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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.

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ℹ *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 for October from 2012 to 2016 to January next year; one of the standard reference periods.
15YA	Fifteen-year average, the average for the four-month period from October from 2012 to 2016 to January next year; 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	Monitoring and Reporting Unit
NDVI	Normalized Difference Vegetation Index
OISST	Optimum Interpolation Sea Surface Temperature
PAR	Photosynthetically active radiation
PET	Potential Evapotranspiration
RADI	CAS Institute of Remote Sensing and Digital Earth
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 between October 2017 and January 2018, 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 108th such publication issued by the CropWatch group at the Institute of Remote Sensing and Digital Earth (RADI) of the Chinese Academy of Sciences, Beijing.

CropWatch analyses and indicators

CropWatch analyses are based mostly on several standard as well as new ground-based and remote sensing indicators, following a hierarchical approach. The analyses cover large global zones; major producing countries of maize, rice, wheat, and soybean; and detailed assessments for Chinese regions, 30 major agricultural countries and 148 Agro-Ecological Zones (AEZs) for those 30 key countries. 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, and RADPAR, which describe weather factors; and (ii) agronomic indicators—BIOMSS, VHIn, CALF, and VCIx, describing crop condition and development. 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. 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 C, as well as online resources and publications posted at www.cropwatch.com.cn.

This bulletin is organized as follows:

Chapter	Spatial coverage	Key indicators
Chapter 1	World, using Monitoring 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	30 key countries (main producers and exporters) and AEZs	As above plus NDVI and GVG survey
Chapter 4	China and regions	As above plus high resolution images; information on pests and diseases; and food import/export outlook
Chapter 5	Production outlook, a focus on the perspectives in crop production in Africa, 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.

Executive summary

Introduction

The period from October 2017 to January 2018 (ONDJ) is a relatively quiet period from the agriculture point of view. In the temperate northern hemisphere summer crops have been harvested, while winter crops have been planted and are now mostly dormant. In tropical and equatorial countries of Asia and Brazil in South America, maize and rice had mostly reached harvest while wheat and second crop of maize and rice were at planting (see the crop calendars in chapter-3). In the southern hemisphere summer crops are at advanced development stages and nearing flowering, for example maize and soybean in Argentina, Brazil and South Africa.

The executive summary first describes significant global agroclimatic patterns and highlights countries with exceptional environmental conditions. After a summary of the current situation of crops in China the CropWatch estimates of agricultural production in the southern hemisphere are presented.

Agroclimatic patterns

Although global temperature was close to average (-0.1°C), tropical and equatorial areas were cooler than expected, while several areas in the temperate northern hemisphere in Eurasia and America experienced warmer than normal weather. Even at the very local scale, few extreme temperatures were observed.

Global radiation (sunshine) was 4% below average, which is significant and constitutes the continuation of a global pattern that started during the previous reporting period (JASO). The lowest values concentrated around the Baltic Sea and only few areas had positive sunshine anomalies. Very significant and record sunshine deficits are also reported mainly from China (Hainan, Lower Yangtze, Southern Japan and the southern fringe of the Korean peninsula.)

The clouds that reduced sunshine also increased precipitation, which was 8% above average. The spatial variability of rainfall was large, with relatively well defined surplus and deficit areas. The most severe droughts occurred in unconnected patches in the southern hemisphere: (1) the southern Cone of Latin America (Chile -51%; Uruguay -26%) and most provinces of Argentina; (2) Southern Africa,(3) East African Highlands and (4) New-Zealand. A large continent-wide drought affected the area; including the Mediterranean, the Middle East and western Asia (Pakistan, -48%) and extended into western central Asia. In this area Portugal (-65%) and Algeria (-63%) were the driest countries. Two remaining drought patches to mention include, eastern Asia with the Lower Yangtze region and the western coast of north America from Mexico to Canada.

Among the areas which recorded excess rainfall, the largest region covers the southern Baltic (Estonia +30%, Finland +32%, Germany and Lithuania +33%, Sweden +37%, Belarus, Poland and Norway +46% and extends across Asia as far as Azerbaijan (+60%) and Kyrgyzstan (+51%) and northern China. Around the Baltic, conditions were abnormal for all CropWatch agroclimatic indicators, resulting from warm, wet and cloudy weather. Others areas with above-normal rainfall include the Caribbean and Central America, Paraguay and Bolivia and adjacent areas for which frequent floods were reported.

Agronomic indicators

The impact of extreme weather conditions, especially drought, is directly assessed by the two main agronomic indicators used by CropWatch i.e. Cropped Arable Land Fraction (CALF), which measures how much arable land is actually cropped, and Maximum Vegetation Condition Index, VCIx, which assesses local yield on a scale from 0 (“same as lowest ever”) to 1 (“same as highest ever”).

For the countries that produce 80% of the world’s main cereals, VCIx reached 0.86 on an average. The lowest values occurred in Iran (0.51), Pakistan (0.67), Australia (0.67), Kazakhstan (0.67), South Africa (0.68) and China (0.70). High values occur in south-east Asia, Brazil (0.97) and some countries of the above-mentioned “Baltic” group (Poland, 1.00 and Ukraine, 1.04). The average CALF variation was +3%. The worst performers for the current reporting period (Canada -11% and Australia -7%) include two of the main global wheat exporters. At the high end are Ukraine (+13%), Iran (+14%), and Pakistan (+16%). Area increase is expected to compensate for yield drops in three countries: winter wheat in Iran (CALF+14%, VCIx 0.51), wheat in Pakistan (+16%, 0.67) and summer crops in Argentina (+8%, 0.71). However, at this stage it is not known, to what extent the “compensation” will ensure satisfactory production.

China

Generally, the Northeast and Inner Mongolia regions do not have any crops in the field at the time of reporting because temperature is too low for winter crops. Hibernating winter wheat is present in all other regions. The current precipitation (as rain or snow) will eventually benefit the crops after the winter dormancy phase.

China recorded rather different crop condition as compared to same period (ONDJ) of the previous cropping season: RAIN -5% (versus +12% in 2016-17), TEMP -0.3°C (Vs. +0.5°C) but the RADPAR deviation was identical, reaching -12% during both seasons. In 2017-18 sunshine was particularly poor in the Lower Yangtze region (RADPAR -18%). So far agroclimatic conditions were mostly unfavorable for the winter crops in China. At the sub-national scale, rainfall was significantly above average in Huanghuaihai, Inner Mongolia and the Loess region, whereas the Lower Yangtze and South-West China experienced the largest deficits. Rainfall was close to average in North East China and Southern China.

At the end of January, CropWatch rainfall departure cluster analysis shows average rainfall in about 62% of croplands, mainly located in the northeast and southwest. 9% of croplands (in the southeast) were generally below average. CALF declined (-3% of 5YA), however BIOMSS (+7% of 5YA) was above average in almost all agroecological zones of China, except in the Lower Yangtze region and Southwest China. In contrast, CALF was below average in most regions of China except in the Loess region. Uncropped arable lands are mainly located in the northern parts of Gansu and Shaanxi provinces, Shanxi province, Hebei province. Winter crops in central and southern Henan province, and northern Anhui province were covered by snow according to satellite images.

The Loess region reports VCIx value at 0.83, While all other regions in China present lower than 0.8 and follow a pattern which is consistent with those of uncropped and cropped arable land.

Compared with previous years, the incidence of pests and diseases was relatively large during the 2017-18 winter in the main wheat growing regions of China. Temperature and rainfall forecasts for the 2018 spring indicate potential for more serious pest and disease damage than in previous years.

Chinese grain imports are projected to increase in 2018, particularly for Maize (+16.9% over 2017), while soybean imports will increase only slightly in 2018.

Southern hemisphere production

The production outlook in the current bulletin includes only the major producers in the southern hemisphere, as assessments for the northern hemisphere would be too hypothetical at this early stage in the season.

CropWatch puts the winter wheat production at 11.08 million tonnes for Argentina, a significant drop of 4.7% below the previous year's value, resulting from the combined decrease of yield (-1.6%) as well as cultivated area (-3.2%). In Australia, the drop in wheat production reached 22.1% with 24.606 million tonnes output. Again, poor climatic conditions are to blame in a mostly semi-arid setting which has demonstrated huge variability in the past. Brazil is one of the smallest wheat producer in the hemisphere, but it is nevertheless one of the most dependable: production reached 7.876 million tonnes, up 4% over 2016-17. In South-Africa, the current seasons output is estimated by CropWatch at 1.356 million tonnes, corresponding to a drop of 20.4% compared with the previous season. Drought, the main factor behind the poor performance of South African wheat is likely to take its toll on the current maize summer crop as well.

Chapter 1. Global agroclimatic patterns

Chapter 1 describes the CropWatch Agroclimatic Indicators (CWAIs) rainfall (RAIN), temperature (TEMP), and radiation (RADPAR), along with the agronomic indicator for potential biomass (BIOMSS) in sixty-five global Monitoring and Reporting Units (MRU). Rainfall, temperature, and radiation indicators are compared to their average value for the same period over the last fifteen years (called the "average"), while BIOMSS is compared to the indicator's average of the recent five years. Indicator values for all MRUs are included in Annex A table A.1. For more information about the MRUs and indicators, please see Annex C and online CropWatch resources at www.cropwatch.com.cn.

1.1 Overview

Over the current reporting period and based on findings from all 65 MRUs, the CropWatch indicator with the largest variability in departure from average conditions is temperature (as measured by the coefficient of variation of TEMP departures from average for all 65 units), followed by rainfall (RAIN), BIOMSS and radiation (RADPAR). Nevertheless, global temperature was close to average (-0.1 °C), while rainfall was 8% above average and radiation 4% below, which is significant and constitutes the continuation of globally low radiation values highlighted in the previous CropWatch bulletin. In general, for the reporting period, no significant correlation exists between the intensity of RAIN and BIOMSS and their departures from average. However, the correlation is negative for TEMP, i.e. warm climates had large negative departures, which is clearly visible in figure 1.2. There is positive correlation for RADPAR .

Starting with rainfall, the sections below will focus on the description of anomaly patterns (see also figures 1.1 through 1.4).

1.2 Abnormal rainfall patterns

The driest areas occur in four relatively isolated southern patches in Western Patagonia (MRU-27, -50%) and the adjacent semiarid southern cone (MRU-28, -20%), the Nordeste in Brazil (MRU-22, -11%), South-west Madagascar (MRU-06, -48%) and New-Zealand (MRU-56, -48%). This is followed by a large contiguous area including almost all of Africa (except the Gulf of Guinea, MRU-03, with a slight deficit of -7%), the Mediterranean, the Middle East and western Asia extending into western central Asia. In this large ensemble, water deficit affected mostly the periphery in the north and the east: MRU-07, North Africa with a deficit of 39%, Mediterranean Europe and Turkey (MRU-59, -35%) and MRU-02, the East African highlands with a deficit of 34%. In western Asia (MRU-31) and the Ural to the Altai mountain range (MRU-62) the deficit is less severe at -15% and -13%, respectively.

The two remaining rainfall deficit patches include: two MRUs at -24% (MRU-43, East Asia; MRU-37, Lower Yangtze) as well as South-west China (MRU-41 at -18%) and a band extending from Florida to California and British Columbia with the following departure values: -29% in the Cotton Belt to NE Mexico (MRU-14); -28% along the western USA Coast (MRU-16) and -13% in the south-western USA and the Mexican highlands (MRU-18).

Large positive departures occur essentially in one area of major agricultural relevance, encompassing Huanghuahai (MRU-34) and the Loess region of China (MRU-36) at +47% and +113%, respectively. Adjacent areas less important for crops (but not for livestock) are listed hereafter by increasing values of rainfall excess: MRU-39 (Qinghai-Tibet, +36%), Gansu-Xinjiang (MRU-32, +80%) and southern Mongolia