Chapter 1. Global agroclimatic patterns

Chapter 1 describes the CropWatch agroclimatic indicators (CWAIs) for rainfall (RAIN), temperature (TEMP), and radiation (RADPAR), along with the agronomic indicator for potential biomass (BIOMSS) for sixty-five global Monitoring and Reporting Units (MRU). Rainfall, temperature, and radiation indicators are compared to their average value for the same period over the last fifteen years (called the "average"), while BIOMSS is compared to the indicator's average of the recent five years. Indicator values for all MRUs are included in Annex A table A.1. For more information about the MRUs and indicators, please see Annex C and online CropWatch resources at www.cropwatch.com.cn.

1.1 Overview

The current report period was mostly characterized by dry conditions over northern South America, southern Africa, and eastern Asia. Wetter than average conditions prevailed over much of Asia, in particular central Asia (figure 1.1). The global patterns of rainfall anomalies that largely persisted over the previous two CropWatch reporting periods (that is, roughly from October 2015) have now started to fade away, although some features are still noticeable from April to June 2016; these are mentioned below.

For temperature (figure 1.2), a very consistent pattern exists of above average temperature equatorial areas (increasing further in the southern hemisphere) and areas in the northern Mediterranean. Slightly cooler than average conditions prevailed in western North America, the Sahara and its southern border, and parts of eastern Asia. Meanwhile, below average radiation very systematically affects most of North America, Eurasia, maritime Southeast Asia and Oceania, as well as the south of South America (figure 1.3). Finally, BIOMSS (figure 1.4) shows a very large area of favorable conditions stretching from the West-African Sahel to eastern Asia. Unfavorable expectations are assigned to northern South America, the Mediterranean and northern Africa, southern Africa, and the United States Corn Belt. Because the BIOMSS indicator, like all CropWatch agronomic indicators but unlike its agroclimatic indicators, uses the last 5-year period as reference, BIOMSS production potential patterns are not necessarily directly related to the spatial anomaly distribution described for RAIN, TEMP, and RADPAR.

The text below is mostly organized around rainfall patterns.

Figure 1.1. Global map of April-July 2016 rainfall anomaly (as indicated by the RAIN indicator) by MRU, departure from 15YA (percentage)

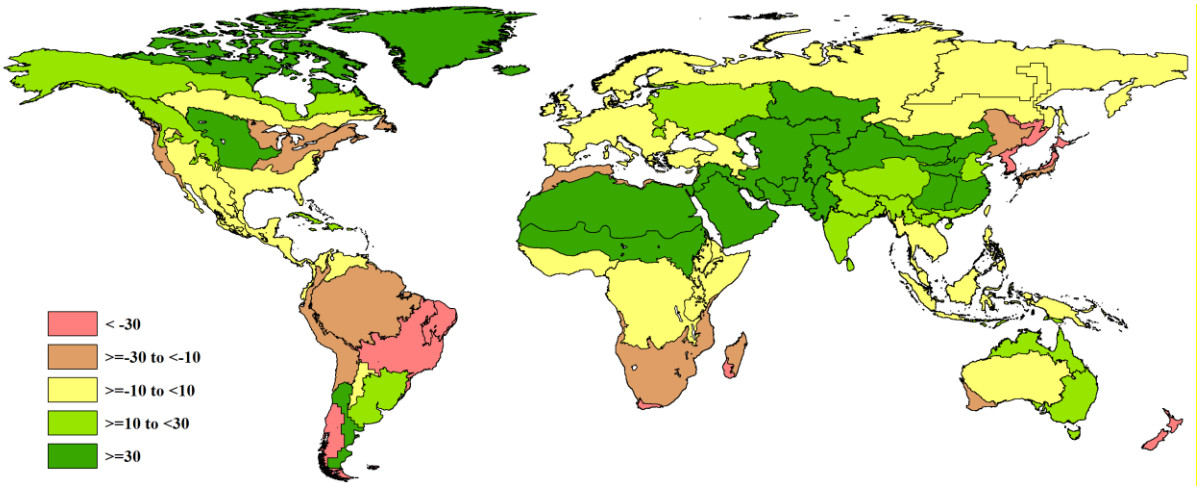


Figure 1.2. Global map of April-July 2016 temperature anomaly (as indicated by the TEMP indicator) by MRU, departure from 15YA (degrees Celsius)

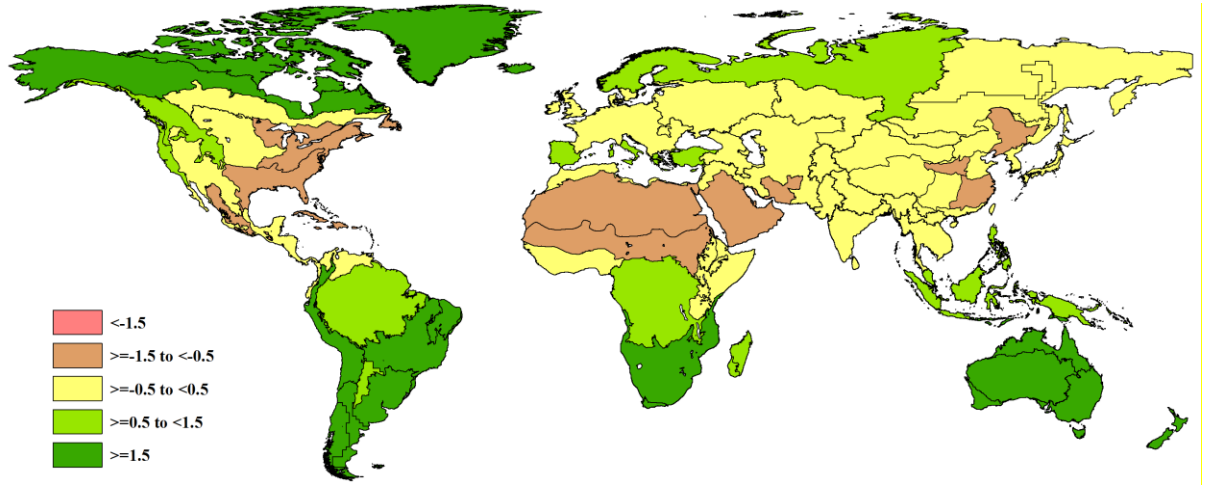


Figure 1.3. Global map of April-July 2016 PAR anomaly (as indicated by the RADPAR indicator) by MRU, departure from 15YA (percentage)

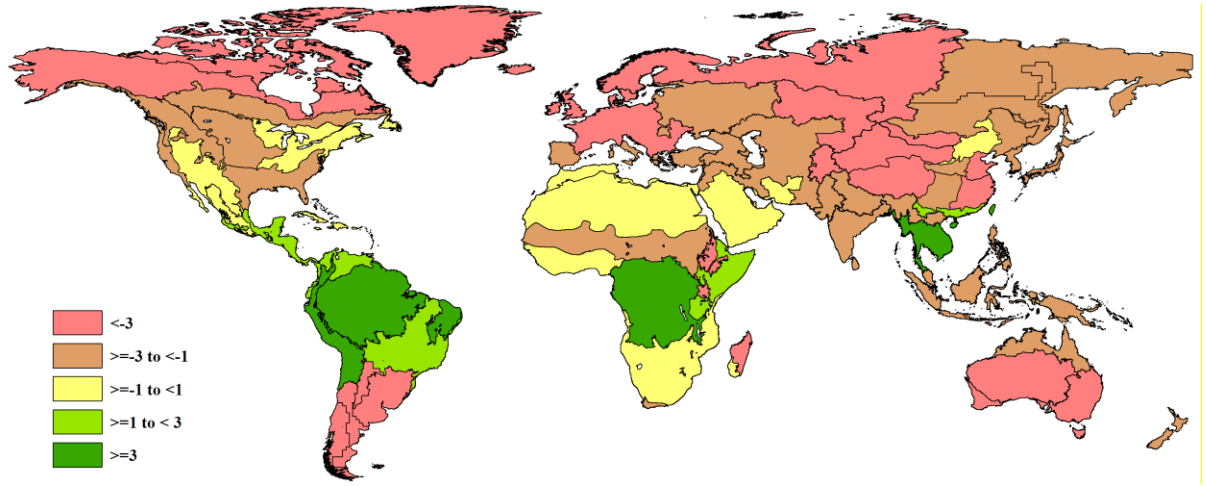
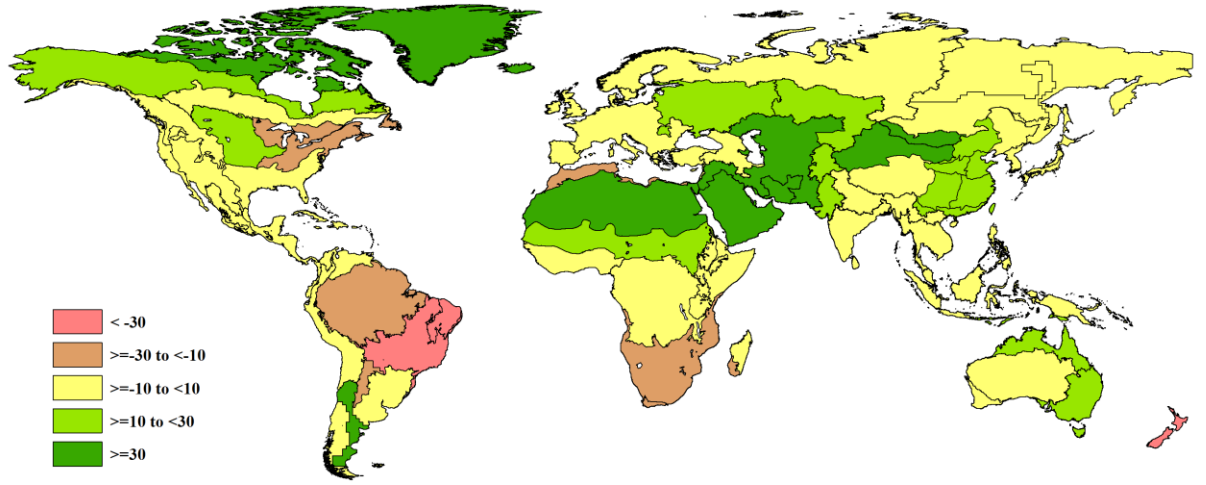


Figure 1.4. Global map of April-July 2016 biomass accumulation (BIOMSS) by MRU, departure from 5YA (percentage)



Northern South America: dry

The areas mostly affected by dry conditions include in particular the Brazilian Nordeste (MRU-22) and central eastern Brazil (MRU-23) with rainfall (RAIN) deficits of 57% and 31%, respectively, compared to average. Both areas were at the late stages of their rainfed growing season. The two MRUs are also characterized by significant positive temperature anomalies of 2.1°C and 1.7°C, respectively, which is expected to result in biomass production drops in excess of 40%. The adjacent Amazon (MRU-24, -11% precipitation; temperature anomaly of +1.3°C) and the central-northern Andes (MRU-21, -18% rainfall, -1.9°C) are less important agricultural areas; they normally record higher rainfall and the deficits were less severe. Expected biomass drops are close to 10%.

Southern Africa: dry and hot

In southern Africa (MRU-09), the largest area underwent the main harvest of maize at the beginning of the reporting period under relatively dry conditions (-13% rainfall) after the growing season (planting from October-November) had started under a very unfavorable water supply. South Africa's Western Cape area (MRU-10), where the season is Mediterranean and peaks around the end of the reporting period, suffered a stronger precipitation deficit (-46%, recording only 83 mm on average). Temperature anomalies vary from +2°C to +3°C. For the third period in a row (that is, since October 2015), Madagascar (MRU-05) witnessed a drop of precipitation of 29% over most of the island, while Madagascar's southwest (MRU-06), which is the driest part of the country, recorded only 34 mm (RAIN, -56%) and also the third consecutive dry period. Rainfall anomalies are the only noteworthy anomalies on the island.

Eastern Asia and North America: dry

With the exception of northeast China (MRU-38, -11% precipitation over the reporting period), much of the area also had dry conditions during early winter, including East Asia (MRU-43, -32% rainfall) and South Korea and Japan (MRU-46, -15%). Temperature and radiation anomalies were moderate, and so were the drops in biomass potential, which did not reach 10%.

In North America, the Corn Belt (MRU-13) recorded only 383 mm of rainfall on average (RAIN, -12%), while rainfall dropped 22% to 93 mm along the West Coast (MRU-16). Only minor or insignificant anomalies of temperature and radiation were recorded.

Other dry areas

The remaining areas all were in their third successive period of rainfall deficit. The effect was particularly marked in New Zealand (MRU-56, -63% with only a 122 mm measure, and a record temperature anomaly of 4.3°C at the beginning of the winter season) and Mediterranean North Africa (MRU-07) where 79 mm constitute a water supply loss of 14% after more severe losses throughout the growing season from late 2015. In Western Patagonia (MRU-27) in South America, the 44% rainfall deficit marks a poor start of the winter season. While MRU-7 had an about average temperature and radiation, MRU-27 recorded a marked positive temperature departure of 3.1°C.

Sahel to Central Asia and west Asia: wet

As mentioned in previous analyses, this large contiguous area has recorded exceptionally favorable conditions over the last 9 months. It includes many Asian range-lands, which have thus benefited from unusually favorable vegetation conditions during winter in the warmer areas, while in spring accumulated soil moisture has favored the development of grasses. In the west African Sahel (MRU-08), the higher than expected water supply (RAIN, +39%) has ensured an early or at least timely start of the cropping

season and ensured favorable development of the crops to be harvested in the coming months, unless the higher than average temperature (TEMP, +1.8°C) has resulted in above-average crop water requirements in spite of average sunshine. In the Sahara to Afghan deserts (MRU-64) the recorded average amounts (70 mm or +68%) constitute a sizeable increase of available moisture. In line with the CropWatch TEMP indicator (-0.6°C) and average sunshine conditions, a significant biomass increase (+40%) is conjectured. The combination of factors may have resulted in favorable breeding conditions for migratory pest or, at the very least, improved the greening of grasslands.

In west Asian highlands (Ural to Altai Mountains, MRU-62) moderately above average rainfall was recorded (+33%), accompanied by a minor drop in radiation (RADPAR, -6%). The mentioned rainfall anomalies were exceeded by far in western China (Gansu-Xinjiang MRU-32; RAIN, +143%) and in the southern Mongolian region (MRU-47, +170% equivalent to 430 mm), where a marked biomass increase (>36%) is expected. Lower excesses were noted in Qinghai-Tibet (MRU-39, RAIN, +28%) and Inner Mongolia (MRU-35, +46%). The important adjacent agricultural regions include three areas in China, which are Huanghuaihai (MRU-34, with 446 mm or RAIN, +14%), the Loess Region (MRU-36, +41%), and Southwest China (MRU-41, +31%). Of the five regions listed for China, two (MRU-34 and MRU-37) also record a sunshine anomaly in excess of -5%.

Eastern west Asia and southern Asia: wet

Wet conditions in southern Asia over the reporting period (774 mm or +17% in MRU-45) and in Punjab to Gujarat (MRU-48 with 443 mm or +34%) follow a dry period that prevailed at the beginning of the year. This has provided relief to the rainfed winter crops. Both expect a slight biomass production potential increase (7% to 17%) due to other indicators having remained close to average during the reporting period.

Southeastern South America: wet and warmer than average

The Pampas (MRU-26, RAIN, +23%) and the agriculturally less important semi-arid Southern Cone (MRU-28, +45% with just over 100 mm of rain) have benefited from favorable rainfall for the last 9 months, including the beginning of the ongoing winter season. Excess rainfall was no doubt recorded locally at the harvesting time of soybeans and maize but, altogether, the water supply will benefit the early stages of winter wheat for the major producers of the continent. Both areas underwent a drop in RADPAR (10% and 14%, respectively) and high temperature (+1.6°C, +2.0°C) but, due to normally low rainfall and temperature, only the semi-arid Southern Cone is characterized by a jump in BIOMSS (+46%)

North America: wet

The third consecutive quarter of wet conditions prevailed over the northern Great Plains (MRU-12, 468 mm or +31%). Other agroclimatic variables and BIOMSS are about average.