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CropWatch Online Resources: The data and charts of this report are available at http://cloud.cropwatch.com.cn/.

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Abbreviations

5YA	Five-year average, the average for the four-month period from April to July of for 2017-2021; one of the standard reference periods.
15YA	Fifteen-year average, the average for the four-month period from April to July for 2007-2021; 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
CPI	Crop Production Index
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	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
Tonne	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 2023, a period referred to in this bulletin as the JFMA (April, May, June and July) period or just the "reporting period.", while the information on disaster events was updated until mid-August The bulletin is the 126th 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.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, 43 major agricultural countries, and 223 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	46 key countries (main producers and exporters) and 223 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.cn**, **http://cloud.cropwatch.cn/**

Executive summary

The current CropWatch bulletin describes world-wide crop condition and food production as appraised by data up to the end of July 2023. It is prepared by an international team coordinated by the Aerospace Information Research Institute, Chinese Academy of Sciences.

The assessment is based mainly on remotely sensed data. It covers prevailing agri-climatic conditions, including extreme factors, 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 comprise at least 80% of production and exports (the "core countries") while chapter 4 zooms into China. Special attention is paid to the production outlook of main crop producing and exporting countries where major cereal and oil crops (maize, rice, wheat and soybean) are harvested this year or currently still in the field. Subsequent sections of Chapter 5 describe the global disasters that occurred from April to July 2023.

Agroclimatic conditions

During this monitoring period, temperature records were broken in different parts of the world. However, the transition from La Niña to El Niño tended to smooth out precipitation. It brought relatively more rainfall to regions that had been drought-stricken, such as the Middle East and Eastern Africa, and parts of South America, such as Argentina. On the other hand, rainfall declined from above-average to average levels in most of Australia. Central Asia continued to have a rainfall deficit. Rainfall was close to the average for most of the USA, Canada and Europe. Flooding created some crop damage in India and China. Central and Northern China benefitted from generally above-average rainfall.

Global crop production situation

Maize: In Brazil, the cultivation area and yield of second maize increased, bringing Brazilian maize production to 100.68 million tonnes (+10.3%). Similarly, China also increased the area by 1.234 million ha, resulting in a production increase by 2.2%, whereas for the USA, an increase by 3.8% is forecasted. Conditions in Europe were generally favorable and slight increases in production can be expected. The sharpest decline was estimated for India, where flooding decreased the area and yield, leading to a decline in production by 9.1% to 17.1 million tonnes. All in all, the supply of maize has rebounded from last year. Global maize production is projected to reach 1.072 billion tonnes, marking an increase of 26.94 million tonnes or 2.6% compared to the decreased production (1.045 billion tonnes) in 2022, yet remaining below the peak in 2021.

Rice: As the world's largest rice producer, China is expected at 193.346 million tonnes, down by 1.0%, due to reduced cultivation areas. Adverse weather conditions, including excessive rainfall during heading and flowering, affected both early-season and single-season rice in its major producing regions and in northern China. Southeast Asian countries, including Bangladesh, Indonesia, the Philippines, Thailand, Myanmar, and Sri Lanka, experienced normal to slightly below-average rainfall during the rainy season, leading to decreased rice yields and resulting in lower rice production. However, in July, excessive rainfall occurred in Pakistan and India, leading to localized flooding. Nevertheless, conditions have been better in Pakistan as compared to last year, when widespread flooding had caused large yield losses. Pakistan's rice production is expected to increase by 6.8%, while India's rice production is estimated to decrease slightly by 0.9%. Vietnam, Cambodia, Nigeria, and the United States saw varying degrees of increased rice production. Overall, the global rice production is forecasted to slightly decline by 4.4 million tonnes or 0.6%.

Wheat: The conditions for production in major wheat-producing countries varied significantly. As compared to last year, agro-climatic conditions improved notably in East Africa and the Middle East. As the world's largest wheat producer, China experienced favorable weather conditions early in the season but frequent rainfall during the late grain-filling and harvest phase. This resulted in a yield of 134.72 million tonnes, an increase of 0.4%. In Russia, wheat production decreased by 3.8% to 82.94 million tonnes, primarily due to

a mild drought in May and June. The wheat production of the United States, despite experiencing unfavorable weather conditions during early growth, saw an increase of 7.9% to 55.64 million tonnes. The six largest year-on-year increases, by more than 9%, were estimated for Syria, Ethiopia, Morocco, Turkey, Iran, and Lebanon, where the conditions were better than during the extreme drought year of 2022. Due to an expansion of area and higher yields, production increased in some European countries, such as Hungary (+1.4%), Romania (+5.6%), Italy (+6.4%), and Ukraine (+5.6%). Afghanistan and Central Asian countries, including Kazakhstan, Uzbekistan, and Kyrgyzstan, experienced a reduction in both cultivation areas and yields. In the Southern Hemisphere, production is estimated to decrease in Australia (-11%), Argentina (-14.1%), and Brazil (-3.1%), and increase in South Africa (+8.4%). Global wheat production is estimated to decline by 0.6% to 736.6 million tonnes, which is the lowest production of the past 5 years.

Soybean: Its production increased in the Southern Hemisphere, but the situations in Brazil and Argentina varied significantly. The increase in production in Brazil more than offset the decline in Argentina, resulting in a net increase of 1.71 million tonnes. In China, farmers expanded the area of maize at the expense of soybean, resulting in a decline in production by 5.7% to 17.2 million tonnes. A decline in the area was also estimated for the USA. Its production is forecasted to reach 100.5 million tonnes, 1.25% less than last year. Canada (+3.1%) and India (+1.0%) saw increased production. The cumulative decrease of 1.9 million tonnes in soybean production in the Northern Hemisphere exceeded the increase in the Southern Hemisphere, resulting in a global soybean production decrease of 0.3% to 319.06 million tonnes. Overall, the global soybean supply situation remains relatively stable.