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) and maximum vegetation condition index (VCIx)—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 six MPZs, comparing the indicators to their fourteen- and five-year averages.

Table 2.1. January-April 2015 agroclimatic indicators by Major Production Zone, current value and departure from 14YA

	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 14YA (%)	Current (°C)	Departure from 14YA (°C)	Current (MJ/m^2)	Departure from 14YA (%)
West Africa	158	-10	29.2	0.7	1251	1
South America	694	3	24.8	1.2	1169	4
North America	372	28	4.0	-0.7	780	-5
South and SE Asia	149	21	24.2	0.5	1143	-2
Western Europe	163	-27	6.4	1.0	590	0
C. Europe and W. Russia	177	4	0.5	1.3	522	-3

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 fourteen-year average (14YA) for the same period (January-April) for 2001-14.

Table 2.2. January-April 2015 agronomic indicators by Major Production Zone, current season values and departure from 5YA

	BIOMSS (gDM/m^2)		Cropped arable land fraction		Maximum VCI
	Current	Departure from 5YA (%)	Current (% of pixels)	Departure from 5YA (%)	Current
West Africa	487	-16	65	-8	0.61
South America	1808	5	89	0	0.86
North America	823	15	55	1	0.72
South and Southeast Asia	516	34	83	3	0.81
Western Europe	674	-13	92	1	0.86
Central Europe and W. Russia	676	12	65	-5	0.64

Note: Departures are expressed in relative terms (percentage) for all variables. 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 five-year (5YA) average for the same period (January-April) for 2010-2014.

2.2 West Africa

With some minor variations due to elevation and terrain features, most of the West African MPZ was in the dry season in January and February, when the last 2014 crops were being harvested. In March and

April, the southernmost areas, particularly in the center and east, have started planting maize and rainfed rice. Figure 2.1 illustrates agroclimatic and agronomic indicators for the MPZ for the reporting period.

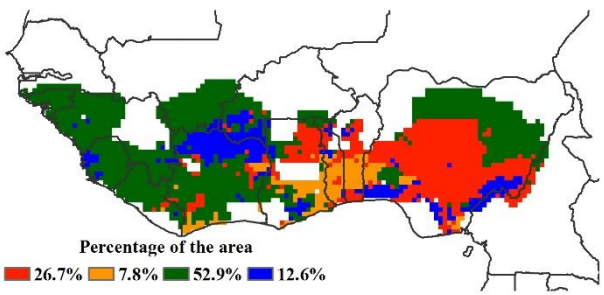
Compared with average conditions, for January to April the region as a whole underwent a rainfall deficit in the order of 10%, accompanied by slightly positive temperature and radiation departures. Taking into account the skewed statistical distribution of rainfall (that is, average rainfall overestimates amounts actually expected), it is still early to say if the slight deficit is likely to impact crops production, although it is likely to have delayed planting in some of the northernmost areas (the Sahelian areas) of the MPZ, especially in north Ghana (RAIN -8%), Côte d'Ivoire (RAIN -6% and TEMP +1.4°C), Nigeria (RAIN -12%), and the southernmost parts of Mali and Burkina Faso. In Liberia, which is the only country in the MPZ where rice is a major staple next to cassava and yams, a rainfall deficit of 13% was recorded. The only country that recorded a marked rainfall excess was Togo (+18%), but this may have been offset by higher than average temperature (+1.1°C).

The rainfall profiles and clusters show that rainfall deficits occurred throughout the region in April, with the north and west usually experiencing RAIN departures around -10mm in the north and west. The April deficit is more marked (close to -30mm) from northern Côte d'Ivoire to Central Nigeria, where it follows abundant rainfall (+40 mm) in March. Also in April, the whole region experienced above average temperatures (TEMP, +1.0°C).

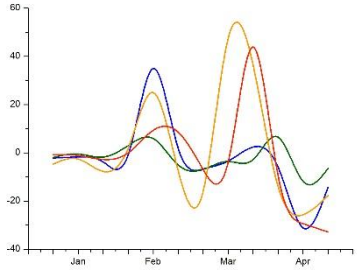
Generally, a somewhat late onset of the season compared with average is confirmed by the maximum VCI, for which low values occur in the north of Côte d'Ivoire, in Ghana, Togo, Benin, and across northern-central Nigeria. This is also where low VHI values tend to concentrate. Two additional crop-related indicators (fraction of cropped arable land (CALF) and BIOMSS) departures, expressed as the departure from the average of the recent five seasons only, confirm a drop in production potential close to or below 20% in the north of the MPZ, except in the very west where drops and improvements coexist, resulting in mixed but average conditions. Spatial variations in CALF are somehow difficult to interpret in southern Mali and adjacent Côte d'Ivoire, where the indicator values may result from early planting in March, following February rains.

Altogether, the indicators in the region are consistent with the expected seasonal behavior of climate and crops, with a possible false start of the cropping season in the northernmost areas in the west and slight delay of the Sahelian season in the central east, from Burkina Faso to Nigeria.

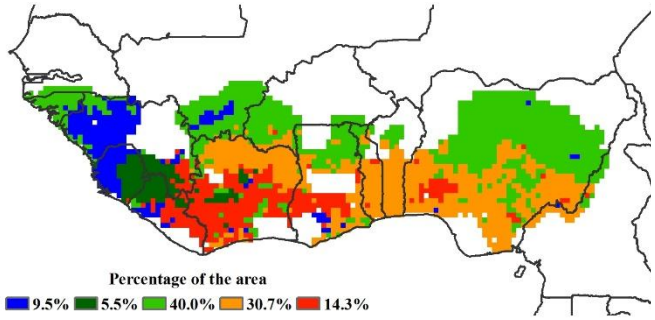
Figure 2.1. West Africa MPZ: Agroclimatic and agronomic indicators, January-April 2015



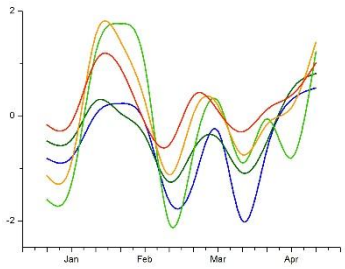
a. Spatial distribution of rainfall profiles



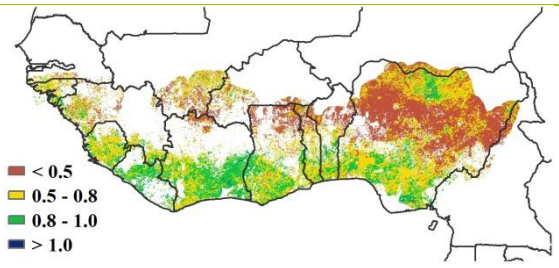
b. Profiles of rainfall departure from average (mm)



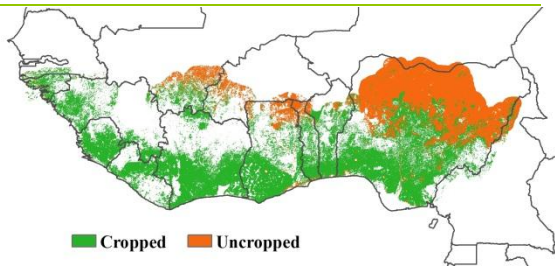
c. Spatial distribution of temperature profiles



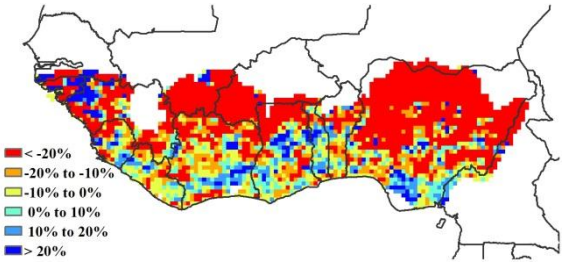
d. Profiles of temperature departure from average (°C)



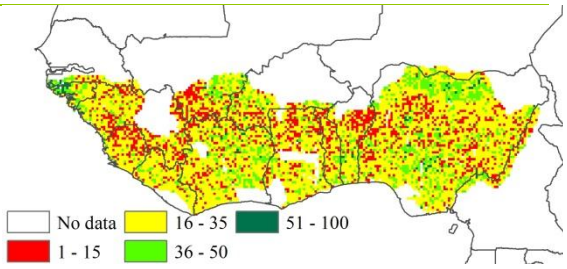
e. Maximum VCI



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

In general, crop condition of winter crops is above average in the North American MPZ (figure 2.2). Summer crops (maize, soybean, and spring wheat) are close to planting, and winter crops were in the middle of their growing season. Overall, the agroclimatic indicators show that rainfall was 28% above average, while temperature and radiation were both below average (-0.7°C and -5%, respectively).

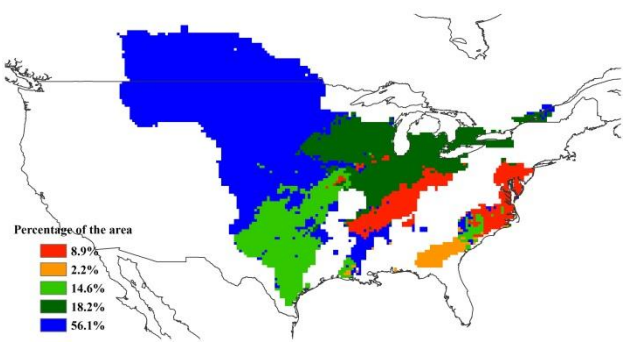
Among the main winter crops zones, abundant rainfall was recorded in the southern plains, Texas (RAIN, +35%), Oklahoma (+32%), Kansas (+16%), and in Nebraska (+48%), which is favorable for the growth of winter wheat. Temperature (TEMP) was close to average in the Southern Plains, including Kansas (+0.2), Texas (-0.8), Oklahoma (-0.7), and Nebraska (+1.0). Radiation (RADPAR) in the MPZ is below or close to average: Texas (-11%), Oklahoma (-6%), Nebraska (0%), and Kansas (+1%).

In the Corn Belt, rainfall was above average, including Illinois (+22%), Indiana (+30%), Iowa (+24%), Missouri (+26%), and Ohio (+52%), benefiting the planting of maize and soybean. The northern plains also received abundant rainfall, including in Montana (+149%), North Dakota (+129%), and South Dakota (+98%), which provides needed soil moisture for the planting of spring wheat and barley. In Canada, rainfall was above average for the provinces of Alberta (+23%), Manitoba (+1%), and Saskatchewan (+12%).

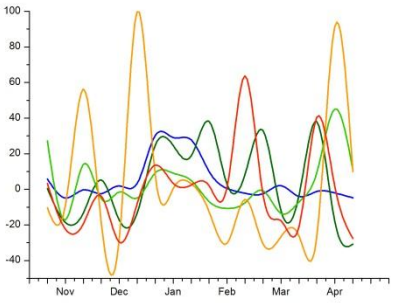
Overall, the accumulated biomass potential (BIOMASS) showed a positive departure of 15% compared to average, due to abundant rainfall, especially in the southern plains, indicating good performance of

winter crops in Texas (+52%), Oklahoma (+35%), Kansas (+18%), and Nebraska (+41%). Maximum VCI (the VCIx) is 0.72, while the fraction of cropped arable land (CALF) increased 1%.

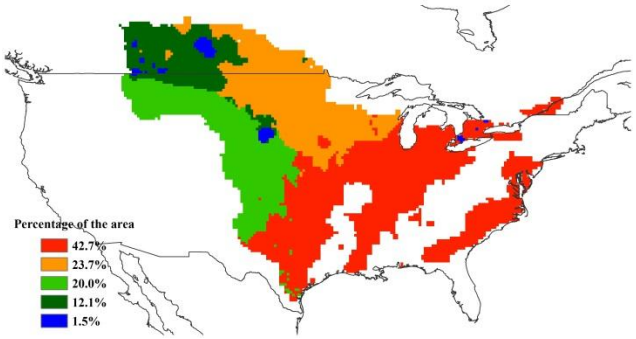
Figure 2.2. North America MPZ: Agroclimatic and agronomic indicators, January-April 2015



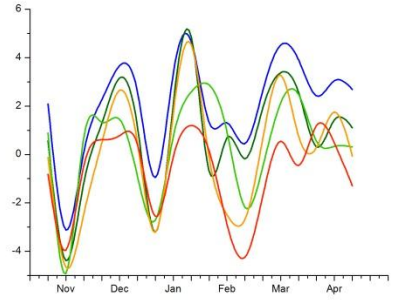
a. Spatial distribution of rainfall profiles



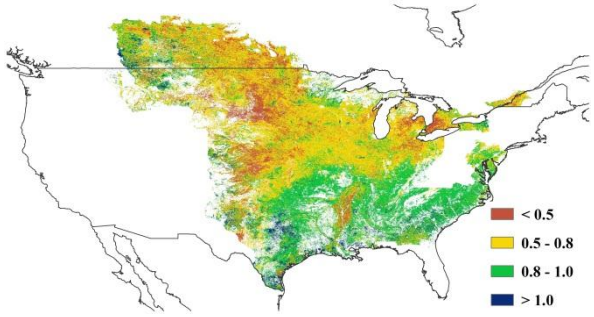
b. Profiles of rainfall departure from average (mm)



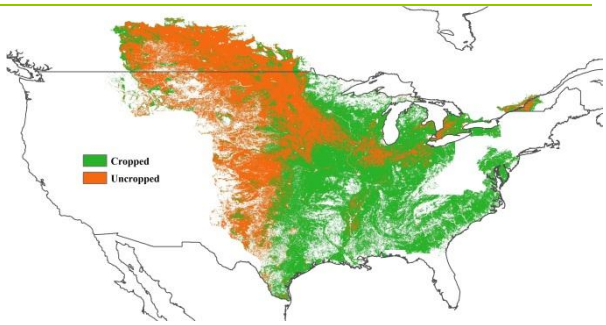
c. Spatial distribution of temperature profiles



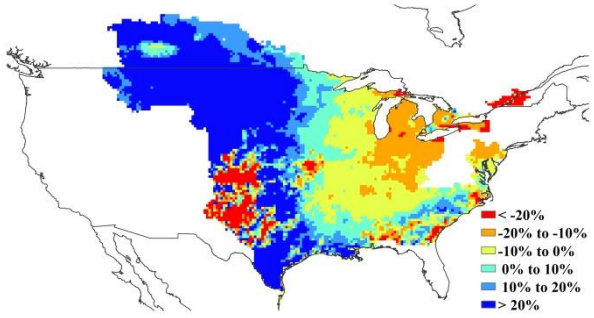
d. Profiles of temperature departure from average (°C)



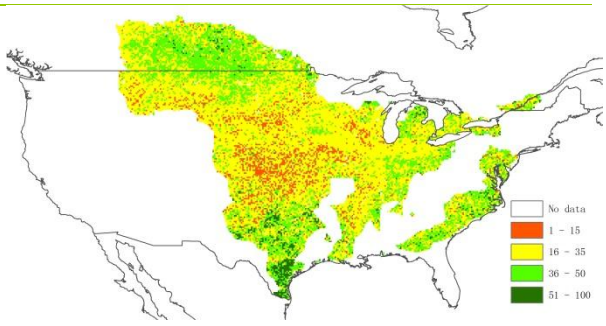
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

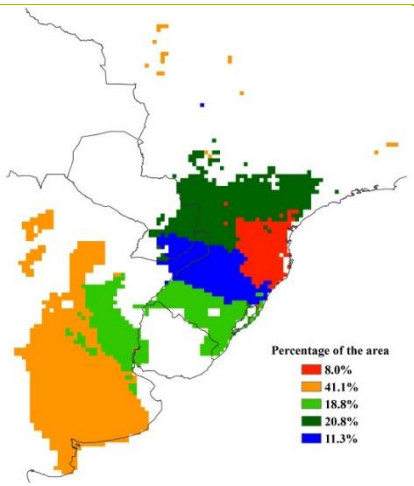
Note: For more information about the indicators, see Annex C.

2.4 South America

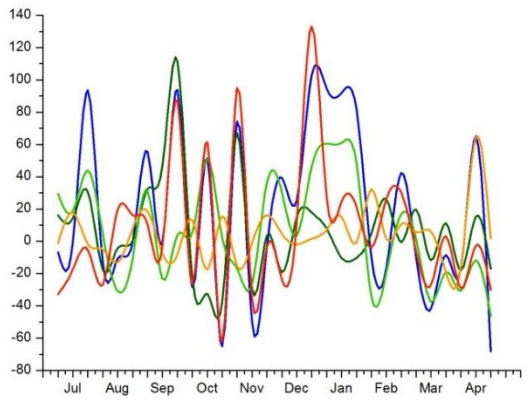
In general, crops did well in the South America MPZ from January to April 2015; figure 2.3 presents the indicators for this MPZ. Favorable agroclimatic conditions were observed with average rainfall and radiation, and 1.2°C above average temperature which contributes to the 5% above average value for BIOMSS. Spatially, below average BIOMSS occurs in Paraguay and in central and northeast Buenos Aires, where below average rainfall in late January combined with high temperature in early January was unfavorable for crops. The minimum vegetation health index confirms the water deficit that occurred in those regions over the last four months. As is shown in the spatial pattern of rainfall departure, abundant rainfall was recorded in most of southern Brazil (including Rio Grande Do Sul, Santa Catarina, and Parana) around December and January. The north of the MPZ suffered low rainfall in January; rainfall in Argentina fluctuated significantly but was generally average over the reporting period. Temperature was in general favorable for crops in the MPZ, except for the regions from Southern Mato Grosso Du Sol north to Central Mato Grosso where extreme temperature deficits occurred in early January, mid-February, and again late March, hampering crop development.

According to the map showing the maximum vegetation condition index (VCIx), crop condition was below average in central Buenos Aires province. Average VCIx for the MPZ is 0.86 over the reporting period. The cropped arable land fraction (CALF) in the MPZ is 99%, which is the same level as the previous five-year average, with only some arable land in an area from Bahia Blanca to Santa Rosa uncropped.

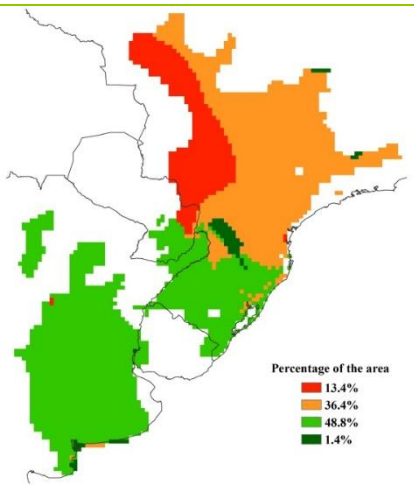
Figure 2.3. South America MPZ: Agroclimatic and agronomic indicators, January-April 2015



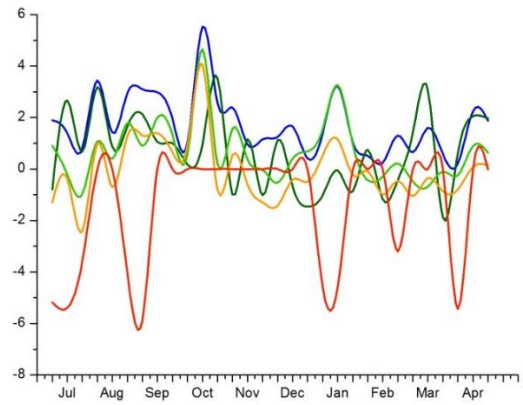
a. Spatial distribution of rainfall profiles



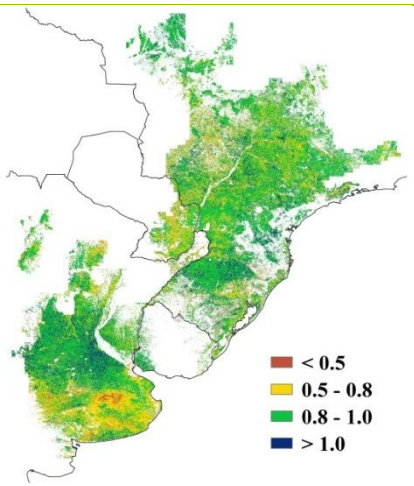
b. Profiles of rainfall departure from average (mm)



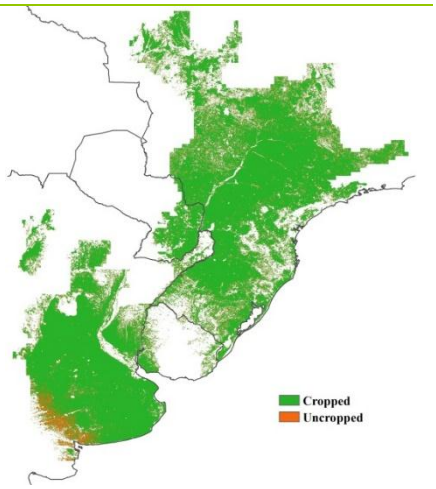
c. Spatial distribution of temperature profiles



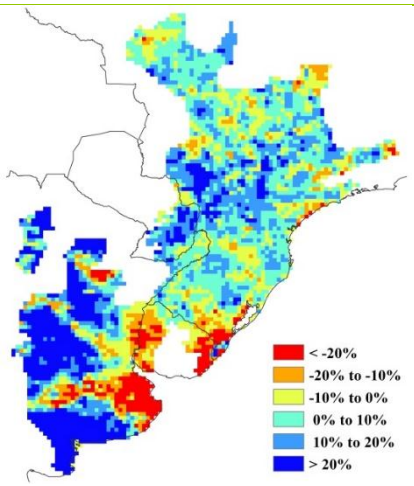
d. Profiles of temperature departure from average (°C)



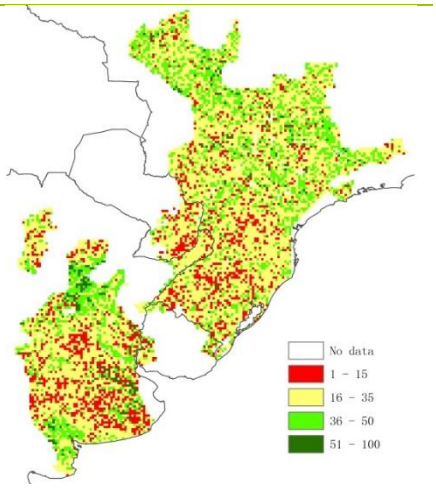
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



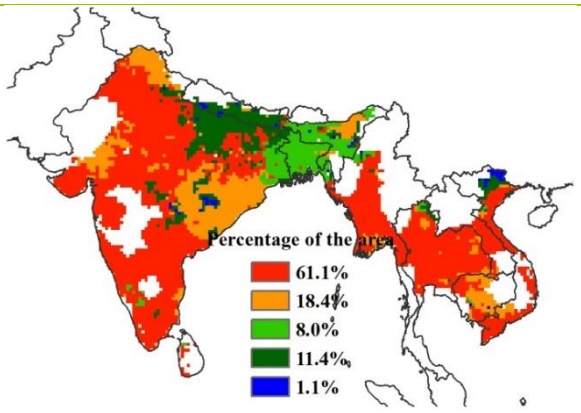
h. VHI minimum

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

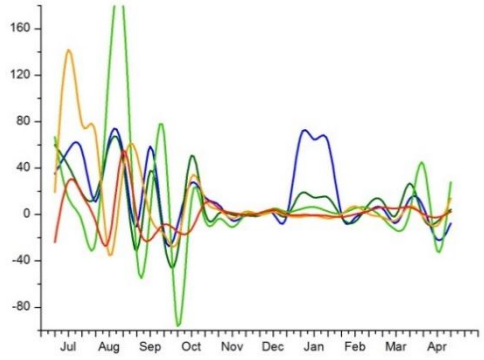
2.5 South and Southeast Asia

The monitoring period is the growing and harvesting season of winter rice, wheat, and maize for this MPZ. The crop condition of the zone was average and locally below average, especially in central Myanmar and northeast Thailand. In the MPZ as a whole, the rainfall indicator (RAIN) was 21% higher than average, but lower than average rainfall was observed in Cambodia (-18%), Thailand (-11%), and Vietnam (-7%). TEMP was average and RADPAR was 2% below average in the region. The biomass accumulation and cropped arable land fraction both increased compared to the last five-year average (34% and 3%, respectively), but the average hides large local disparities. Maximum VCI mostly ranges from 0.5 to 1; VCIx values below 0.5 were observed in central Myanmar and some parts of Thailand, indicating less favorable crop condition. Due to reduced rainfall in Cambodia, Thailand, Vietnam, and Myanmar, minimum VHI values were low and indicate less favorable crop condition. Figure 2.4 summarizes CropWatch findings for this MPZ.

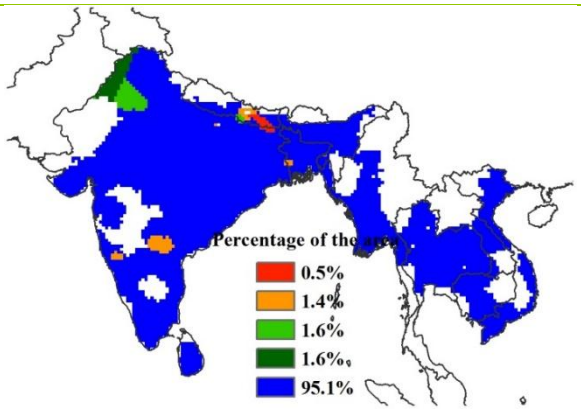
Figure 2.4. South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, January-April 2015



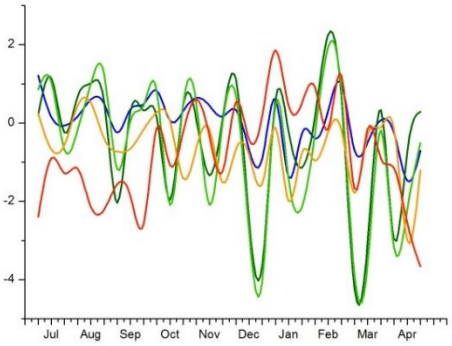
a. Spatial distribution of rainfall profiles



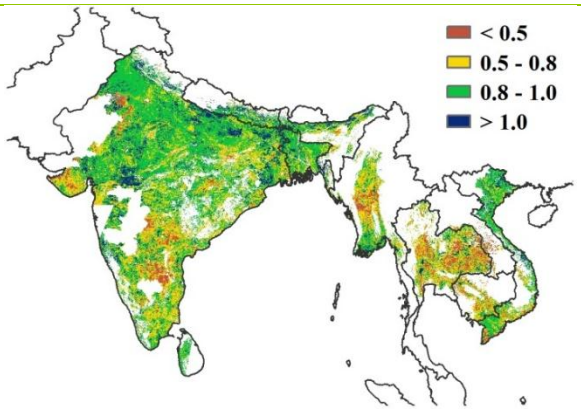
b. Profiles of rainfall departure from average (mm)



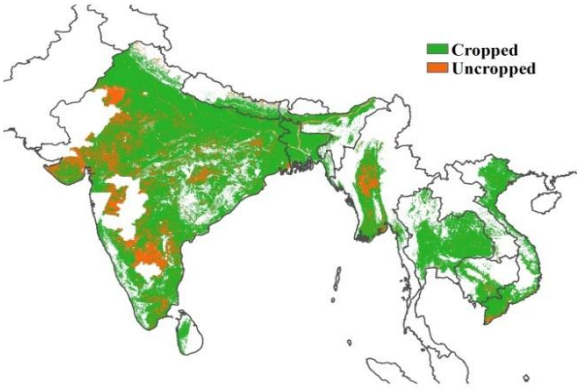
c. Spatial distribution of temperature profiles



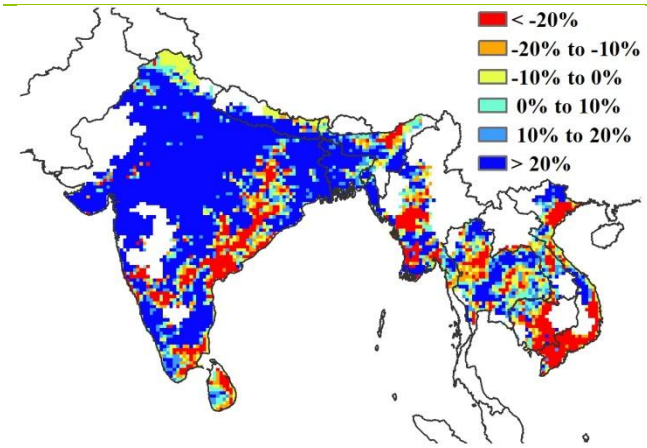
d. Profiles of temperature departure from average (°C)



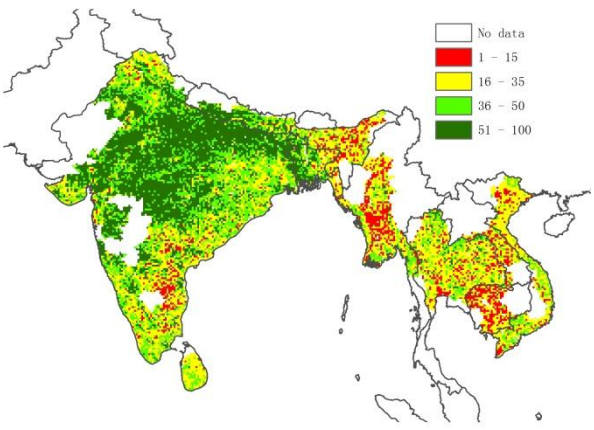
e. Maximum VCI



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

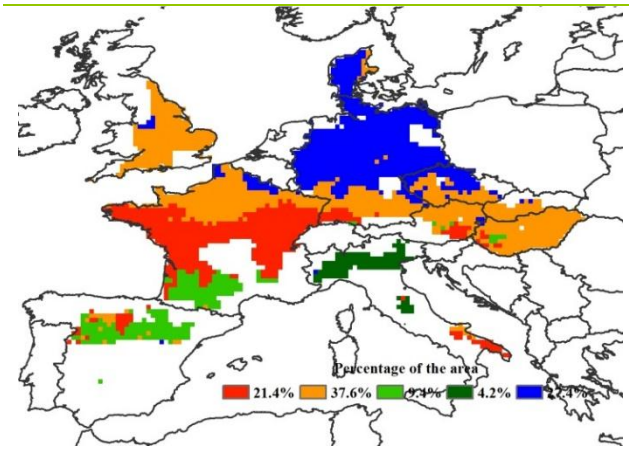
In general, crop condition was above average in most parts of Western Europe during this reporting period, especially for winter crop growth and spring sowings. Figure 2.5 presents an overview of CropWatch agroclimatic and agronomic indicators.

Total precipitation was 27% below the recent fourteen-year average, with exceptional positive departures over northern Italy from early January to early February and most parts of Germany in early January and March. Temperature showed an increase of 1.0°C and radiation was about average. Due to the rainfall deficit, the biomass accumulation potential, BIOMSS, was below (-13%) the recent five-year average. The spatial distribution of BIOMSS shows that the lowest values (-20% and below) occur over most of France, Spain, Italy, Hungary, and the eastern United Kingdom. In contrast, BIOMSS in most other regions was 10% above average.

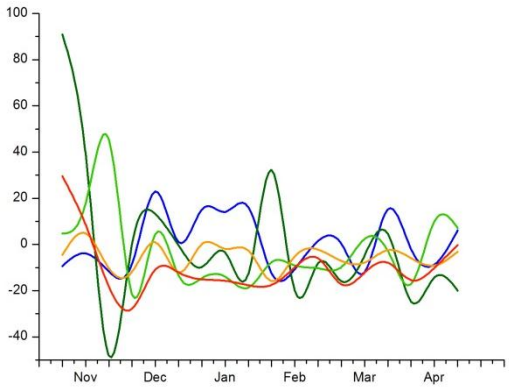
The average maximum VCI values reach a high value of 0.86, indicating favorable crop condition. More than 92% of the arable lands were cropped, which is 1 percentage point above the recent five-year average. Most uncropped arable land is concentrated in Spain and southeast France. Accordingly, maximum VCI was lower as well, compared with other regions in the MPZ. Areas with low minimum VHI were partially scattered in Spain and northern Italy.

Generally, crop condition in Western Europe was favorable, but—depending on spring and early summer rain—limited soil water storage may make itself felt later in the season.

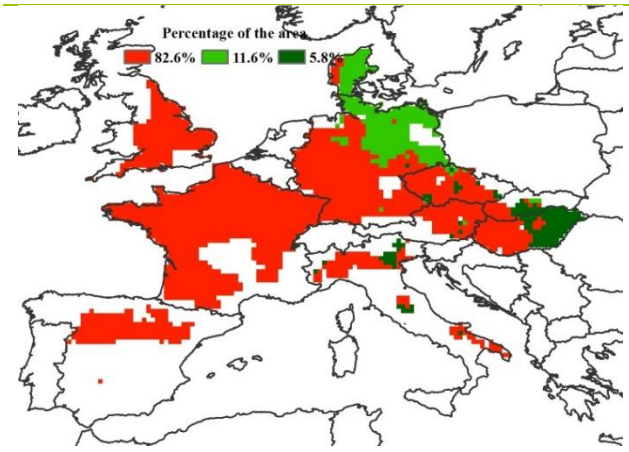
Figure 2.5. Western Europe MPZ: Agroclimatic and agronomic indicators, January-April 2015



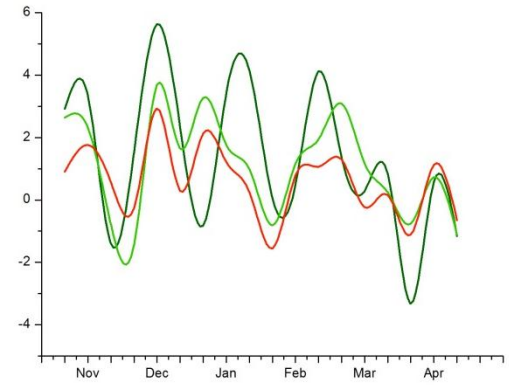
a. Spatial distribution of rainfall profiles



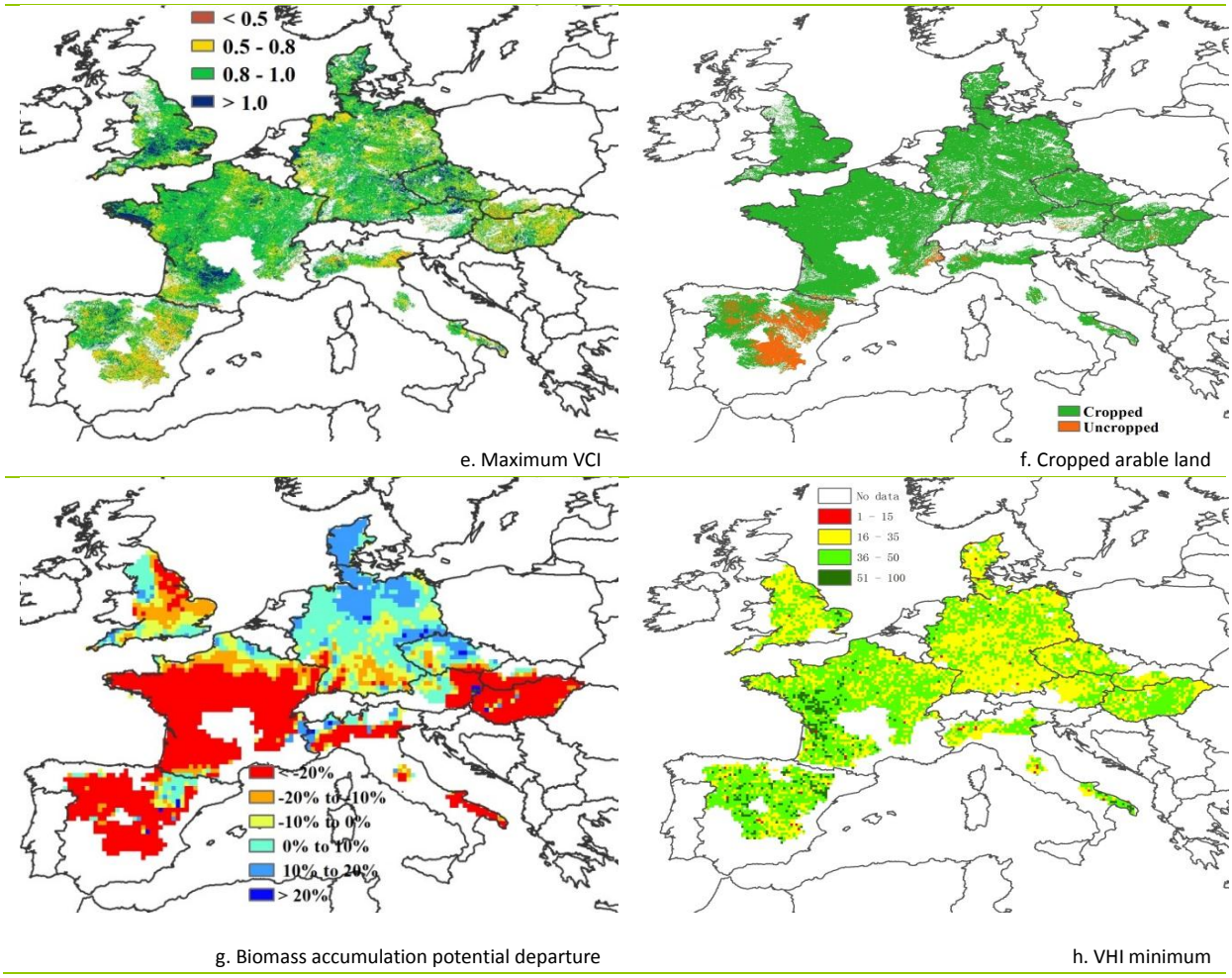
b. Profiles of rainfall departure from average (mm)



c. Spatial distribution of temperature profiles



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



e. Maximum VCI

f. Cropped arable land

g. Biomass accumulation potential departure

h. VHI minimum

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

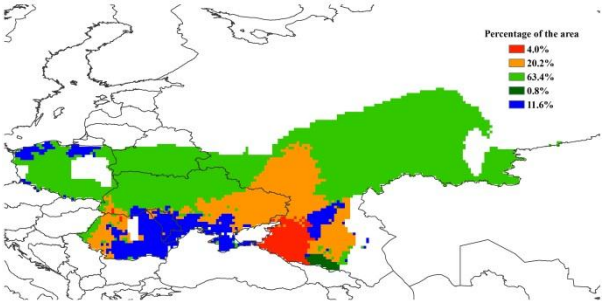
2.7 Central Europe to Western Russia

Between January and April 2015, winter crops in this MPZ were mostly at the vegetative stage (see figure 2.6). The agroclimatic indicators show predominantly normal conditions. RAIN was slightly above average (+4%), while RADPAR was below by 3%. The TEMP anomaly, however, was significant and reached +1.3°C; the resulting BIOMSS increase compared to the five-year average was 12%. Across the MPZ, the crop condition degrades from west to east, with favorable condition in Poland and relatively poor condition in western Russia.

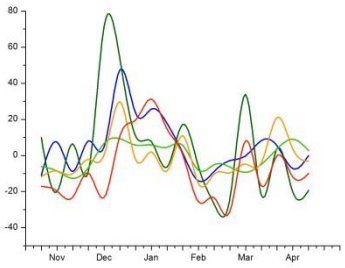
Temperature profiles show correlated variations among most countries of the MPZ, with above average temperature from mid-January to late March in Poland, Romania, Belarus, the western Ukraine, and in the northern part of western Russia. Low temperatures occurred in several waves, affecting the whole region (as in December) or only part of it. The region of Russia adjacent to Kazakhstan, including the oblasts of Orenburg, Samar, Saratov, and Chelyabinsk, as well as the Republic of Bashkortostan, were particularly affected (-8°C compared with average in December; -4°C in late January), leading to poor crop condition (maximum VCI below 0.5). As indicated by the rainfall profiles, almost all areas of the MPZ suffered a significant rainfall deficit in February, especially in the Krasnodar and Stavropol Krays and the oblast of Rostov, with a more than 20% decrease in rainfall compared with average. Starting in March, rainfall recovered to above average in most areas, which was beneficial to the key growing season of winter crops. According to the map showing BIOMSS, a large positive biomass departure (more than 20%) is likely for Tulcea, Braila, and Calarasi in Romania; Grodno and Vitebsk in Belarus; the Kalmyk and Dagestan Republics; and the oblast of Astrakhan.

Only 65% of the arable lands were cropped in the January to April period, which represents a decrease of 5% compared to the recent five-year average. Most uncropped arable land was scattered in Russia (the easternmost part of the MPZ). The maximum VCI (VCIx=0.64) is fair but low compared with other MPZs.

Figure 2.6. Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, January-April 2015

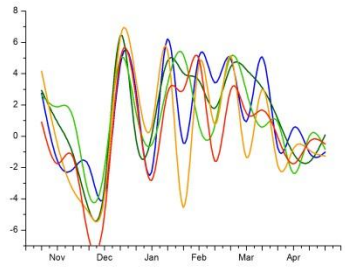


a. Spatial distribution of rainfall profiles

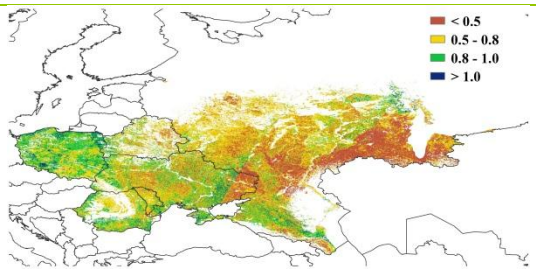


b. Profiles of rainfall departure from average (mm)

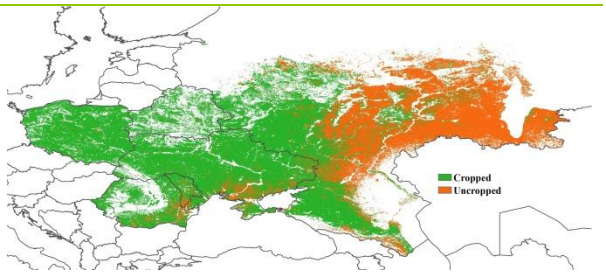
c. Spatial distribution of temperature profiles



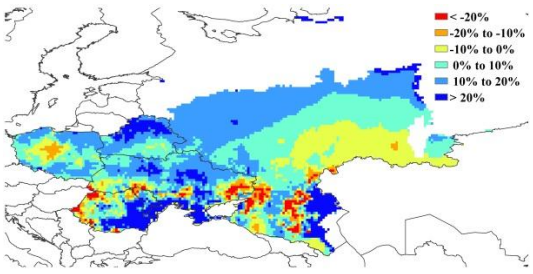
d. Profiles of temperature departure from average (°C)



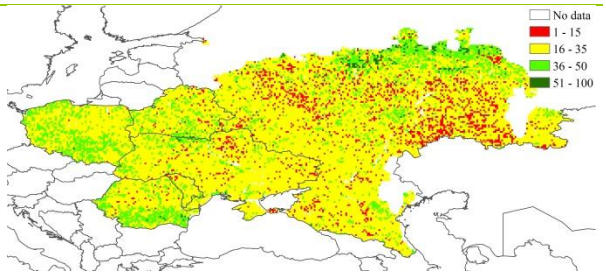
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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