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 seven 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 seven MPZs, comparing the indicators to their respective thirteen- and five-year averages.

Table 2.1. April to July 2014 agroclimatic indicators by Major Production Zone, current value and departure from 13YA

	RAIN		TEMP		RADPAR	
	Current (mm)	Departure from 13YA (%)	Current (°C)	Departure from 13YA (°C)	Current (MJ/m^2)	Departure from 13YA (%)
West Africa	622	0.2	28.5	0.5	1137	2
South America	456	51	18.9	0.9	771	-4
North America	462	17	18.8	-0.3	1295	-2
South and Southeast Asia	818	8	29.7	1.2	1191	4
Western Europe	262	-6	15.0	-0.3	1170	-0.5
Central Europe and Western Russia	227	-9	15.8	0.2	1178	3
Southern Australia	130	-27	13.4	0.8	670	-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 thirteen-year average (13YA) for the same period (April-July) for 2001-13.

Table 2.2. April to July 2014 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	1695	3	98.0	1.9	0.80
South America	1112	24	97.3	1.2	0.86
North America	1362	9	98.6	-0.2	0.86
South and Southeast Asia	1461	-0.6	91.5	5.5	0.73
Western Europe	1068	-2	99.8	0.0	0.86
Central Europe/ Western Russia	939	-2	96.5	-0.5	0.87
Southern Australia	565	-18	95.7	4.4	0.89

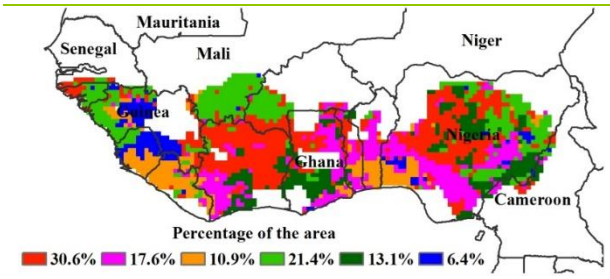
Note: Departures are expressed in relative terms (percentage) for all variables. Zero means no change from the average value; Relative departures are calculated as (C-R)/R*100, with C=current value and R=reference value, which is the five-year (5YA) average for the same period (April-July) for 2009-13.

2.2 West Africa

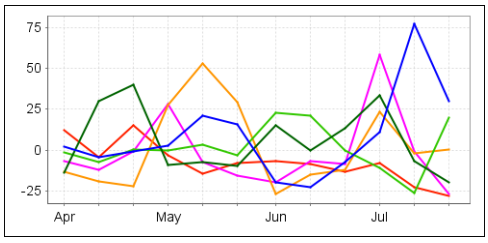
Due to the movement of the Intertropical convergence zone (ITCZ) from south to north over west Africa during the first half of the year, the rainy season starts earlier in the south of the countries included in this MPZ. In most countries, planting of maize thus occurs from March or April in the south, and in May or later in the north. In the west of the MPZ, countries are located at higher latitudes and maize plantings also begin in May. Seasons may vary from very long to bimodal in the south, depending mostly on elevation.

Figure 2.1 illustrates the CropWatch agroclimatic and agronomic indicators for the MPZ. Slightly below average temperature prevailed from April to early June in the center and south-east of Nigeria, as well as in an area centered around north-east Guinea.

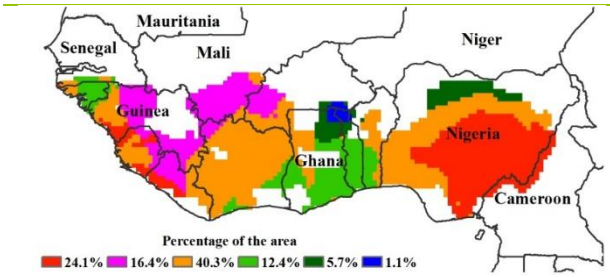
Figure 2.1. West Africa MPZ: Agroclimatic and agronomic indicators, April-July 2014



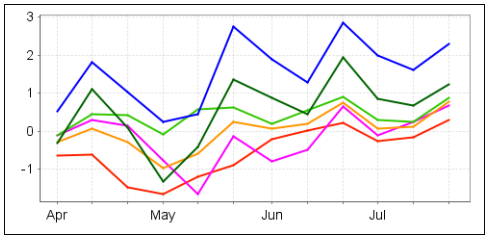
a. Spatial distribution of rainfall profiles



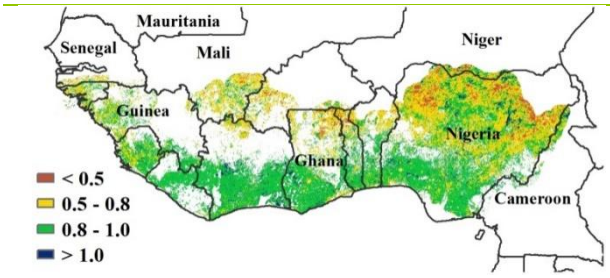
b. Profiles of rainfall departure from average



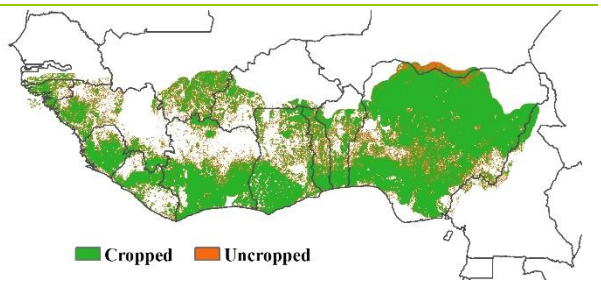
c. Spatial distribution of temperature profiles



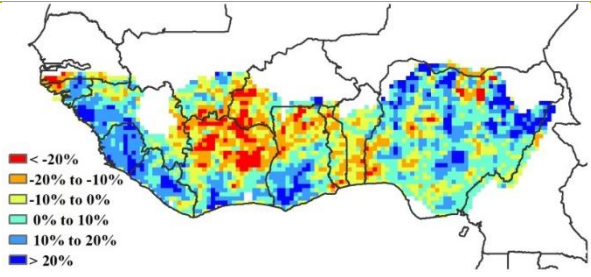
d. Profiles of temperature departure from average



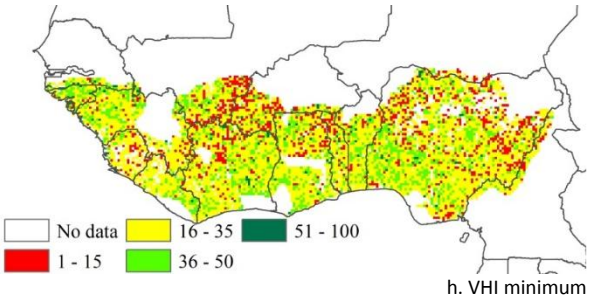
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential (gDM/m^2)

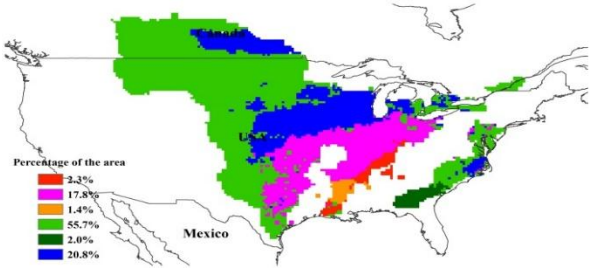


h. VHI minimum

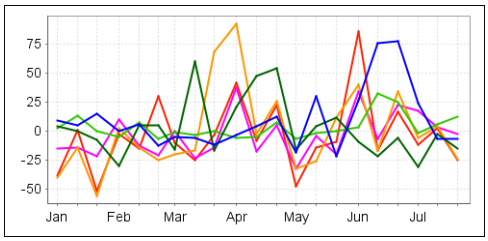
Note: For more information about the indicators, see Annex C.

Most of the region had below average temperature during early May. Rainfall fluctuated widely but usually stayed in the range of plus or minus 25% compared with the recent average. More significant positive rainfall departures (> + 50%) occurred in May in southern Benin, Togo, and south-west Nigeria; during the first dekad of July in much of the southern center of the region (east Ghana to southern-central Nigeria) and during all of July in some of the areas that underwent a relative cold spell in the highlands of Guinea, thereby creating favorable water flow conditions for the Niger river later this year. The cropped arable land map indicates that the season has not actually started in the northernmost central (Mali, Burkina Faso) and eastern parts of the MPZ (Nigeria). With the possible exception of parts of the northern halves of Côte d'Ivoire and Ghana, most indicators concur to describe the conditions of crops over the area as generally average or favorable, with a slight increase of cropped arable land (+1.9%) and relatively high average regional maximum VCI (0.80).

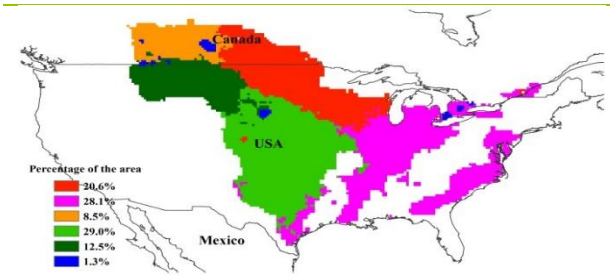
Figure 2.2. North America MPZ: Agroclimatic and agronomic indicators, April-July 2014



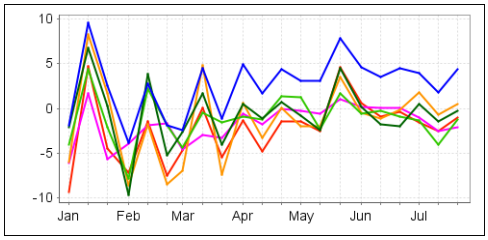
a. Spatial distribution of rainfall profiles



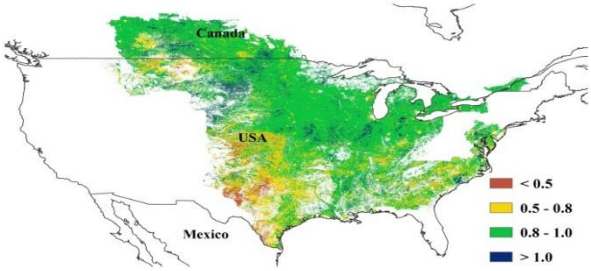
b. Profiles of rainfall departure from average



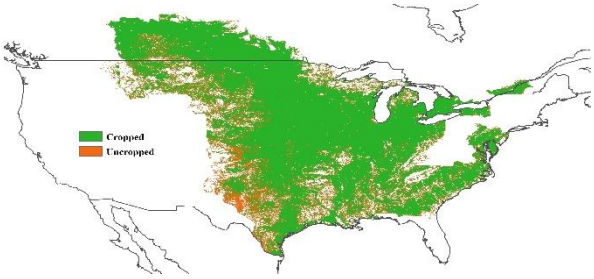
c. Spatial distribution of temperature profiles



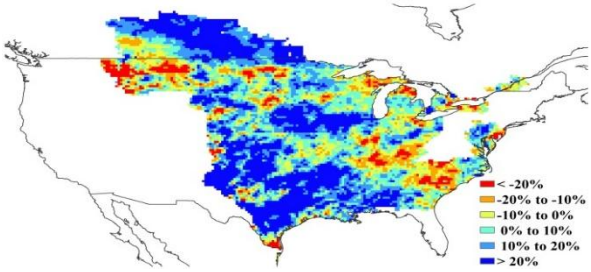
d. Profiles of temperature departure from average



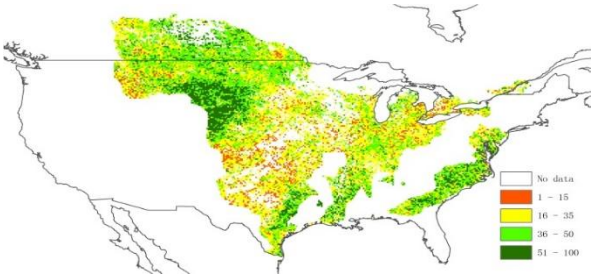
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential (gDM/m^2)



h. VHI minimum

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

2.3 North America

In general, crops are average in the North American MPZ. Overall, rainfall (RAIN) increased by 13%, temperature (TEMP) decreased by 0.3°C, and radiation (RADPAR) dropped 2% compared with the average of the last thirteen years (2001-2013). The most significant rainfall deficit occurred in early May and in particular affected Washington, northern Texas, Oklahoma, and Kansas, which is confirmed by low VHIn values in the MPZ (see figure 2.2). Late May witnessed above average temperature in some of the same areas (Texas), leading to increased water deficits. Fortunately, June recorded several wet episodes, starting in the south at the beginning of the month and expanding to Wisconsin, Iowa, southern Saskatchewan, and Manitoba. Rainfall was far above the recent five-year average (more than 75%) and provided plentiful water resources for crop growth; it also decreased PAR, which has no doubt limited crop photosynthesis.

Although accumulated biomass (BIOMSS) showed a positive departure of 9% and good crop performance was recorded (according to VCIx), cropped arable land fraction decreased by 0.2% (especially concentrated in the southwestern region of the MPZ) compared to the five-year average. Combined with weakened crop photosynthesis and serious water stress in the west, findings indicate that less than average crop production is to be expected.

2.4 South America

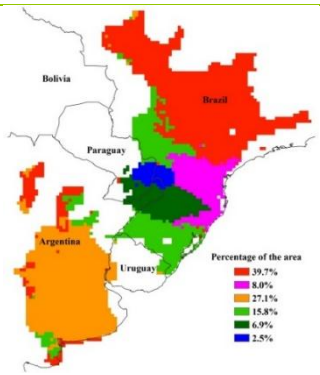
Thanks to favorable climatic conditions in the MPZ, the harvesting of maize, rice, and soybean and the planting of winter wheat has been completed over the reporting period. Figure 2.3 summarizes the CropWatch indicators for the MPZ.

Rainfall (RAIN) and temperature (TEMP) in the MPZ were generally favorable from April to July 2014, with nearly half more rainfall and one degree higher temperature compared with the thirteen-year average over the same period. Four percent below average RADPAR was observed during the last four months. Generally, the above average climatic conditions are beneficial for crop development and maturation, with the exception of some areas suffering from excess rainfall and floods, as mentioned in chapter 5.

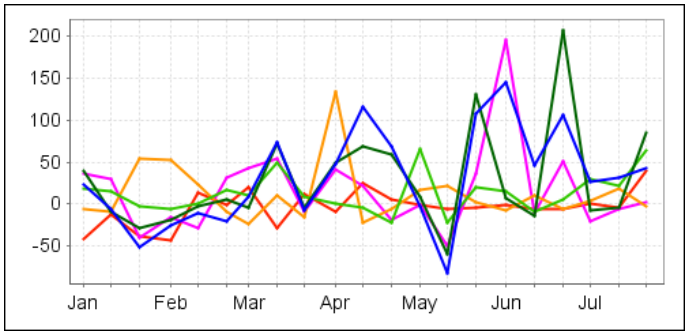
The condition of crops was above average, as confirmed by 24% above average biomass (BIOMSS) and a high VCIx value (0.86). Biomass accumulation in Sao Paulo and central Mato Grosso, however, was well below average (20% lower), while in contrast, biomass in most of other regions in the MPZ was 10% above average. The 50 mm rainfall deficit in mid-May and the continuously above average temperature from May to July in Sao Paulo was the main reason for the low biomass, which is confirmed by the low values of the VHI minimum map.

More than 97% of the arable lands were cropped in April to July 2014, 1% higher than the recent five-year average. Only central Mato Grosso Do Sul and regions close to Bahia Blanca show uncropped land from April to July. Accordingly, maximum VCI were lower as well, compared with other regions in the MPZ. Generally, crop condition in Brazil is more favorable than in Argentina, as shown in the maximum VCI map. Pixels with low minimum VHI (below 15) are found sporadically in Argentina, mostly in the central Pampas.

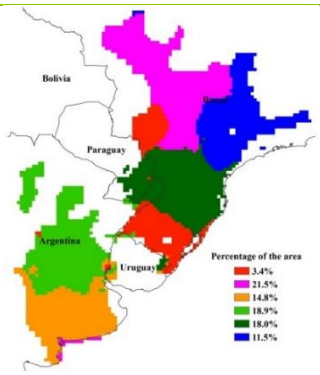
Figure 2.3. South America MPZ: Agroclimatic and agronomic indicators, April-July 2014



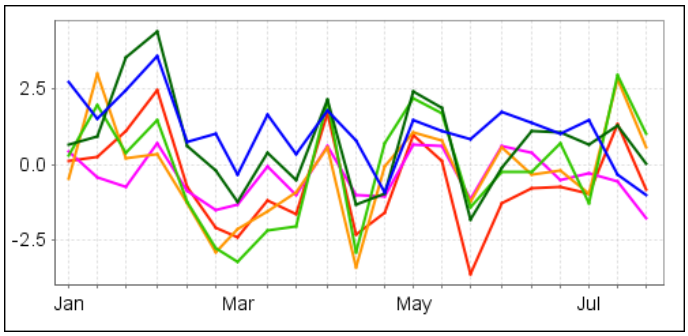
a. Spatial distribution of rainfall profiles



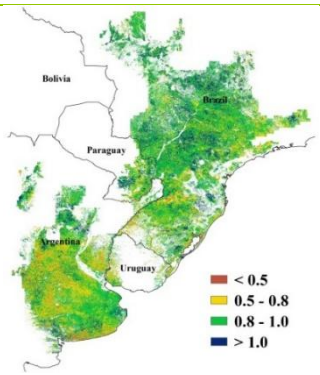
b. Profiles of rainfall departure from average



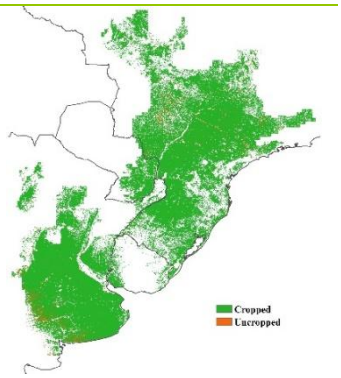
c. Spatial distribution of temperature profiles (% difference)



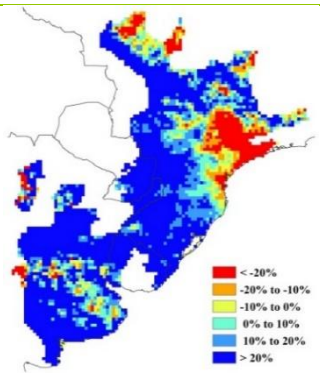
d. Profiles of temperature departure from average



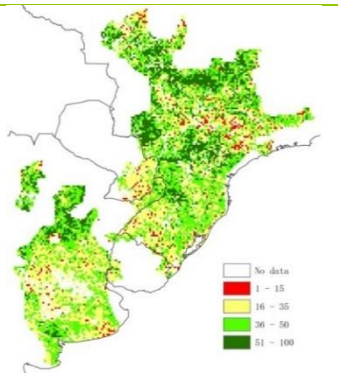
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential (gDM/m^2)



h. VHI minimum

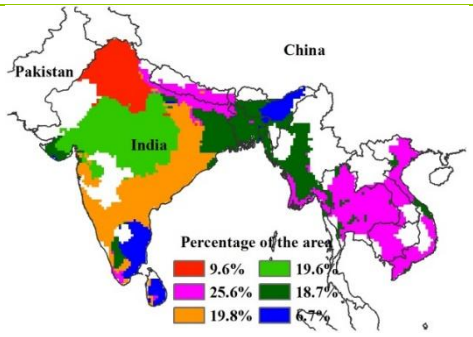
Note: For more information about the indicators, see Annex C.

2.5 South and Southeast Asia

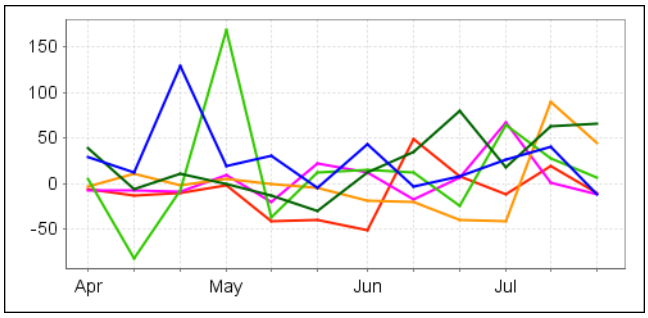
Agroclimatic and agricultural indicators during April to July indicate slight increases of RAIN (+8%), TEMP (1.2°C), and RADPAR (4%), compared with the thirteen-year average (figure 2.4). Rainfall in all countries was comparable to the average, except a period of low RAIN in April followed by high values in May in Gujarat, Rajasthan, and Madhya Pradesh. Droughts, possibly associated with El Niño (see section 5.3), occurred in April to June, especially in the dry zone of Myanmar and the north and central areas of Thailand, as well as in Punjab, Uttar Pradesh, Rajasthan, and Madhya Pradesh. The biomass accumulation potential shows favorable conditions along the Mekong River, the Red River delta of Vietnam, and in Punjab province in India, which are all major rice plantation areas.

The VCIx map indicates good crop condition (+0.73), particularly in Sisaket, Surin, Burirum, Roiet, and Yasothon provinces of Thailand. In contrast, VCIx values are low in Madhya Pradesh, Gujarat, Rajasthan, and Andhra Pradesh in India, and in the dry zone of Myanmar. The increase over the recent five-year average of the fraction of cropped arable land in the MPZ is the world's highest increase (+5.5%). The uncropped areas are located mostly in Andhra Pradesh, Karnataka, Gujarat, and Haryana in India, as well as in the dry zone of Myanmar, related to low VCIx and VHIn values.

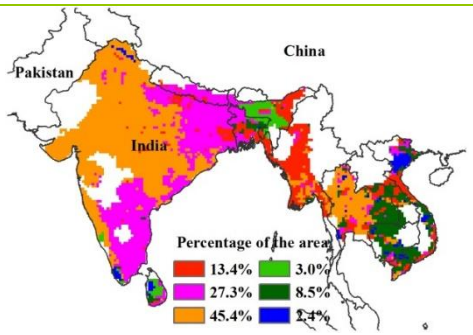
Figure 2.4. South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, April-July 2014



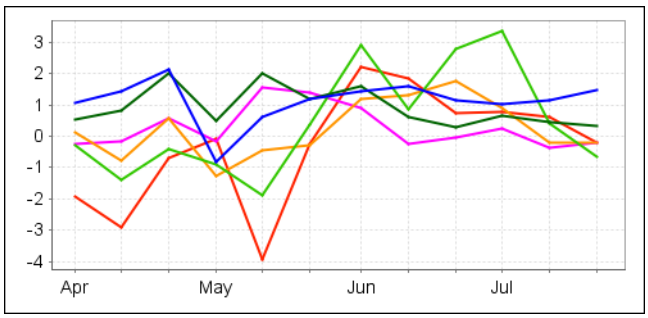
a. Spatial distribution of rainfall profiles



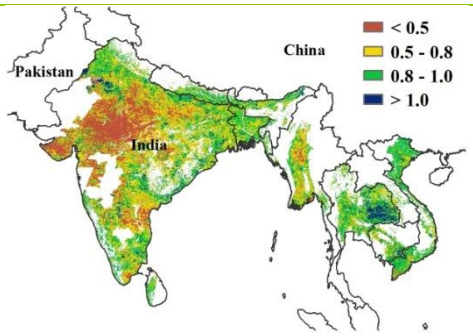
b. Profiles of rainfall departure from average



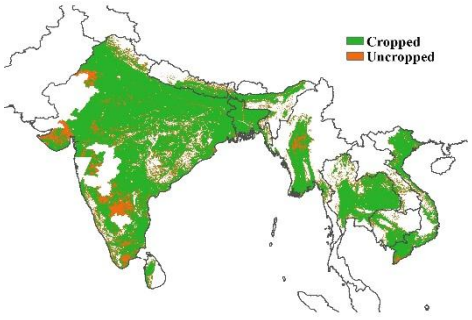
c. Spatial distribution of temperature profiles



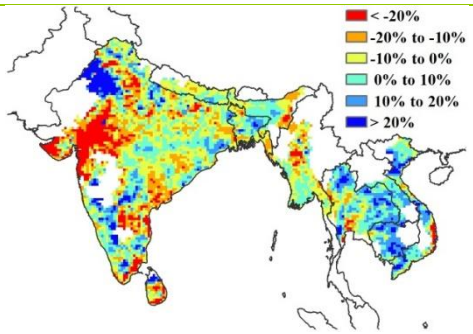
d. Profiles of temperature departure from average



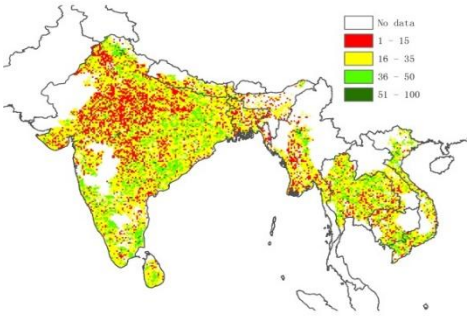
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential (gDM/m^2)



h. VHI minimum

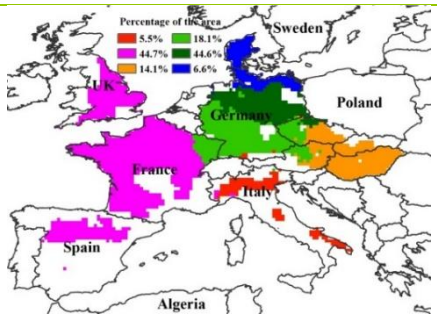
Note: For more information about the indicators, see Annex C.

2.6 Western Europe

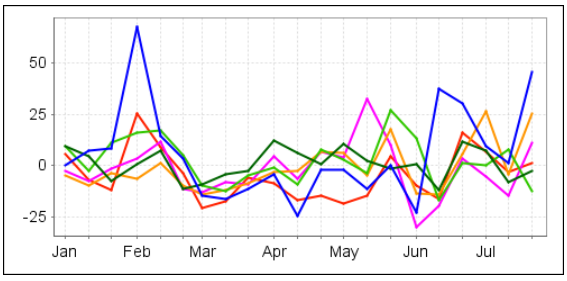
Overall, the total April to July precipitation (RAIN) in Western Europe was 6% below the recent thirteen-year average, with exceptional positive departures over Germany and Denmark (figure 2.5). Temperature (TEMP) shows a decrease of 0.3°C. The spatial distributions of TEMP show a positive departure in north and east Italy, northern France, and southeastern United Kingdom, especially in late May, early June, and early July. RADPAR displays a decrease of 0.5%. As a result of poor environmental conditions, biomass (BIOMSS) is below the five-year average in southern Germany, northeastern and western France, and Spain. In general, BIOMSS for the MPZ shows a decrease of 2% compared to the five-year average.

The average VCIx value for the MPZ is 0.86; low values are seen for the south and east of Spain (in Aragon, Castilla y Léon, and Extremadura and Castilla-La Mancha), south-west France (Poitou-Charentes and Midi-Pyrénées), south-east Germany (Bayern and Baden-Württemberg), Northeastern Austria (Niederōsterreich) and eastern Hungary (Békés and Csongrád). The spatial distributions of VHIn show the lowest value in southern Germany, northeastern France, northern Italy, and southern Spain, due to low precipitation, but to varying extents. The fraction of cropped arable land reached 99.8% over the monitoring period.

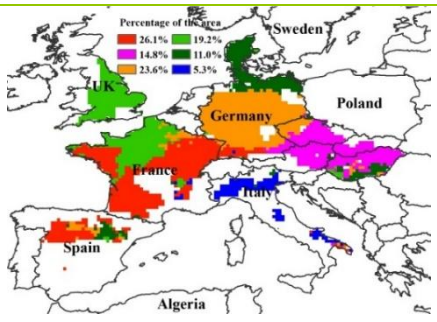
Figure 2.5. Western Europe MPZ: Agroclimatic and agronomic indicators, April-July 2014



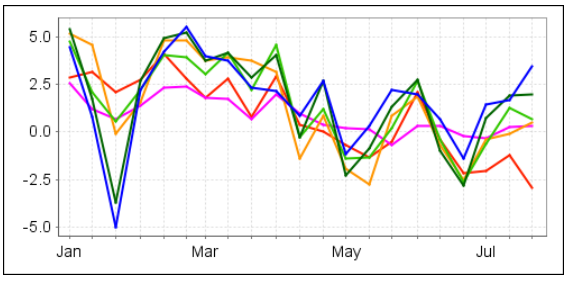
a. Spatial distribution of rainfall profiles



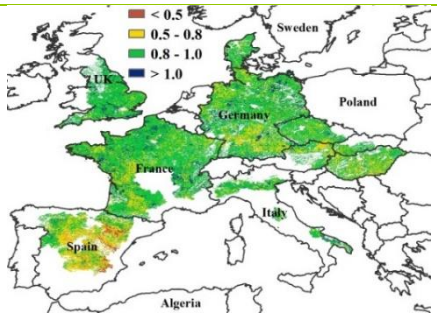
b. Profiles of rainfall departure from average



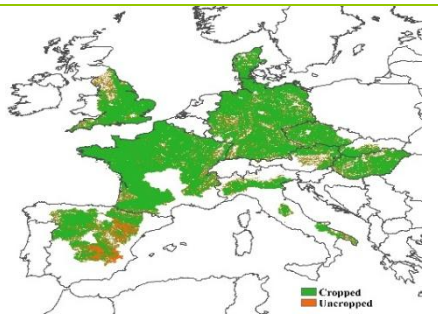
c. Spatial distribution of temperature profiles



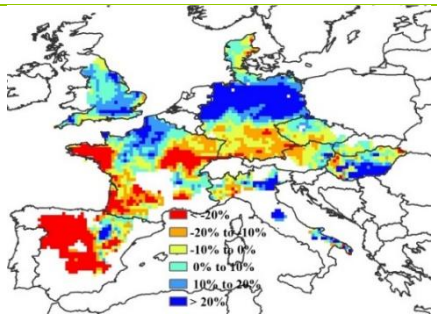
d. Profiles of temperature departure from average



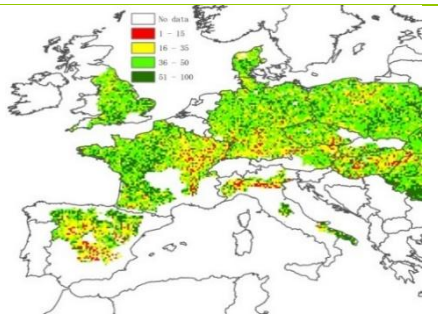
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential (gDM/m^2)



h. VHI minimum

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

2.7 Central Europe to Western Russia

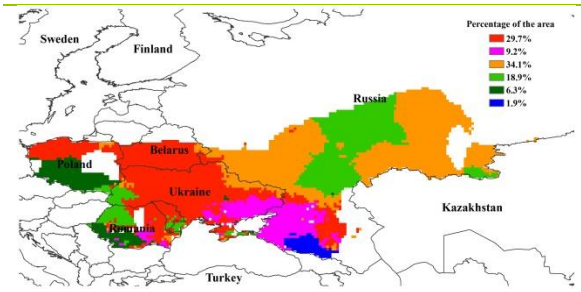
Most parts of the Central Europe to Western Russia MPZ present favorable conditions of winter and summer crop (average VCIx=0.87) over the monitoring period. On average, drier than usual weather has been experienced for the whole MPZ, with decreased rainfall (RAIN, -9%) and increased temperature (TEMP, +0.2°C). Radiation (RADPAR) increased 3% over the recent thirteen-year average.

The potential biomass is slightly lower than the five-year average (-2%). Due to the wet condition in April and May in most parts of Ukraine, Poland, and Russia's southwest, the accumulated potential biomass (BIOMSS) is above the five-year average (>20%).

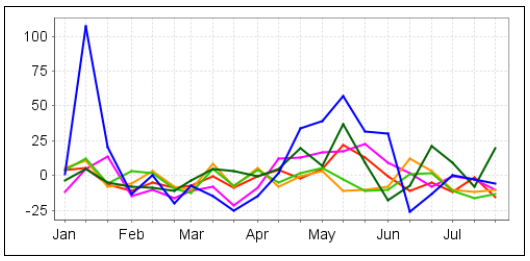
Rainfall and temperature profiles show correlated variations in Romania, Poland, Ukraine, Belarus, and western Russia. During this monitoring period, for most parts of the MPZ, temperature was much higher than usual in May and lower in June. In July, temperature returned to average, except for cold weather in the northeast of the MPZ. In most of the parts of Russia that are included in this MPZ (except Volgograd, Krasnodar, and Rostov-on-Don), rainfall was close to average if the whole reporting period is considered. Rainfall was higher than the last thirteen-year average from April to early June in most areas (+10%), and significantly so (+50%) in the Chechen and Dagestan Republics.

Most arable land was actually cropped during this period (96.5%). Otherwise, as the VHI minimum shows, in most parts of Russia the cold and dry weather (VHI below 35) led to a significant drop in BIOMSS.

Figure 2.6. Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, April-July 2014

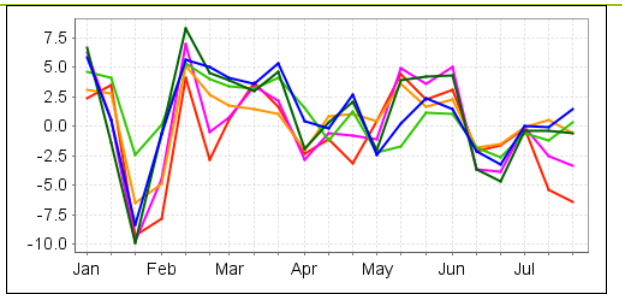


a. Spatial distribution of rainfall profiles

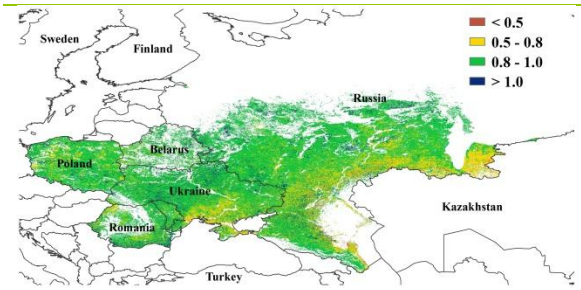


b. Profiles of rainfall departure from average

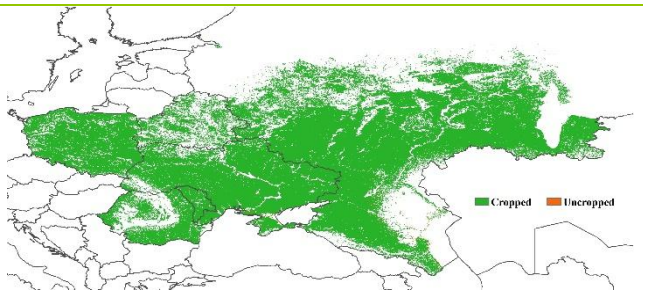
c. Spatial distribution of temperature profiles



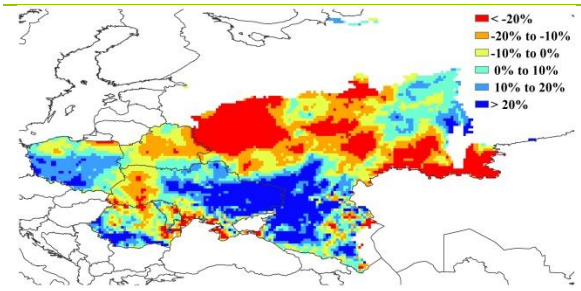
d. Profiles of temperature departure from average



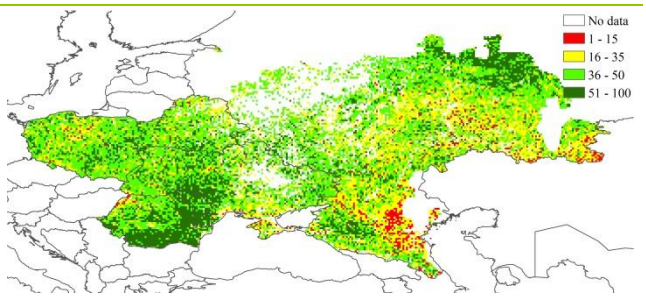
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential (gDM/m^2)



h. VHI minimum

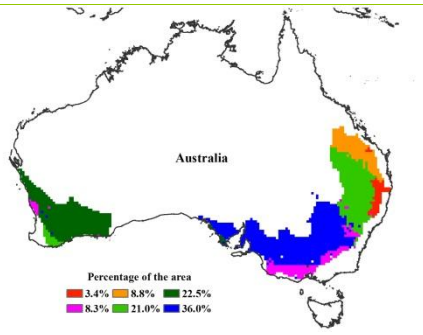
Note: For more information about the indicators, see Annex C.

2.8 Southern Australia

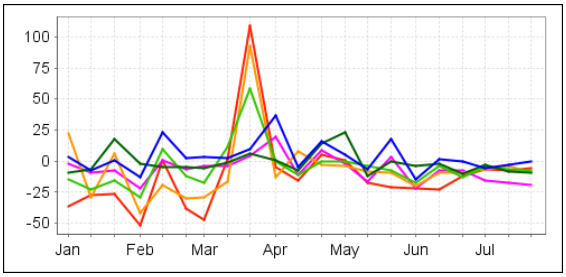
On the whole, when integrating the findings of the various CropWatch agroclimatic and agronomic indicators (see figure 2.7), crops in Southern Australia showed favorable condition between April and July. Most arable land was cropped (reaching 95.7% of the total), except for areas in eastern and south-western New South Wales. The maximum VCI of 0.89 indicates a normal to favorable crop growing situation for most region of the MPZ, except for some local areas in the central part of New South Wales. The biomass accumulation potential shows a similar pattern to that for maximum VCI. The low VHI minimum occurs in south-eastern Queensland and Eastern New South Wales, where precipitation was low based on the rainfall profiles.

The temperature profiles show a positive departure over 2.5°C in south-eastern Queensland, eastern New South Wales, southern Victoria and south-eastern South Australia in May, which, combined with below average rainfall, may have interfered negatively with crop development.

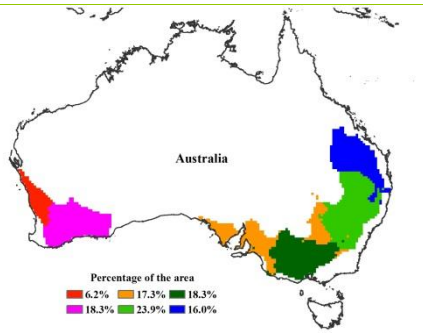
Figure 2.7. Southern Australia MPZ: Agroclimatic and agronomic indicators, April-July 2014



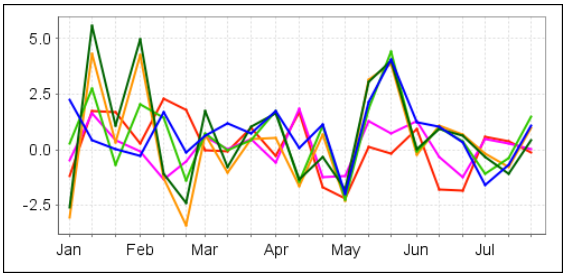
a. Spatial distribution of rainfall profiles



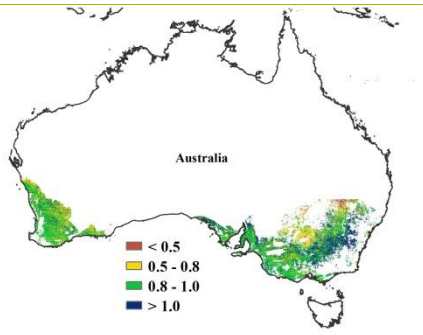
b. Profiles of rainfall departure from average



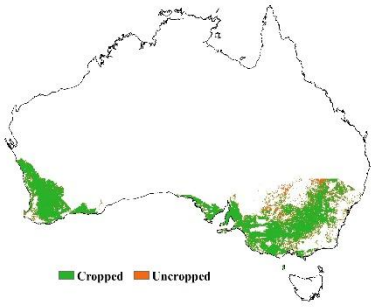
c. Spatial distribution of temperature profiles



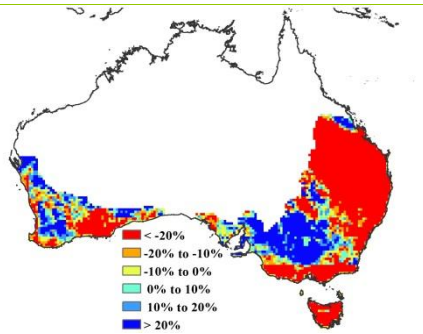
d. Profiles of temperature departure from average



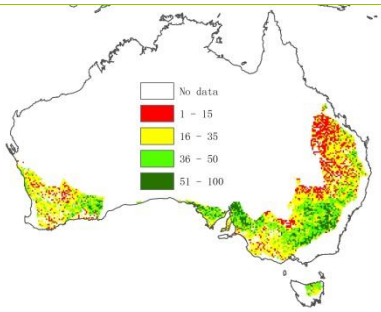
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential (gDM/m^2)



h. VHI minimum

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