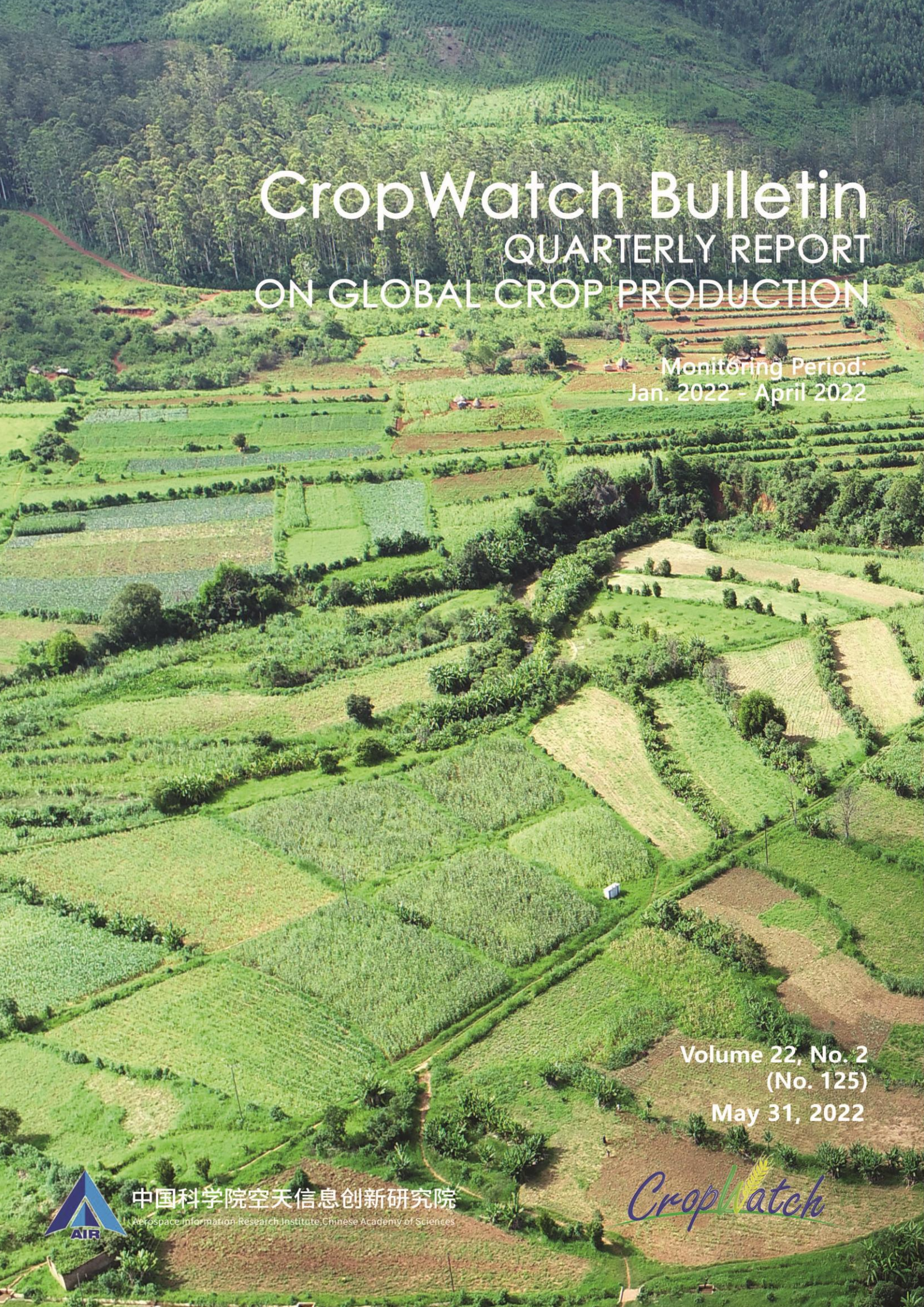

CropWatch Bulletin

QUARTERLY REPORT ON GLOBAL CROP PRODUCTION

Monitoring Period:
Jan. 2022 - April 2022

Volume 22, No. 2
(No. 125)
May 31, 2022

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May 2022

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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 January to April of for 2017-2021; one of the standard reference periods.
15YA	Fifteen-year average, the average for the four-month period from January to April 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
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 January and April 2022, 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 125th 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, 42 major agricultural countries, and 217 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	42 key countries (main producers and exporters) and 210 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 April 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 January to April 2022.

Agroclimatic conditions and global warming

Temperatures keep raising, though at a slightly slower pace thanks to La Niña. While the global average increase in March was “only” 0.95ºC over the 20th-century average, it nevertheless caused much larger increases at the regional scale. Temperatures in the northwest of India, as well as in the Punjab of Pakistan were above 35ºC during the grain filling stage of wheat in March. This caused terminal heat stress and a yield reduction by 15-20% in some regions.

Deforestation in the Brazilian Amazon during the first three months of 2022 has increased by 64% compared to the same period last year. The total burned area in 2022 reached 43,000 ha, more than twice the average of the past ten years.

Ukraine, the commodity market and food security

Russia Ukraine conflict brought uncertainties to world food supply. Before the conflict , Ukraine used to export about 27 million tonnes of maize and 21 million tonnes of wheat. This represents a 11 to 13% share of the world market. It also is the second largest exporter of barley and the largest exporter of sunflower oil, with a market share of 40%. As shown in our special section on “The impact of the Russia Ukraine conflict on global food security,” potential production levels for winter wheat are almost unchanged, due to favorable weather conditions – yet the conflict impacts farming operations, logistics and trade, and it is almost impossible to forecast the levels of commodity exports for the coming months. Partly due to the large uncertainties and fueled by speculators, commodity prices have risen sharply.

According to the remote sensing-based estimates, the winter crop area increased 3.8% in Ukraine, the production of winter crops increased 2.1% (520 thousand tonnes). The area increase of winter crops in the Donetsk and Luhansk regions of eastern Ukraine has led to a doubling of production in both regions. However, the conflicts bring uncertain for the coming harvest season.

Agroclimatic conditions and crop production

In the Northern Hemisphere, wheat was the dominant crop that was in the field during this period. It had reached maturity in India and Pakistan by March. In most other production regions, it was still in its vegetative growth phase at that time. The planting of spring wheat,

soybean and rice had started or was already in full swing in most northern regions by late April. In South America, maize and soybean were the key crops to be monitored. The harvest of the first crop, mainly soybean, and the subsequent sowing of the second crop in Brazil took place in February, whereas the harvest of the main crop in the other South American countries was well advanced by April. Closer to the Equator, this report covers the end tail of the harvest of the main season rice crop and production of the winter rice crops (Boro/Kharif) in South- and South-east Asia.

Global rainfall patterns were strongly affected by the current La Niña conditions. The largest rainfall deficits, exceeding more than -30%, as compared to the 15 year average, were observed for Central-Eastern Brazil, the West-Coast of North America, the Horn of Africa, as well as Afghanistan. Negative departures of rainfall, in the range of -30 to -10%, were also observed for a large region stretching from Morocco to Afghanistan. Most of the European part of Russia, most of China, as well as South-east Asia and Australia experienced rainfall that was at least 10% above average.

Impact of weather conditions on crops

Maize: Argentina and Brazil contribute about 40% to the maize that is being traded internationally. Conditions in Argentina were favorable. In Brazil, the regular, though below average rainfall ensured favorable conditions for the important second season (safrinha) maize. Hence, CropWatch estimates a production increase by 9% for Brazil and 2.9% for Argentina, amounting to a combined increase by roughly 11 million tonnes. Maize production during the rainy season in Africa south of the equator was negatively impacted by irregular rains, but production levels stayed close to average. However, Kenya was hit by a severe drought, causing a decline in production by 12.9%. Maize production in South and Southeast Asia benefitted from generally favorable conditions. Maize planting started in April in North America and Europe. So far, weather conditions have been favorable, although the weather has been cooler than normal in the USA and drier than normal in most of Western Europe. Total global production is forecasted at 1009 million tonnes (+0.8%).

Wheat: In China, wheat benefitted from favorable weather conditions in recent two months. The crop more than compensated for the delayed sowing in last fall. Nevertheless, there was a slight reduction in area, causing an overall reduction of production by 1.2%. A heat wave hit the northwest of India and the Punjab of Pakistan in mid March. The ensuing terminal heat stress caused a fast brown-down of the crops and shortened the grain-filling period. At the national level, this resulted in wheat production decreases by 4.9% to 25.57 million tonnes in Pakistan and by 2.8% to 93.24 million tonnes in India. Severe yield losses for the rainfed wheat production are forecasted for the drought stricken countries of the Maghreb, Near- and Middle East and Central Asia. Production in Morocco is estimated to have declined by 40%. The south of the USA is also affected by drought conditions. Significant yield reductions are to be expected for Texas, Oklahoma and Kansas. Abundant rain in recent weeks has caused rather favorable conditions for the upcoming planting period of wheat in Argentina, Brazil and Australia. CropWatch estimates a decline in global wheat production by 1% to 713 million tonnes, which continued the wheat decrease since 2021 and world wheat supply is still with tension.

Rice: Conditions for winter (Rabi) season rice production were generally favorable in India, the largest rice exporter. Production is estimated to increase by 1.5% year on year. Conditions were also favorable in Bangladesh (+4.2%) and Vietnam (+1.7%), whereas a slight decrease in production by -0.7% is forecasted for Thailand. Conditions for the other important rice producing countries

and regions, such as the Philippines (-0.2%) and Indonesia (+3.1%) were average or above. CropWatch forecasts a slight increase of total global rice production by 0.7% to 769 million tonnes.

Soybean: Argentina, Brazil, Paraguay and Uruguay produce more than half of the world's soybeans traded on the international market. Conditions in Brazil for soybean production were unfavorable due to drought conditions from October to December. CropWatch forecasts a decline by 7.4% to 89 million tonnes, whereas for Argentina, a slight increase by 0.3% to 51 million tonnes is expected. In the USA, Canada and the Ukraine, soybean sowing started at the end of this monitoring period, in late April. Soil moisture conditions are mostly favorable in these countries, but the war causes high uncertainties for the Ukrainian production. Conditions in May will determine the area planted and crop establishment. CropWatch foresees a decline in global soybean production by 3.3% to 310 million tonnes.