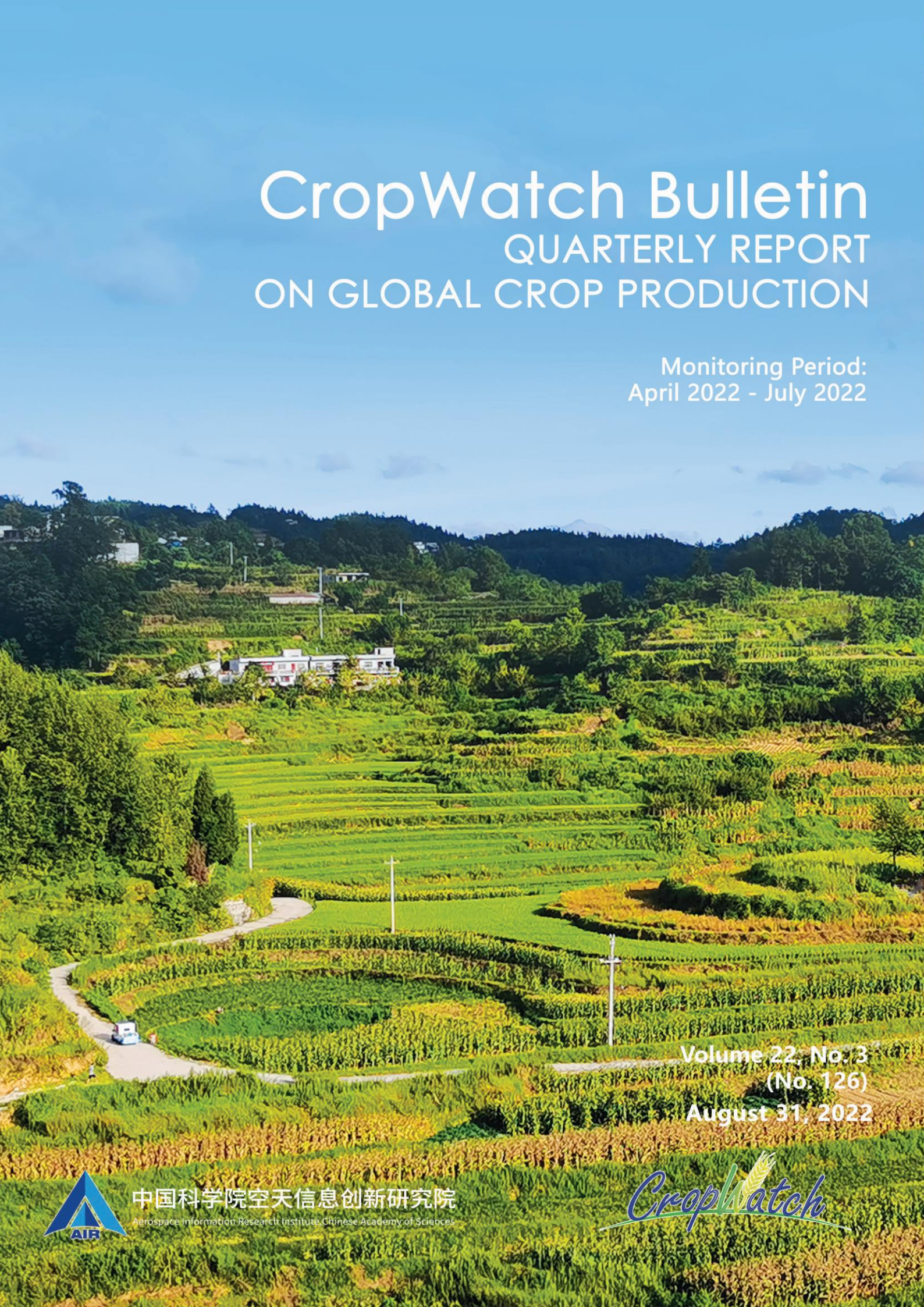
CropWatch Bulletin

QUARTERLY REPORT ON GLOBAL CROP PRODUCTION

Monitoring Period:
April 2022 - July 2022



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CropWatch

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CropWatch Online Resources: This bulletin along with additional resources is also available on the CropWatch Website at http://www.cropwatch.cn and http://cloud.cropwatch.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 2022, 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	43 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 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 weather 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 April to July 2022.

Agroclimatic conditions and global warming

As a consequence, weather conditions for crop production are getting more extreme, exacerbated by a third year of La Niña conditions. The period from January to July ranks as the 6th hottest on record. The five warmest Julys on record have all occurred since 2016. Unusually high temperatures were recorded in the North China Plain, as well as in Europe. Apart from the high temperatures, Europe, as well as parts of China, were hit by severe drought conditions, causing not only damage to crops, but also limiting hydropower generation and shipping operations on the Rhine, Loire and Yangtze rivers. Thus, global warming is not only impacting agriculture, but the economy and well-being of people as well.

In many regions of the world, water is the most important factor controlling crop production. The regional rainfall patterns continue to be influenced by La Niña, as well as by climate change: The largest rainfall deficits, exceeding more than -30%, as compared to the 15 year average (15YA), were observed for most of Europe and the Horn of Africa, Central-Eastern Brazil, and the Central-northern Andes. In most other regions in South America, as well as in the Southern USA and Northern Mexico, the Maghreb, Central and Western Africa and the Indian subcontinent, rainfall deficits ranged between -10 to -30%. The strongest positive departures were observed for Pakistan, Ural to Altai mountains, northeast of China and Eastern Australia. Only few regions, such as the northern half of the USA, Russia west of the Ural, South-East China and South-East Asia experienced normal rainfall, with a departure range of -10 to +10%.

Impact of weather conditions on crops

Maize: The main maize producing countries in the northern hemisphere have been affected by high temperature and dry weather, causing a decline in area and yield. The southern hemisphere countries had expanded their maize acreage and production increased. 2022 global maize production is expected to be 1.037 billion tonnes, a decrease of 40.68 million tonnes (-3.8%). In the 2022 northern hemisphere summer, extreme heat and dry weather had a serious adverse impact on agricultural production in Europe, resulting in reduced maize yields, among others, in France, Germany, Hungary, Italy, Romania, and the Ukraine. Hungary, Italy, and Romania were the most severely affected countries. Their maize yields declined by more than 10%; the war in the Ukraine limited the country's agricultural production. Both area and yield fell sharply, resulting in a large decline by 34% or 12.22 million tonnes, resulting in production of 23.72 million tonnes. The U.S. is the world's top maize producer. It experienced drought conditions in its main maize-producing regions in June, resulting in a decrease in maize production to 363.59 million tonnes, down by 17.51 million tonnes or 4.6 %. China's maize acreage shrank, and the high temperature and drought in the Yangtze River basin and flooding in some northern areas led to a reduction in maize production to 222.76 million tonnes, down by 11.08 million tonnes or 4.7%. The continued drought in Ethiopia and Kenya in the Horn of Africa led to a 20.1% and 7.8% reduction in production, respectively. Production in Canada, Nigeria, Vietnam and other countries was slightly reduced. In Brazil, the second season maize acreage increased by 9.2%. Combined with higher yields (+6,7%) due to favorable weather during the grain filling period in April, second season total maize production increased by 16.5%, prompting

Brazil's total 2021-22 maize production to reach 91.3 million tonnes, an increase of 9.6%. Argentina's and South Africa's maize production is estimated to be 54.97 million tonnes (+2.9%) and 11.86 million tonnes (+3.5%), respectively.

Rice: Rice production is forecasted to increase slightly by 3.54 to 768 million tonnes (+0.5%). In China, the world's largest rice producer, production is expected to increase slightly by 0.3% to 197.01 million tonnes, although local areas were affected by high temperatures, drought or flooding. In the important rice production countries of South- and South-East Asia, such as Thailand, Vietnam, Indonesia, the Philippines, Myanmar and Bangladesh, precipitation has generally been normal and production levels are similar to last year. Pakistan has received significantly more precipitation, causing local flooding. But overall conditions are still conducive to the growth of rice. Production is estimated to increase by 6.8%. In central and north-central India, precipitation is significantly below average, but the main rice producing areas have well-developed irrigation systems, and the dry and hot weather has less of an impact on rice production. The country's rice production is expected to decline slightly by 1.7%. Rice production in the U.S. and Nigeria also declined due to below average rainfall. Overall, the global rice production and supply situation is stable and an increase by 3.54 million tonnes in global rice production is forecasted.

Wheat: Total wheat production is expected to be 708 million tonnes, a reduction of 12.68 million tonnes (-1.8%). In most of Europe, wheat reached maturity before the drought had intensified and production levels in France, the UK and Germany dropped by less than 10%. Romania was the country that was most severely affected and its wheat production decreased by 13.2%. In India and Pakistan, a heat wave led to a shorter grain filling period, resulting in a yield decline by 2.8% and 4.9%, respectively. Total wheat production is estimated at 93.24 million tonnes and 25.57 million tonnes, respectively. Due to droughts, Morocco (-33%), Ethiopia (-20.7%), Kenya (-16,6%) and Afghanistan (-7,4%) saw sharp declines in their wheat production. In Iran, wheat acreage and yields fell simultaneously, resulting in a decline of the country's wheat production by 13.4%. Conditions in the USA have been mixed. Winter wheat production in the Plains was impacted by drought conditions, whereas spring wheat production in the North is benefitting from favorable moisture conditions, resulting in decline of production by 1% at the national level. Among the major wheat-producing countries, only Australia, Brazil, Canada, Mexico and Kazakhstan and Kyrgyzstan in Central Asia have increased wheat production. Total global wheat production has fallen to the lowest level in the past five years, and the tight situation of global wheat supply is expected to continue.

Soybean: Global soybean production is forecasted at 320 million tonnes, with a slight decrease by 0.2%. Production in major soybean exporting countries declined, while in China, the largest importer, it increased significantly. The United States and Brazil are the world's two largest soybean exporters. Production is estimated at 102.36 million tonnes and 95.14 million tonnes, respectively, a decrease of 2.35 million tonnes and 1.16 million tonnes or 2.2% and 3.3%. The main reason for the reduction in soybean production in the United States is the low precipitation and high temperatures in its main soybean producing areas in June and July, affecting soybean flowering and podding, while Brazil is mainly affected by persistent drought conditions, which reduced yields. In contrast, China, the largest soybean importer, increased its soybean acreage significantly this year, prompting Chinese soybean production to reach 18.15 million tonnes, the highest production in nearly 10 years, an increase of 3.81 million tonnes or 26.5%. This increase offsets reductions in U.S. and Brazilian production. Soybean production in Canada and India decreased by 260,000 tonnes and 440,000 tonnes, respectively, while production in Russia and Argentina increased by 230,000 tonnes and 170,000 tonnes, respectively. Overall, the global soybean supply situation is normal.