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. April-July 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	628	1	29.2	0.6	1141	2
South America	439	40	19.9	0.9	775	-3
North America	526	31	19.8	0.3	1272	-4
South and SE Asia	849	11	29.6	0.1	1161	1
Western Europe	206	-26	14.9	0.1	1198	2
C. Europe and W. Russia	229	-7	15.7	-0.3	1157	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 fourteen-year average (14YA) for the same period (April-July) for 2001-14.

Table 2.2. April-July 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	1566	-6	83	-1	0.81
South America	1118	18	88	1	0.67
North America	1390	10	90	1	0.90
South and Southeast Asia	1453	-2	81	-4	0.85
Western Europe	846	-22	95	0	0.74
Central Europe and W. Russia	973	1	93	0	0.87

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 (April-July) for 2010-2014.

2.2 West Africa

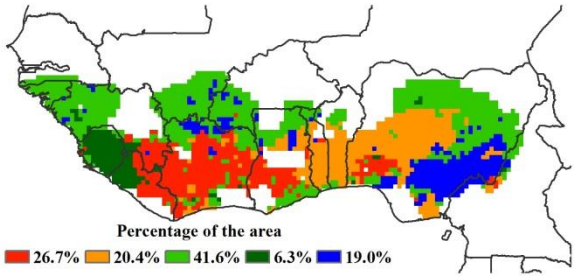
In the West Africa MPZ, the planting of maize occurs from March or April in the south, but in May or later in the north and in the west, where countries are located at higher latitudes. Rice is a major crop in the west of the MPZ. Seasons may vary from very long to bimodal in the south, depending mostly on

elevation. For the reporting period, rainfall was average in the region as a whole, resulting from above average rainfall in the west (Guinea Bissau, RAIN, +25%; Sierra Leone, +14%; and Guinea, +27%), average precipitation in Ghana and Nigeria, and a relative shortfall in Liberia (-18%), Côte d'Ivoire and Togo (both -19%), and Benin (-13%). As far as rainfall distribution over time is concerned, in April the MPZ experienced below average rainfall from southern Guinea to eastern Nigeria across the center of all the countries in-between, thus leaving mostly the west (Guinea Bissau, Sierra Leone, west Liberia, and west Guinea) as well as coastal areas and the north with average conditions. A second dry spell occurred mid-June throughout the area, but it is unlikely to have affected the global water balance significantly. Significant rainfall peaks (+100mm) occurred in Sierra Leone and west Liberia in May, and in southeast Nigeria in July.

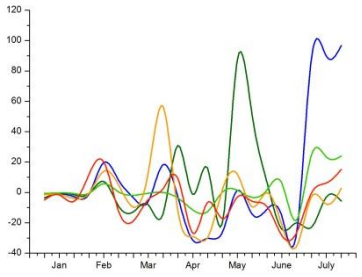
The region experienced a moderate warm spell (TEMP, +0.6°C on average) as well increased sunshine (RADPAR, +2%). Temperature peaks can be mentioned for limited areas, such as a cold spell in central northeastern Nigeria in April (-2.0°C) and a heat peak (+4.0°C) in Ghana in mid-April. Among all countries, Ghana, Togo, and Benin display the highest temperature anomalies (+0.8°C). The same countries also have the highest radiation departures (RADPAR, +4%, +3% and +6%, respectively) from average.

The biomass production potential (BIOMSS) in the region underwent a moderate drop of 6%, while the cropped arable land fraction at 83% (-1 percentage point compared to average) and VCIx (0.81) point at very close to average conditions in the west. Liberia, Côte d'Ivoire, Togo, Benin, and Nigeria underwent greater variability, with a BIOMSS drop between 10 and 14%. VHIn is very mixed, but with a tendency to low values in the north in relation with the late onset of the rainy seasons at higher latitude. Altogether, environmental conditions and vegetation indices create no particular concerns for the area. Figure 2.1 illustrates agroclimatic and agronomic indicators for the MPZ for the reporting period.

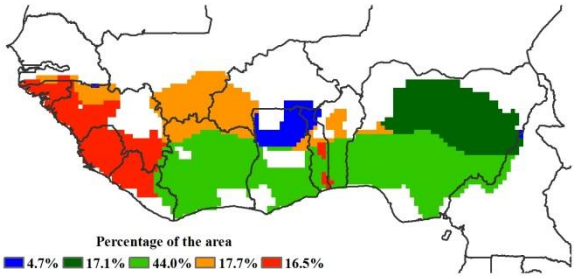
Figure 2.1. West Africa MPZ: Agroclimatic and agronomic indicators, April-July 2015



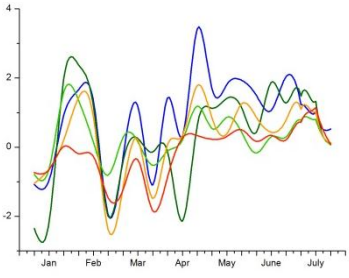
a. Spatial distribution of rainfall profiles



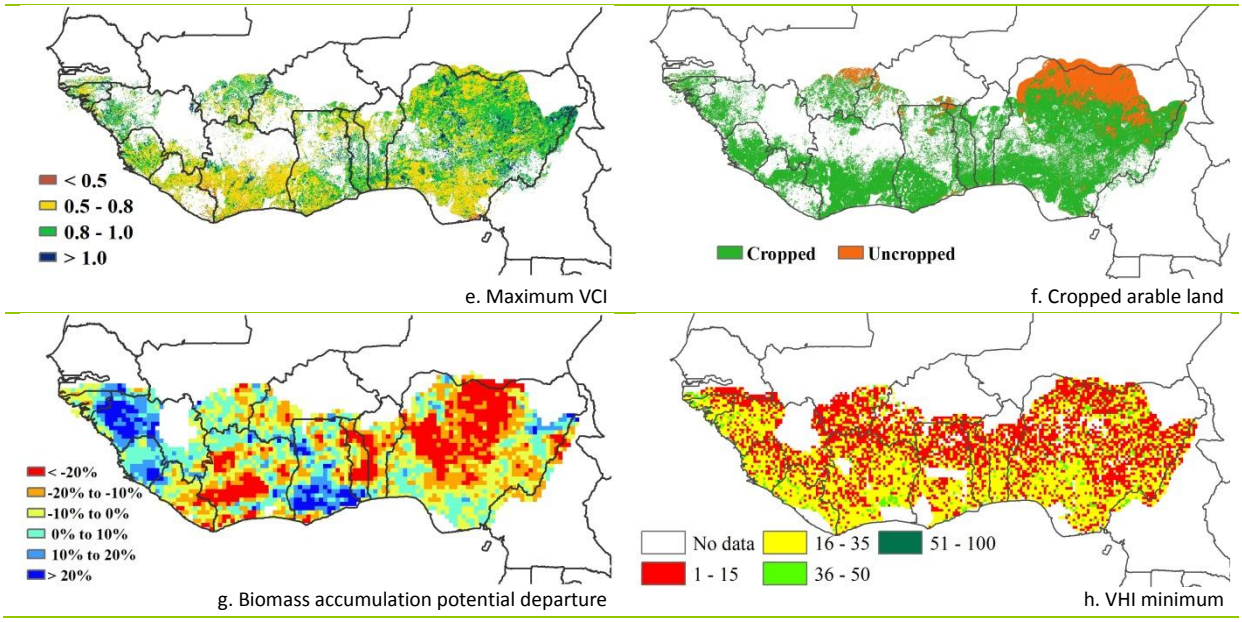
b. Profiles of rainfall departure from average (mm)



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.

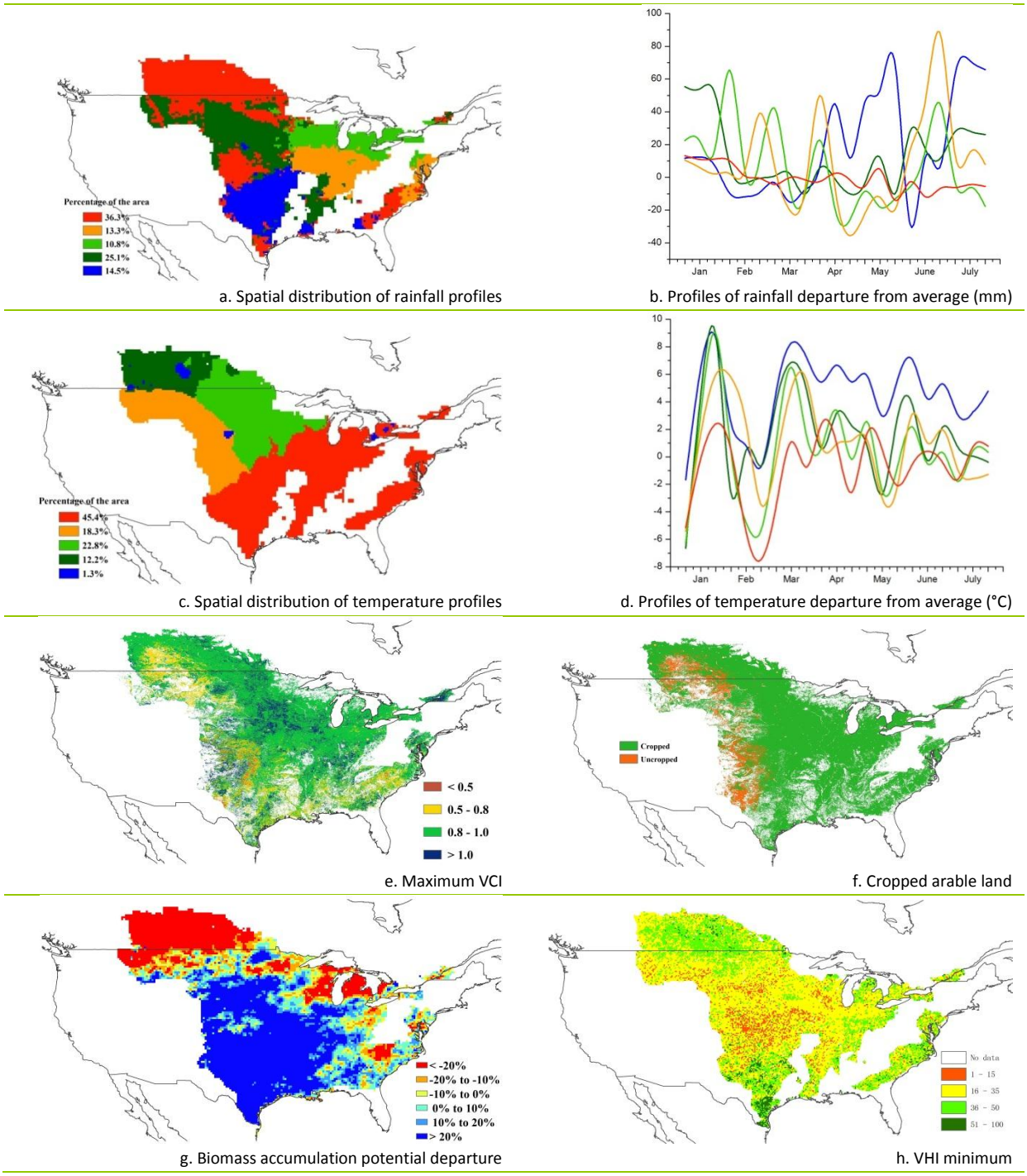
2.3 North America

In general, crop condition was above average in the North American MPZ (figure 2.2) over the reporting period. This monitoring period covered seeding, flowering, and heading stages of summer crops (maize, soybeans, barley, oats, spring wheat, and durum wheat) as well as heading and harvesting stages of winter wheat (hard red, soft red, soft white, and hard white wheat). Overall, the agroclimatic indicators show that rainfall (RAIN) was 31% above average and temperature (TEMP) average, while radiation (RADPAR) was 4% below average. Biomass (BIOMSS) shows a 10% positive departure, and the fraction of cropped arable land (CALF) was 1 percentage point above average. The maximum VCI for the MPZ was 0.9.

In June and July, abundant rainfall fell in the Corn Belt and major soybean production zones, providing enough soil water for maize and soybeans growth, especially in Iowa (RAIN +15%), Illinois (+59%), Nebraska (+67%), Indiana (+33%), Minnesota (+1%), Ohio (+7%), and Indiana (+33%). The good performance of crops is supported by high values for maximum VCI; VCI values in almost all regions were above 0.8 and in some states even greater than 1.0, indicating record crop condition. In the winter wheat zones, abundant rainfall occurred in Kansas (+36%), Oklahoma (+126%), Texas (+101%), and Arkansas (+56%), especially in May and July. It is reported by United States media that excessive rain caused record-breaking floods in Oklahoma and Texas; additional detail is provided in section 5.2. In the rice zones, abundant rainfall fell in Arkansas (+56%) and Louisiana (+43%), favoring the rice crop.

In Canada's main production zones, rainfall amounts were below average. In Alberta and Saskatchewan, rainfall sharply decreased by -49% compared to average. Considering rain-fed cropped land features in Canada, crop condition would be impacted by serious water stress.

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

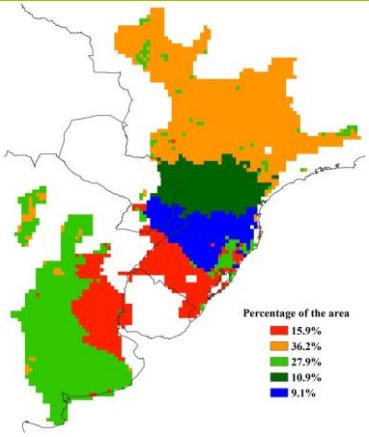
The condition of crops was generally average in the South American MPZ during the monitoring period. Sufficient (40% above average) rainfall was observed over the whole area, which was beneficial for crops. High temperature (0.9°C above average), however, had negative effects on crops. Overall agroclimatic conditions were nevertheless beneficial to crops as shown by an 18% above average value for BIOMSS.

Figure 2.3 presents agroclimatic and agronomic indicators for the MPZ over the last four months. Spatially, significantly above average BIOMSS occurred in the central Pampas in Argentina and Mato Grosso do Sol and neighboring states in Brazil, where crops enjoyed adequate rainfall. Rainfall clusters

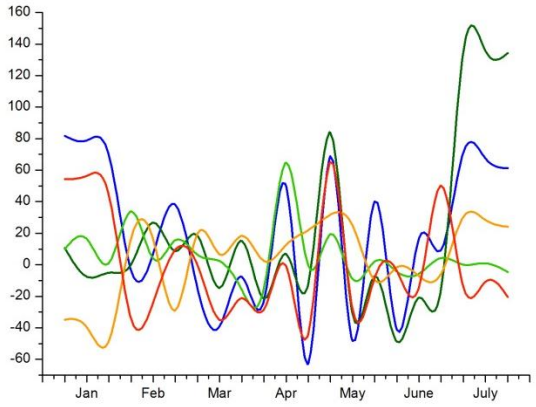
and the corresponding profiles also confirm this. Below average BIOMSS is observed in adjacent regions of Paraguay resulting from both low rainfall and high temperature. According to the temperature departure clusters and profiles, the extreme high temperature in May and late July dominates the whole MPZ and had negative impacts on crops as confirmed by a low vegetation health index (VHI). Rainfall was more than double the normal precipitation in Goias and Mato Grosso and around 70% above average in Mato Grosso Do Sul and Parana from April to July (see also annex A, table A.5). The abundant rainfall mitigates the impacts of high temperature on crops as shown by high values indicated on the maximum vegetation index (VCIx) map.

The VCIx map further indicates crop conditions in Argentina are less favorable than those in Brazil. The low VCIx values in Argentina are mainly due to the unseasonably early harvest of summer crops concluded in April, which was already observed in the previous bulletin. Average VCIx for the MPZ is 0.67 over the reporting period. Meanwhile, CALF is 89%, which is 1 percentage point above the previous five-year average. Most of the uncropped arable land is in an area between Bahia Blanca and Santa Rosa. Other uncropped arable land is scattered in the northern part of the MPZ.

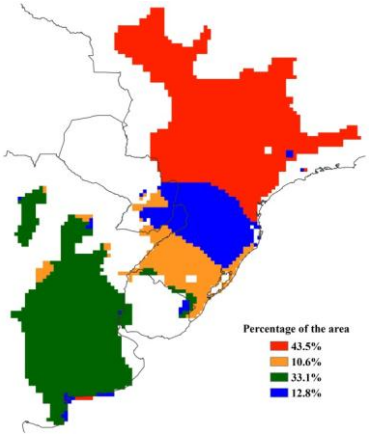
Figure 2.3. South America MPZ: Agroclimatic and agronomic indicators, April-July 2015



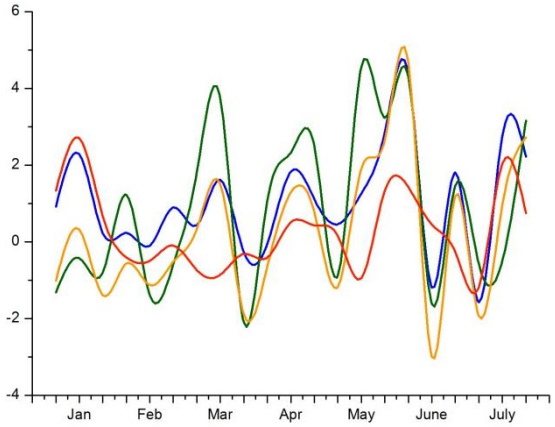
a. Spatial distribution of rainfall profiles



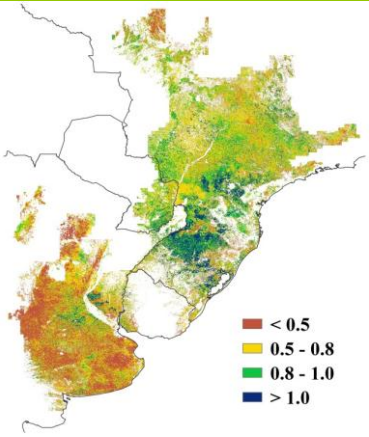
b. Profiles of rainfall departure from average (mm)



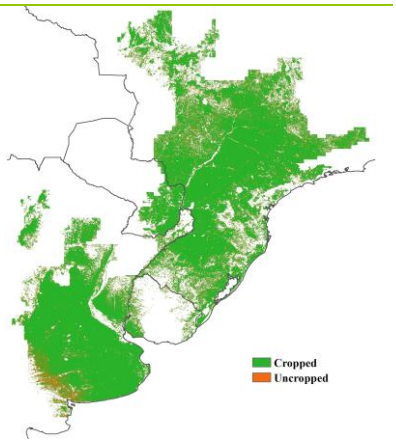
c. Spatial distribution of temperature profiles



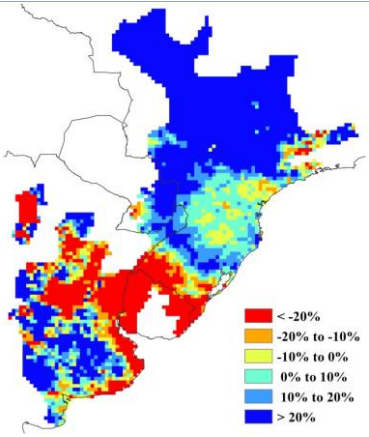
d. Profiles of temperature departure from average (°C)



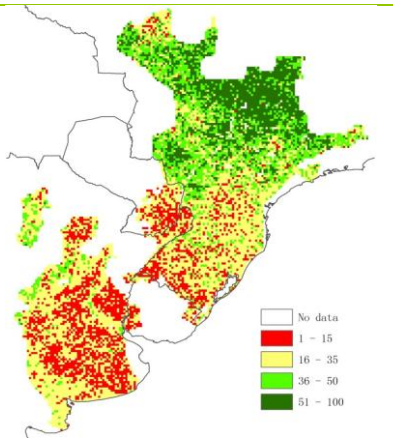
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

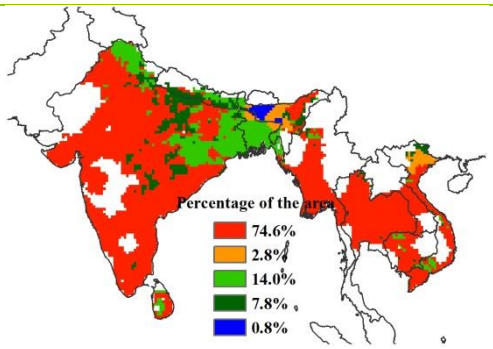
2.5 South and Southeast Asia

The reporting period is the planting and growing season of rice and maize in this MPZ. Overall, the CropWatch agroclimatic indicators show average crop condition. Rainfall for the entire zone was 11% above average, but low rainfall was recorded for Myanmar (-12%), Thailand (-24%), and Cambodia (-3%), while above average rainfall occurred in Bangladesh (+30%) and India (+11%). The spatial distribution of rainfall profiles indicate 74.6% of the MPZ experienced deficit rainfall after June. Temperature and radiation for the MPZ were about average.

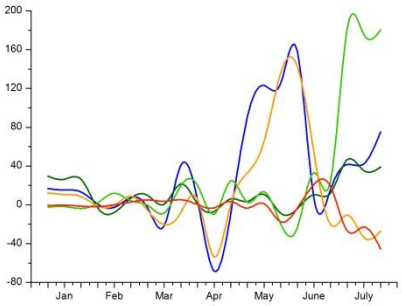
The maximum VCI values for the MPZ range from 0.5 to 1, pointing at average to favorable crop condition. However, VCIx values below 0.5 are recorded in some parts of southern and western India where they indicate poor crop condition. The fraction of crop arable land (CALF) was 81%. The uncropped areas were spatially distributed in the Indian state of Karnataka, Andhra Pradesh, Gujarat, Rajasthan, and the central part of Myanmar. The biomass accumulation potential for the MPZ was slightly below average (-2%). Its spatial distribution shows below average values in western India, most of Thailand, and some areas of Vietnam. Low values of VHI minimum were found over central India, Myanmar, Thailand, and Cambodia, indicating water stress linked with low rainfall.

Overall, crop condition is average in the MPZ, in spite of severe floods in northeastern India, Myanmar, and Bangladesh, and dry weather in western India, Thailand, Cambodia, and Vietnam.

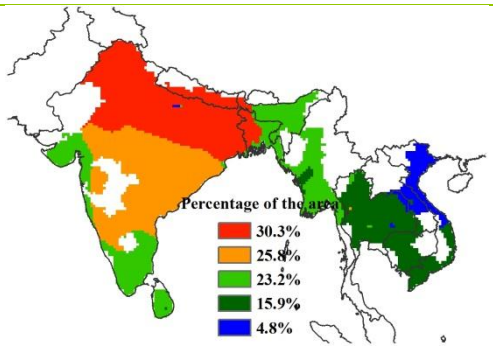
Figure 2.4. South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, April-July 2015



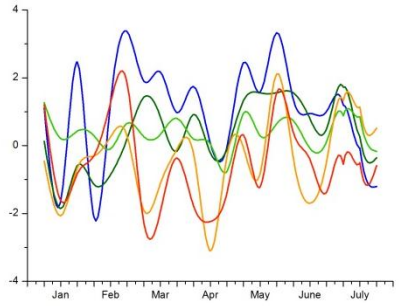
a. Spatial distribution of rainfall profiles



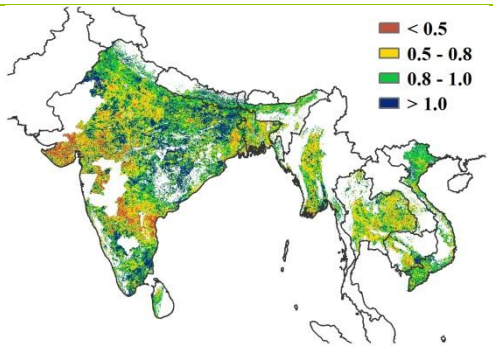
b. Profiles of rainfall departure from average (mm)



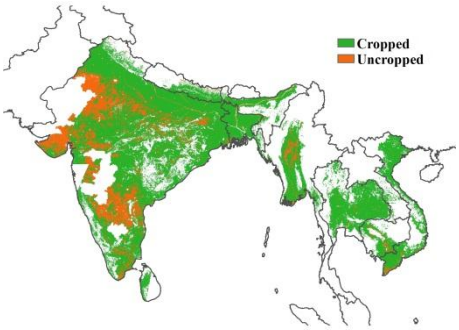
c. Spatial distribution of temperature profiles



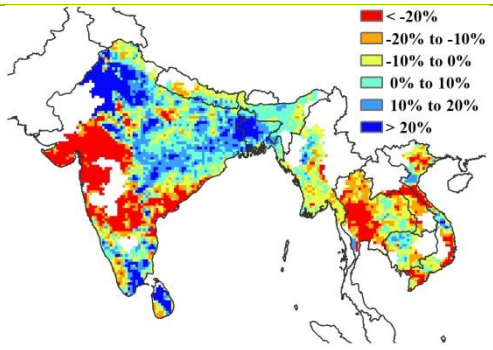
d. Profiles of temperature departure from average (°C)



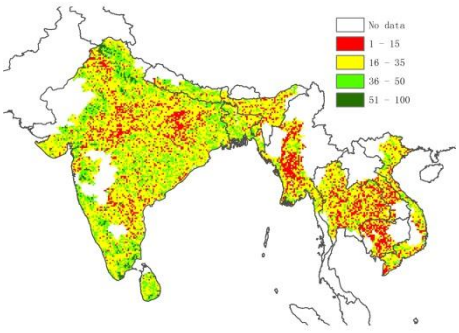
e. Maximum VCI



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

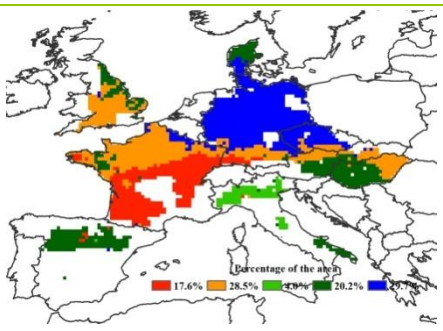
In general, crop condition was below average in most parts of Western Europe during this reporting period, with drought and high temperature conditions hitting spring and winter crops during grain filling and maize while flowering. Figure 2.5 presents an overview of CropWatch agroclimatic and agronomic indicators for this MPZ.

The total precipitation was 26% below average, with exceptional positive departures in RAIN over most of Spain, eastern Austria, western Hungary, most of Denmark, and also northern Italy from late May to early June. Meanwhile, overall TEMP showed an increase of 0.1°C while RADPAR for the MPZ was 2% above average. On a more detailed level, high temperatures occurred in most of Western Europe during this reporting period, with exceptional below average temperatures in the middle of May and early June. Due to the rainfall deficit and warm weather in most of Western Europe, overall BIOMSS for the MPZ was 22% below the recent five-year average. As shown in figure 2.5, the highest values for BIOMSS (20% and above) occurred over western Spain, eastern Austria, western Hungary, and most of Denmark where water stress was experienced in limited areas. In contrast, BIOMSS in most other regions (including most of France, western and northern Germany, southern United Kingdom, northern Hungary, southern Czechia, and southern Slovakia) was 10% below average with severe water stress and high temperature effects. The values for the minimum VHI confirm the water deficit in those regions over the last four months.

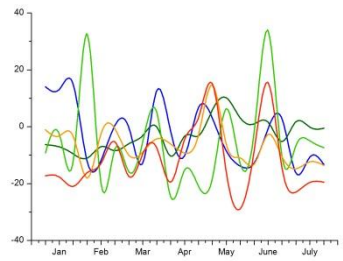
According to the VCIx map, crop condition was below average in most of Spain, France (with the exception of the north), and the eastern part of Italy. Average VCIx for the MPZ was 0.74. The CALF indicator for the fraction of cropped arable land was 95% across the MPZ, which is the same as the five-year average; most uncropped arable land is scattered in the south and northeast of Spain.

Generally, crop condition in Western Europe was unfavorable. The rainfall deficit and warmer-than-seasonal weather limited soil water storage and crop growth and reduced the yield potential of summer crops that are reaching the sensitive stages of flowering or the beginning of the grain-filling period.

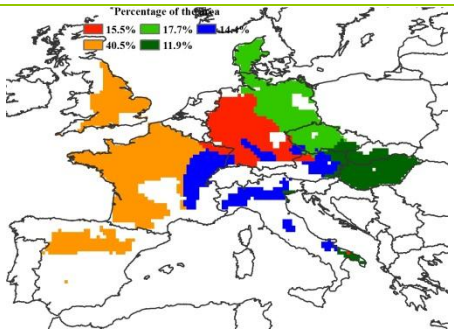
Figure 2.5. Western Europe MPZ: Agroclimatic and agronomic indicators, April-July 2015



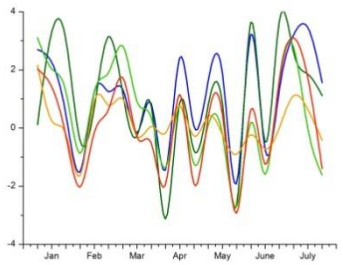
a. Spatial distribution of rainfall profiles



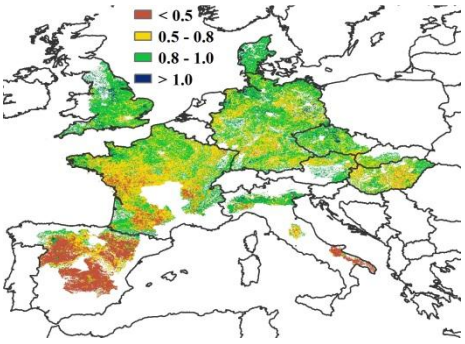
b. Profiles of rainfall departure from average (mm)



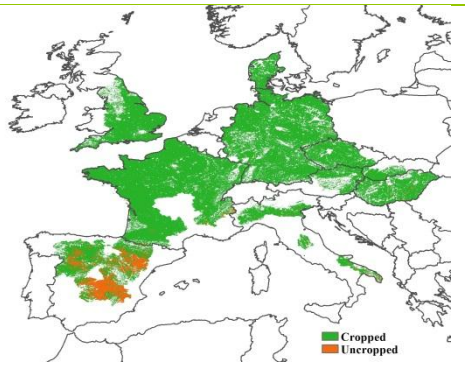
c. Spatial distribution of temperature profiles



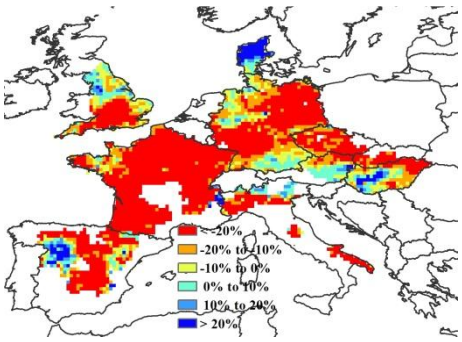
d. Profiles of temperature departure from average (°C)



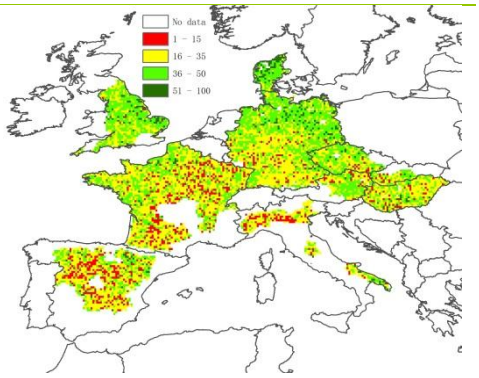
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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

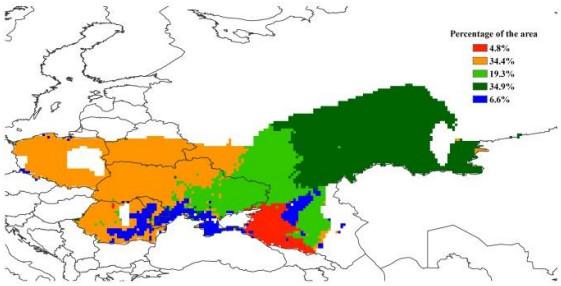
2.7 Central Europe to Western Russia

During the current monitoring period, most parts of the Central Europe to Western Russia MPZ presented favorable conditions of winter and summer crop (average VCIx=0.87). Colder and drier than usual weather has been experienced across the MPZ, with decreased rainfall (RAIN, -7%) and slightly decreased temperature (TEMP, -0.3°C). Radiation (RADPAR) increased 1% over the recent average. (See figure 2.6.)

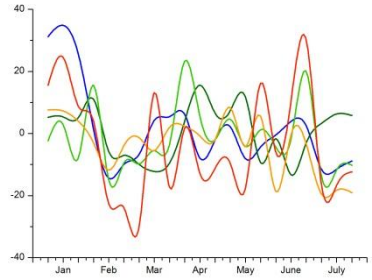
As indicated by the rainfall profile analysis, the west and south of Russia and eastern Ukraine received well above average rainfall since May, with significant rainfall peaks in mid-June, especially in the Krais of Krasnodar and Stavropol and the Oblast of Rostov, which received almost 30% more rainfall than average. Most regions of the MPZ presented below average moisture conditions in late-June and July except the eastern part of the MPZ in Russia. Temperature profiles show that the western part of the MPZ experienced low temperatures over the monitoring period, including Romania, Poland, Belarus, and western Ukraine. Most arable land in Russia shows low temperature in July.

Most arable land was actually cropped during this period, with a CALF of 93%. Due to the low temperature in the western part of the MPZ, the accumulated potential biomass (BIOMSS) is below the five-year average in Romania, Poland, Belarus (<-20%), while as a result of the BIOMSS increase in the eastern part, the biomass accumulation of the whole MPZ shows a slight increase of 1%. The average maximum VCI values reach a high of 0.87.

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

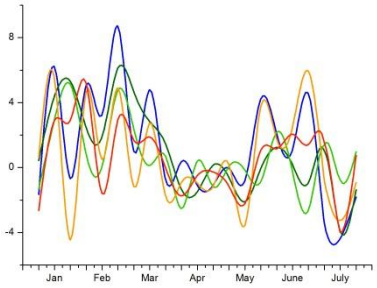


a. Spatial distribution of rainfall profiles

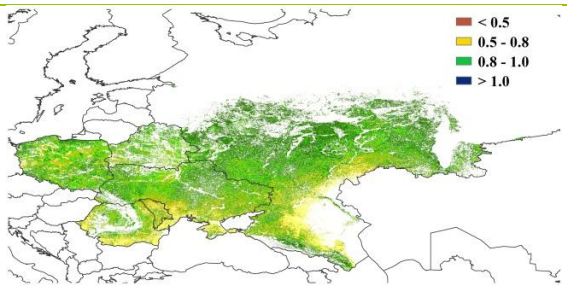


b. Profiles of rainfall departure from average (mm)

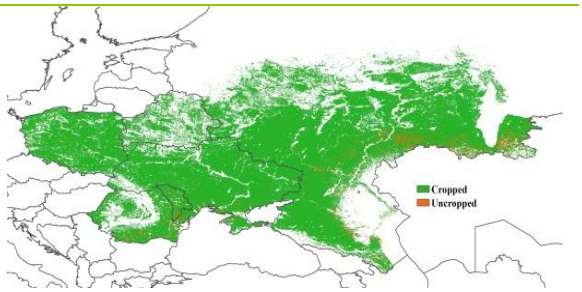
c. Spatial distribution of temperature profiles



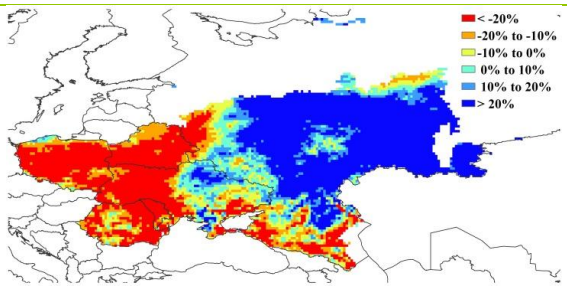
d. Profiles of temperature departure from average (°C)



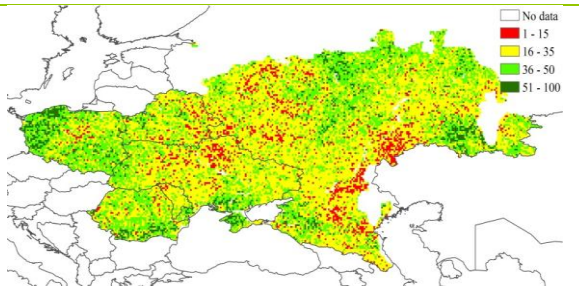
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential departure



h. VHI minimum

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