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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 July to October for 2017-2021; one of the standard reference periods.
15YA	Fifteen-year average, the average for the four-month period from July to October 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	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 July and October 2022, 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 127th 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, 44 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), 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	43 key countries (main producers and exporters) and 216AEZs	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 <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 2022. 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 July to October 2022.

Agroclimatic conditions and global warming

Temperatures keep setting new records. During this monitoring period, Europe experienced the hottest summer and autumn on record, accompanied by a prolonged drought. The Yangtze river basin in China also experienced an extremely hot and dry summer and autumn. Extreme rainfall anomalies were recorded as well in other parts of the world: Pakistan suffered from devastating floods, while the South of the USA, Argentina, southern Africa and the Horn of Africa were affected by severe droughts. These conditions are partly due to La Niña, which is entering a rare 3rd consecutive northern winter. Thus, the outlook for the upcoming months is rather dire for some regions.

In many regions of the world, rainfall is the main limiting factor for crop production. The largest rainfall deficits, exceeding more than -30%, as compared to the 15-year average, were observed for Central-Eastern Brazil, the Central-Northern Andes, California, the northern Plains of the United States, the coast of North African and Middle Asia region, the Caucasus region, Africa south of the equator, Tibet and South-East China. Rainfall deficits in the range of -10 to -30% were observed for the Pampas of Argentina, southern and north-eastern Brazil, the Amazon basin, the Mexican Highlands, most of Canada's crop production regions, most of Europe and Türkiye, Central Africa and Gulf of Guinea, northwest India, the North China Plain and Southern China. Only few summer crop production regions in the northern hemisphere received above average rainfall. In Pakistan, torrential rainfalls caused prolonged floods in Sindh and Baluchistan provinces. In the southern hemisphere, the Malay Archipelago, as well as Australia and New Zealand experienced above average rainfall conditions.

Global crop production situation

During the monitoring period from July to October, the global crop production index (CPI) was at the lowest level (CPI=1.15) in the same period of nearly 10 years, which was equivalent to that in 2018. Although the crop production situation in this monitoring period is worse than that in previous years, a CPI greater than 1 indicates that global crop production is stable on the whole, and there will be no significant reduction in production.

Estimates of global crop production

The global production of majors crops for 2022 is expected to be 2859.86 million tonnes with a decrease by 44.10 million tonnes (-1.5%) from 2021. Maize production is expected to be 1045.17 million tonnes

with a decrease of 32.01 million tonnes (-3.0%), which is the largest reduction in the past five years. Rice production is expected to be 754.57 million tonnes with a decrease of 9.45 million tonnes (-1.2%) from 2021. Wheat production is expected to be 740.07 million tonnes, a reduction of 2.32 million tonnes, a drop by 0.3% from 2021. Soybean production is expected to be 320.05 million tonnes with a decrease of 0.32 million tonnes (-0.1%) from the previous year.

Outlook

In October, the prolonged drought negatively impacted the sowing of winter wheat in the High Plains of the USA and the planting of maize and soybeans in Argentina. In Brazil, conditions for sowing of maize and soybean were close to normal. Planting of winter wheat in Europe and China benefitted from generally favorable moisture conditions, although dry conditions persisted in the Caucasus region of Russia.