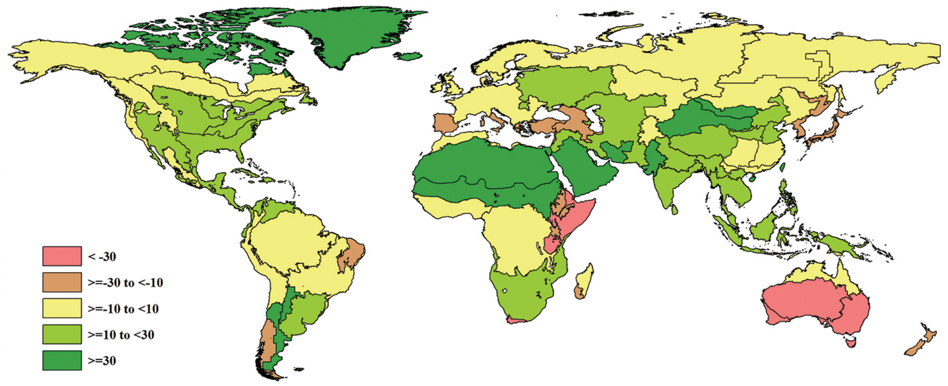

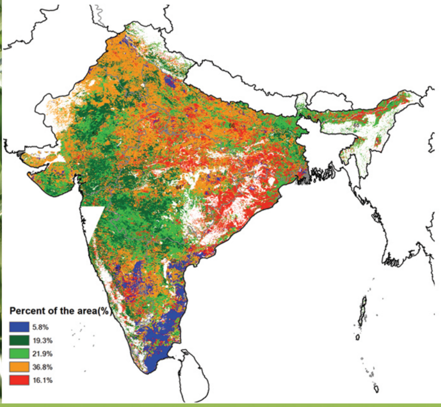

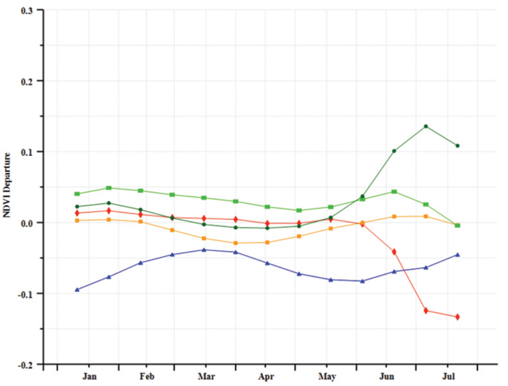

CropWatch bulletin

QUARTERLY REPORT ON GLOBAL CROP PRODUCTION

Monitoring Period: April- August 2017

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Institute of Remote Sensing and Digital Earth (RADI)
Chinese Academy of Sciences (CAS)

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CropWatch Online Resources: This bulletin along with additional resources is also available on the CropWatch Website at http://www.cropwatch.com.cn.

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Note: CropWatch resources, background materials and additional data are available online at www.cropwatch.com.cn.

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Abbreviations

5YA	Five-year average, the average for the four-month period for April-July from 2012 to 2016; one of the standard reference periods.
15YA	Fifteen-year average, the average for the four-month period from April-July from 2002 to 2016; one of the standard reference periods and typically referred to as "average."
BIOMSS	CropWatch agroclimatic indicator for biomass production potential
BOM	Australian Bureau of Meteorology
CALF	Cropped Arable Land Fraction
CAS	Chinese Academy of Sciences
CWAI	CropWatch Agroclimatic Indicator
CWSU	CropWatch Spatial Units
DM	Dry matter
EC/JRC	European Commission Joint Research Centre
ENSO	El Niño Southern Oscillation
FAO	Food and Agriculture Organization of the United Nations
GAUL	Global Administrative Units Layer
GVG	GPS, Video, and GIS data
ha	hectare
kcal	kilocalorie
MPZ	Major Production Zone
MRU	Monitoring and Reporting Unit
NDVI	Normalized Difference Vegetation Index
OISST	Optimum Interpolation Sea Surface Temperature
PAR	Photosynthetically active radiation
PET	Potential Evapotranspiration
RADI	CAS Institute of Remote Sensing and Digital Earth
RADPAR	CropWatch PAR agroclimatic indicator
RAIN	CropWatch rainfall agroclimatic indicator
SOI	Southern Oscillation Index
TEMP	CropWatch air temperature agroclimatic indicator
Ton	Thousand kilograms
VCIx	CropWatch maximum Vegetation Condition Index
VHI	CropWatch Vegetation Health Index
VHIn	CropWatch minimum Vegetation Health Index
W/m^2	Watt per square meter

Bulletin overview and reporting period

This CropWatch bulletin presents a global overview of crop stage and condition between April and July 2017, a period referred to in this bulletin as the AMJJ (April, May, June and July) period or just the "reporting period." The bulletin is the 106th such publication issued by the CropWatch group at the Institute of Remote Sensing and Digital Earth (RADI) at the Chinese Academy of Sciences, Beijing.

CropWatch analyses and indicators

CropWatch analyses are based mostly on several standard as well as new ground-based and remote sensing indicators, following a hierarchical approach. The analyses cover large global zones; major producing countries of maize, rice, wheat, and soybean; and detailed assessments for 30 major agricultural countries and Chinese regions. In parallel to an increasing spatial precision of the analyses, indicators become more focused on agriculture as the analyses zoom in to smaller spatial units.

CropWatch uses two sets of indicators: (i) agroclimatic indicators—RAIN, TEMP, and RADPAR, which describe weather factors; and (ii) agronomic indicators—BIOMSS, VHIn, CALF, and VCIx, describing crop condition and development. Importantly, the indicators RAIN, TEMP, RADPAR, and BIOMSS do not directly describe the weather variables rain, temperature, radiation, or biomass, but rather they are spatial averages over agricultural areas, which are weighted according to the local crop production potential. For each reporting period, the bulletin reports on the *departures* for all seven indicators, which (with the exception of TEMP) are expressed in relative terms as a percentage change compared to the average value for that indicator for the last five or fifteen years (depending on the indicator). For more details on the CropWatch indicators and spatial units used for the analysis, please see the quick reference guide in Annex C, as well as online resources and publications posted at www.cropwatch.com.cn.

This bulletin is organized as follows:

Chapter	Spatial coverage	Key indicators
Chapter 1	World, using Monitoring and Reporting Units (MRU), 65 large, agro-ecologically homogeneous units covering the globe	RAIN, TEMP, RADPAR, BIOMSS
Chapter 2	Major Production Zones (MPZ), six regions that contribute most to global food production	As above, plus CALF, VCIx, and VHIn
Chapter 3	30 key countries (main producers and exporters) and sub-national regions	As above plus NDVI and GVG survey
Chapter 4	China	As above plus high resolution images; information on pests and diseases; and food import/export outlook
Chapter 5	Production outlook, a focus on the Horn of Africa area, and updates on disaster events and El Niño.	

Regular updates and online resources

The bulletin is released quarterly in both English and Chinese. E-mail cropwatch@radi.ac.cn to sign up for the mailing list or visit CropWatch online at www.cropwatch.com.cn.

Executive summary

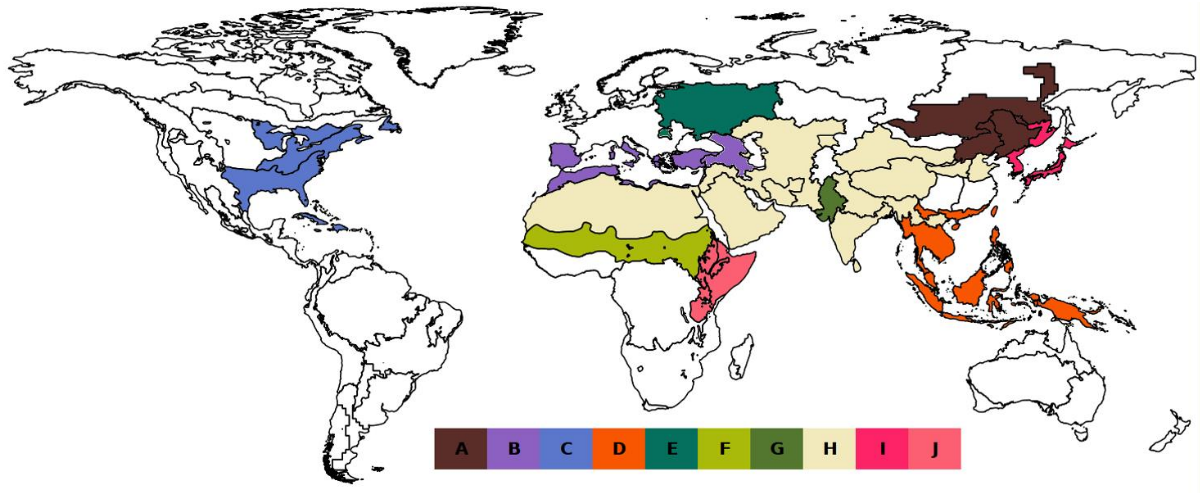
The current CropWatch bulletin is based mainly on remotely sensed data, both for agroclimatic data and crop condition. The bulletin focuses on crops that were either growing or harvested between April and July 2017. It covers prevailing weather conditions (including extreme conditions) at different spatial scales, starting with global patterns in Chapter 1. Chapter 2 focuses on agroclimatic and agronomic conditions in major production zones in all continents. Chapter 3 covers the major agricultural countries that, together, make up at least 80% of production and exports (the "top 30"), while chapter 4 zooms into China. Detailed data and narratives about crops and environmental conditions are presented in both chapters 3 and 4, with special attention paid to the major producers of maize, rice, wheat, and soybean. The bulletin then, in chapter 5, presents a global production estimate for crops to be harvested throughout 2017 (Chapter 5.1), a revision from the first CropWatch estimate for this year published in May; at least 95% of the current production estimates are based on modeled data and 5% or less are based on statistical projections. Subsequent sections of Chapter 5 describe the global disasters that occurred from April to July 2017, as well as a comprehensive analysis of the humanitarian emergency in the Horn of Africa and the current situation of El Niño.

Global agroclimatic conditions

This bulletin is issued at a time when almost all winter crops in the northern hemisphere, including China, have been harvested, summer crops are in their late stages, and monsoon/autumn crops are in a planting stage; in the southern hemisphere winter crops are growing and the planting of the summer season/monsoon season will start in a month or so.

This bulletin confirms a pattern observed in previous issues of a continent-sized reach of land extending from West Africa to semi-arid Central Asia in which precipitation exceeds the recent average. The area is identified as (H) in figure 0.1, but actually includes some of the smaller zones listed below, such as (E), which is most of Ukraine to Ural Mountains, where both temperature and sunshine were below average (TEMP, -2.2ºC and RADPAR, -4%) but rainfall was abundant (RAIN, +22%) (this area also recorded the lowest temperature departure for the reporting period); (F) the west African Sahel where the corresponding values of the CropWatch agroclimatic indicators are -0.9ºC, -2%, and +35%, respectively; and (G) Punjab to Gujarat, which has relatively lower TEMP and RADPAR departures (-0.8ºC and -2%) but rather high precipitation (RAIN, +72%). Another wet area to mention is the mostly pastoral semi-arid Southern Cone of South America which had an increase of 83% above average RAIN.

Figure 0.1. Major agroclimatic anomalies between April and July 2017



Note: Refer to the text for details of the legend.

Dry conditions prevailed in the lowlands of the Horn of Africa (HoA, area J) with precipitation 32% below the average amount. The HoA suffered the third consecutive rainfall deficit season, resulting in severe hardship for people, animals, and crops. The HoA is included in a major humanitarian crisis zone that is described in chapter 5, section 5.2. The neighboring highlands of East Africa (also part of area J) suffered a more moderate deficit (RAIN, -13%) and less serious impacts are expected, if not for the massive movements of refugees that increase the demand for food and drive up prices. Finally, drought, although less pronounced, also affected the Mediterranean (area B, especially the north), extending east into the Caucasus.

Several additional anomalies deserve mentioning. These include (i) a record warm sunshine departure of RADPAR +4% in East Asia (area A); (ii) cooler than expected weather with low sunshine (RADPAR -4%) and abundant rainfall (RAIN+17%) over the eastern United States, parts of Mexico, and the Caribbean (C); as well as (iii) maritime eastern and south-eastern Asia (D) with (on average) TEMP at -0.9ºC and RADPAR at a very significant -5%, while the RAIN departure was consistently positive at +24%. The areas under consideration include Southern China, Hainan, Taiwan, as well as continental and maritime south-east Asia.

As discussed in Chapter 3, among the major agricultural countries, Argentina generally experienced above-average rainfall (RAIN, +48%) that benefited winter crops, although sunshine was abnormally low (RADPAR, -10%). The Cropped Arable Land Fraction decreased 2% compared with average. In Brazil, the slight RAIN deficit (-3%) resulted from a large disparity between states. Meanwhile, its cultivated area varied little compared with 2016, but the vegetation condition index was rather favorable (VCIx 0.90). In the northern hemisphere, Russia (RAIN, +19%) and India (+17%) had generally favorable rainfall at the early stages of their summer and monsoon crops, respectively. India nevertheless underwent a very large drop in cropped land (-18%), which is reflected in the CropWatch production estimates. Mixed RAIN conditions occurred in Canada (RAIN, -8%), China (+9%), Kazakhstan (+12%, with an 8% increase in cultivated area), and the United States (+21%, dry in the north). Generally poor conditions are reported for France (RAIN, -23%) and Ukraine (-17%), with the shortfall occurring over most of the territory of both countries. The same observation applies to much of western Europe west of Albania to Belgium. France had abnormally high temperatures throughout the country but close to normal sunshine.

Crop production

CropWatch estimates the global 2017 production at 1,008 million tons of maize, up 0.6% over 2016; 748 million tons of rice (up 1.6%); 737 million tons of wheat (0.5% increase over 2016); and 315 million tons of soybeans, down 0.7%. The top 30 producers contribute 887 million tons of maize (+0.3%), 672 million tons of rice (+1.6%), 624 million tons of wheat (-0.9%); and 298 million tons of soybeans (+0.9%).

Maize. Large increases are estimated for maize production in Australia (+61.4%), Poland (+27.8%), Uzbekistan (15.4%), and Kazakhstan (4.8%). The largest modeled, and thus more reliable, increases are those of Argentina (+16.5%), Brazil (+19.3%), and especially South Africa (+57%), as the country recovers from the 2016 El Niño drought. In the first country, Argentina, the production was achieved through a 20% expansion of land cropped with maize, while in Brazil the yield increased 19% due to favorable agroclimatic conditions. Among the major producers in the northern hemisphere, CropWatch puts China at 194 million tons (-3.2% compared to last year) and the United States at 355 million tons (-3.6%).

Rice. For the major Asian producers and exporters of rice, positive increases over 2016 are recorded in India (+4.3% to 163 million tons), Vietnam (+9.3%), and Thailand (+1.8%). These increases were usually achieved through increase in area or, especially in Vietnam, yield (+8.4%). China suffered a small and comparable drop in both area and yield (-0.6%), which, together, brought about the nation-wide near-stagnation of production.

Wheat. For the current report, due to less favorable agroclimatic conditions than during the previous years, CropWatch expects a drop in wheat production in three of the major wheat producers: Canada, down 7.8% to 31 million tons; United States, down 4.6% to 54 million tons; and Australia, down 6.0% to 30 million tons. In China, the change is +0.3%.

Soybean. China remains a minor soybean producer (14 million tons) when compared to the United States (109 million ton), Brazil (97 million tons), and Argentina (51 million tons).

China

This bulletin covers the peak of the agricultural season for most of China. The vegetation condition index at the national level was moderate (0.75). Higher values appear in Northeast and Southwest China, as well as in Huanghuaihai; lower values occur in the Loess region and Inner Mongolia. Compared with average, cropland decreased by 1.7%, with significant declines in the Loess region (-13%) and Inner Mongolia (-9%).

As mentioned above, for both maize and rice, Crop Watch puts the national production close to 200 million tons (193,853 thousand tons and 200,371 thousand tons, respectively). Compared with 2016, maize is down 3.2% and rice 0.1%. Wheat is estimated to reach 118,902 thousand tons (+0.3%) and soybean, 13,860 thousand tons, a significant +4.3% change. This is the second consecutive increase in soybean production (after a decade long decline) and was brought about by a new agricultural policy. Winter crops production in China increased by 0.9%, in which wheat accounts for 90%. The major winter crop producing area is Henan province. It produced 26.3 million tons, which is 3.9% or 988,000 tons more than its 2016 production. Significant drops in production occurred in Anhui (-7.8%), Shaanxi (-4.8%), and Jiangsu (-3.9%) provinces.

The overall rice production in China remained close to 2016, but different situations occur according to the type of the growing season. Early rice and late rice production increased by 0.7% and 0.1%, respectively, while single-cropped rice production was 0.3% below the 2016 level. To some extent, the performance of rice was affected by pest attacks which were severe in several provinces: rice hopper in central Guizhou, northern Guangxi, and most of Guangdong; leaf roller in central Guizhou and northern

Guangdong over around 2.7 million hectares; and sheath blight in southern Jiangsu and northern Zhejiang for close to 4.5 million hectares.

The most significant increase in soybean production (+7.0%) was observed in Heilongjiang, the top soybean producer in China, thanks to both favorable yield and increased area. Inner Mongolia also outputs 2% above 2016 production due to the expanded planted area. Soybean production decreased in the North China Plain including Henan, Shandong, and Shanxi. As for maize, the provinces in the North China Plain, and Southwestern China all displayed lower production, including Anhui, Jiangsu, Hebei, Shandong, Shanxi, Inner Mongolia, Ningxia, Sichuan, Chongqing, and Yunnan. The reasons differ from province to province, such as a shrinking area in Inner Mongolia, Ningxia, and Shanxi. In Anhui, Chongqing, Sichuan, and Yunnan the main factor was a drop in yield.

Due the significant drop in maize production, CropWatch puts the total 2017 output of summer crops (including maize, single rice, late rice, spring wheat, soybean, minor cereals, and tubers at 399.6 million tons, a 1.8% drop from 2016 or a decrease in production of 7.3 million tons. The total annual crop production is at 558.7 million tons, 1.2% lower from 2016 (a decrease of 6.9 million tons). As late rice is still at the vegetative stage, and maize and single rice are at grain filling, CropWatch will further revise the production for each crop type as well as total production in the next bulletin.

Winter crops production in China were revised in this bulletin and close to 2016 (+0.1%), in which wheat accounts for 90%. The major winter crop producing area is Henan province. It produced 26.3 million tons, which is 3.9% or 988,000 tons more than its 2016 production. Significant drops in production occurred in Anhui (-7.8%), Shaanxi (-4.8%), and Jiangsu (-3.9%) provinces.