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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.com.cn and http://cloud.cropwatch.com.cn/.

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Abbreviations

5YA	Five-year average, the average for the four-month period from October to January for 2016-2020; one of the standard reference periods.
15YA	Fifteen-year average, the average for the four-month period from October to January for 2006-2020; 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
Ton	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 from January to April 2021, 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 121st 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.com.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 201 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.com.cn**, **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 April 2021. 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 2021.

In the Northern Hemisphere, wheat was the dominant crop that was in the field during this period. It had reached maturity in South Asia by April and was mostly in its vegetative growth phase in the other regions. The planting of spring wheat, soybean and rice started and was in full swing in most northern regions by late April. In the Southern Hemisphere, mainly in South America, maize and soybean were the key crops to be monitored. The harvest of the first crop 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.

The outbreak of desert locusts in East Africa, Middle East and southwest Asia is still not under control either. Ample rainfall keeps maintaining a favorable environment for them to spread even further. Their impact on world food supply is limited, but is devastating for the farmers in the areas that are hit by a swarm.

Agroclimatic conditions

Global agroclimatic conditions are assessed based on CropWatch Agroclimatic Indices which describe weather and climate over agricultural areas only. They are referred to as RAIN, TEMP and RADPAR and expressed in the same units as the corresponding climatological variables (rainfall, temperature and photosynthetically active radiation). BIOMSS is an estimate of the plant biomass production potential.

Weather conditions during this monitoring period were influenced by La Niña and a break-down of the polar vortex. La Niña officially ended in March 2021. It brought wetter conditions to eastern Australia and drier conditions to equatorial Africa. The weakening and break down of the polar vortex caused cold spells mainly in the USA and Europe.

According to the analyses presented in Chapters 1 and 3.1, prevailing climate conditions during the current 2021 JFMA reporting period were dominated by severe drought conditions in Brazil, Mexico, California, Iran, Iraq, Syria, Afghanistan, Southern and Taiwan of China, Angola and Madagascar. In Mexico and Chinese Taiwan, winter rains were far below average, prolonging the severe drought conditions that had started during the rainy season last summer. For the other drought-stricken regions, The time from January to April represents the period during which most of the annual rainfall is usually recorded. In Brazil, the rainy season had started with a delay last October/November and below-average

rainfall conditions continued in the Pantanal, Mato Grosso, Rio Grande and the North East. Hence, practically all crop production regions of the country were affected. Rainfall in Argentina, as well as in eastern Europe and the wheat production regions of Russia was above average. This helped restore soil moisture conditions especially in southern Russia, as that region had been affected by drought conditions during the previous reporting period. Precipitation was below average for the Indian subcontinent. However, this had very limited impact on crop production, since almost all of the production is irrigated. For most of the other regions, rainfall was near average. The recovery from drought conditions in Australia is note-worthy, as this helped restore soil moisture for the coming wheat production season.

Temperatures were generally close to average in most regions. However, Central and Eastern Europe were affected by cooler-than-usual temperatures in March and April, which slowed crop growth. However, the crops were still at an early stage in the growth cycle and this should not have a negative impact on yield.

Crop specific impact of weather conditions :

At a global scale, rainfall (RAIN) returned close to average levels after the high positive deviation during the last monitoring period. Photosynthetically active solar radiation (RADPAR) was slightly below average.

The following is a summary of the situation in key production regions and noteworthy anomalies:

- **Maize**: Argentina and Brazil contribute about 40% to the maize that is being traded internationally. Conditions in Argentina were favorable. In Brazil, rainfall deficits reached 50% and more during this reporting period. The Parana basin received only 348 mm during the January to April period. Hence, supply from Brazil will be below average. In southern Africa, rainfall was generally favorable and normal production can be expected, except for Angola, which was also affected by drought conditions.

- **Rice**: Conditions for winter (Rabi) season rice production were generally favorable in India, the largest rice exporter. Another region with important dry season rice production is Southeast Asia. For Thailand and Vietnam crop conditions were mixed. Rainfall increased to above-average levels in Thailand, after drought conditions in 2020. But low water levels in the dams and rivers at the beginning of the growing season posed challenges for irrigation. Similarly, in the south of Vietnam, crop conditions were rather unfavorable. Water levels in the Mekong River are recovering from record lows observed in 2020. Brazil was affected by severe rainfall deficit. Conditions for the other important rice producing countries and regions, such as the Philippines, Indonesia, Southern Africa and Argentina were generally favorable.

- **Wheat**: Precipitation in most of the rainfed wheat producing areas in the Northern Hemisphere was favorable, especially in Central- and Eastern Europe, the Maghreb, Russia, Ukraine and Kazakhstan. Most countries in the Near East and Central Asia were affected by a lack of winter rains. Especially Iran, Iraq, Syria and Afghanistan suffered from severe rainfall deficits, by more than 40%. Conditions in North America have been rather favorable so far. A severe cold spell in the USA in February seems to have caused only little damage to wheat.

- **Soybean**: 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 those countries. Conditions in May will determine the area planted and crop establishment. 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 the severe drought conditions. Conditions for soybean production in Paraguay were more favorable, although the delayed planting of the first crop subsequently also delayed the sowing of the second crop. Argentina benefited from above-average rainfall, thus yield prospects are favorable for this country.

2021 Global production estimates

Crop conditions in 2020 were generally very favorable. This year, production prospects are mixed, due to some extreme events such as the severe drought conditions in the countries mentioned above. Global maize production in 2021 is expected to decrease by 1.1% or 11.66 million tons to 1.059 billion tons; global rice production is also expected to decrease, by 1.0% to 753 million tons; a sharper decrease by 2.1% is forecasted for wheat, resulting in a production of 726 million tons; the drought in Brazil is expected to cause a decline in global soybean production by 1.0%. Global soybean production in 2021 is expected to 320 million tons.

China

This report covers the main growing period of winter wheat and rapeseed. The sowing of the first summer crops, such as spring maize and early rice started in March. In 2021, the total planted area of early rice of China is estimated at 5029.9 thousand hectares, down from 2020 but still higher than that in 2019. Agroclimatic conditions over the major winter crop producing regions were favorable, especially in the North China Plain (HuangHuaihai). CALF was 7% above average. Rain was above average for most of the country, apart from the Lower Yangtze region and Southern and Taiwan of China. Drought conditions in the South-East continued until the end of April, whereas rainfall returned to slightly above average conditions in the Lower Yangtze. Overall, prospects for crop production in China are favorable. CropWatch puts the total output of winter crops at 132.46 million tons, up by 0.7% or 0.96 million tons from 2020. The total winter wheat output in 2021 is expected to be 122.26 million tons, an increase of 1.11 million tons compared to 2020, or up by 0.9%.