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 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 thirteen- and five-year averages.

Table 2.1. October 2014 to January 2015 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	225	6	27.2	0.5	1150	-1
South America	734	4	25.0	1.5	1344	3
North America	347	22	4.7	-0.4	534	-4
South and Southeast Asia	205	1	22.4	0.6	958	-1
Western Europe	264	-4	8.4	2.6	298	-7
Central Europe and Western Russia	199	0	-0.4	-0.2	237	-1
Southern Australia	237	5	19.6	-0.4	1494	0

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 (October-January) for 2001-13.

Table 2.2. October 2014 to January 2015 agronomic indicators by Major Production Zone, current season values and departure from 5YA

	BIOMSS		Cropped arable land fraction		Maximum VCI
	Current (gDM/m^2)	Departure from 5YA (%)	Current (% of pixels)	Departure from 5YA (%)	Current
West Africa	638	-4	90	1	0.85
South America	1855	4	82	-1	0.86
North America	823	17	82	4	0.82
South and Southeast Asia	543	9	87	-1	0.85
Western Europe	936	1	93	3	0.90
Central Europe & Western Russia	638	-4	79	5	0.63
Southern Australia	824	2	71	5	0.62

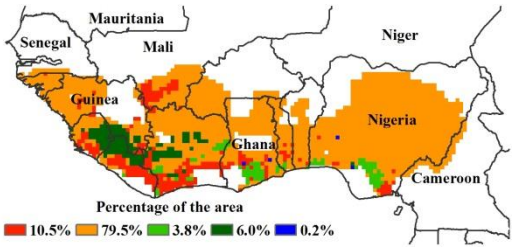
Note: Departures are expressed in relative terms (percentage) for all variables. Zero means no change from the average value; Relative departures are calculated as (C-R)/R*100, with C=current value and R=reference value, which is the five-year (5YA) average for the same period (October-January) for 2009-13.

2.2 West Africa

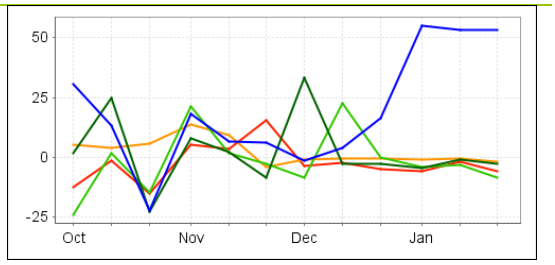
Over the reporting period, cereals and tubers were harvested throughout the West Africa MPZ, with small spatial differences in harvest times conditioned by latitude and elevation (such as in the case of Guinea). The MPZ as a whole underwent close to average conditions (see figure 2.1), with rainfall exceeding average by 6% and a drop in radiation of 1%, resulting in an overall drop in biomass potential of 6%. Few countries experienced extreme conditions: the largest rainfall deficit occurred in Côte d'Ivoire (-17%, leading to a BIOMSS drop of 18%), while Sierra Leone and Guinea both recorded rainfall excesses just above 20%, which were associated with drops in sunshine between 3 and 4%.

Not only were total rainfall amounts close to average, but their distribution over time was according to expectation too in about 80% of the region, with some local exceptions in October. At the beginning of the month, about 15% of the MPZ (in the very south of all countries and especially in Ghana and Nigeria) experienced a rainfall shortfall between 10 and 25%. At the end of October, the same areas experienced a weaker deficit of about 10%. The area including northeast Sierra Leone, northern Liberia, southeast Guinea, and parts of central Côte d'Ivoire did experience the late October deficit, but also benefited from abundant rain during mid-October and at the beginning of December. This is also the area where the highest VCIx values were recorded.

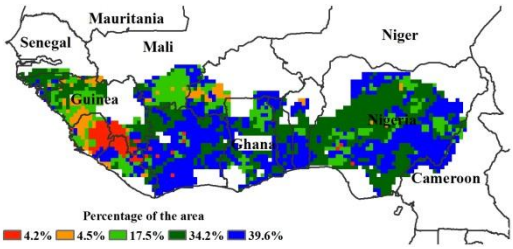
Figure 2.1. West Africa MPZ: Agroclimatic and agronomic indicators, October 2014-January 2015



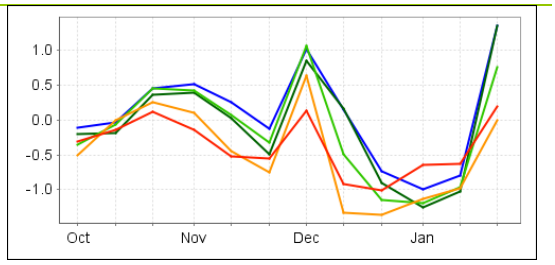
a. Spatial distribution of rainfall profiles



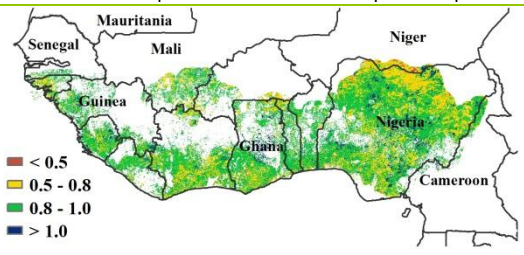
b. Profiles of rainfall departure from average



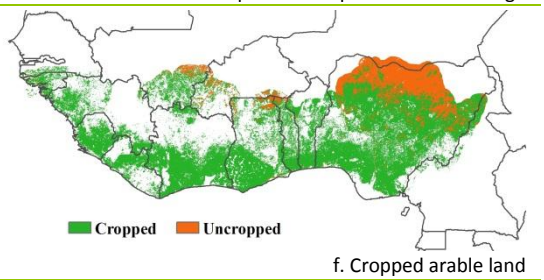
c. Spatial distribution of temperature profiles



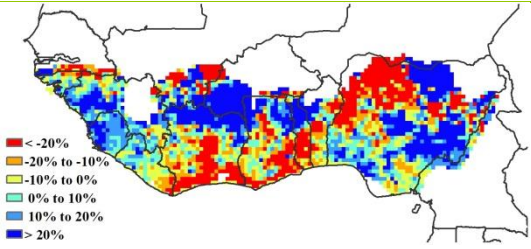
d. Profiles of temperature departure from average



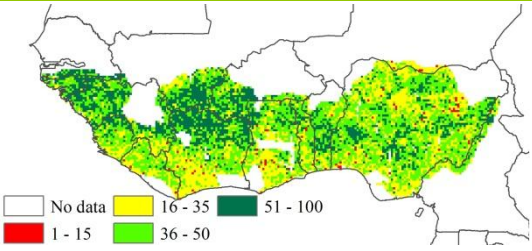
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential



h. VHI minimum

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

Other than this area with high VCIx values, no clear VCIx pattern existed; the current regional average of 0.85 points at rather satisfactory conditions except in the northernmost areas where planting is still several dekads off. Those areas are identified in the Cropped/uncropped land map.

Temperature followed a consistent pattern of slightly above average values from October to early December followed by a weak negative departure between mid-December and mid-January. The decrease in regional biomass production potential over the average of the last five years (-6%) can be ascribed to this relative cold spell. Spatially, it affects about 50% of the MPZ with drops in BIOMSS exceeding 10% in the southern halves of Côte d'Ivoire, Ghana, Togo, and Benin, as well as the northwestern quadrant of Nigeria. However, because the crops were all in their late phenological stages, the effect on yield was low.

Aside from environmental conditions, the region has suffered from a combination of ongoing and new emergencies, starting with the Ebola Virus Disease (EBV) outbreak from May in Sierra Leone, Guinea and Liberia. The EBV emergency affected agriculture in several ways, as it interfered with farm operations, the availability and use of inputs, as well as movement of people and goods across borders. In general, rainfed cereals have been more seriously affected than roots, tubers (cassava and yams), and rice, which predominate in the south and west and are harvested later than cereals. EBV also affected the return of refugees to Côte d'Ivoire after the situations normalized in the country. In Nigeria, Boko Haram have created an insecure situation in the northeast (especially in the states of Borno, Adamawa, and Yobe), with a resulting drop in farm output.

FAO and the World Food Program have recently assessed the situation and put the production drop as a result of EBV at 1% to 5% (affecting cassava and cereals (including rice) in the three affected countries) and 12% (rice in Liberia).

Altogether, the indicators assessed by CropWatch, especially VCIx, concur to qualifying the season in the MPZ as fair to good, due to the absence of extreme conditions.

2.3 North America

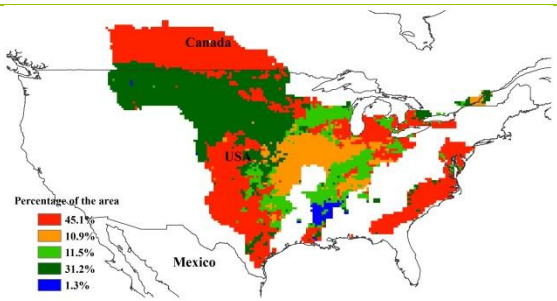
In general, crop condition is above average in the North America MPZ (figure 2.2). The summer crops (maize, soybean, and spring wheat) were completely harvested; winter crops were planted and stayed in over-wintering stages.

The agroclimatic indicators show that rainfall was 22% above average while temperature was slightly below. Abundant rainfall recharged soil water reserves for winter crop planting and the coming growth, especially in Kansas (RAIN, +62%), Oklahoma (+49%), northern Texas (+20%), and Arkansas (+42%). The maximum VCI (VCIx) and BIOMSS also indicate a good performance of crops.

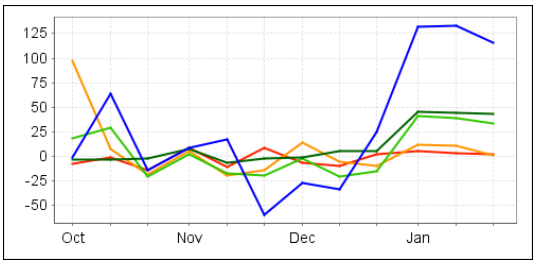
Other regions that also received abundant rainfall include Alberta (+29%), Idaho (+49%), Iowa (+45%), Minnesota (+33%), Missouri (+53%), Montana (+152%), Nebraska (+71%), North Dakota (+95%) and South Dakota (+139%). This will benefit summer crops (spring wheat, maize, and soybeans) in 2015. The development of rainfall and especially temperature profiles showed significant variations in this monitoring period. Generally from early January on forward, both temperature and rainfall increased to values above average; in some areas, temperature exceeded averages by 5°C or more.

The accumulated biomass (BIOMSS) showed a positive departure of 17%, and good crop performance was recorded (according to VCIx). The fraction of cropped arable land increased by 4%. Most indicators for this MPZ concur to forecast above average crop condition.

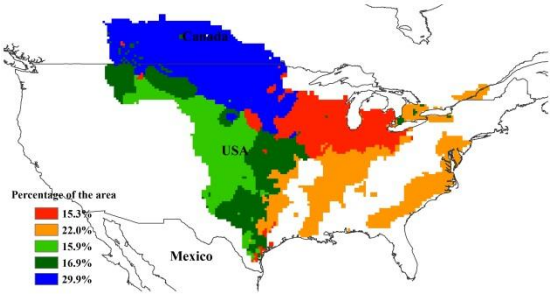
Figure 2.2. North America MPZ: Agroclimatic and agronomic indicators, October 2014-January 2015



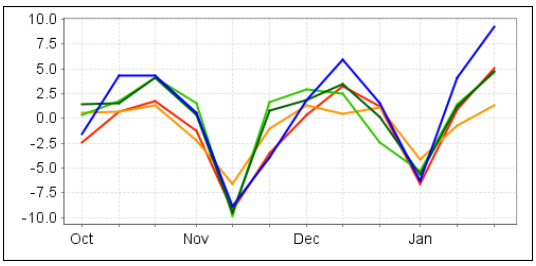
a. Spatial distribution of rainfall profiles



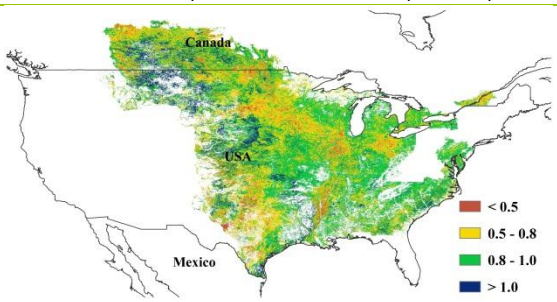
b. Profiles of rainfall departure from average



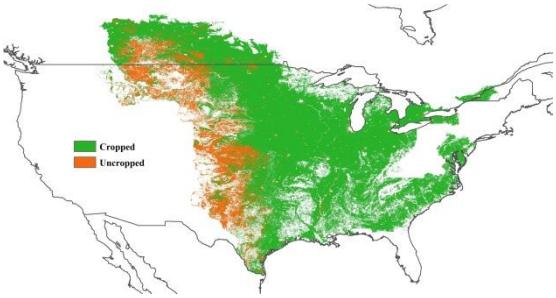
c. Spatial distribution of temperature profiles



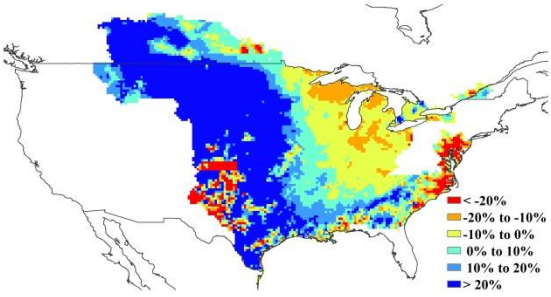
d. Profiles of temperature departure from average



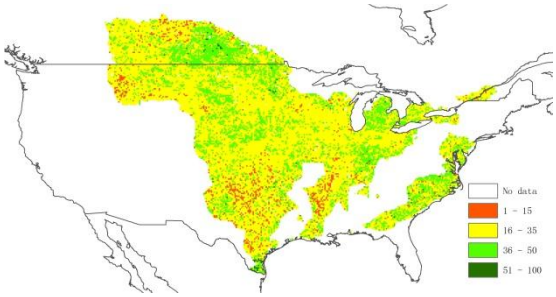
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential



h. VHI minimum

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

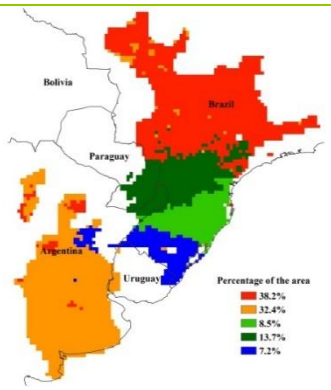
2.4 South America

Generally, favorable climatic conditions predominate over South America this reporting period, with above average crop growth condition. Slightly above average rainfall and air temperature promoted the progress of summer crops. Figure 2.3 presents an overview.

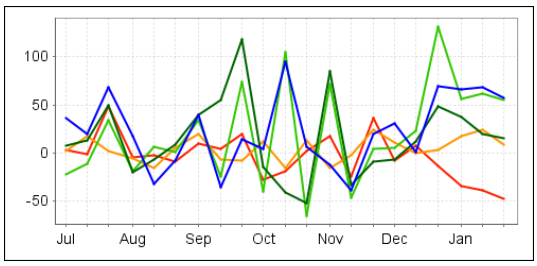
Environmental conditions were generally favorable, with rainfall 4% above average and temperature up 1.5°C. Rainfall, however, varied a lot from place to place. Argentina experienced average rainfall conditions; southern Brazil, including Rio Grande do Sul and Santa Catarina, suffered from excessive rainfall, while northern parts of the MPZ (Parana, Mato Grosso do Sul, and Sao Paulo) had a shortage of precipitation. High temperature from October to January together with average rainfall induced a water deficit in the central Pampas, which is confirmed by the low VHI (below 0.35) and below average BIOMSS. The excessive rainfall offset the impacts of consistently high temperature in Rio Grande do Sul where 20% or more above average biomass estimates and high VCIx can be observed. Spatially, VCIx in Brazil is well

correlated with VHIn, indicating that water deficit was indeed the key limiting factor for crop development. In contrast, VCIx is not consistent with VHIn in Argentina, which means that water deficit is insignificant. Over the monitoring period, 82% of arable lands were cropped, which is 1% below average. Most uncropped arable land was scattered in the central Pampas.

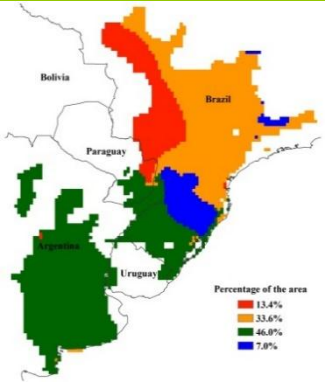
Figure 2.3. South America MPZ: Agroclimatic and agronomic indicators, October 2014-January 2015



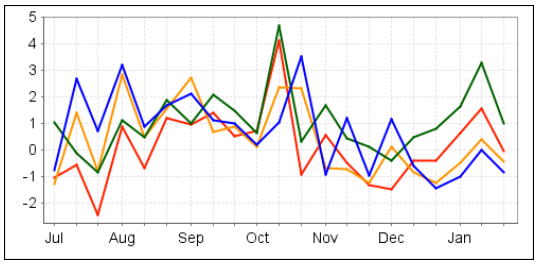
a. Spatial distribution of rainfall profiles



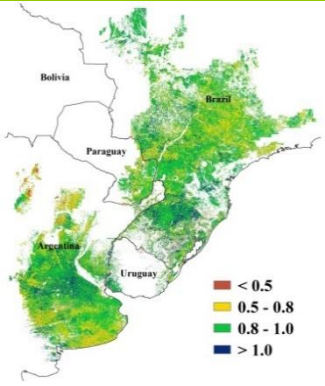
b. Profiles of rainfall departure from average



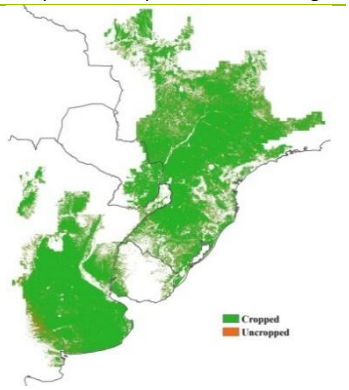
c. Spatial distribution of temperature profiles



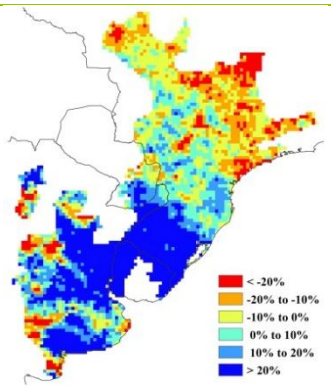
d. Profiles of temperature departure from average



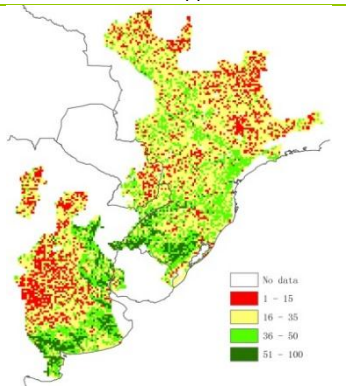
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential



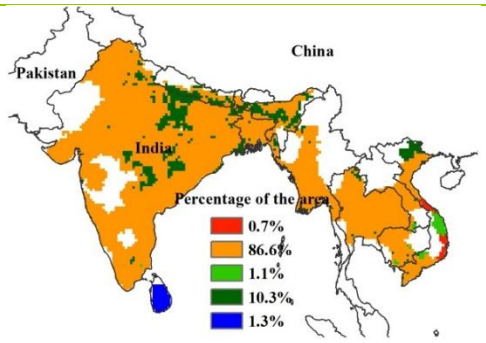
h. VHI minimum

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

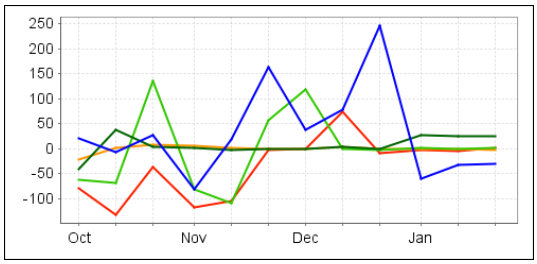
2.5 South and Southeast Asia

The reporting period was the season for the growing and harvesting of rice and cereal crops in this MPZ. The zone experienced a 1% increase in rainfall compared to average, although a rainfall deficit was recorded for Bangladesh (-43%) and Vietnam (-18%), leading to low biomass accumulation in Vietnam (-15%) compared with the previous five years. The TEMP (+0.6°C) and RADPAR (-1%) indicators were close to average. The cropped arable land fraction underwent a slight decrease (-1%), also compared to the average, although biomass accumulation was at +9% over the region. Figure 2.4 summarizes CropWatch findings.

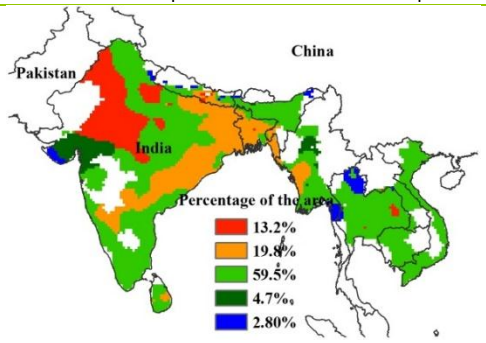
Figure 2.4. South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, October 2014-January 2015



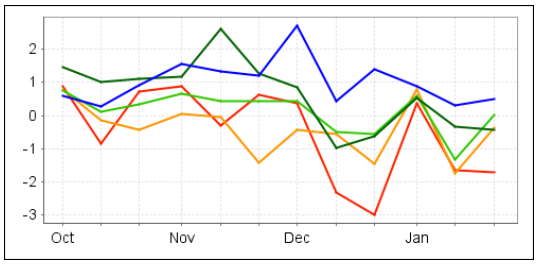
a. Spatial distribution of rainfall profiles



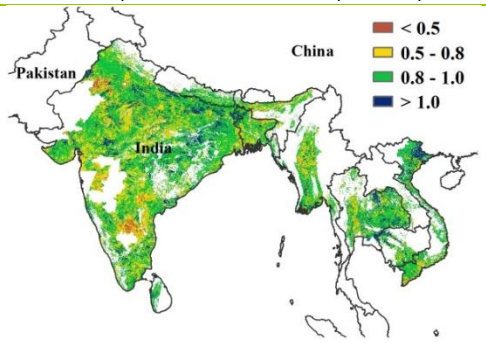
b. Profiles of rainfall departure from average



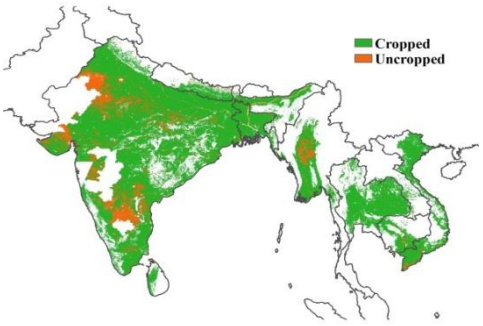
c. Spatial distribution of temperature profiles



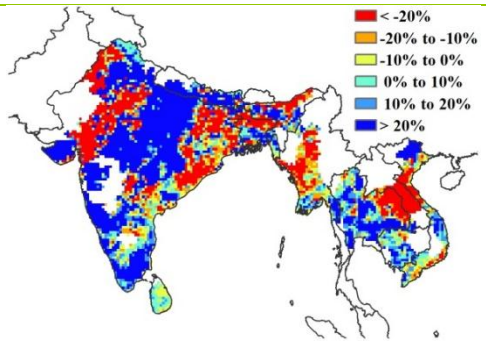
d. Profiles of temperature departure from average



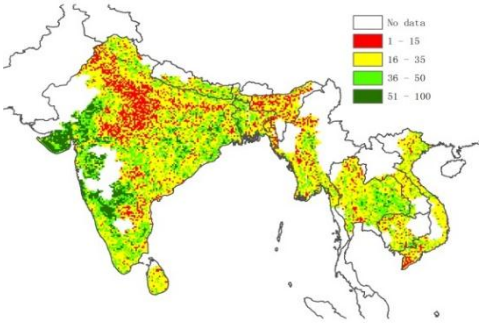
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential



h. VHI minimum

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

The rainfall amount was close to average over 86% of the area, although a drop was noticed in areas of northern India and eastern Vietnam during November and December. Temperature followed an average pattern from October to early December, with a slight drop during mid-December. In eastern India and Gujarat, negative departures of temperature were recorded.

The current maximum VCI was 0.85 while the VCI ranges between 0.5 and 0.8, indicating favorable crop condition over the region. Most parts of the region had cropped land and a positive biomass accumulation potential compared with recent years. Overall, CropWatch indicators forecast good crop condition without any concerns of major extreme conditions.

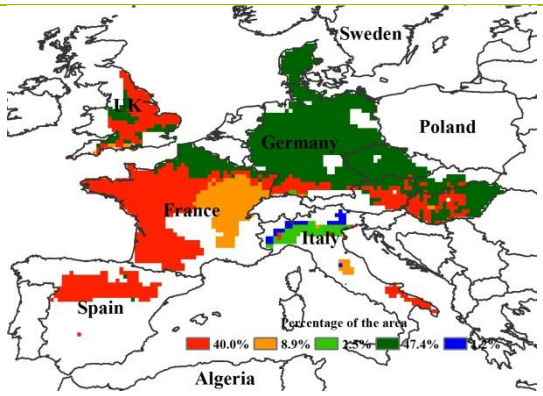
2.6 Western Europe

Overall, agroclimatic and agricultural indicators for October 2014 to January 2015 indicate most parts of Western Europe presented favorable condition of winter crop and a large average VCIx value (0.9). Figure 2.5 presents an overview of CropWatch agroclimatic and agronomic indicators.

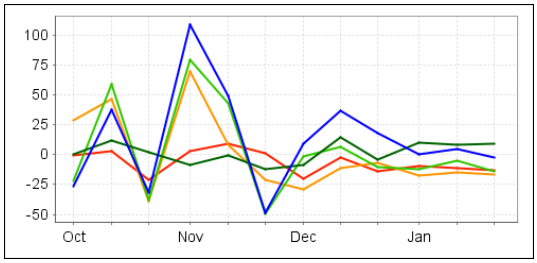
Temperature was generally favorable (2.6°C above average), while below average rainfall (-4%) and radiation (-7%) were observed. The condition of crops was about average according to the BIOMSS indicator. Biomass accumulation potential, however, was well below the recent five year average (-20% and below) in central and western France, northwestern and southern Spain, southeastern Italy, and Hungary. In contrast, BIOMSS in most other regions was 10% above average. The rainfall deficit in late October and the continuously below average temperature from December to January are the main reasons behind the low BIOMSS indicator.

More than 93% of the arable lands were cropped, which is 3% above the recent five-year average. Most uncropped arable land is concentrated in Spain. Accordingly, maximum VCI was lower as well, compared with other regions in the MPZ. Generally, crop condition in Western Europe was above average relative to both the thirteen-year and the five-year averages. Areas with low minimum VHI are found mainly in central Spain and the United Kingdom.

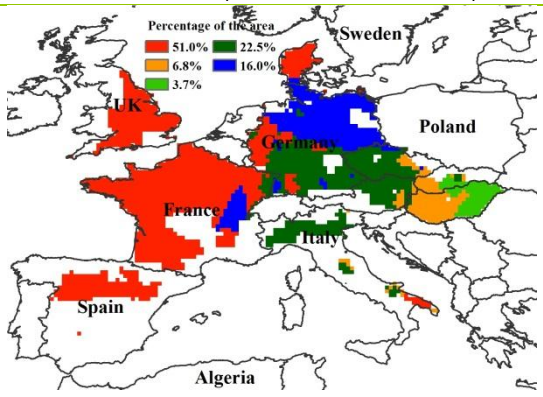
Figure 2.5. Western Europe MPZ: Agroclimatic and agronomic indicators, October 2014-January 2015



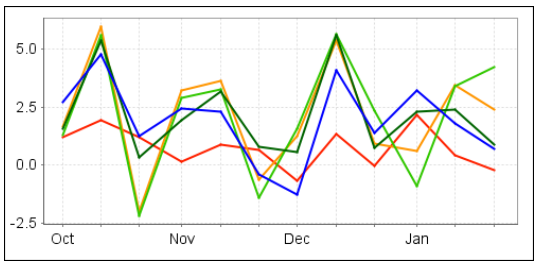
a. Spatial distribution of rainfall profiles



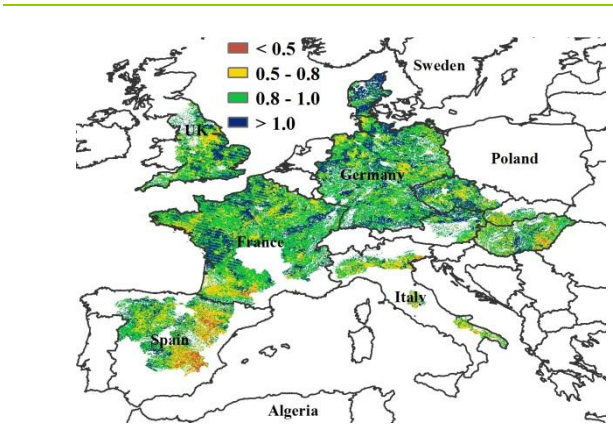
b. Profiles of rainfall departure from average



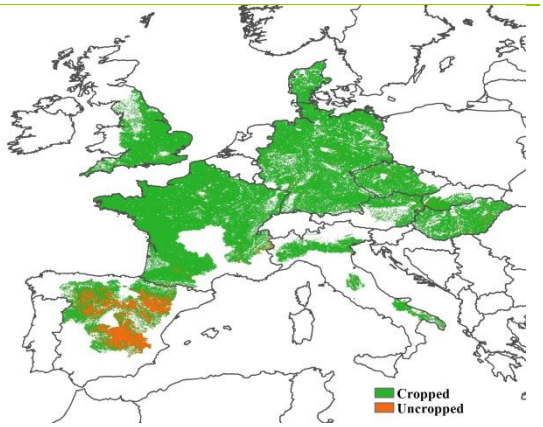
c. Spatial distribution of temperature profiles



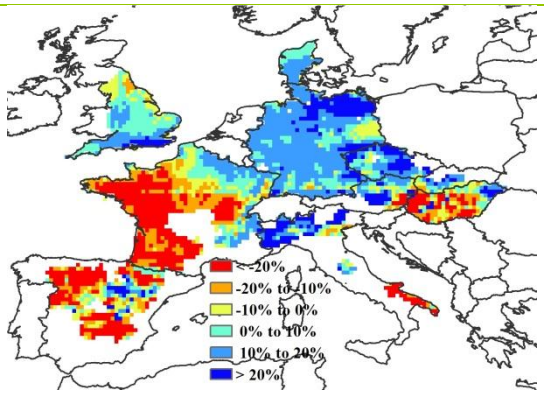
d. Profiles of temperature departure from average



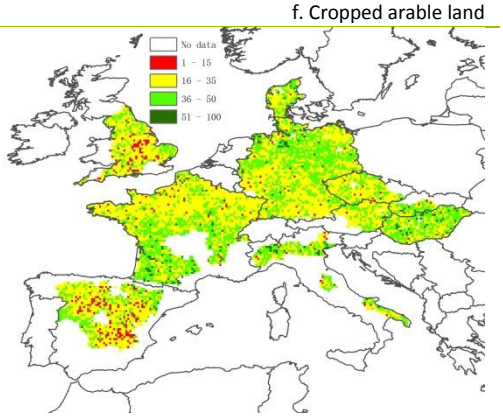
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential



h. VHI minimum

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

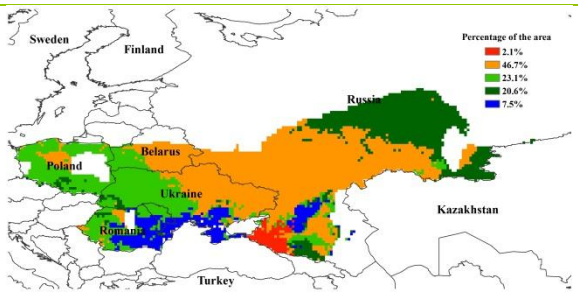
2.7 Central Europe to Western Russia

The reporting period covers the harvest of summer crops and the early vegetative stages of winter crops for the MPZ. The region experienced slightly below normal thermal conditions; rainfall and radiation were approximately average as well. Temperature profiles show similar variations in Romania, Poland, Ukraine, and Belarus. Between October and December, almost all areas of central Europe to western Russia suffered a significant rainfall deficit, especially in Krasnodarskiy Kray in the south of western Russia, where rainfall was more than 25mm below average in mid-December. The negative impact is confirmed by low VHIn values in the MPZ. From the end of December to January, rainfall recovered to above average: abundant rainfall was recorded in the southern part of Romania, Ukraine, and western Russia. In the second and third dekad of January, above average temperature prevailed over central Europe, which benefited the development of hardened winter crops. However, as a result of decreased precipitation and low temperature from October to December, BIOMSS is down 4% compared to its five-year average. The biomass accumulation potential deteriorates from west to east, with about a 20% decrease in the eastern Ukraine and southeastern Belarus.

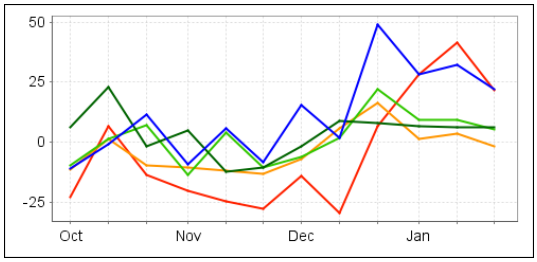
Overall, 79% of the arable lands were cropped in October to January in 2015, which is 5% above the recent five-year average. Most uncropped arable land was scattered in the south of western Russia (including the Oblasts of Volgogradskaya, Saratovskaya and Samarskaya).The maximum VCI (0.63) is lower compared with other regions; below average production is to be expected due to poor agrometeorological conditions for winter.

Figure 2.6 illustrates the CropWatch agroclimatic and agronomic indicators for the MPZ.

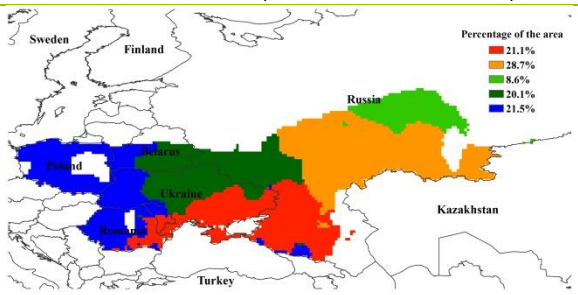
Figure 2.6. Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, October 2014-January 2015



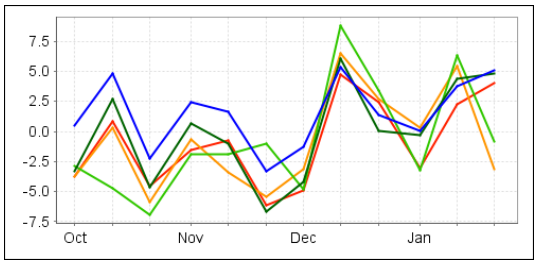
a. Spatial distribution of rainfall profiles



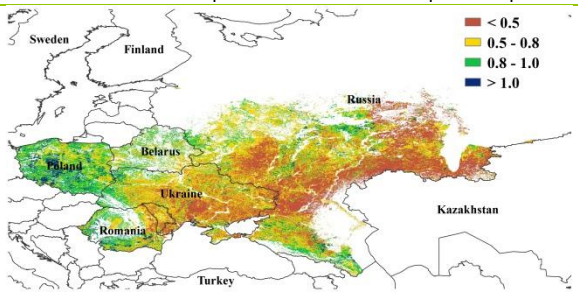
b. Profiles of rainfall departure from average



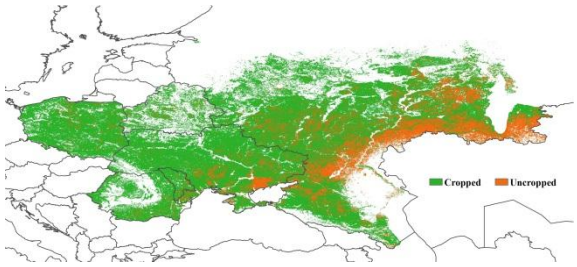
c. Spatial distribution of temperature profiles



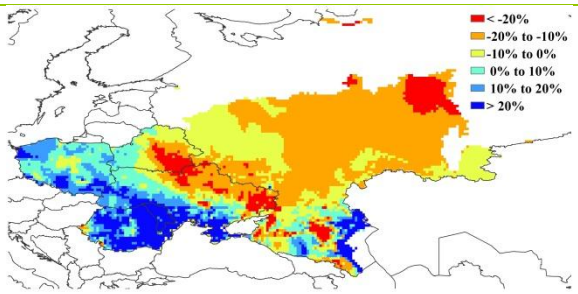
d. Profiles of temperature departure from average



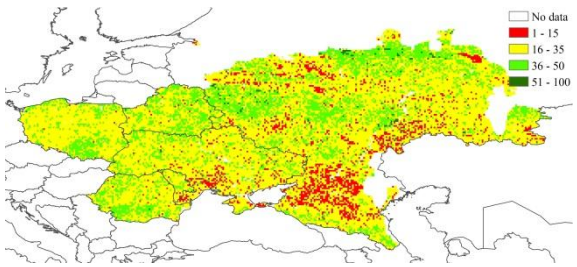
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential



h. VHI minimum

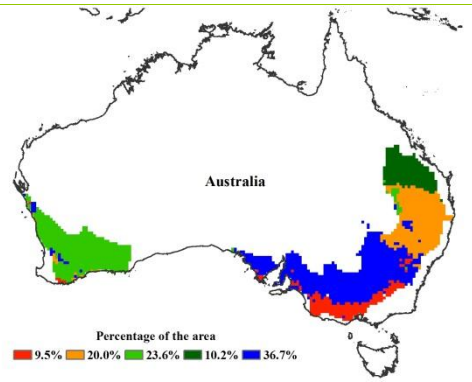
Note: For more information about the indicators, see Annex C.

2.8 Southern Australia

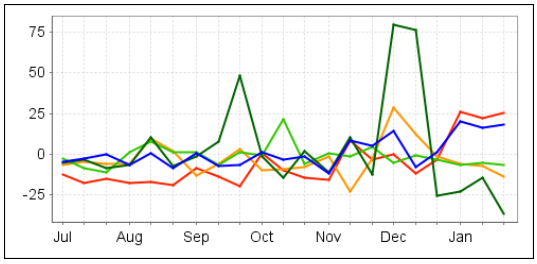
October to January is the harvest season for the main crops of wheat and barley in Southern Australia. As a result, the average agroclimatic conditions have no marked direct influences on these crops. Conditions were favorable for the early growth stages for the limited areas cultivated in maize, late potatoes, and sorghum, which are planted during this period. Rainfall was average with a total amount of 237 mm (a 5% increase compared to average). Temperature was between 16.8 and 19.8°C, a little higher than average, except for New South Wales, which showed a 1°C drop.

The maximum VCI of 0.62 indicates below average condition of wheat and barley for Australia this year, which is confirmed by the low minimum VHI, mainly in the low ranges of 1-15 and 16-35. Although area of cropped arable land has increased by 5%, CropWatch foresees a reduction in production for wheat and barley for 2014. Figure 2.7 presents an overview of the agroclimatic and agronomic indicators for Southern Australia.

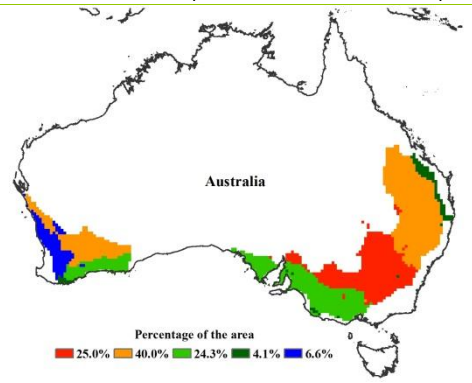
Figure 2.7. Southern Australia MPZ: Agroclimatic and agronomic indicators, October 2014-January 2015



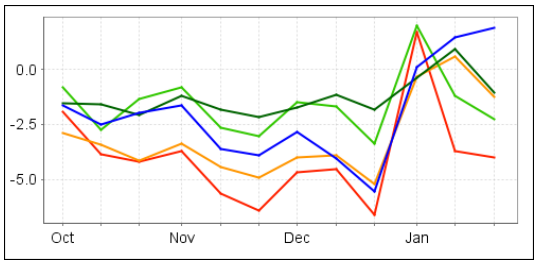
a. Spatial distribution of rainfall profiles



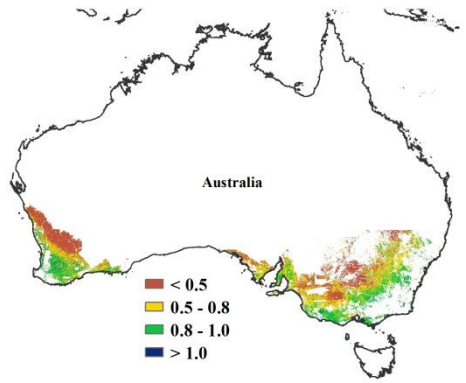
b. Profiles of rainfall departure from average



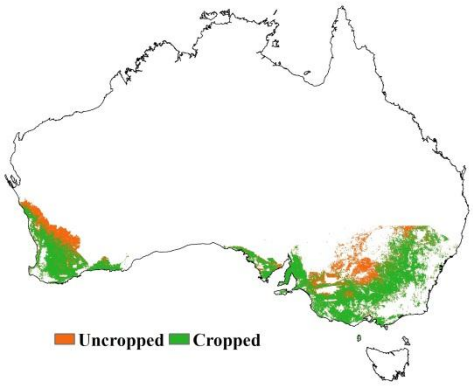
c. Spatial distribution of temperature profiles



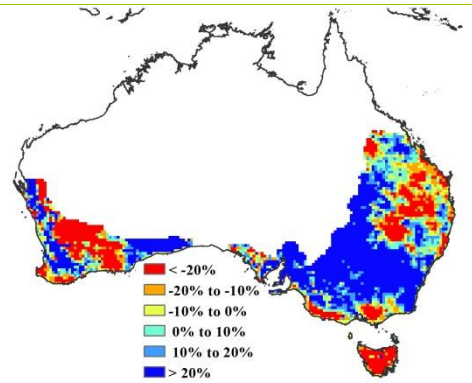
d. Profiles of temperature departure from average



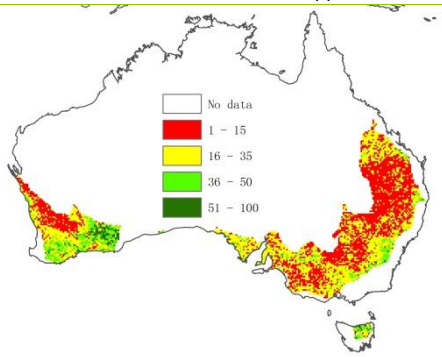
e. Maximum VCI



f. Cropped arable land



g. Biomass accumulation potential



h. VHI minimum

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