indicates that the poor precipitation was observed in 50% of the entire MPZ (most of France, Italy, Spain, south-eastern Czech Republic, eastern Austria, southern Slovakia and Hungary) almost throughout the monitoring period. The most severely affected countries were Austria (RAIN -25%), Italy (RAIN -24%), Spain (RAIN -19%) and France (RAIN -18%). Crop growth in of the major winter wheat producing areas (eastern Hungary and central France) was impacted by continuous dry weather conditions. The other half of the cropland in the MPZ recorded above average precipitation in early February and late February to early March.

Temperature (TEMP) for the MPZ as a whole was above average (+0.3°C), and radiation was well above average with RADPAR at +5%. Most parts of MPZ experienced warmer-than-usual conditions from February to March, while below the average temperature mostly occurred in January; frost damage had very limited impact on crop growth. Planting of spring crops is well advanced in most regions based on the agroclimatic indicators but in the region that was affected by the persistent dry weather, only 94% of arable lands were cropped (i.e. 1% below average) in the area including Hungary, Austria, Italy, central France and Spain. More rain is needed in the coming months to raise soil moisture levels, and create favorable conditions for the growth of winter crops.

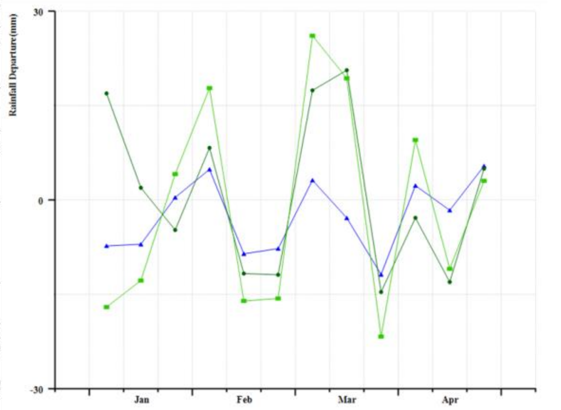
Due to more than 50% of the region experiencing persistent dry weather and overall warmer-than-usual conditions for the MPZ, the biomass accumulation potential BIOMSS was 6% below average. The lowest BIOMSS values (-20% and below) occurred in Hungary, Austria, Italy, France, Spain and UK, and this spatial distribution is consistent with the above-mentioned precipitation deficit region. In contrast, BIOMSS was above average (sometimes exceeding a 10% departure) over Germany and Denmark. The average maximum VCI for the MPZ reached 0.91.

Generally, crop condition of winter crops in Western Europe was favorable, but more rain will be needed in several important crop production areas to ensure an adequate soil moisture supply for the ongoing winter.

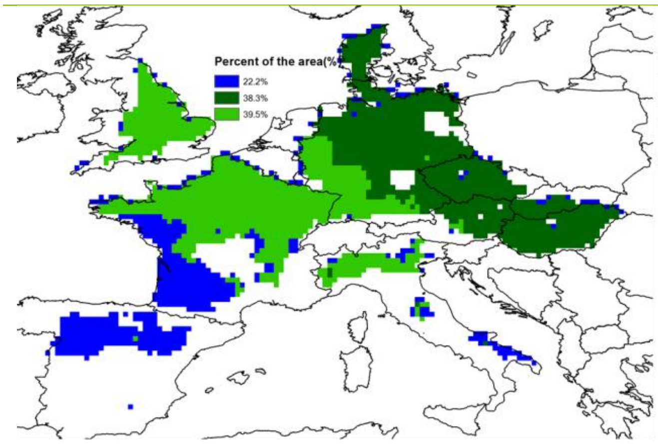
Figure 2.5 Western Europe MPZ: Agroclimatic and agronomic indicators, January to April 2019.



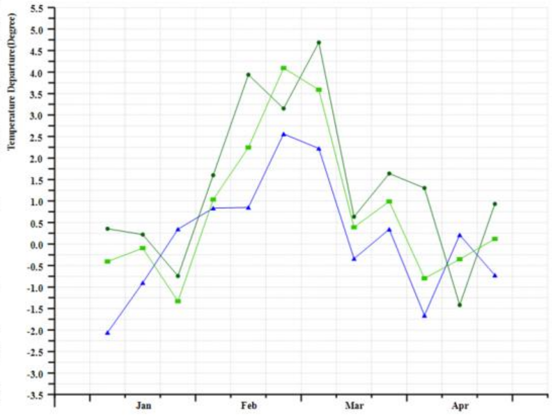
a. Spatial distribution of rainfall profiles



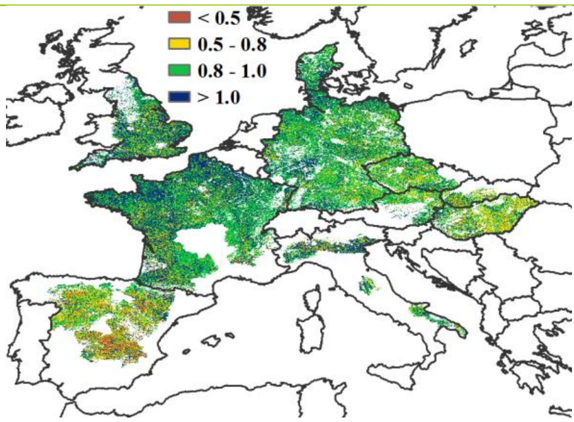
b. Profiles of rainfall departure from average (mm)



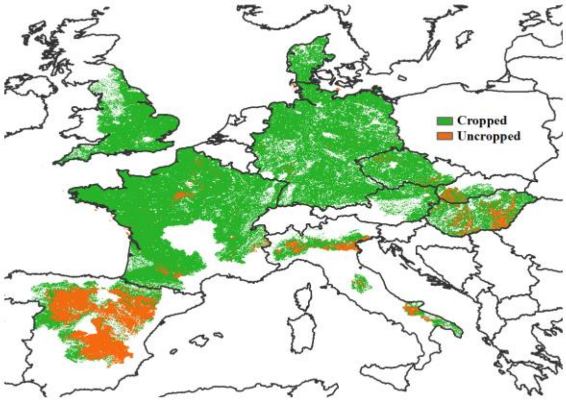
c. Spatial distribution of temperature profiles



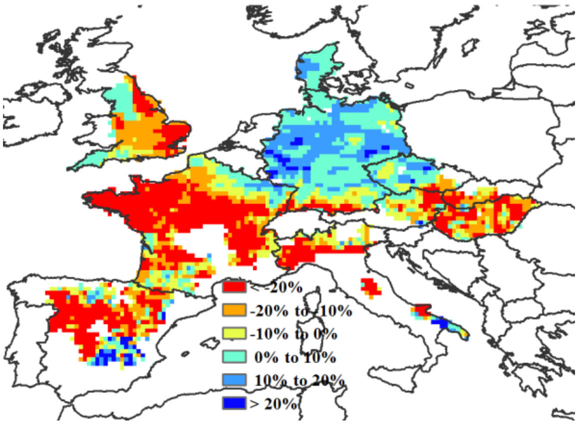
d. Profiles of temperature departure from average (mm)



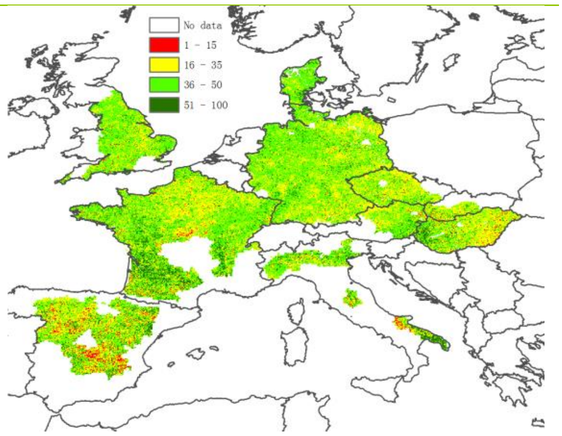
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

2.7 Central Europe to Western Russia

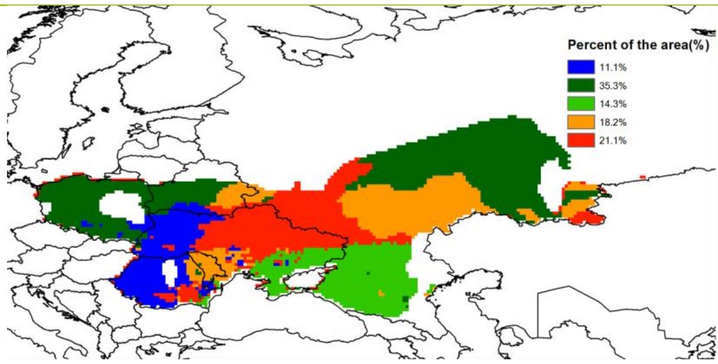
During the current monitoring period, main winter crops in central Europe to western Russia were in the field and dormant. Sowing of summer crop was in underway, starting in the south and west of the MPZ. Agroclimatic variables show average conditions for rainfall (down 2% below average) and sunshine (RADPAR down 1%) but 1.5°C warmer than average weather, which is significant for the large area of the MPZ (Figure 2.6).

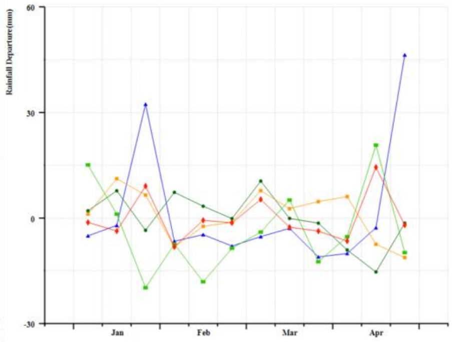
The temperature profiles displayed overall above average values from February to March for most parts of Belarus, Romania, north-west Ukraine, central and western parts of Western Russia. The departures range from 0.9°C to 5.3°C, affecting 72.7% of the MPZ. The effect on crops is mixed as the high temperature has locally damaged crops through defreezing-refreezing cycles, and increased crop water demand. Slightly below average temperature between 0.0°C and 0.3°C occurred in late February and late March in 27.3% of the areas, including western Belarus, Poland, Romania, central and south-eastern Moldova, and southern Ukraine.

Off average rainfall was recorded in Poland (RAIN -4%), Ukraine (-4%), Belarus (-14%), and central and southern West Russia. Only Romania had above-average water supply (+12%), resulting from high rainfall that occurred in late January and late April when precipitation was more than 30% and 45% above average in Romania and in the west of Ukraine. Below rainfall around -15% was observed in late January, mid-February and middle-April over the southern part of Western Russia (Adygeya Republic, Stavropolskiy Kray, southern Rostovskaya Oblast), and south-eastern Ukraine. The reduced rainfall has not necessarily had a negative impact on the dormant winter crops, unless temperature has prematurely broken dormancy.

The biomass accumulation potential (BIOMSS) of the MPZ was close to average, being 6% above. Largest increases (more than 10%) occurred in southern Poland. According to the maximum VCI map values were above 0.8 in Poland, West Belarus and Eastern Ukraine. The maximum VCI was below 0.5 in most of Western Russia, where the arable land was apparently uncropped. For the MPZ as a whole CALF dropped 20 percentage points compared to the recent five-year average, which may be due to abnormal phenology or to winter drought brought about by high temperature.

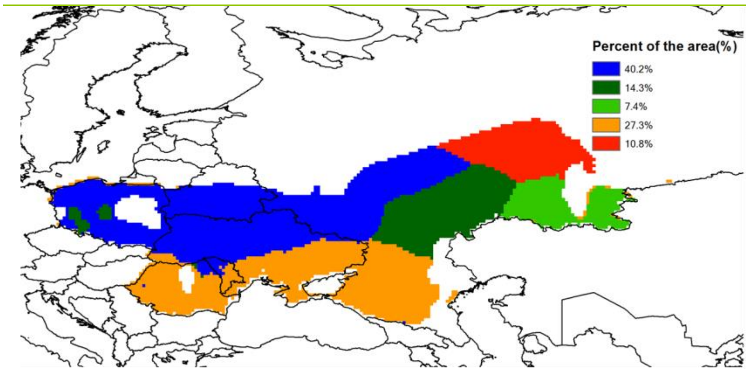
Figure 2.6 Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, January to April 2019.

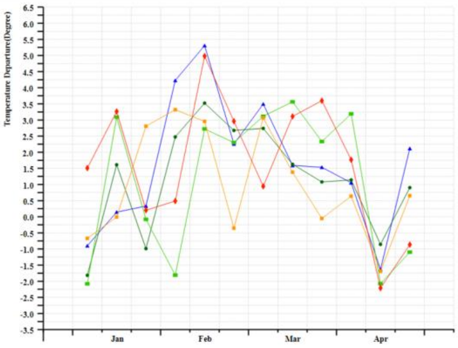




a. Spatial distribution of rainfall profiles

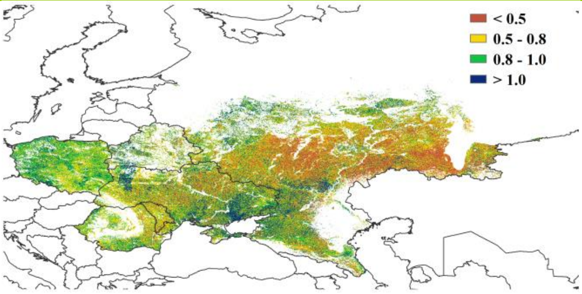
b. Profiles of rainfall departure from average (mm)

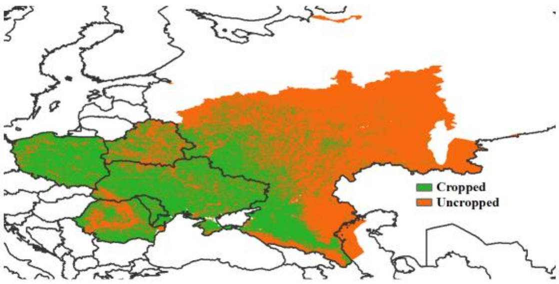




c. Spatial distribution of temperature profiles

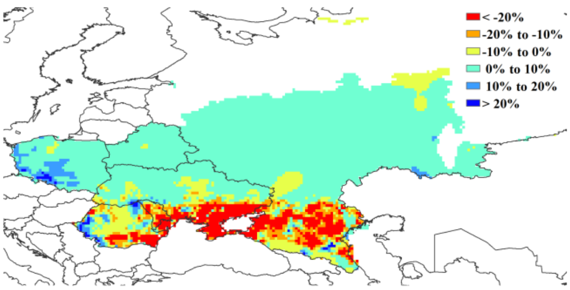
d. Profiles of temperature departure from average (mm)

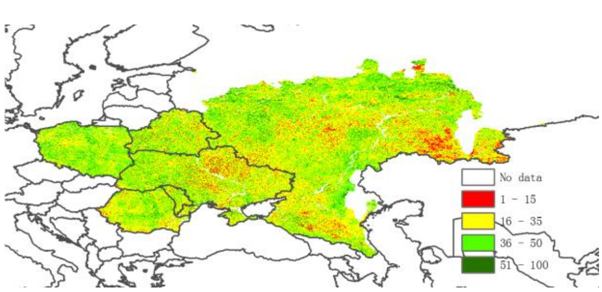




e. Maximum VCI

f. Cropped arable land





g. Biomass accumulation potential departure

h. VHI minimum

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