

CropWatch bulletin

QUARTERLY REPORT ON GLOBAL CROP PRODUCTION

Monitoring Period: April-July 2014

August 31, 2014

Volume 14, No. 3 (No. 94)



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



CropWatch Bulletin

QUARTERLY REPORT ON GLOBAL CROP PRODUCTION

Monitoring Period: April-July 2014

August 31, 2014

Vol. 14, No. 3 (total No. 94)



Institute of Remote Sensing and Digital Earth
Chinese Academy of Sciences



August 2014

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 Institute of Remote Sensing and Digital Earth (RADI), Chinese Academy of Sciences, under the overall guidance of Professor Bingfang Wu, Division Head of Digital Agriculture of RADI. Contributors are Sheng Chang, Bo Chen, René Gommès, Anna van der Heijden, Jiratiwan Kruasilp, Zhongyuan Li, Mrinal Singha, Qiang Xing, Nana Yan, Mingzhao Yu, Hongwei Zeng, Miao Zhang, Ning Zhang, Xin Zhang, Yang Zheng, Weiwei Zhu, and Wentao Zou.

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
المُلخَص التَّنْفِيذِي	10
Résumé	13
Краткий обзор	15
Resumen	17
Chapter 1. Global agroclimatic patterns	19
1.1 Overview	19
1.2 Rainfall	20
1.3 Temperature	20
1.4 Photosynthetically active radiation	21
1.5 Biomass	22
Chapter 2. Crop and environmental conditions in major production zones	24
2.1 Overview	24
2.2 West Africa	25
2.3 North America	27
2.4 South America	27
2.5 South and Southeast Asia	29
2.6 Western Europe	30
2.7 Central Europe to Western Russia	31
2.8 Southern Australia	32
Chapter 3. Main producing and exporting countries	34
3.1 Overview	34
3.2 Country analysis	37

Chapter 4. China	68
4.1 Overview	68
4.2 Regional analysis	72
Chapter 5. Focus and perspectives	80
5.1 Production outlook for 2014	80
5.2 Disaster events	81
5.3 El Niño	83
5.4 Maize trends	85
Annex A. Agroclimatic indicators and BIOMSS	89
Annex B. 2014 production estimates	95
Annex C. Quick reference guide to CropWatch indicators, spatial units, and production estimation methodology	97
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 13YA, April-July 2014 (percentage).....	20
Figure 1.2. Global map of air temperature anomaly (as indicated by the TEMP indicator) by MRU, departure from 13YA, April-July 2014 (degrees Celsius).....	21
Figure 1.3. Global map of PAR anomaly (as indicated by the RADPAR indicator) by MRU, departure from 13YA, April-July 2014 (percentage).....	22
Figure 1.4. Global map of biomass accumulation (BIOMSS) by MRU, departure from 13YA, April-July 2014 (percentage) ..	22
Figure 2.1. West Africa MPZ: Agroclimatic and agronomic indicators, April-July 2014	25
Figure 2.2. North America MPZ: Agroclimatic and agronomic indicators, April-July 2014	26
Figure 2.3. South America MPZ: Agroclimatic and agronomic indicators, April-July 2014	28
Figure 2.4. South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, April-July 2014	29
Figure 2.5. Western Europe MPZ: Agroclimatic and agronomic indicators, April-July 2014.....	30
Figure 2.6. Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, April-July 2014	32
Figure 2.7. Southern Australia MPZ: Agroclimatic and agronomic indicators, April-July 2014	33
Figure 3.1. Global map of rainfall (RAIN) by country and sub-national areas, departure from 13YA (percentage), April-July 2014	34
Figure 3.2. Global map of temperature (TEMP) by country and sub-national areas, departure from 13YA (degrees), April-July 2014	35
Figure 3.3. Global map of PAR (RADPAR) by country and sub-national areas, departure from 13YA (percentage), April-July 2014	35
Figure 3.4. Global map of biomass (BIOMSS) by country and sub-national areas, departure from 13YA (percentage), April-July 2014	35
Figures 3.5-3.34. Crop condition for individual countries ([ARG] Argentina- [ZAF] South Africa) for April-July 2014	37
Figure 4.1. China spatial distribution of rainfall profiles, April-July 2014	68
Figure 4.2. China spatial distribution of temperature profiles, April-July 2014	68
Figure 4.3. China cropped and uncropped arable land, by pixel, April-July 2014	69

Figure 4.4. China maximum Vegetation Condition Index (VCIx), by pixel, April-July 2014	69
Figure 4.5. China minimum Vegetation Health Condition Index (VHI _n), by pixel, April-July 2014	69
Figure 4.6. Crop condition China North-east region, April-July 2014	73
Figure 4.7. Crop condition China Inner Mongolia region, April-July 2014	74
Figure 4.8. Crop condition China Huanghuaihai region, April-July 2014	75
Figure 4.9. Crop condition China Loess region, April-July 2014	76
Figure 4.10. Crop condition Lower Yangtze region, April-July 2014	77
Figure 4.11. Crop condition Southwest China region, April-July 2014	78
Figure 4.12. Crop condition Southern China region, April-July 2014	79
Figure 5.1. Comparison between monthly BOM and NOAA SOI datasets from July 2013 to July 2014	84
Figure 5.2. Typical climate anomalies associated with El Niño events for June to August	84
Figure 5.3. Worldwide production of major cereals and tubers since 1961 (million tons)	85
Figure 5.4. National variations in maize yield since 1993 for country clusters	86

TABLES

Table 2.1. April to July 2014 agroclimatic indicators by Major Production Zone, current value and departure from 13YA ...	24
Table 2.2. April to July 2014 agronomic indicators by Major Production Zone, current season values and departure from 5YA	24
Table 3.1. CropWatch agroclimatic and agronomic indicators for April-July 2014, departure from 5YA and 13YA	37
Table 4.1. CropWatch agroclimatic and agronomic indicators for China, April-July 2014, departure from 5YA and 13YA	70
Table 4.2. China, 2014 production and difference with 2013, by province (thousand tons)	70
Table 4.3. China, 2014 single rice, early rice and late rice production and difference with 2013, by province (thousand tons)	71
Table 5.1. Estimated rates of change of production compared with 2013 for maize, rice, wheat, and soybean (thousand tons) and derived 2014 production in selected countries	81
Table 5.2. Relative maize production and increases in area and production for select countries	87
Table A.1. April to July 2014 agroclimatic indicators and biomass by global Monitoring and Reporting Unit, current value and departure from 13YA	89
Table A.2. April to July 2014 agroclimatic indicators and biomass by country, current value and departure from 13YA	90
Table A.3. Argentina, April to July 2014 agroclimatic indicators and biomass (by province), current value and departure from 13YA	91
Table A.4. Australia, April to July 2014 agroclimatic indicators and biomass (by state), current value and departure from 13YA	91
Table A.5. Brazil, April to July 2014 agroclimatic indicators and biomass (by state), current value and departure from 13YA	91
Table A.6. Canada, April to July 2014 agroclimatic indicators and biomass (by province), current value and departure from 13YA	92
Table A.7. India, April to July 2014 agroclimatic indicators and biomass (by state), current value and departure from 13YA	92
Table A.8. Kazakhstan, April to July 2014 agroclimatic indicators and biomass (by province), current value and departure from 13YA	93
Table A.9. Russia, April to July 2014 agroclimatic indicators and biomass (by oblast), current value and departure from 13YA	93
Table A.10. United States, April to July 2014 agroclimatic indicators and biomass (by state), current value and departure from 13YA	94
Table A.11. China, April to July 2014 agroclimatic indicators and biomass (by province), current value and departure from 13YA	94
Table B.1. Argentina, 2014 maize, wheat, and soybean production, by province (thousand tons)	95
Table B.2. Australia, 2014 wheat production, by state (thousand tons)	95
Table B.3. Brazil, 2014 maize, rice, wheat, and soybean production, by state (thousand tons)	95
Table B.4. Canada, 2014 maize and wheat production, by state (thousand tons)	96
Table B.5. United States, 2014 maize, rice, wheat, and soybean production, by state (thousand tons)	96

Abbreviations

5YA	Five-year average, the average for the April-July periods from 2009 to 2013; one of the standard reference periods and referred to as “recent past.”
13YA	Thirteen-year average, the average for the April-July periods from 2001 to 2013; one of the standard reference periods and referred to as “last decade.”
BIOMSS	Agroclimatic indicator for biomass production potential
CALF	Cropped Arable Land Fraction
CAS	Chinese Academy of Sciences
CWSU	CropWatch Spatial Units
DM	Dry matter
EC/JRC	European Commission Joint Research Centre
FAO	Food and Agriculture Organization of the United Nations
GAUL	Global Administrative Units Layer
GVG	GPS, Video, and GIS data
ha	hectare
ITCZ	Intertropical Convergence Zone
MPZ	Major Production Zone
MRU	Monitoring and Reporting Unit (formerly CPSZ)
NCDC	U.S. National Climatic Data Center
NDVI	Normalized Difference Vegetation Index
NOAA	U.S. National Oceanic and Atmospheric Administration
PAR	Photosynthetically active radiation
RADI	CAS Institute of Remote Sensing and Digital Earth
RADPAR	PAR agroclimatic indicator
RAIN	Rainfall agroclimatic indicator
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 April 1 and July 31, 2014. It is the 94th 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	<i>Special topics and outlook</i>	
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 CropWatch August bulletin assesses the recent agroclimatic and agronomic factors up to July 2014 that determine crop development and the 2014 agricultural production. The analyses of environmental and satellite-based agronomic indicators focus on worldwide patterns and zoom into major production areas and countries. This bulletin also reports about disasters and El Niño perspectives.

Water stress

Vagaries of water supply have played a significant part in shaping the outcome of the 2014 agricultural production. Droughts and excess rainfall, sometimes resulting in floods, have markedly influenced the development of crops in several large and spatially coherent areas. Associated landslides and fires are reported on, although these phenomena tend to be of local importance only. Another remarkable feature of the current period is that very limited areas experienced exceptional temperatures.

East Asia is among the major rainfall deficit areas, with significantly below average values in southern Japan (-34%) and the Korean peninsula (-50%), as well as several zones in China, including the Loess region, north-east China, and particularly the north China Plain (-25%). The most affected provinces in China include Shandong (-31%), Henan (-25%), Shaanxi (-22%), Liaoning (-21%), and Hubei (-16%). The drought was accompanied by moderate increases in temperature (+1.0°C to 1.5°C) and sunshine (+5%) and the effect on crop production was severe.

Less serious impacts characterize another rainfall deficit area in eastern Russia and central Asia (Kazakhstan, Uzbekistan) where many crops suffered water deficits between 20 and 50%, with the drought decreasing in the east to the extent that Tajikistan, Kyrgyzstan, Gansu-Xinjiang in China and areas around Mongolia actually recorded large excesses of rainfall, which benefited agriculture and pastureland.

Southern-central Europe, North America (+17%), and especially South America are among the areas where rainfall significantly affected crops; the South American Major Production Zone recorded an increase of rainfall close to 50%, resulting in an estimated biomass increase of 24% and markedly benefiting crop production. Other droughts occurred in parts of India (Punjab, Gujarat, Goa, and Kerala), Thailand and Myanmar.

Land use intensity

The above-mentioned climatic conditions have interfered with cropland management, which CropWatch assesses through the Cropped Arable Land Fraction indicator for major production zones, important food producing and exporting countries, and for Chinese regions and provinces. The final outcome of the season eventually results from the product of cultivated areas and yields, which are estimated quantitatively as well as qualitatively through several satellite-based indicators.

Significant changes in cropped arable land occurred in Southern Australia (4.4% increase), south and south-east Asia (+5.5%), and in the Gulf of Guinea countries (+1.9%), where Nigeria (+5.5%) displays one of the highest values in the African continent, followed by Ethiopia (+4.9%). On the other hand, South Africa decreased arable land for the winter crops (essentially wheat) by 12.6%. Similarly, Turkey decreased summer crop areas by 6.7%. Several countries in Asia, including drought-affected India, increased cropped arable land significantly, which contributed to limiting the impact of the adverse

conditions on projected crop production. Cropped land increases include those in India (+8.6%), Pakistan (+8.3%), and Cambodia (+4.7%).

Projected 2014 production

CropWatch projections for the global 2014 agricultural output include poor performance of maize (-2.7% compared with 2013 estimates), a near-stagnation of rice (+0.5%) and wheat (+0.3%) production, but a significant rise of soybeans (+4.4%).

The drop in maize mostly affects the major producers, including Canada (-17.9%), the United States (-7.7%), Argentina (-1.8%), and Brazil (-2.8%). Ukraine is one of the few countries that did well (+6.1%).

The slight wheat increase results from the combination of very favorable output in South America (up more than 20% in Brazil and Argentina, where the harvest marks the return to normal or better conditions after two poor seasons affected by drought) with mediocre harvests in North America (-7.5% in Canada and -2.3% in the United States). Rice did not do well among the largest countries, including India (-1.5%), and Indonesia (-1.7%). Production is projected to decline as well in Bangladesh and Thailand (-0.3% and -0.2%, respectively), while expectations are better for the Philippines (+2.8%) and Egypt (+3.5%), in spite of a cyclone affecting the crop in the former.

Soybeans are the only crop that is expected to do well, with a sizeable production increase of 4.4%, mostly driven by the United States (+10.9%) and Brazil (+9.0%). Argentina stayed at a low output increase of 0.5%.

In China, wheat production is estimated to be slightly up (+1.2%) from last year's, which puts the country's total cereal production at 544 million tons, virtually the same level as the 2013 output. Maize (217 million tons) is down 1.2% due to drought and rice stagnates at 211 million tons. Soybean continued the recent downward trend (-2.3%).