CropWatch Bulletin

QUARTERLY REPORT ON GLOBAL CROP PRODUCTION

Monitoring Period: October 2018 – January 2019

February 28, 2019
Vol. 19, No. 1 (total No. 112)

Institute of Remote Sensing and Digital Earth
Chinese Academy of Sciences

February 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 Jose Bofana, Sheng Chang, Bulgan Davdai, Wenwen Gao, René Gommes, Zhaoxin He, Wenjun Liu, Zonghan Ma, EI-Shirbeny Mohammed, Elijah Phiri, Mohsen N. Ramadan, Elena Prudnikova, Igor Savin, Shen Tan, Fuyou Tian, Battestseg Tuvdendorj, 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.

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/.

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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 October from 2013 to 2017 to January next year; one of the standard reference periods.
15YA	Fifteen-year average, the average for the four-month period from October from 2003 to 2017 to January 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 October 2018 and January 2019, a period referred to in this bulletin as the ONDJ (October, November, December and January) period or just the "reporting period." The bulletin is the 112nd 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 C, 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 190 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 190 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 January 2019. It is prepared by an international team coordinated by the Insitute of Remote Sensing and Digital Earth, Chinese Academy of Sciences.

The period from October 2018 to January 2019 (ONDJ) is a relatively quiet period from an agricultural point of view. In the temperate northern hemisphere summer crops have been harvested, while winter crops have been were planted and are now mostly dormant. In some tropical and equatorial countries, including the Philippines, Thailand, Vietnam and Brazil, planting of the second maize and rice generally starts around January, while in the southern hemisphere summer crops are at advanced development stages and nearing flowering, for example maize and soybean in Argentina, Brazil and South Africa.

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 country is the object of a detailed analysis and Chapter 3 constitutes the bulk of the Bulletin. Chapter 4 zooms into China. The bulletin also presents early production estimates for selected countries, mostly in the southern hemisphere in chapter 5.

Agro-climatic conditions

Globally, rainfall over agricultural areas was close to average (4% above) during the ONDJ monitoring period. Temperature was just below average by 0.2°C and sunshine was above average in 69% of arable land, even if the average departure was just +1%.

Some large positive and negative precipitation anomalies occurred essentially in Asia (East and south, -17% and -9%, respectively) and Oceania (-10%) and in North America (+33%). The globally average rainfall contrasts with the situations that prevailed during the previous reporting (JASO, +12%) and the corresponding period in 2017-18 (+8%).

Although experts currently debate whether El Niño conditions are developing again just three years after it's previous occurrence in 2015-16, most below average rainfall areas are consistent with El Niño patterns with deficits more severe than 20% occurring in Western Cape in South Africa (-58%), Australia (Nullarbor to Darling, -23%), maritime Southeast Asia (-29%) and the Caribbean (-36%). Eastern Asia and China had several areas with unfavorable precipitation, including Southern Japan and the southern fringe of the Korean peninsula (-47 %), Inner Mongolia (-42%) and North-east China (-34%). Several of the listed areas practice winter crop cultivation and will start their growing season with insufficient soil moisture storage if rainfall will be short in February and subsequent months.

At the national level, low rainfall affected several countries of which some are listed here. Chapter 3 has additional detail, country by country and including sub-national data. In Asia, drought affected Japan (-53%), India (-35%), the Philippines (-25%) and some Chinese provinces (Liaoning, -37%; Hebei -45 %.); in southern and eastern Africa: Namibia (-44%), Botswana (-33%), Zimbabwe (-32%) and Somalia (-40%). Four European countries recorded a deficit between 20 and 30%, but raise little concern in view of the limited importance of winter crops at high latitudes: Denmark, Sweden, Finland and the Netherlands. The same applies to a long list of Oblasts in Russia centered around the Republic of Mordovia

Excess precipitation resulting in floods, destruction and loss of life are reported from all continents and are described in detail in the section on disasters in Chapter 5. For America we need to mention some important agricultural areas such as the Northern Great Plains, the Corn Belt and the Cotton Belt.

As mentioned, TEMP was close to average but significant negative (cold) departures occurred in the American continent and positive ones in Oceania. Unseasonably high temperature occurred in the Caucasus, in north-eastern China and in some agriculturally less important areas. The last six months constitute the first close to average sunshine period after a run of negative departures. Unusually low values do occur in some of the mentioned cold areas.

In terms of biomass accumulation potential, the most favorable values occur in Europe (+6%), central Asia (+9%) and western and southern North America (+12%).

Agronomic indicators

The impact of extreme weather conditions, especially drought, is directly assessed by the two main agronomic indicators used by CropWatch i.e. Cropped Arable Land Fraction, CALF, which measures how much arable land is actually cropped, and Maximum Vegetation Condition Index, VCIx, which assesses local yield on a scale from 0 ("same as lowest ever") to 1 ("same as highest ever").

Romania suffered the largest decrease in CALF among the monitored countries (-35%). Large increases between 10% and 20% occurred in Zambia, Mozambique, Ukraine, Kazakhstan, Turkey and Pakistan (19%); between 25% and 30% in Afghanistan, Morocco and Mongolia.

The lowest VCIx values between 0.45 and 0.72 were observed in Afghanistan (0.45), Australia, South Africa, Romania, Canada and Pakistan (0.72). High VCIx occurs mostly in Asia, starting with Sri Lanka (0.98), Indonesia and Vietnam (0.96), and the Philippines (0.95); in Brazil (0.95) and Mexico (0.93); in Belarus (0.94) and Poland (0.91).

China

Agro-climatic conditions were generally below average in China from October 2018 to January 2019, with sunshine deficits of 6% although temperature was average. The rainfall deficit reached 7% nationwide, affecting mostly Inner Mongolia (-42%), the Loess region (-18%), North-east China (-34%) and Southwest China (-18%). The largest positive temperature anomalies (in excess of 1.0°C) were recorded in Inner Mongolia, Heilongjiang, Jilin and Liaoning.

Nationwide CALF was low 2% compared with the previous seasons, indicating reduced planted area of winter crops. The drop was 1% in Huanghuaihai, Loess region, and Lower Yangtze which are the main winter crops producing zones. The average national VCIx value was 0.88 with limited variability among the agricultural regions, ranging from 0.83 in Inner Mongolia to 0.93 in southern and south-west China.

Production estimates

The production outlook for the current bulletin includes only the major producers in the southern hemisphere and some isolated northern hemisphere countries where crop development is sufficiently advanced to ensure that estimates are reliable.

Argentina, the third global exporter of Maize did well (production up 9% compared with the previous season) while the CropWatch estimate for Brazil, the second exporter is 1% down. Maize available for export should not be affected by the current situation. Mexico's good performance (+21%) will allow the country to reduce imports. In South Africa (-14%) the production shortfall is likely to increase imports from outside the region as most countries in the region suffered from a poor rainfall season.

None of the important Asian rice producers is covered in the current estimates. For Brazil and Argentina, which rank about 10th among exporters the production is up by 4% and 16%, respectively.

Australia, one of the top wheat exporters suffered a marked production drop (-13%) that is, however, in line with the very large historical variability of national wheat production. A negative value in Argentina (-3%) is also consistent with the recent behavior of wheat in the country. Exports are unlikely to be affected. Similarly, although the production is up 7% in Brazil, this will not affect international markets as the country exports virtually no wheat. The Bulletin presents wheat production estimates for several other countries which all underwent an increase of their production compared with 2018. They are either self-sufficient (India, Pakistan) or net importers (Mexico, Morocco, South Africa and especially Egypt). The improved productions will them countries to reduce imports.

Brazil and Argentina, which both increased their soybean production, are the second and third exporters for the commodity. The extra production of 2019 over 2018 is about 4.7 million tonnes in Argentina and about 2 million tonnes in Brazil. When taking into account the recent reversal of the negative trend of Chinese soybean production, and correlated reduced imports, the data suggest that the current soybean glut is unlikely to improve.