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中国科学院空天信息创新研究院
Aerospace Information Research Institute, Chinese Academy of Sciences

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Aerospace Information Research Institute (AIR), 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, Aerospace Information Research Institute (AIR), Chinese Academy of Sciences, under the overall guidance of Professor Bingfang Wu.

Contributors are Abdelrazek Elnashar (Egypt), Sheng Chang, Yicheng Cai (Hubei, China), Shuping Chengping (Hubei, China), Diego de Abelleyra (Argentina), Elijah Phiri (Zambia), Jose Bofana (Mozambique), Ganbat Bavuudorj(Mongolia), Li Fu, Zhijun Fu, Yuanchao Li, Zhongyuan Li (Hubei, China), Wenjun Liu, Yuming Lu, Linghua Meng (Changchun, China), Zonghan Ma, Mohsen N. Ramadan (Egypt), Rukundo Emmanuel (Rwanda), Urs Christoph Schulthess (CIMMYT, Netherlands), Bishnu Prasad Pangali Sharma (Nepal), Binfeng Sun (Jiangxi, China), Shengtao Su, Meng Tang (Hubei, China), Fuyou Tian, Huanfang Wang, Linjiang Wang, Qiang Wang (Anhui,China), Yuandong Wang (Jiangxi, China), Zhengdong Wang, Panpan Wei (Henan, China), Bingfang Wu, Fangming Wu, Jiaming Xu, Nana Yan, Zhishan Ye (Anhui, China), Hongwei Zeng, Miao Zhang, Xiwang Zhang (Henan, China), Dan Zhao, Hang Zhao, Xinfeng Zhao, Liang Zhu, Weiwei Zhu, and Qifeng Zhuang (Jiangsu, China).

Editor: Liang Zhu

Corresponding author: Professor Bingfang Wu
Aerospace Information Research Institute, 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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Abbreviations

5YA	Five-year average, the average for the four-month period from July to October for 2015-2019; one of the standard reference periods.
15YA	Fifteen-year average, the average for the four-month period from July to October for 2005-2019; 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	EI 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	Mapping and Reporting Unit
NDVI	Normalized Difference Vegetation Index
OISST	Optimum Interpolation Sea Surface Temperature
PAR	Photosynthetically active radiation
PET	Potential Evapotranspiration
AIR	CAS Aerospace Information Research Institute
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 July and October 2020, a period referred to in this bulletin as the JASO (July, August, September and October) period or just the "reporting period." The bulletin is the 119th such publication issued by the CropWatch group at the Aerospace Information Research Institute (AIR) 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. 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; and (ii) agronomic indicators—VHIn, CALF, and VCIx and vegetation indices, describing crop condition and development. (iii) 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, 42 major agricultural countries, and 217 Agro-Ecological Zones (AEZs).

This bulletin is organized as follows:

Chapter	Spatial coverage	Key indicators
Chapter 1	World, using Mapping 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	42 key countries (main producers and exporters) and 210 AEZs	As above plus NDVI and GVG survey
Chapter 4	China and regions	As above plus high-resolution images; Pest and crops trade prospects
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 October 2020. It is prepared by an international team coordinated by the Aerospace Information Research Institute, 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 this year's third CropWatch production estimates for selected countries and reviews the first production estimation in chapter 5.

This report for the period from July to October 2020 covers wheat, maize, soybean and rice production in the Northern Hemisphere. Winter wheat reached maturity in June/July. The harvest of the summer crops (spring wheat, maize, rice and soybean) started in August and was mostly finished by the end of October. In the southern hemisphere, wheat is the only major crop that was grown during this monitoring period. It reaches maturity in October (Southern Brazil) or in November and December (Argentina, South Africa and Australia).

So far, the outbreak of COVID-19 has had limited impact on the production of the major crops. As this, and other reports, show, production levels of the major staple crops, such as maize, rice, wheat and soybean remained high and also benefitted from generally favorable weather conditions. However, disruptions in the domestic food supply chains, price hikes, loss of remittances and income have mostly hurt the people who were already poor. Before the pandemic outbreak covered the entire globe, 690 million people were already chronically and 135 million were acutely food insecure. The U.N. World Food Programme has warned that an additional 130 million could face acute food insecurity by the end of 2020.

Another plague, the outbreak of desert locusts in East Africa, Middle East and southwest Asia is still not under control either. According to the FAO, the situation remains alarming in Ethiopia, Kenya and Somalia, a region where millions of people already face acute food insecurity.

Agro-climatic conditions

According to the analyses presented in Chapters 1 and 3.1, prevailing climate conditions during the current 2020 JASO reporting period were close to normal for cropland. Average temperatures, rainfall and photosynthetically active solar radiation stayed close to the 15-year average. No prolonged heat wave in any of the major production countries was observed during this period.

At the global scale, the series of record or close to record high temperatures continued throughout this monitoring period: July and August ranked as 2nd, September as 1st and October as the 4th warmest respective months in past 141 years. For the months from January to October, this was the second warmest period on record. The temperature departure was +1.0°C above the 20th century average.

Overall, the prospects for crop production were quite favorable, mainly because no prolonged, large scale droughts were observed. In many regions, the crops benefitted from the above average rainfall that had

been recorded for the previous monitoring period. The stored soil moisture helped sustain crop growth, even when precipitation was below average. Below average rainfall was recorded for Central and South America (-14%) and North America (-11%), mainly in the Western USA. Conditions were drier than usual in Europe as well (-6%). Above average rainfall was recorded for Central Asia (+20%) and East Asia (+19%). The latter started this monitoring period under drought conditions, but a series of typhoons and tropical depression brought large amounts of rainfall to that region. Conditions turned back to normal in Oceania as well, where rainfall was 8% above average.

The following is a summary of the conditions in the key production regions:

- North America: Production conditions were generally favorable for maize and soybean. Harvest benefitted from slightly drier than usual conditions. US maize (+2%), rice (+2%) and soybean (+2%) production is estimated to increase. A reduction by 3 % is expected for wheat. In Canada, soybean production remained at the same level as last year, whereas wheat increased by +5%.

- South America: Wheat production in Brazil was favorable (+3%), but Argentina suffered from drought conditions (-16%). A delay in the onset of the summer rains delayed sowing of maize and soybean in Brazil. La Niña may cause further rainfall deficits in Brazil and Argentina in the coming months.

- Europe: Rainfall was generally on the dry side. Production of summer crops was slightly below normal.

- Africa: Abundant rainfall benefitted the crops in the Horn of Africa and West Africa. Wheat in South Africa also benefitted from favorable weather conditions

- Eastern Europe to the Ural: Romania, the northern Caucasus and Volga regions of Russia, as well as the Ukraine suffered from a rainfall deficit which caused reduced yields of the summer crops.

- Siberia and Kazakhstan: benefited from above average rainfall and above average wheat yields were harvested in that region.

- China: It generally benefitted from abundant rainfall and production slightly increased over last year's levels: Maize production is estimated to increase by 0.8%, wheat by 2,9% and soybean by 0.9%. Rice production remained stable (-0.2%), despite of the heavy floods in the Yangtze river basin in early summer. The north-east was hit by 3 typhoons, causing wind damage and local floods affecting about 1 million ha of maize.

- South Asia: India, as well as Pakistan benefitted from favorable monsoon rains and rice production increased by more than 6% in both countries. Bangladesh, on the other hand, experienced severe floods and production is expected to decrease by 6%.

- South-East Asia: This region recovered from the drought conditions. Several typhoons, most of them hitting the area just after harvest of the main rice crops, brought plenty of rainfall to the region. Production is estimated at average levels.

- Australia: Especially the south-east recovered from last year's severe drought and a sharp increase by 8.57 million tons (+44.3%) from 2019 is estimated for wheat.

In 2020, global maize production is expected to be at 1.070 billion tons, an increase of 1.4% or equivalent to 15.15 million tons; global rice production is expected to be 760 million tons at an increase of 0.9% or an increase of 6.80 million tons; global wheat production is 738 million tons, an 3.1% increase of 21.98 million tons; global soybean production is expected to be 323 million tons, a slight decrease of 0.2%. In 2020, the global production of the major cereals and oil crops will be generally stable.