Chapter 2. Crop and environmental conditions in major production zones

Chapter 2 presents the same indicators—RAIN, TEMP, RADPAR, and BIOMSS—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 C as well as the CropWatch bulletin online resources at www.cropwatch.com.cn.

2.1 Overview

Tables 2.1 and 2.2 present an overview of the agroclimatic (table 2.1) and agronomic (table 2.2) indicators for each of the six MPZs, comparing the indicators to their fifteen and five-year averages.

Table 2.1. January-April 2017 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	184	4	28.8	-0.3	1237	0
South America	745	10	23.9	-0.5	1130	0
North America	378	26	6.9	2.1	765	-6
South and SE Asia	126	2	24.6	-0.1	1168	0
Western Europe	168	-22	5.7	-0.3	581	-2
C. Europe and W. Russia	200	16	-0.4	0.5	507	-5

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 2002-2016.

Table 2.2. January-April 2017 agronomic indicators by Major Production Zone, current season values and departure from 5YA

	BIOMSS (gDM/m^2)		CALF (Cropped arable land fraction)		Maximum VCI Intensity
	Current	Departure (%)	Current	Departure (% points)	Current
West Africa	557	-2	50	-13	0.67
South America	1802	6	100	0	0.89
North America	881	17	47	5	0.85
S. and SE Asia	348	-12	73	5	0.81
Western Europe	687	-16	94	0	0.84
Central Europe and W Russia	668	5	72	-8	0.65

Note: See note for table 2.1, with reference value R defined as the five-year average (5YA) for January-April 2012-2016.

2.2 West Africa

The previous (2016-2017) season has ended in the West Africa region, and the agricultural and food situations were generally described as satisfactory.

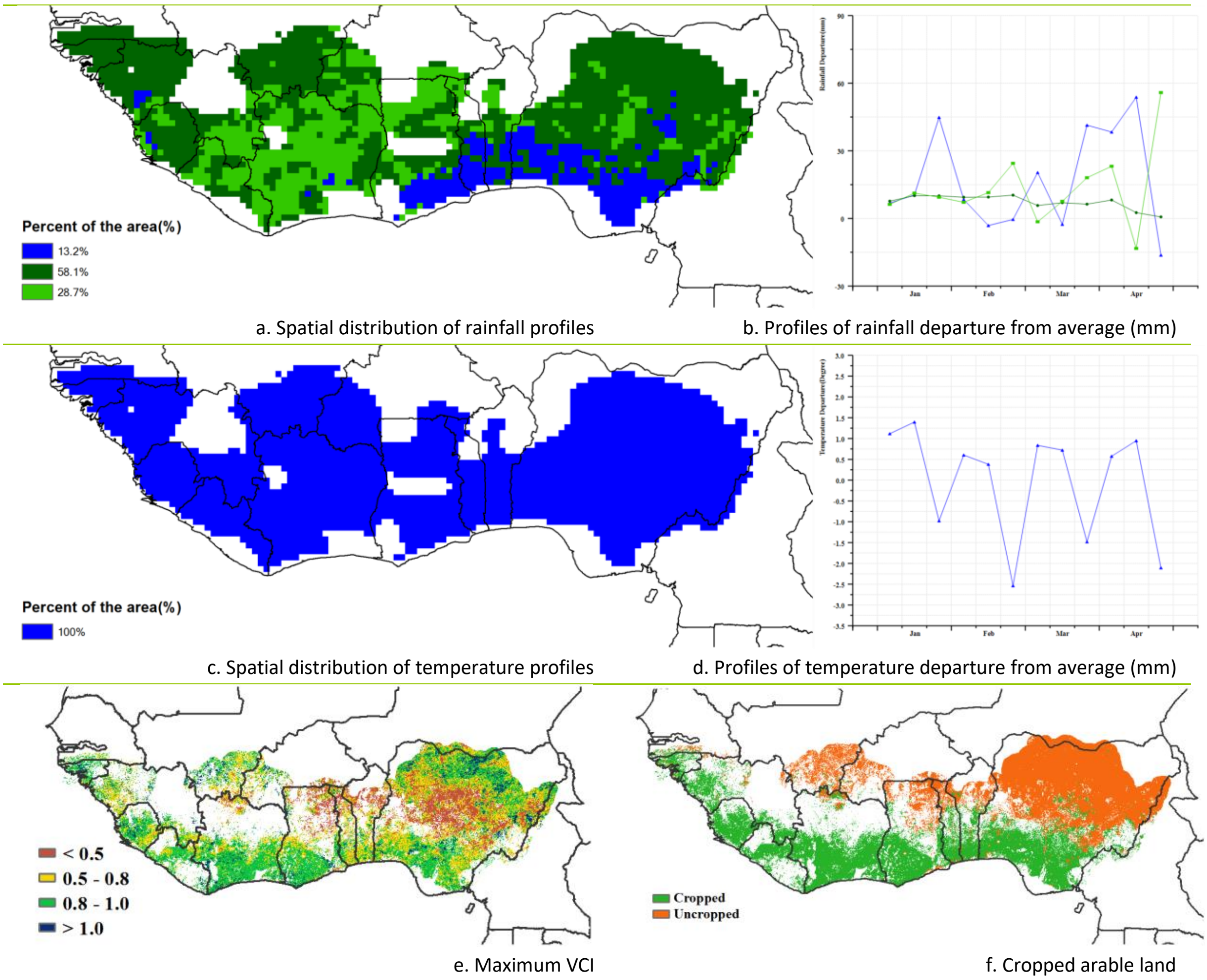
This reporting period marks yet another onset of the main growing season throughout the West African region for main crops (maize, sorghum, millet, and yams and cassava). It is also the beginning of the main long rainy season in West Africa, which will last till the end of April to mid-July in the south, and from July to September in the semi-arid Sahelian north.

For the MPZ as a whole, cumulative rainfall was recorded at 184 mm (4% above average), with positive departures in the coastal/southern parts of Nigeria, Togo, Gabon, and Ghana (representing 13.2% of West Africa). Both Togo and Côte d'Ivoire recorded abundant rainfall (+17% and +13%, respectively). In Sierra Leone, where rice is one of the major crops, the rainfall deficit was light (RAIN, -8%) but may nevertheless have affected planting of rice. Precipitation is currently building up, marking the transition from the "little" dry season into the main rainy season starting with the southern coastal areas. Average temperature of 28.8°C (-0.3°C departure) and sunshine (RADPAR: 1237 MJm-2) were experienced during this period. The largest departure for radiation occurred in Liberia (RADPAR, -7%).

A fraction of cropped arable land (CALF) of 50% (a decrease in 13 percentage points compared to average) and a biomass proportion of 557 gDM m-2 were also observed in the MPZ, much of which is the cropped land in the coastal area (BIOMSS, +20%), while the northern areas (BIOMSS departures <-20%) are still uncropped. This finding is supported by the VCIx map, an alternative measure of the relative vegetation health and crop condition and a proxy to detect potential drought; the maximum VCI intensity for the MPZ was 0.67 (range 0.5-0.8).

CropWatch indicators depict a stable and coherent climatic condition for the MPZ.

Figure 2.1. West Africa MPZ: Agroclimatic and agronomic indicators, January-April 2017



a. Spatial distribution of rainfall profiles

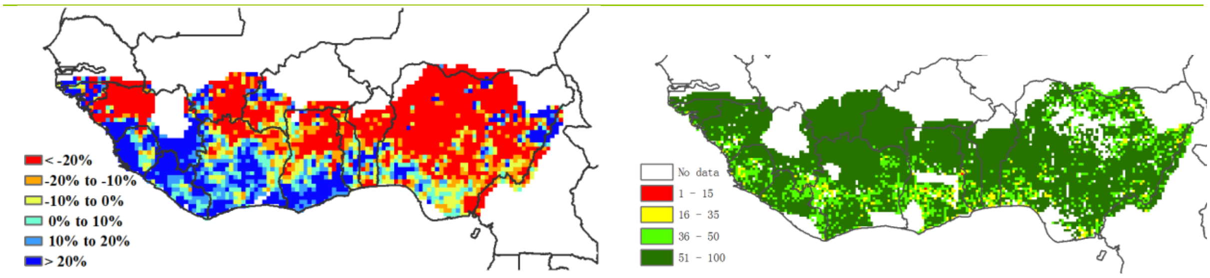
b. Profiles of rainfall departure from average (mm)

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 C.

2.3 North America

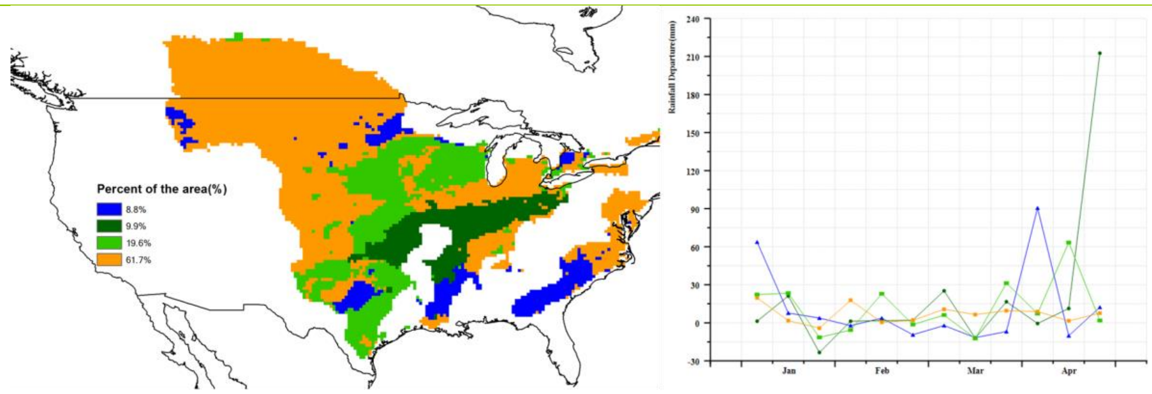
The current monitoring period from January to April of 2017 covers the growth season of winter crops and planting season of summer crops in southern regions. CropWatch agroclimatic and agronomic indicators show above average crop condition in the North American MPZ (figure 2.2).

During the monitoring period, warm and humid weather prevailed in the MPZ, which was conducive to crop growth. The agroclimatic indicators show that RAIN was 26% above average, TEMP 2.1°C above, and RADPAR was significant below average (-6%), probably as a result of increased cloudiness associated with continuous precipitation. The extreme weather events that occurred in this reporting period include abnormally above average temperature in the late of January (+5 to +10°C) and February (+7 to +11°C), and 210 mm above average rainfall in the southern Corn Belt. Almost all major crop production regions recorded abundant rainfall, including Northern Plains (+RAIN, 56.5%), Corn Belt (+31.7%), California (+76.2%), Blue Grass (+17.4), and Canadian Prairies (+10.6%) which provided adequate soil water for the growth of winter crops. The impact of reduced sunshine on photosynthesis is probably not too relevant at this stage of crop development. Very few drought pockets are shown in the Minimum Vegetation Health Index map (VHIn).

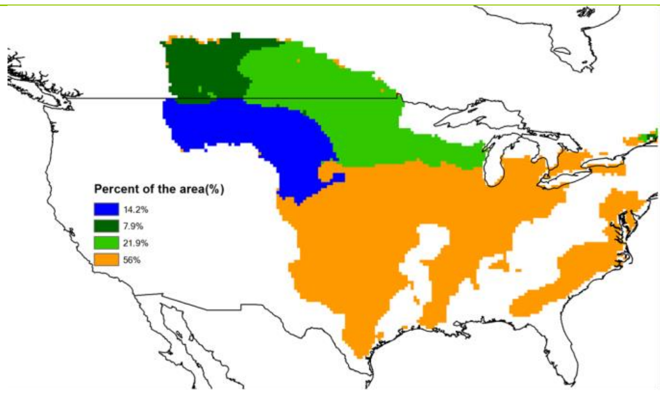
Agronomic indicators confirm the generally above-average crop condition. Compared to the average of the past five years, accumulated biomass potential (BIOMSS) increased by 17%, with positive departure in almost all areas, for instance in the Northern Plains (BIOMSS, +33.8%) and the Corn Belt (+17.9%). Above average crop condition is confirmed by a high average VCIx value (0.85). However, a significant negative BIOMSS departure and below average VCIx value (<0.5) were observed in Eastern Colorado, Eastern Wyoming, and Western Nebraska due to heavy snow, resulting in unfavorable crop growth condition.

When considering these various agroclimatic and agronomic indicators together with the CropWatch indicator for cropped arable lands—which shows 47% of arable lands cropped; an increase of 5 percentage points over the five-year average, average or above average crop production can be expected for the North American MPZ.

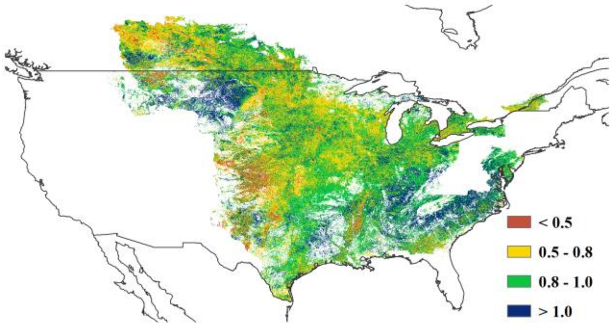
Figure 2.2. North America MPZ: Agroclimatic and agronomic indicators, January-April 2017

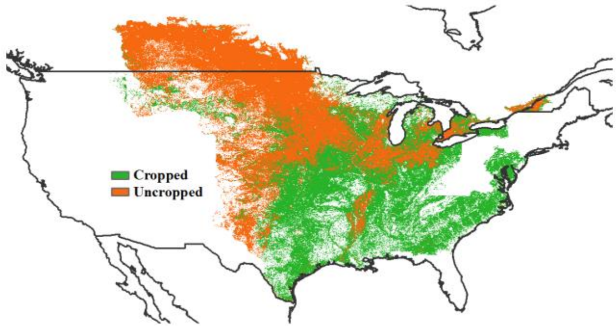


a. Spatial distribution of rainfall profiles b. Profiles of rainfall departure from average (mm)

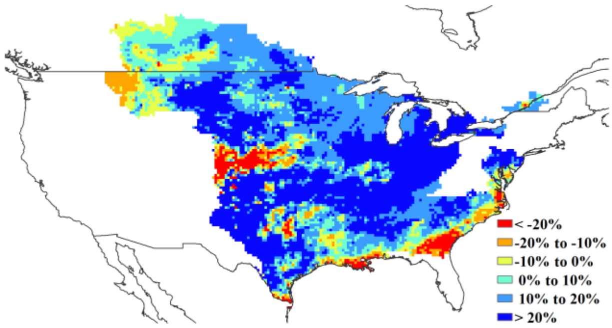


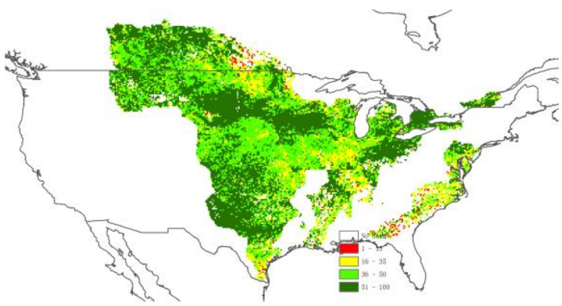
c. Spatial distribution of temperature profiles d. Profiles of temperature departure from average (mm)





e. Maximum VCI f. Cropped arable land





g. Biomass accumulation potential departure h. VHI minimum

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

2.4 South America

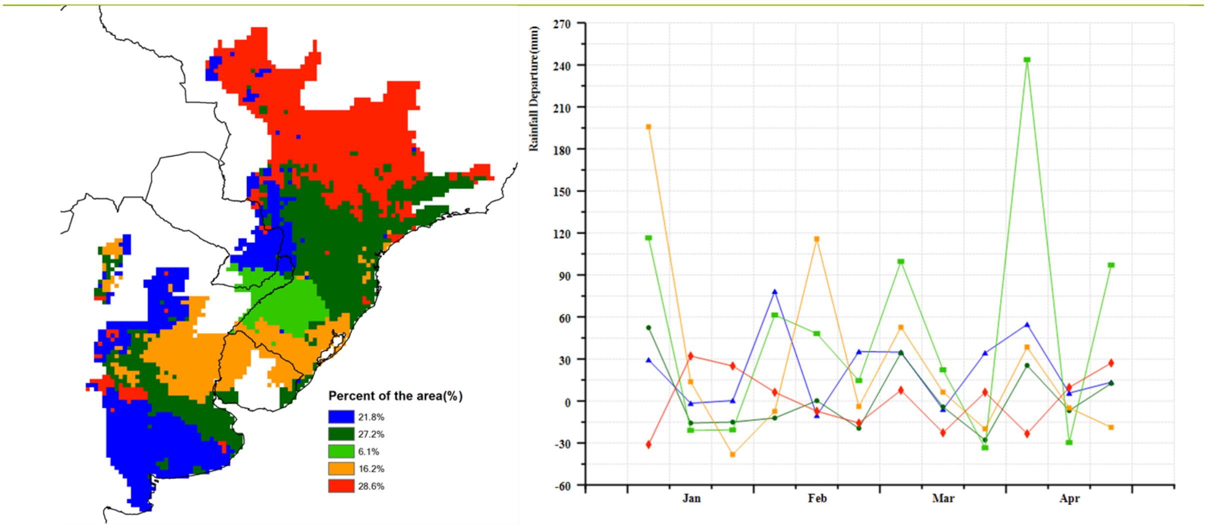
The current bulletin covers the main growing period of summer crops maize (main season), soybean, and rice in the South American MPZ (figure 2.3). Winter crops are currently not in their growing season.

Overall, conditions were favorable for crops during the monitoring period. Rainfall was 10% above average over the whole MPZ. According to the rainfall departure clustering analysis, extreme high precipitation (+100mm above average) occurred in early January and early April in Rio Grande do Sul (Brazil), Entre Rios and Santa Fe (Argentina) and in Uruguay. Most other places received normal rainfall (-30mm to +30mm from average) over the last four months. Average temperature was 23.9°C, about 0.5°C below average, but departures fluctuated between -2.5°C and +3.0°C. Favorable conditions resulted in a 6% above average BIOMSS, although the biomass accumulation potential departure map shows values of 20% or more below average in Cordoba in Argentina and in Santa Catarina and Minas Gerais in Brazil. The VHI map, however, does not show drought condition in those areas, indicating that the below average BIOMSS resulted from the combined effect of temperature and rainfall anomalies.

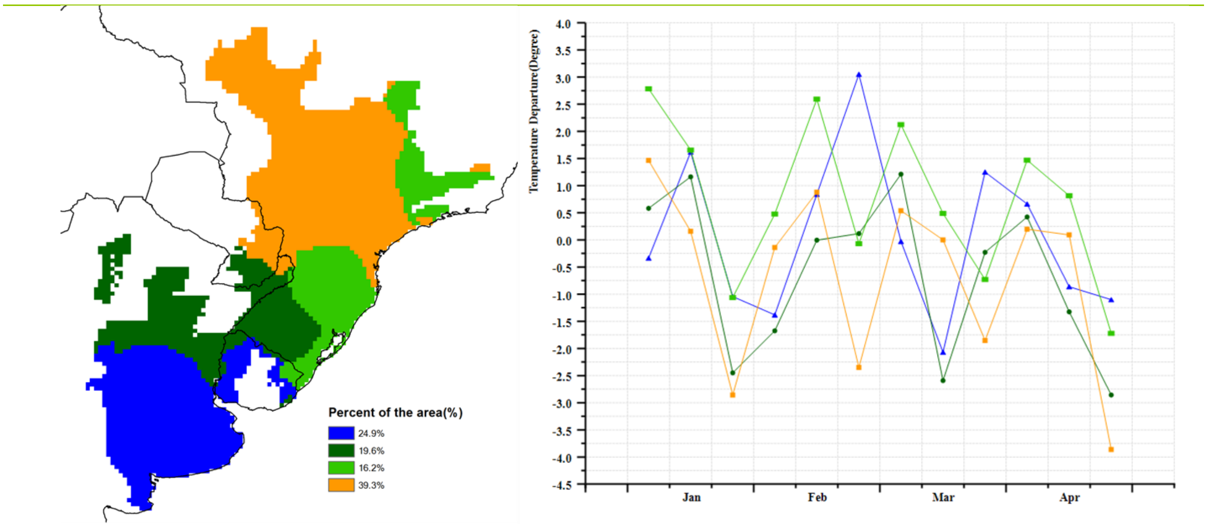
Favorable conditions together with the increase in maize planted area (as a result of strong export demand) led to almost 100% of arable land being cultivated during the last four months, with the only exception in an area around Bahia Blanca. Crops benefited from the good climatic conditions with an average VCIx for the whole MPZ of 0.89, a record level for this time of the year compared to the last five years. VCIx in Brazil was relatively higher than in Argentina, which might be caused by an early harvest of summer crops in Argentina.

In general, prospects are good for summer crop outputs in the South American MPZ.

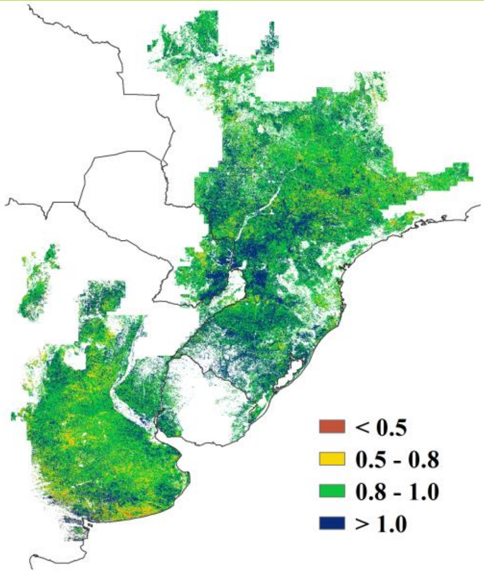
Figure 2.3. South America MPZ: Agroclimatic and agronomic indicators, January-April 2017



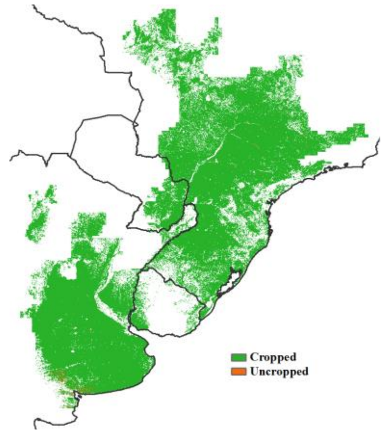
a. Spatial distribution of rainfall profiles b. Profiles of rainfall departure from average (mm)



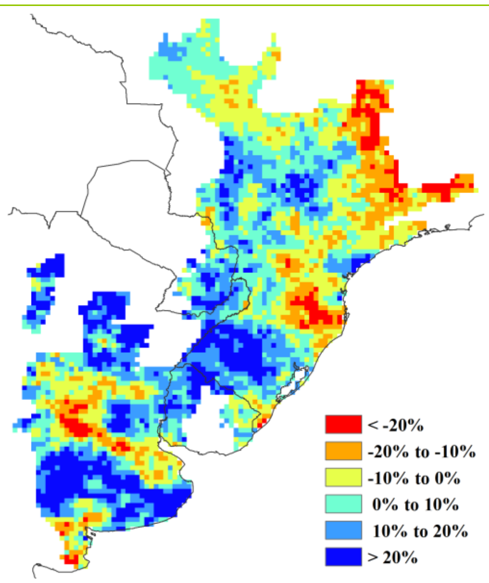
c. Spatial distribution of temperature profiles d. Profiles of temperature departure from average (mm)



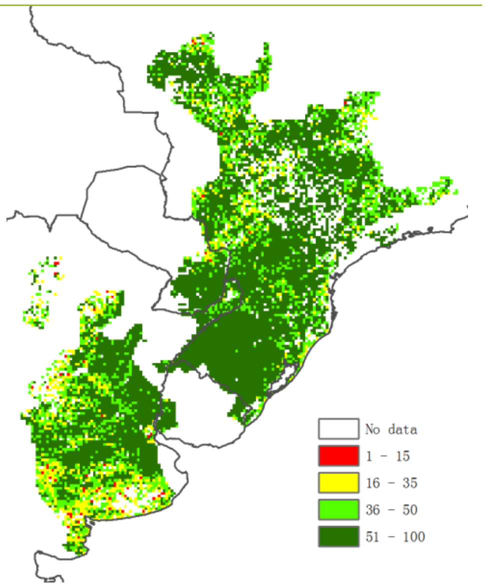
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

2.5 South and Southeast Asia

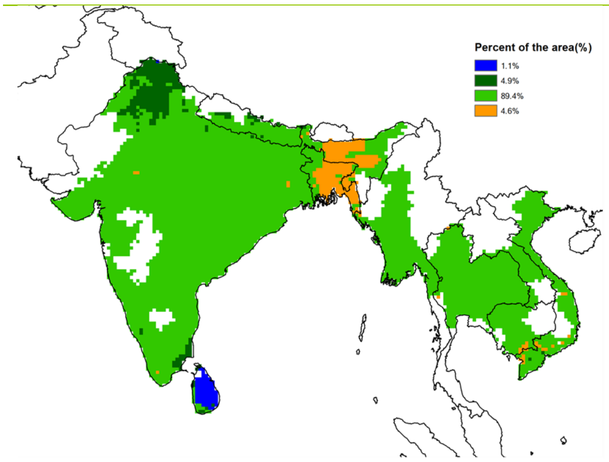
With large regional disparities, the crop condition was generally favorable in this MPZ (figure 2.4). The monitoring period covers the growing and harvesting period of winter season rice, wheat, and maize, and the planting of summer or "second" crops. Rainfall (RAIN, +2%) was slightly above average. Except for India (RAIN, -16%) and Laos (-9%), the nationwide rainfall was above average in most countries, mainly in Bangladesh (+76%), Thailand (+61%), Cambodia (+30%), Sri Lanka (+25%), Vietnam (+14%), and Myanmar (+5%). According to the rainfall departure clusters, the rainfall was evenly distributed over 89.4% of the region. Bangladesh and the Assam state of India received excessive rainfall in April. Rainfall was in deficit in Sri Lanka in the beginning and end of January and the whole of April.

Temperature for the MPZ (TEMP, -0.1°C) and radiation were close to the average, although temperature profiles show large fluctuations. The lowest temperature departure value (-2.5°C) occurred at the end of February and April in most countries of the MPZ, such as Myanmar, Thailand, Cambodia, Laos and

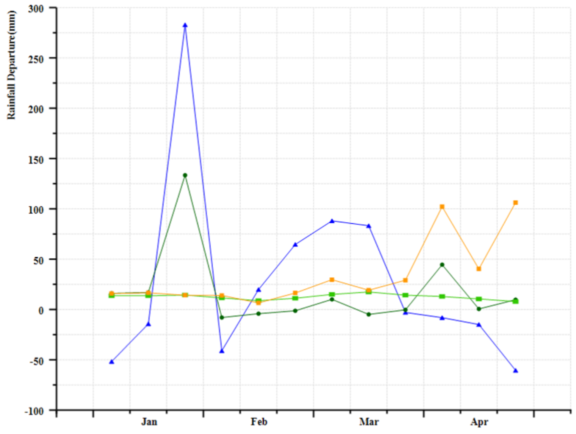
Vietnam, while the highest departure value (+4°C) was observed in the middle of February in the Himachal Pradesh state of India.

The biomass production potential indicator (BIOMSS) in most of India was more than 20% below average due to dry weather. The fraction of cropped arable land (CALF) increased 5% compared to recent five-year average, while the average VCIx was 0.81 for the MPZ. The VCIx values below 0.5 were mainly distributed in the Indian states of Andhra Pradesh, Karnataka, and Tamil Nadu and "sprinkled" over Thailand, mostly coinciding with the uncropped regions shown by the CALF map. With local exceptions, the MPZ nevertheless experienced favorable conditions.

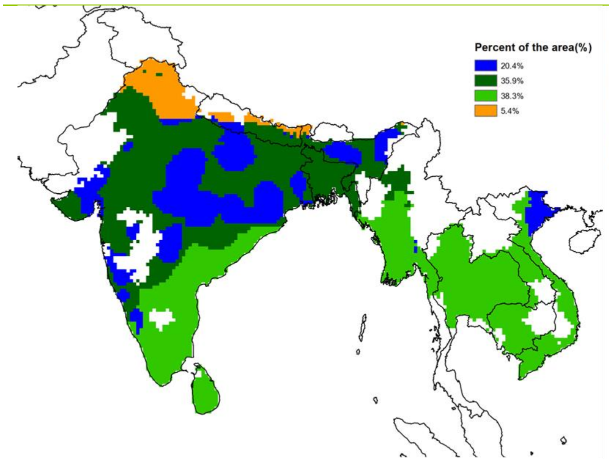
Figure 2.4. South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, January-April 2017



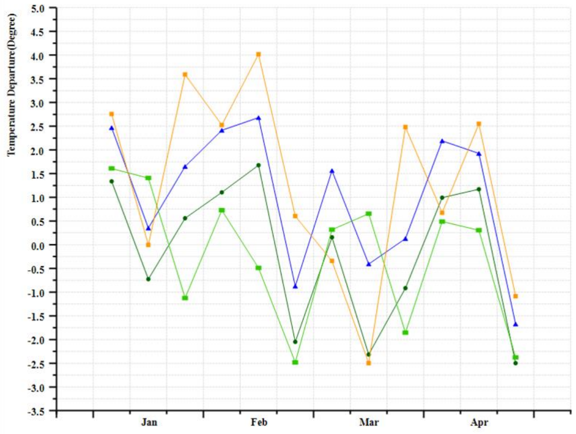
a. Spatial distribution of rainfall profiles



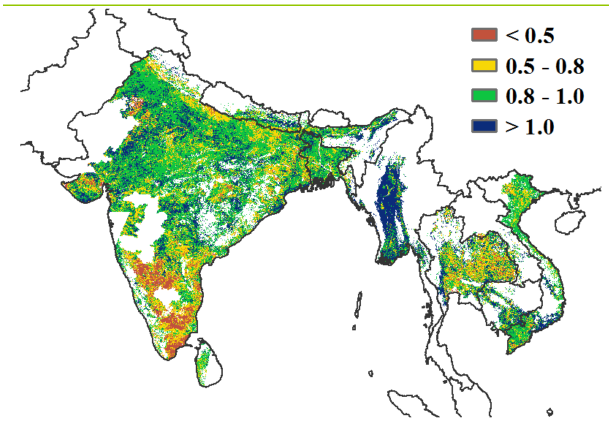
b. Profiles of rainfall departure from average (mm)



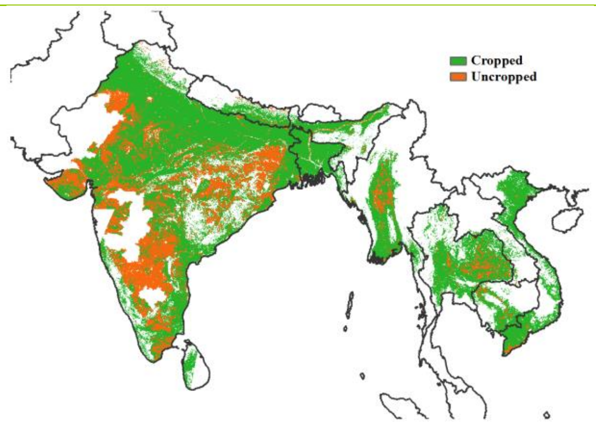
c. Spatial distribution of temperature profiles



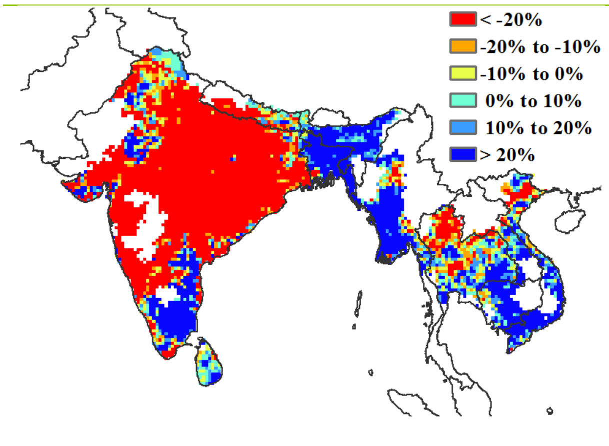
d. Profiles of temperature departure from average (mm)



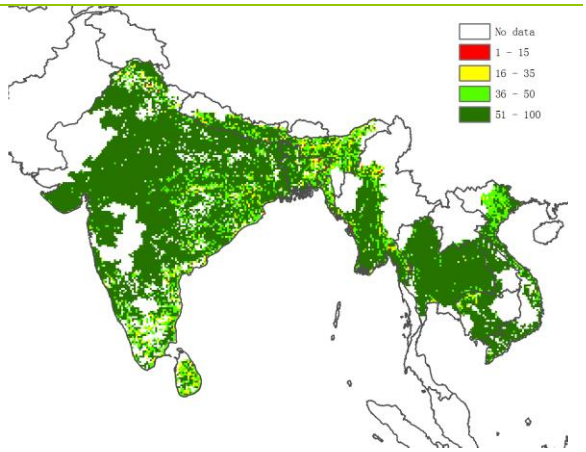
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

2.6 Western Europe

In general, crop condition was above average in many parts of the continental Western European MPZ based on the integration of agroclimatic and agronomic indicators (figure 2.5).

The agroclimatic indicators show that total rainfall was 22% below average over the region, resulting from marked negative departures in central England, southwest Germany, most of France, the north and south of Italy, eastern Austria, and southern Hungary. The most severely affected country was France with a 36% drop nationwide. Exceptional positive departures, however, were recorded over most of Germany, Denmark, the Czech Republic, northwest Austria, the south of Slovakia, northern Hungary, and east and western parts of England from late February to mid-March and also in early April, as well as in southwest France and northern Spain in a period from late January to mid-February and in late March. Abundant precipitation, with accumulated values above 120 mm, was recorded in northern Italy from mid-February to mid-March, while sparse rainfall was registered in northeastern Italy in April. More rain is needed in some Western European countries for winter crop growth and the early stages of summer crops.

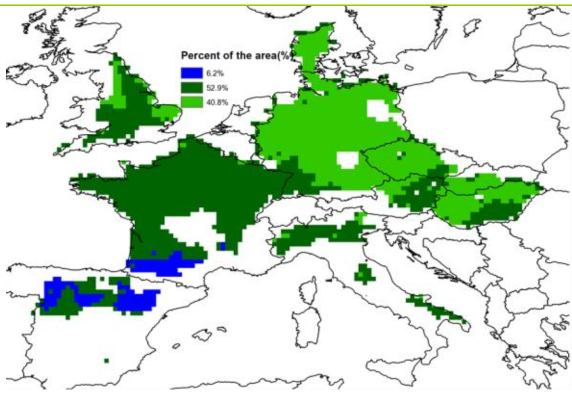
Radiation for the MPZ as a whole was 2% below average, and so was temperature (-0.3°C). A cold spell persisted throughout January in central Europe with several days with minimum temperatures around -15°C. Since the first days of February, however, temperatures have exceeded their long-term-average by 1 to 4°C in most of Europe, and frost events were sparse. Drier-than-usual weather conditions were observed in southern Italy. The exceptionally mild temperature conditions in late February and late March have been favorable for winter crop growth and spring sowing activities. Low minimum temperatures that set in after early April, however, are likely to have affected flowering rapeseed in eastern France, western and southern Germany, the Czech Republic, Slovakia, Austria, Hungary, and Slovenia.

Due to the continuous rainfall deficit (especially after early March), and coupled with the impact of low temperature (in particular in France, the United Kingdom, northern Italy, northeast Austria, the south of Hungary, and the middle of Spain), the biomass accumulation potential BIOMSS was 16% below the recent five-year average. The lowest BIOMSS values (-20% and less) occurred in France, the south of the United Kingdom, Spain, Italy, and the south of Hungary. In contrast, BIOMSS was above average (sometimes exceeding a 10% departure) in parts of Germany, the Czech Republic, and Denmark.

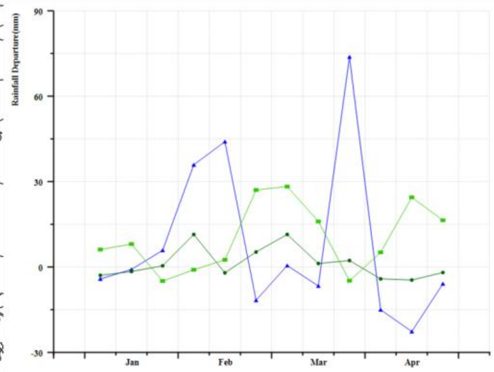
The average maximum VCI for the MPZ reached a value of 0.84 during this reporting period, indicating favorable crop condition. More than 94% of arable lands were cropped, which is the same as the recent five-year average. Most uncropped arable land is concentrated in Spain, southeast France, and northern

Italy. Generally, crop condition in Western Europe was favorable, but more rain is needed in several important crop production areas to sustain good yields.

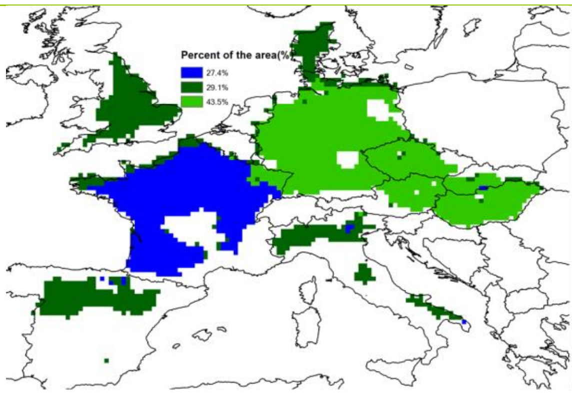
Figure 2.5. Western Europe MPZ: Agroclimatic and agronomic indicators, January-April 2017



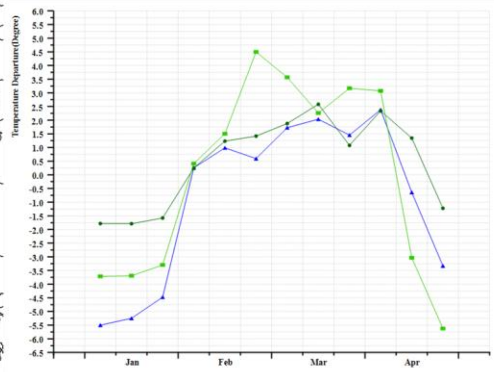
a. Spatial distribution of rainfall profiles



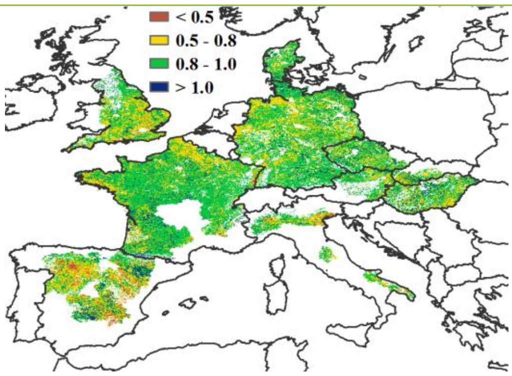
b. Profiles of rainfall departure from average (mm)



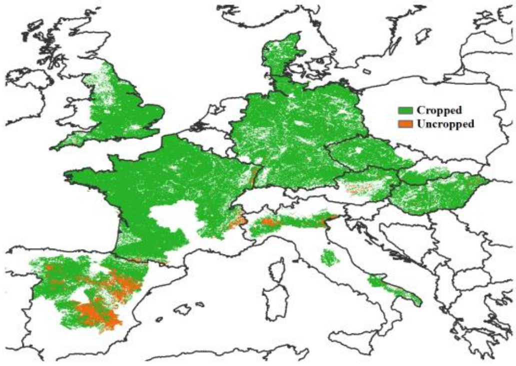
c. Spatial distribution of temperature profiles



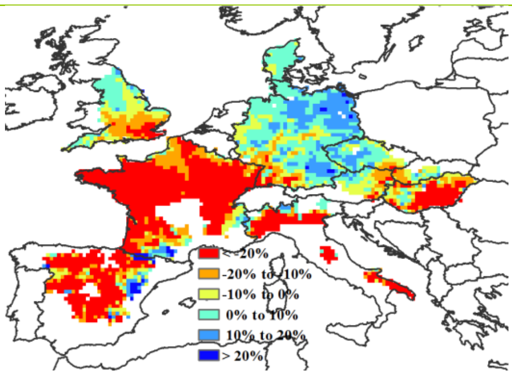
d. Profiles of temperature departure from average (mm)



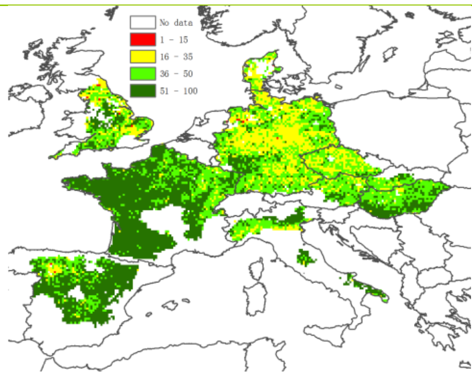
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

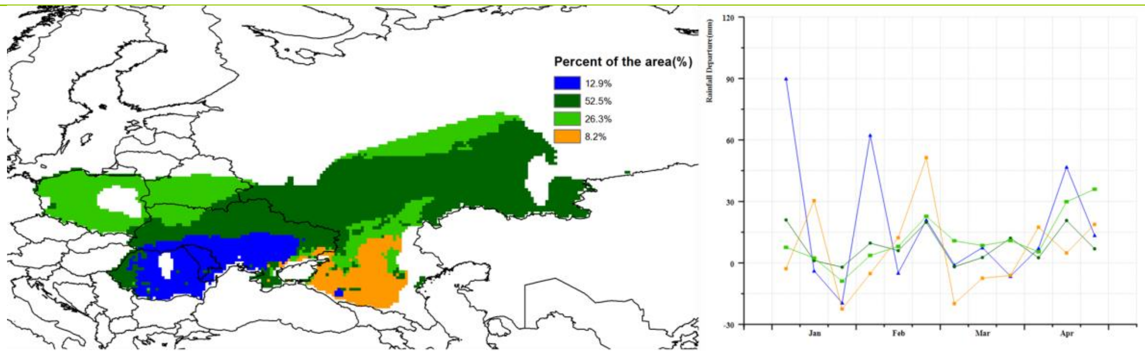
2.7 Central Europe to Western Russia

During the current monitoring period, dormant winter crops in central Europe to western Russia were in the vegetative stage. The agroclimatic indicators showed favorable condition for crop growing, with a 16% increase of rainfall over average—which provided ample soil moisture—and a 0.5°C increase in temperature, while radiation was below average by 5% (figure 2.6).

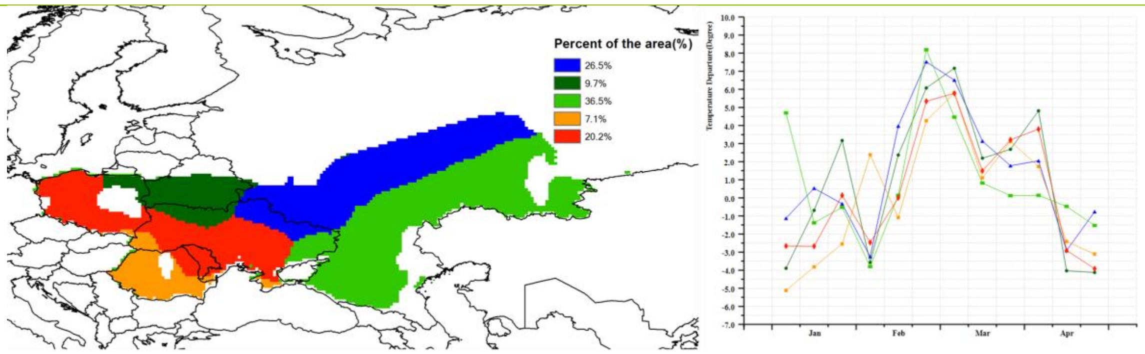
Temperature profiles showed correlated variations from February to April for most countries in the MPZ. The whole region experienced high temperatures from late-January to March (as much as 8°C above average in the east, including most of southwestern Russia which forms almost 63% of the MPZ), which had positive effects on the development of winter crops. Temperatures in most areas started to fall starting in April, and more than 3°C below average values occurred in Belarus, Poland, and western Ukraine in late-April. As indicated by the rainfall profiles, the north of central Europe to western Russia—about two thirds of the MPZ's territory, enjoyed above average precipitation over the monitoring period, including Poland (RAIN, +23%), Belarus (RAIN, +31%), and the northern part of Ukraine and southern Russia. The maximum precipitation occurred in early-January when precipitation was 90% above average in Romania and in the south of Ukraine. Unfavorable rainfall was recorded in southern Russia (from the Kray of Krasnodar to the Kabardino balkariya republic) in late-January and early-April.

As a result of the large precipitation increase and above average temperature, the biomass accumulation potential (BIOMSS) of the MPZ was 5% above the recent five-year average. However, a decrease (more than 20%) in BIOMSS occurred in Krasnodarskiy Kray in Russia and Timis in Romania. The maximum VCI (0.65) is lower than those of other MPZs. According to the maximum VCI map of this monitoring period, most pixels were below 0.5 in southwestern Russia, where most uncropped arable land is concentrated. Across the MPZ, 72% of arable lands were cropped in the monitoring period, a decrease of 8 percentage points compared to the recent five-year average for this indicator.

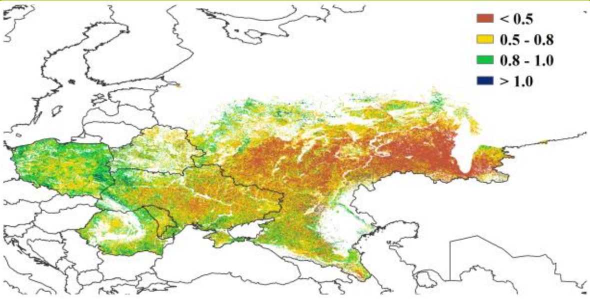
Figure 2.6. Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, January-April 2017



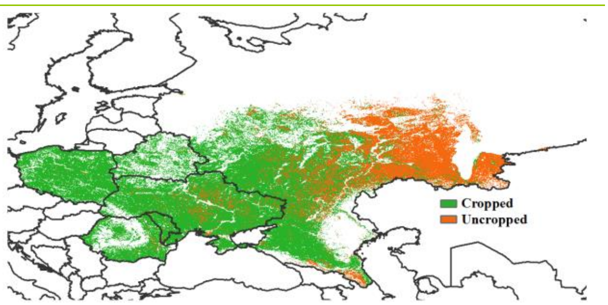
a. Spatial distribution of rainfall profiles b. Profiles of rainfall departure from average (mm)



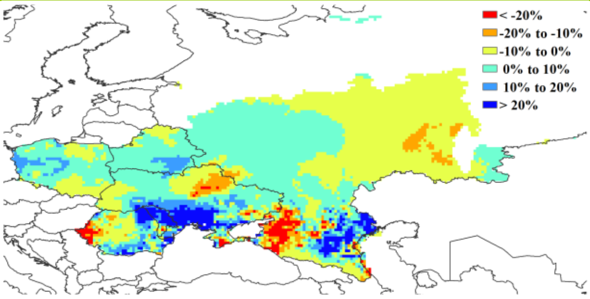
c. Spatial distribution of temperature profiles d. Profiles of temperature departure from average (mm)



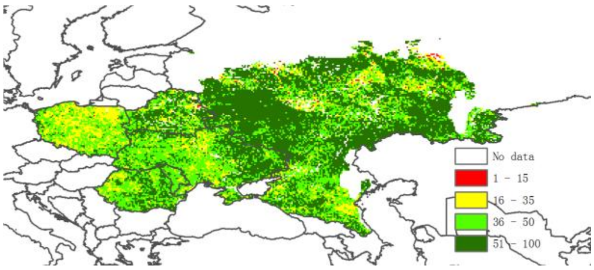
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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