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QUARTERLY REPORT ON GLOBAL CROP PRODUCTION

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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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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 from January to April for 2018-2022; one of the standard reference periods.
15YA	Fifteen-year average, the average for the four-month period from January to April of for 2008-2022; 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
CPI	Crop Production Index
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	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
CPI	Crop Production Index

Bulletin overview and reporting period

This CropWatch bulletin presents a global overview of crop stage and condition between January and April 2023, a period referred to in this bulletin as the JFMA (January, February, March and April) period or just the "reporting period." The bulletin is the 129th 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 the actual crop production and stresses experienced during the monitoring period. (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, 45 major agricultural countries, and 228 Agro-Ecological Zones (AEZs).

This bulletin is organized as follows:

Chapter	Spatial coverage	Key indicators
Chapter 1	World, using Mapping and Reporting Units (MRU), 105 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	44 key countries (main producers and exporters) and 221 AEZs	As above, plus NDVI, GVG survey, and CPI
Chapter 4	China and seven agro-ecological zones	As above plus high-resolution images; Pest and crops trade prospects
Chapter 5	Production outlook, and updates on disaster events and El Niño.	
Online Resource	http://cloud.cropwatch.com.cn/	

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 **http://cloud.cropwatch.com.cn/**. Additionally, by accessing the website, you can obtain information on methods, overviews of major producing countries, and their trends in the medium and long term.

Executive summary

The current CropWatch bulletin describes world-wide crop condition and food production as appraised by data up to the end of April 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, together, make up 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 January to April 2023.

Agroclimatic conditions

Europe had its warmest January and the second warmest winter since the start of industrialization. Global warming does not only affect temperatures. Another record was set by tropical cyclone Freddy, which traversed the southern Indian Ocean for more than five weeks in February and March 2023. It was the longest-lasting and highest accumulated cyclone energy-producing **tropical cyclone** ever recorded worldwide. It started on February 5, 2023, off the coast of Australia and finally dissipated on March 14 over Mozambique. It caused flooding conditions in southeast Africa, mainly in Malawi. La Niña ended its unusually long cycle, which lasted for three years and caused droughts in East Africa and Argentina. It also brought abundant rainfall to Australia. The end of La Niña already improved the rainfall situation in Argentina and East Africa. Another noteworthy improvement is the end of the multi-year drought in the West of the USA. California benefitted from abundant precipitation caused by a series of so-called atmospheric rivers, which helped restore groundwater and replenish reservoirs.

Global crop production situation

In the current monitoring period, the Crop Production Index (CPI) for global crop production improved from 1.12 to 1.15, indicating slightly better conditions. It was still slightly lower than the 10-year average (CPI=1.16) and significantly lower than the 1.21 value obtained for 2020.

Maize: In Brazil, production of the less important first maize decreased, while the cultivation area and yield of second maize increased, bringing Brazilian maize production to 100.68 million tonnes (+10.3%). However, in Argentina, the drought caused a decrease in production by 9.6%. In Africa south of the Equator, rainfall was somewhat irregular, but all in all, production levels remained unchanged.

Early monitoring indicators of crop cultivation area based on remote sensing indicate that the progress of maize planting in the United States and Canada is slower, lagging behind by 8% and 10%, respectively. However, maize planting in most European countries is progressing much faster. Soil moisture conditions for crop establishment have been mostly favorable in North America and Europe. Global maize production is estimated to increase by 0.4% to 1,049 million tonnes.

Rice: Production of irrigated rice during the dry winter-season was generally normal in South and Southeast Asia, with small increases in rice production in Indonesia, Thailand, Vietnam and Sri Lanka. Small decreases in rice cultivation area in Bangladesh (-3%), Cambodia (-2.2%), Myanmar (-1.7%), India (-1.4%) and the Philippines (-0.8%) were estimated. The production also decreased in Angola (-4.5%), Argentina (-3%) and

Brazil (-0.6%) due to drought conditions. As a result, global rice production decreased by 0.5% to 750.87 million tonnes.

Wheat: Conditions for wheat production were rather favorable in India (+1.9%) and Pakistan (+1.2%), resulting in an increase by 1.9% and 1.2% respectively. In China, untimely frost and snow in April had caused yield reductions in Shanxi (-3.2%), western Hubei (-4.7%), and eastern Gansu (-4.4%). However, in the North China Plain, both area and yield increased in Henan and the neighboring provinces. At the national level, production increased by 1.8% to 136,33 million tonnes. In the USA, Kansas, an important winter wheat producer, continued to be affected by drought conditions. Wheat production in the USA is forecasted to drop by 5.2% to 48,870 million tonnes. Conditions in Morocco were slightly better than last year, resulting in an increase in production by 14.8% to 6.94 million tonnes. Similarly, production in Turkey is estimated to increase by 12.7% to 18.99 million tonnes. Winter wheat production in Western, Central and Eastern Europe benefitted from a mild winter with above average precipitation. Hence, a higher production than in 2022 can be expected. Global wheat production is estimated to increase by 0.7% to 745,53 million tonnes.

Soybean: The soybean production of Brazil and Argentina is only second to that of the United States. CropWatch predicts that Brazil's soybean production will reach 108.4 million tonnes (+13.9%) due to an expansion of the cultivated area and favorable weather conditions resulting in higher yields. In Argentina, the drought conditions caused a reduction in area and yield, resulting in a production by 18.9% to 42,01 million tonnes. Conditions for sowing have been favorable in North America and Europe. Global soybean production is estimated to increase by 2.2% to 327,17 million tonnes.

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