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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 October of the previous year to January of the current year for 2018-2022; one of the standard reference periods.
15YA	Fifteen-year average, the average for the four-month period from October of the previous year to January of the current year 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
CPI	Crop Production Index
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
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 October 2022 and January 2023, 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 128th 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 conditions and food production as appraised by data up to the end of January 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 October 2022 to January 2023.

Agroclimatic conditions

Globally, 2022 was the sixth warmest year on record since 1880. Temperatures were above average in Europe and Asia, resulting in the second warmest year. A heat wave accompanied by drought reduced autumn grain crop production in most of Europe and Southern China. An early heat wave in northwest India, in which temperatures exceeded 35ºC in March, caused yield losses in wheat at regional scale.

During this monitoring period, a third consecutive year of La Niña conditions has caused a prolonged drought that keeps affecting East Africa. It reduced crop production, and livestock was also decimated due to a lack of water. La Niña also limited crop production in Argentina. Other climatic factors, exacerbated by climate change, have caused a severe rainfall deficit in all regions bordering the Mediterranean Sea. In that region, winter is the season with the highest precipitation. Hence, the drought will not only impact the production of cereals and legumes in the winter months. Low water levels in the reservoirs mean less water will be available for irrigation in the dry summer months. The rainfall situation is grave in the Maghreb, Levant, and the Caucasus, where the deficit exceeded 30%. Conditions were average in Central and Northern Europe and most of Russia's crop production region. California and the Western states of the USA benefited from above-average rainfall, which helped to restore soil moisture to normal levels. Most of South and South-East Asia, Northern China, Australia, and New Zealand experienced average to above-average rainfall.

Global crop production situation

In the current monitoring period, the Crop Production Index (CPI) for global crop production had declined for the third consecutive year from 1.19 to 1.12, which is the second lowest level in the past 11 years. This is mainly due to heat and drought conditions in key production regions.

Maize: In the Southern Hemisphere, maize planting starts at the beginning of the rainy season in November and December. In Brazil, first season maize was sown in October. Sowing of the more important second season maize is starting in February, after the soybean harvest. Brazil and Argentina are the second and third largest maize exporters. The total maize production in Brazil is expected to reach 93.603 million tonnes, with an increase of 2.5%. In Argentina, rainfall conditions improved in January, and farmers planted a significant area of late-season maize. Its production is expected to be at 55.924 million tonnes, slightly increasing by 1.7%. For southern Africa, which is affected by slight rainfall deficits, production is generally estimated to be reduced by less than 5%, except in Mozambique, where production is estimated to increase

by 9.1% due to a larger area planted. In Indonesia, production is forecasted to increase to 19.586 million tonnes (+2.3%).

Rice: Production in most countries in South and Southeast Asia is close to 2022 levels. Conditions were close to normal in most countries, except Cambodia, where a reduction of 2.2% is forecasted due to a lack of water. In the Philippines, an increase of 5.3% is estimated. In most other countries, the changes are less than 2%. Rice yield and cultivation areas in Brazil and Argentina have decreased slightly, with total rice production decreasing by 5.0% and 4.1%, respectively.

Wheat: This is the most important crop grown during the northern hemisphere's winter months. Severe rainfall deficits have affected Kansas and Oklahoma in the USA, the Maghreb, the Levant, Türkiye and the Caucasus. Conditions were generally favorable for sowing and crop establishment in all other major production zones. This covers most of Europe, South Asia and China. Wheat yields in Australia and Brazil benefitted from favorable weather conditions, whereas in Argentina, the drought caused a significant yield reduction.

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 105.178 million tonnes (+10.6%) due to an expansion of the cultivated area. The planted area of soybeans in Argentina had also increased, but drought occurred in the main soybean-producing areas, which delayed the soybean sowing period. Although rainfall returned to normal in January 2023 and the growth of late-planted soybeans improved, yields of the late-sown fields will be reduced. The national average soybean yield is expected to decrease by 5.7%, with a total production of 50.022 million tonnes (-3.4%).