CropWatch Bulletin

QUARTERLY REPORT ON GLOBAL CROP PRODUCTION

Monitoring Period: January – April 2019

May 31, 2019
Vol. 19, No. 2 (total No. 113)

Institute of Remote Sensing and Digital Earth
Chinese Academy of Sciences

May 2019

Institute of Remote Sensing and Digital Earth (RADI), Chinese Academy of Sciences
P.O. Box 9718-29, Olympic Village Science Park
West Beichen Road, Chaoyang
Beijing 100101, China

This bulletin is produced by the CropWatch research team, Institute of Remote Sensing and Digital Earth (RADI), Chinese Academy of Sciences, under the overall guidance of Professor Bingfang Wu.

Contributors are Diego de Abelleyra (Argentina), Awetahegn Niguse Beyene(Ethiopia), Jose Bofana (Mozambique), Sheng Chang, Bulgan Davdai (Mongolia), Abdelrazek Elnashar (Egypt), Wenwen Gao, René Gommes (Belgium), Zhaoxin He, Mingyong Li, Wenjun Liu, Yuming Lu, Zonghan Ma, Elijah Phiri (Zambia), Elena Proudnikova (Russia), Mohsen N. Ramadan (Egypt), Igor Savin (Russia), Shen Tan, Fuyou Tian, Battestseg Tuvdendorj (Mongolia), Linjiang Wang, Zhengdong Wang, Bingfang Wu, Qiang Xing, Jie Xiong, Jiaming Xu, Nana Yan, Hongwei Zeng, Miao Zhang, Dan Zhao, Xinfeng Zhao, Liang Zhu and Weiwei Zhu.

Thematic contributors for this bulletin include: Fengying Nie (niefengying@sohu.com) and Xuebiao Zhang (zhangxuebiao@caas.cn) for the section on food import and export outlook for 2019.

Field data contributor are Zhongyuan Li, Yichen Cai, Shaoqi Huang, Meng Tang, Zhengbin Zheng and other more than 300 persons

Editor: Xinfeng Zhao

Corresponding author: Professor Bingfang Wu
Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences
Fax: +8610-64858721, E-mail: **cropwatch@radi.ac.cn**, **wubf@radi.ac.cn**

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

Contents

ⓘ *NOTE:* CROPWATCH RESOURCES, BACKGROUND MATERIALS AND ADDITIONAL DATA ARE AVAILABLE ONLINE AT WWW.CROPWATCH.COM.CN.

LIST OF TABLES

LIST OF FIGURES

Abbreviations

5YA	Five-year average, the average for the four-month period from January from 2014 to 2018 to April next year; one of the standard reference periods.
15YA	Fifteen-year average, the average for the four-month period from January from 2004 to 2018 to April next year; one of the standard reference periods and typically referred to as "average".
AEZ	Agro-Ecological Zone
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 January and April 2019, a period referred to in this bulletin as the JFMA (January, Februray, March and April) period or just the "reporting period." The bulletin is the 113rd such publication issued by the CropWatch group at the Institute of Remote Sensing and Digital Earth (RADI) of the Chinese Academy of Sciences, Beijing.

CropWatch indicators

CropWatch analyses are based mostly on several standard as well as new ground-based and remote sensing indicators, following a hierarchical approach.

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, RADPAR, and potential BIOMSS, which describe weather factors and its impacts on crops; and (ii) agronomic indicators—VHIn, CALF, and VCIx, Cropping Intensity, and vegetation indices, 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. (ii) PAY indicators: planted area, yield and production.

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 B, as well as online resources and publications posted at www.cropwatch.com.cn.

CropWatch analysis and indicators

The analyses cover large global zones; major producing countries of maize, rice, wheat, and soybean; and detailed assessments for Chinese regions, 41 major agricultural countries, and 201 Agro-Ecological Zones (AEZs).

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	41 key countries (main producers and exporters) and 201 AEZs	As above plus NDVI and GVG survey
Chapter 4	China and regions	As above plus high resolution images;
Chapter 5	Production outlook, 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**, **http://cloud.cropwatch.com.cn/**

Executive summary

The current CropWatch bulletin describes world-wide crop condition and food production as appraised by data up to the end of April 2019. It is prepared by an international team coordinated by the Chinese Academy of Sciences.

Special attention is paid to the major producers of maize, rice, wheat and soybean throughout the bulletin. The assessment is based mainly on remotely sensed data. It covers prevailing weather conditions, including extreme factors, at different spatial scales, starting with global patterns in Chapter 1. Chapter 2 focuses on agro-climatic 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. Each is the object of a detailed analysis. Chapter 3 constitutes the bulk of the Bulletin. Chapter 4 zooms into China. The bulletin also presents the first CropWatch production estimate for selected countries in chapter 5.

The period from January to April 2019 (JFMA) covers the end dormancy for northern hemisphere winter crops, especially wheat, and the early stages of summer crops. In the southern hemisphere, it covers the harvest of summer crops (maize, soybean), or their mid-season and late stages (maize in southern Africa). Closer to the equator, it includes the harvest of the late 2018 crop of maize or rice and the planting of the first 2019 crops, for instance instance in the Philippines, Thailand, Vietnam and Brazil.

Agro-climatic conditions

According to the analyses presented in Chapters 1 and 3.1, prevailing climate conditions during the current 2019 JFMA reporting period were closer to average than during a long series of previous CropWatch reporting periods: global rainfall was just 2% above average, which compares with 13% in 2017 and 8% in 2018. Significant continental differences are nevertheless observed, with large rainfall deficits in Oceania (-23%), moderate deficits in central America (late and end of growing season), south America and in southern Africa where JFMA is the core of the maize season. Some national values were rather low, including Venezuela (-54%), Mexico (-49%), Guatemala (-43%), Portugal (-45%) and neighboring Morocco (-39%), the Philippines (-49%), New Zealand (-32%) and Kenya (-40%). The impact of low rainfall is often confirmed by CropWatch agronomic indicators, for instance in Australia where the fraction of cultivated cropland dropped 39% and vegetation condition indices were the lowest among the 20 top exporters of wheat.

Large positive rainfall anomalies occurred in two disjoined areas in the North America (+12%) and in an area extending from west Africa to central Asia (+11%) and eastern Asia (+10%). This area was highlighted in most recent CropWatch bulletins as it seems to have become a permanent feature. Specific countries to be listed include Iraq (+64%) and Syria (+75%). Both Iran (+39%) and Mozambique (+27%) and adjacent areas receive special attention in the section on disasters in Chapter 5 because of the destruction brought about by floods. Globally, the most anomalous conditions are those that prevailed in the eastern Mediterranean and the Middle East, especially Lebanon and Iraq, with precipitation excess larger than 40%, low temperature and sunshine (departures in excess of -1.2°C and sunshine 8% or more below average)

The largest area of spatially consistent positive temperature anomalies occurred in Eurasia in late winter. Examples include +2.2°C in Latvia, +2.4°C in the Buryatia Republic and Vologda Oblast in Russia, +2.5°C in the Yaroslav Oblast and +3.6°C in the Province of Heilongjiang in China. The unseasonably high temperatures may have affected winter crops and forthcoming summer crops in a way that is not yet fully understood, possibly in areas where agronomic and climatic indicators do not agree. Several cold areas occurred in north and south America. For sunshine, low values occurred (1) from west Africa to eastern Asia, (2) northern America and (3) the main temperature summer crop areas in south America. Virtually all other areas experienced above-average radiation.

2019 Production estimate

The production estimate proposed in Chapter 5.1 will be updated two times this year. Except for the southern hemisphere, it is currently based largely on a mix of actual crop and weather data for the JFMA period and estimates for May onward, as only one third of the year has elapsed. The share of actual data varies from approximately 18% for maize to 71% for wheat.

CropWatch estimates the global 2019 production of the major commodities at 1005 million tonnes of maize (up 0.7% over 2018), 731 million for rice (up 1.1%), 733 million tonnes of wheat (a 1.5% increase) and 331 million tonnes of soybeans, a 1.2% increase over last year's output. The current estimate is one of the most optimistic issued by CropWatch over the recent cropping seasons, since all crops show positive variations compared with the previous campaign.

Countries that experienced large production increases for maize include mostly Argentina (+7%) and Mexico (+8%) as well as three South-east Asian countries including Bangladesh (+8%), Myanmar (+9%) and Vietnam where the estimated increase reaches 12%. All countries with a significant drop in maize production are located in Africa.

The production of rice increases in south and South-East Asia, starting with India (+1%), Indonesia (+2%), Bangladesh (+6%) and Vietnam (+8%). The most significant decreases occurred in Thailand (-3%) and Cambodia (-8%).

For wheat in several European producers decreases below 2018 output, some of them significantly in Romania (-17%), Turkey (-15%), Belarus (-13%) and Hungary (-11%). Positive values are observed for Italy (+7%) and Great Britain (+8%) and some eastern European and western to central Asian countries, including Ukraine (+4%) and Russia (+9%). The estimates will need to be reassessed because of the uncertainties about the impact of very high temperature in some areas. A production increases is also inferred for China (+1%), Egypt, Brazil, Ethiopia and Pakistan (+4% to +10%). The largest increases are projected for Pakistan (+10%), Morocco (+12%), South-Africa (+14%), Mexico (+17%), and Iran (+19%) where floods have destroyed crops and infrastructure but also supplied much needed water. Production decreases are projected for two southern Hemisphere wheat growers, Argentina and Australia, -3% and -13%. For the United States, the wheat production estimate is up 10%.

Similar to the other rain-fed summer crop in the country, the Argentinian soybean crop is up (+9%) while Brazil stayed at the level of the 2018 output.

The performance of major exporters and importers does not rise any concerns for the availability of maize, rice, wheat and sorghum.

China

Climatic variables and the resulting crop condition were generally favorable in the main winter crop producing areas. Both precipitation and temperature were above average (20% and 0.6°C, respectively). The total output of combined winter crops is estimated to reach 127 million tons, an increase of 1.23 million tons (or 1%) above the 2018 season.

The largest drop of winter crop production occurred in the provinces of Hebei and Shaanxi, but also in Shanxi, Hubei, and Chongqing. Henan and Shandong Provinces, the top two provinces in terms of winter crop production, both recovered from their poor situation in 2018 with a year-on-year increase of 2.8% and 5.6%, respectively, due to the simultaneous increase in planted area and yield.

For wheat alone, production is estimated to reach 117 million tons, an increase of 1.35 million tons or 1.2% above 2018. The largest wheat production drop (8.4%) occurred in Shaanxi. This is the largest annual winter crop production drop in percentage since 2013. The winter wheat planted area in Hubei province is 6.2% down from 2018, leading to very significant 7.2% reduction in production.