

CropWatch Bulletin

QUARTERLY REPORT ON GLOBAL CROP PRODUCTION

Monitoring Period: January - April 2015

May 31, 2015

Vol. 15, No. 2 (total No. 97)



Institute of Remote Sensing and Digital Earth
Chinese Academy of Sciences



May 2015

Institute of Remote Sensing and Digital Earth (RADI), Chinese Academy of Sciences

P.O. Box 9718-29, Olympic Village Science Park

West Beichen Road, Chaoyang

Beijing 100101, China

This bulletin is produced by the CropWatch research team at the Digital Agriculture Division, Institute of Remote Sensing and Digital Earth (RADI), Chinese Academy of Sciences, under the overall guidance of Professor Bingfang Wu. Contributors are Sheng Chang, Bo Chen, René Gommaes, Anna van der Heijden, Jiratiwan Kruasilp, Mrinal Singha, Shen Tan, Qiang Xing, Nana Yan, Mingzhao Yu, Hongwei Zeng, Miao Zhang, Xin Zhang, Yang Zheng, and Weiwei Zhu.

English version editing was provided by Anna van der Heijden; the Chinese version was edited by Beijing YongChengTianDi Creative Design Co., LTD.

Corresponding author: Professor Bingfang Wu


Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences

Fax: +8610-64858721; E-mail: cropwatch@radi.ac.cn, wubf@radi.ac.cn

CropWatch Online Resources: This bulletin along with additional resources is also available on the CropWatch Website at <http://www.cropwatch.com.cn>.

Disclaimer: This bulletin is a product of the CropWatch research team at the Institute of Remote Sensing and Digital Earth (RADI), Chinese Academy of Sciences. The findings and analysis described in this bulletin do not necessarily reflect the views of the Institute or the Academy; the CropWatch team also does not guarantee the accuracy of the data included in this work. RADI and CAS are not responsible for any losses as a result of the use of this data. The boundaries used for the maps are the GAUL boundaries (Global Administrative Unit Layers) maintained by FAO; where applicable official Chinese boundaries have been used. The boundaries and markings on the maps do not imply a formal endorsement or opinion by any of the entities involved with this bulletin.

Contents

 *Note:* CropWatch resources, background materials and additional data are available online at www.cropwatch.com.cn.

Contents iii

FIGURES	iv
TABLES	v
Abbreviations	vi
Bulletin overview and reporting period.....	vii
Executive summary	8
الملخص التنفيذي	10
Résumé	12
Краткий обзор	14
Resumen	16
Chapter 1. Global agroclimatic patterns	18
1.1 Overview	18
1.2 Rainfall	19
1.3 Temperature	20
1.4 Photosynthetically active radiation	20
1.5 Biomass	21
Chapter 2. Crop and environmental conditions in major production zones	22
2.1 Overview	22
2.2 West Africa	22
2.3 North America	24
2.4 South America	26
2.5 South and Southeast Asia	27
2.6 Western Europe	29
2.7 Central Europe to Western Russia	30
Chapter 3. Main producing and exporting countries	32
3.1 Overview	32
3.2 Country analysis	35

Chapter 4. China	66
4.1 Overview	66
4.2 Winter crops production	68
4.3 Regional analysis	69
Chapter 5. Focus and perspectives	77
5.1 Production outlook for 2015	77
5.2 Disaster events	81
5.3 Crop production and trends in South America	83
5.4 El Niño	87
Annex A. Agroclimatic indicators and BIOMSS.....	88
Annex B. 2015 production estimates.....	95
Annex C. Quick reference guide to CropWatch indicators, spatial units, and production estimation methodology.....	96
Data notes and bibliography.....	102
Acknowledgments.....	103
Online resources	104

FIGURES

Figure 1.1. Global map of rainfall anomaly (as indicated by the RAIN indicator) by MRU, departure from 14YA, January-April 2015 (percentage)	19
Figure 1.2. Global map of air temperature anomaly (as indicated by the TEMP indicator) by MRU, departure from 14YA, January-April 2015 (degrees Celsius)	20
Figure 1.3. Global map of PAR anomaly (as indicated by the RADPAR indicator) by MRU, departure from 14YA, January-April 2015 (percentage)	21
Figure 1.4. Global map of biomass accumulation (BIOMSS) by MRU, departure from 5YA, January-April 2015 (percentage).....	21
Figure 2.1. West Africa MPZ: Agroclimatic and agronomic indicators, January-April 2015	23
Figure 2.2. North America MPZ: Agroclimatic and agronomic indicators, January-April 2015	25
Figure 2.3. South America MPZ: Agroclimatic and agronomic indicators, January-April 2015	26
Figure 2.4. South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, January-April 2015.....	28
Figure 2.5. Western Europe MPZ: Agroclimatic and agronomic indicators, January-April 2015	29
Figure 2.6. Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, January-April 2015	31
Figure 3.1. Global map of rainfall (RAIN) by country and sub-national areas, departure from 14YA (percentage), January-April 2015	33
Figure 3.2. Global map of temperature (TEMP) by country and sub-national areas, departure from 14YA (degrees), January-April 2015	34
Figure 3.3. Global map of PAR (RADPAR) by country and sub-national areas, departure from 14YA (percentage), January-April 2015	34
Figure 3.4. Global map of biomass (BIOMSS) by country and sub-national areas, departure from 14YA (percentage), January-April 2015	34
Figures 3.5-3.34. Crop condition for individual countries ([ARG] Argentina- [ZAF] South Africa) for January-April 2015	35
Figure 4.1. China spatial distribution of rainfall profiles, January-April 2015	67

Figure 4.2. China spatial distribution of temperature profiles, January-April 2015	67
Figure 4.3. China cropped and uncropped arable land, by pixel, January-April 2015	67
Figure 4.4. China maximum Vegetation Condition Index (VCIx), by pixel, January-April 2015	67
Figure 4.5. China VHI minimum, by pixel, January-April 2015	68
Figure 4.6. Crop condition China Northeast region, January-April 2015	70
Figure 4.7. Crop condition China Inner Mongolia, January-April 2015	71
Figure 4.8. Crop condition China Huanghuaihai, January-April 2015.....	72
Figure 4.9. Crop condition China Loess region, January-April 2015.....	73
Figure 4.10. Crop condition Lower Yangtze region, January-April 2015	74
Figure 4.11. Crop condition Southwest China region, January-April 2015.....	75
Figure 4.12. Crop condition Southern China region, January-April 2015.....	76
Figure 5.1. Flood situation in South America on February 20, 2015	81
Figure 5.2. Trends in per capita crop production in four South American countries since 1981	85
Figure 5.3. Sowing pools in Buenos Aires province, Argentina	86
Figure 5.4. Monthly SOI time series from January 2014 to January 2015.....	87

TABLES

Table 2.1. January-April 2015 agroclimatic indicators by Major Production Zone, current value and departure from 14YA	22
Table 2.2. January-April 2015 agronomic indicators by Major Production Zone, current season values and departure from 5YA	22
Table 3.1. CropWatch agroclimatic and agronomic indicators for January-April 2015, departure from 5YA and 14YA	35
Table 4.1. CropWatch agroclimatic and agronomic indicators for China, January-April 2015, departure from 5YA and 14YA.....	66
Table 4.2. China, 2015 winter crops production (thousand tons) and percentage difference with 2014, by province	68
Table 4.3. China, 2015 winter wheat area, yield, and production and percentage difference with 2014, by province	69
Table 5.1. 2015 production estimates and forecasts for maize, rice, wheat, and soybean (thousand tons) according to various country groupings	78
Table 5.2. 2015 production estimates and forecasts for maize, rice, wheat, and soybean (thousand tons) in selected countries, compared to 2014 CropWatch estimates	79
Table 5.3. Population and agricultural statistics for selected large South American countries	84
Table 5.4. Agricultural export products of selected large South American countries	85
Table A.1. January-April 2015 agroclimatic indicators and biomass by global Monitoring and Reporting Unit	88
Table A.2. January-April 2015 agroclimatic indicators and biomass by country	89
Table A.3. Argentina, January-April 2015 2014 agroclimatic indicators and biomass (by province)	90
Table A.4. Australia, January-April 2015 agroclimatic indicators and biomass (by state).....	90
Table A.5. Brazil, January-April 2015 agroclimatic indicators and biomass (by state)	91
Table A.6. Canada, January-April 2015 agroclimatic indicators and biomass (by province)	91
Table A.7. India, January-April 2015 agroclimatic indicators and biomass (by state)	91
Table A.8. Kazakhstan, January-April 2015 agroclimatic indicators and biomass (by province)	92
Table A.9. Russia, January-April 2015 agroclimatic indicators and biomass (by oblast)	92
Table A.10. United States, January-April 2015 agroclimatic indicators and biomass (by state)	93
Table A.11. China, January-April 2015 agroclimatic indicators and biomass (by province)	94
Table B.1. Argentina, 2015 maize and soybean production, by province (thousand tons)	95
Table B.2. Brazil, 2015 maize, rice, and soybean production, by state (thousand tons).....	95
Table B.3. United States, 2015 wheat production, by state (thousand tons)	95

Abbreviations

5YA	Five-year average, the average for the January-April periods from 2010 to 2014; one of the standard reference periods.
14YA	Fourteen-year average, the average for the January-April periods from 2001 to 2014; one of the standard reference periods and typically referred to as “average.”
BIOMSS	Agroclimatic indicator for biomass production potential
BOM	Australian Bureau of Meteorology
CALF	Cropped Arable Land Fraction
CAS	Chinese Academy of Sciences
CWSU	CropWatch Spatial Units
DM	Dry matter
EBV	Ebola Virus Disease
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
OCHA	UN Office for the Coordination of Humanitarian Affairs
PAR	Photosynthetically active radiation
RADI	CAS Institute of Remote Sensing and Digital Earth
RADPAR	PAR agroclimatic indicator
RAIN	Rainfall agroclimatic indicator
SOI	Southern Oscillation Index
TEMP	Air temperature agroclimatic indicator
Ton	Thousand kilograms
VCIx	Maximum Vegetation Condition Index
VHI	Vegetation Health Index
VHIn	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 1 and April 30, 2015. It is the 97th bulletin produced by the CropWatch group at the Institute of Remote Sensing and Digital Earth (RADI) at the Chinese Academy of Sciences, Beijing. CropWatch analyses are based mostly on several standard and 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 of Chinese regions.

In parallel to the increasing spatial precision of the analyses, indicators become more focused on agriculture as the analyses zoom into 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. The indicators RAIN, TEMP, RADPAR and BIOMSS do not directly describe the weather variables rain, temperature, radiation, or biomass, but rather are spatial averages over agricultural areas, which are weighted according to the local crop production potential. 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.

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	31 key countries (main producers and exporters)	As above plus NDVI
Chapter 4	China	As above
Chapter 5	Special topics: Disaster events and trends in South America	
Online Resources	www.cropwatch.com.cn	

Newsletter and online resources

The bulletin is released quarterly in both English and Chinese. To sign up for the mailing list, please e-mail cropwatch@radi.ac.cn or visit CropWatch online at www.cropwatch.com.cn. Visit the CropWatch Website for additional resources and background materials about methodology, country agricultural profiles, and country long term trends.

Executive summary

The current CropWatch bulletin is based mainly on remotely sensed data. It focuses on crops that were either growing or harvested between January and April 2015. The bulletin covers prevailing weather conditions, including extreme factors, as well as crop condition and size of cultivated areas, paying special attention to the major worldwide producers of maize, rice, wheat, and soybean. Current condition in China and the likely global production prospects for crops to be harvested throughout 2015 are also described.

Global agroclimatic impacts

The most remarkable feature of the current January to April 2015 reporting period was above average temperature for almost all the CropWatch global mapping and reporting units (MRU), with temperatures for the MRUs usually about 1.0 to 1.5 °C above average, which is significant when it occurs over large areas and month-long time periods. High temperature has accelerated crop development in several regions in the northern hemisphere, including southern areas of west Russia and neighboring areas, which complicates the interpretation of some of the crop condition indicators and adds uncertainty to the analyses.

Below average rainfall occurred in most tropical areas across all continents, affecting also the Horn of Africa and the east African highlands, much of southwest Europe and especially the northern Mediterranean, the southernmost areas in China, Pakistan, the western United States (California and Washington state), and northeast Australia and New-Zealand. The largest positive departures of rainfall from average occurred in the Sierra Madre in Mexico (+139%) and in eastern Asia, including also northwest India and major agricultural areas in China. Water-related disasters were reported from South America, the Caribbean (Peru and Haiti), Central Asia (Kazakhstan), and from southern Africa during the beginning of the reporting period.

>> Global agroclimatic impacts: sections 1.1-1.4; disaster events: section 5.2.

China

For the country as a whole, agroclimatic conditions were generally close to average, with local differences, especially high winter temperature in the Northeast and Southwest, affecting about ten provinces. Rainfall was above average in several major producing regions, resulting in generally favorable crop conditions, above those from last year.

>> Agroclimatic and crop condition in China: chapter 4.

Production outlook

The CropWatch global estimates for 2015 cover both already harvested crops and those currently growing or to be planted; for the latter, average conditions are assumed for later parts of the growing cycle. Compared to 2014, maize production is forecast to decrease 1.3% this year with a 0.6% increase in the southern hemisphere. The drop results mostly from lower expectations for the maize output in the United States compared with the exceptional 2014 harvest, but also low cropped arable land fraction (CALF, 55%) and a low maximum vegetation condition index (VCI_x) of 0.72 at the beginning of the planting season. Global rice projection is up 1.0%, while both wheat and soybean production are

projected to drop 1.1% compared to 2014. When focusing on the main producing and exporting countries only, maize could undergo a decrease of 1.8%; rice is projected to increase (+1.0%), and wheat and soybean could drop 1.6% and 1.7%, respectively.

In China, due to favorable conditions so far, all grain production is expected to increase by about 1% (1.1% for wheat, with maize and rice forecast to increase 1.6% and 0.6% respectively), while soybean is forecast to continue its decade-long falling trend (-1.3%). Winter wheat conditions were particularly favorable in Shandong province (production up by 4.6%) and moderately unfavorable in Hubei (-2.6%) and Anhui (-2.5%).

The largest projected increase for maize production is the one expected for Mexico (+8.2%). Among the major exporters, the situation is also very favorable for wheat in Argentina and Brazil (+14.8% and +8.7% production) and for rice in Thailand (+7.2%) and in Vietnam (+6.6%).

Most projected significant decreases in production are associated with well-identified causes, mostly involving weather and subsequent reductions in cultivated areas in extreme cases. For maize, this applies to countries such as South Africa (-12.4% production compared to 2014 and a decrease in CALF of 10 percentage points) and Ukraine (-15.0% production, only a 1 percentage point reduction in CALF, but a low VCIx of 0.69). For wheat, countries affected are Australia (-9.0% production mostly due to drought), as well as some eastern European countries and Russia (production about -8% with CALF at 65% and VCIx at 0.64).

For India, CropWatch forecasts decreases in the production of maize, rice, and wheat by 4.6%, 1.9%, and 4.5%, respectively, compared to last year's harvest.

>> CropWatch global production outlook: section 5.1; winter crops in China: section 4.2; crop condition indicators and production estimates for individual countries such as the United States and India: chapter 3 and tables 3.1 and 5.1.

Areas of concern

With El Niño conditions considered to be almost certain for the end of this year, the current CropWatch projections will likely need regular revision. Areas deserving close scrutiny include Ethiopia (projected outputs are -10.0% for maize and -7.0% for wheat), as a critical shortage of rainfall for 'Belg' crops is also likely to affect crops harvested later in the year. In the Sahel, signs (to be confirmed) point to a late onset of the rainy season. Other countries where CropWatch identified unfavorable production prospects include Cambodia and Myanmar.

>>El Niño: section 5.4; individual country analyses: section 3.2.