



CropWatch bulletin

QUARTERLY REPORT ON GLOBAL CROP PRODUCTION

Monitoring Period: January - April 2018

May 31, 2018

Volume 18, No. 2 (Total No. 109)



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



May 2018

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 Diego de Abelleira, Jose Bofana, Sheng Chang, Bulgan Davdai, Mohammed El-Shirbeny, René Gomme, Wenwen Gao, Zhaoxin He, Hiten Jantilal, Mingyong Li, Wenjun Liu, Yuming Lu, Olipa N. Lungu, Zonghan Ma, Awetahegn Niguse, Jai Singh Parihar, Elijah Phiri, Mohsen N. Ramadan, Joaquim Tomas, Shen Tan, Fuyou Tian, Battestseg Tuvdendorj, Linjiang Wang, Meiling Wang, Bingfang Wu, Qiang Xing, Jie Xiong, Jiaming Xu, Nana Yan, Hongwei Zeng, Miao Zhang, Xin Zhang, Dan Zhao, Xinfeng Zhao, Liang Zhu and Weiwei Zhu.

Thematic contributors for this bulletin include: Wenjiang Huang (huangwj@radi.ac.cn) and Yingying Dong (dongyy@radi.ac.cn) for the section on pest and diseases monitoring; Fengying Nie (niefengying@sohu.com) and Xuebiao Zhang (zhangxuebiao@caas.cn) for the section on food import and export outlook for 2017.

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 analyses 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
Abbreviations	x
Bulletin overview and reporting period	xi
Executive summary	13
Chapter 1. Global agroclimatic patterns	16
1.1 Correlations between CropWatch agroclimatic indicators (CWAls)	16
1.2 Rainfall and BIOMSS anomalies	17
1.3 Temperature anomalies	19
1.4 Radiation RADPAR anomalies	20
1.5 combinations of extremes	21
Chapter 2. Crop and environmental conditions in major production zones	22
2.1 Overview	22
2.2 West Africa	23
2.3 North America	24
2.4 South America	25
2.5 South and Southeast Asia	27
2.6 Western Europe	30
2.7 Central Europe to Western Russia	32
2.8 Pests and diseases for winter wheat in north Hemisphere	34
Chapter 3. Main producing and exporting countries	37
3.1 Overview	37
3.2 Country analysis	43
Chapter 4. China	163
4.1 Overview	163
4.2 China crop production	165
4.3 Regional analysis	167
4.4 Pest and diseases monitoring	176
4.5 Major crops trade prospects	177
Chapter 5. Focus and perspectives	180
5.1 CropWatch food production estimates.....	180
5.2 Disaster events.....	184
5.3 Mediterranean Agriculture: Features and recent trends.....	187
5.4 Update on El Niño	194
Annex A. Agroclimatic indicators and BIOMSS	196
Annex B. 2018 production estimates	203
Annex C. Quick reference to CropWatch indicators, spatial units and methodologies	205
Data notes and bibliography	214
Acknowledgments	219
Online resources	220

LIST OF TABLES

Table 1.1. departure from recent 15 year average of the RAIN, TEMP and RADPAR indicators over the last year..	16
Table 2.1. January-April 2018 agro-climatic indicators by Major Production Zone, current value and departure from 15YA	22
Table 2.2. January -April 2018 agronomic indicators by Major Production Zone, current season values and departure from 5YA	22
Table 2.3. Statistics of winter wheat diseases and pests in the northern Hemisphere (early May 2018)	36
Table 3.1: Groups of countries with rainfall anomalies in excess of -25% and +25%	37
Table 3.2. CropWatch agroclimatic and agronomic indicators for January to April 2018, departure from 5YA and 15YA	38
Table 3.3. CropWatch-estimated Wheat production for Afghanistan in 2018 (thousand tons)	45
Table 3.4. CropWatch-estimated Maize production for Angola in 2018 (thousand tons)	47
Table 3.5. Argentina’s agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	50
Table 3.6. Argentina’s agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	50
Table 3.7. CropWatch-estimated maize, rice and soybean production for Argentina in 2018 (thousand tons).....	50
Table 3.8. Australia’s agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	53
Table 3.9. Australia’s agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	53
Table 3.10. Bangladesh’s agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	56
Table 3.11. Bangladesh’s agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	56
Table 3.12. CropWatch-estimated rice and wheat production for Bangladesh in 2018 (thousand tons).....	56
Table 3.13. CropWatch-estimated Wheat production for Belarus in 2018 (thousand tons)	58
Table 3.14. Brazil’s agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	62
Table 3.15. Brazil’s agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	63
Table 3.16. CropWatch-estimated maize, rice and soybean production for Brazil in 2018 (thousand tons).....	63
Table 3.17. Canada’s agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	66
Table 3.18. Canada agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	66
Table 3.19. CropWatch-estimated wheat production in Canada for 2018 (thousand tons)	66
Table 3.20. Germany’s agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	70
Table 3.21. Germany’s agronomic indicators by sub-national regions, current season's value and departure from 5YA, January-April 2018	70
Table 3.22. CropWatch-estimated wheat production for Germany in 2018 (thousands tons).....	71
Table 3.23. Egypt’s agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	73
Table 3.24. Egypt’s agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	74
Table 3.25. CropWatch-estimated maize, rice, and wheat production for Egypt in 2018 (thousand tons).....	74
Table 3.26. Ethiopia’s agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	77
Table 3.27. Ethiopia’s agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	77
Table 3.28. CropWatch-estimated Wheat production for Ethiopia in 2018 (thousand tons)	77
Table 3.29. France’s agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	81

Table 3.30. France's agronomic indicators by sub-national regions, current season's value and departure from 5YA, January-April 2018	81
Table 3.31. CropWatch-estimated wheat production for France in 2018 (thousand tons)	81
Table 3.32. United Kingdom's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	84
Table 3.33. United Kingdom's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	84
Table 3.34. CropWatch-estimated wheat production for United Kingdom in 2018 (thousand tons)	84
Table 3.35. CropWatch-estimated wheat production for Hungary in 2018 (thousand tons)	86
Table 3.36. Indonesia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	89
Table 3.37. Indonesia's agronomic indicators by sub-national regions, current season's value and departure from 5YA, January-April 2018	89
Table 3.38. CropWatch-estimated maize and rice production for Indonesia in 2018 (thousands tons).....	89
Table 3.39. India's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	93
Table 3.40. India's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	93
Table 3.41. CropWatch-estimated rice and wheat production for India in 2018 (thousand tons)	93
Table 3.42. Iran's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	96
Table 3.43. Iran's agronomic indicators by sub-national regions, current season's value and departure from 5YA, January-April 2018	96
Table 3.44. CropWatch-estimated wheat production for Iran in 2018 (thousands tons)	96
Table 3.45. CropWatch-estimated Wheat production for Italy in 2018 (thousand tons)	98
Table 3.46. Kazakhstan's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	100
Table 3.47. Kazakhstan's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	100
Table 3.48. CropWatch-estimated Wheat production for Kazakhstan in 2018 (thousand tons)	100
Table 3.49. CropWatch-estimated maize production for Kenya in 2018 (thousand tons).....	102
Table 3.50. Cambodia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	104
Table 3.51. Cambodia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	104
Table 3.52. CropWatch-estimated rice production for Cambodia in 2018 (thousand tons).....	104
Table 3.53. CropWatch-estimated rice production for Sri Lanka in 2018 (thousand tons).....	106
Table 3.54. CropWatch-estimated wheat production for Morocco in 2018 (thousand tons)	108
Table 3.55. Mexico's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	111
Table 3.56. Mexico's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	111
Table 3.57. CropWatch-estimated maize production for Mexico in 2018 (thousands tons)	111
Table 3.58. Myanmar's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	114
Table 3.59. Myanmar's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	114
Table 3.60. CropWatch-estimated rice production for Myanmar in 2018 (thousand tons)	114
Table 3.61. CropWatch-estimated wheat production for Mongolia in 2018 (thousand tons).....	115
Table 3.62. Mozambique agroclimatic indicators by major production zones, current seasonvalues, and departure from 15YA, January 2018-April 2018	119
Table 3.63. Mozambique agronomic indicators by major production zones, current seasonvalues, and departure from 5YA, January 2018-April 2018	120
Table 3.64. CropWatch-estimated Maize production for Mozambique in 2018 (thousand tons)	120

Table 3.65. Nigeria's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	123
Table 3.66. Nigeria's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	123
Table 3.67. CropWatch-estimated maize production for Nigeria in 2018 (thousands tons)	123
Table 3.68. Pakistan's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	126
Table 3.69. Pakistan's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	126
Table 3.70. CropWatch-estimated wheat production for Pakistan in 2018 (thousand tons)	126
Table 3.71. Philippines's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	129
Table 3.72. Philippines's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	129
Table 3.73. CropWatch-estimated maize and rice production for Philippines in 2018 (thousand tons)	129
Table 3.74. Poland's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	132
Table 3.75. Poland's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	132
Table 3.76. CropWatch-estimated Wheat production for Poland in 2018 (thousand tons)	132
Table 3.77. Romania's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	135
Table 3.78. Romania's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	135
Table 3.79. CropWatch-estimated Wheat production for Romania in 2018 (thousand tons)	135
Table 3.80. Russia's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	138
Table 3.81. Russia's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	138
Table 3.82. CropWatch-estimated Wheat production for Russia in 2018 (thousand tons)	138
Table 3.83. Thailand's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	141
Table 3.84. Thailand's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	141
Table 3.85. CropWatch-estimated rice production for Thailand in 2018 (thousand tons)	142
Table 3.86. Turkey's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	145
Table 3.87. Turkey's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	145
Table 3.88. CropWatch-estimated Wheat production for Turkey in 2018 (thousand tons)	145
Table 3.89. Ukraine's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	148
Table 3.90. Ukraine's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	148
Table 3.91. CropWatch-estimated Wheat production for Ukraine in 2018 (thousand tons).....	148
Table 3.92. United States's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	152
Table 3.93. United States's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	152
Table 3.94. CropWatch-estimated Wheat production for United States in 2018 (thousand tons).....	152
Table 3.95. Uzbekistan's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	155
Table 3.96. Uzbekistan's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	155

Table 3.97. CropWatch-estimated Wheat production for Uzbekistan in 2018 (thousand tons)	155
Table 3.98. Vietnam's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	157
Table 3.99. Vietnam's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	157
Table 3.100. CropWatch-estimated rice production for Vietnam's in 2018 (thousand tons)	157
Table 3.101. South Africa's agroclimatic indicators by sub-national regions, current season's values and departure from 15YA, January-April 2018	160
Table 3.102. South Africa's agronomic indicators by sub-national regions, current season's values and departure from 5YA, January-April 2018	160
Table 3.103. CropWatch-estimated maize production for South Africa in 2018 (thousand tons).....	160
Table 3.104. CropWatch-estimated maize production for Zambia in 2018 (thousands tons)	162
Table 4.1. CropWatch agro-climatic and agronomic indicators for China, January - April 2018, departure from 5YA and 15YA	163
Table 4.2. China, 2018 winter wheat area, yield, and production and percentage difference with 2017, by province.	166
Table 4.3. China, 2018 winter crops production (thousand tons) and percentage difference with 2017, by province	166
Table 4.4. Statistics of wheat yellow rust in China (mid May 2018)	177
Table 4.5. Statistics of wheat sheath blight in China (mid May 2018)	177
Table 4.6. Statistics of rice sheath blight in China, mid to late July 2017	177
Table 5.1. CropWatch productions estimates, thousands tons	181
Table 5.2. Comparison of 2018 and 2017 production of top 5 and top 10 importers and exporters as well as the change in the offer and demand for the top 10 importers and exporters between 2017 and 2018	183
Table 5.3. percent change from the early 21st century of some production and export statistics in the Mediterranean region.....	190
Table A.1. January-April 2018 agroclimatic indicators and biomass by global Monitoring and Reporting Unit. All values are averages (TEMP) or totals (RAIN, RADPAR, BIOMSS) over the reporting period	196
Table A.2. January-April 2018 agroclimatic indicators and biomass by country. All values are averages (TEMP) or totals (RAIN, RADPAR, BIOMSS) over the reporting period	197
Table A.3. Argentina, January-April 2018 agroclimatic indicators and biomass (by province). All values are averages (TEMP) or totals (RAIN, RADPAR, BIOMSS) over the reporting period	198
Table A.4. Australia, January-April 2018 agroclimatic indicators and biomass (by state).All values are averages (TEMP) or totals (RAIN, RADPAR, BIOMSS) over the reporting period	198
Table A.5. Brazil, January-April 2018 agroclimatic indicators and biomass (by state). All values are averages (TEMP) or totals (RAIN, RADPAR, BIOMSS) over the reporting period	198
Table A.6. Canada, January-April 2018 agroclimatic indicators and biomass (by province). All values are averages (TEMP) or totals (RAIN, RADPAR, BIOMSS) over the reporting period	199
Table A.7. India, January-April 2018 agroclimatic indicators and biomass (by state). All values are averages (TEMP) or totals (RAIN, RADPAR, BIOMSS) over the reporting period	199
Table A.8. Kazakhstan, January-April 2018 agroclimatic indicators and biomass (by province) .All values are averages (TEMP) or totals (RAIN, RADPAR, BIOMSS) over the reporting period	200
Table A.9. Russia, January-April 2018 agroclimatic indicators and biomass (by oblast).All values are averages (TEMP) or totals (RAIN, RADPAR, BIOMSS) over the reporting period	200
Table A.10. United States, January-April 2018 agroclimatic indicators and biomass(by state). All values are averages (TEMP) or totals (RAIN, RADPAR, BIOMSS) over the reporting period	202
Table A.11. China, January-April 2018 agroclimatic indicators and biomass (by province). All values are averages (TEMP) or totals (RAIN, RADPAR, BIOMSS) over the reporting period	202
Table B.1. Argentina, 2018 maize and soybean production, by province (thousand tons)	203
Table B.2. Brazil, 2018 maize, rice, and soybean production, by state (thousand tons).....	203
Table B.3. United States, 2018 wheat production, by state (thousand tons)	203
Table C.1. Criteria for wheat yellow rust occurrence level	212
Table C.2. Criteria for wheat sheath blight occurrence level	213
Table C.3. Criteria for wheat aphid occurrence level.....	213

LIST OF FIGURES

Figure 1.1. Global map of January - April 2018 rainfall anomaly (as indicated by the RAIN indicator) by MRU, departure from 15YA (percentage).....	18
Figure 1.2. Global map of January - April 2018 biomass accumulation (BIOMSS) by MRU, departure from 5YA, (percentage).....	19
Figure 1.3. Global map of January - April 2018 air temperature anomaly (as indicated by the TEMP indicator) by MRU, departure from 15YA (degrees Celsius)	20
Figure 1.4. Global map of January - April 2018 PAR anomaly (as indicated by the RADPAR indicator) by MRU, departure from 15YA (percentage).....	20
Figure 2.1. West Africa MPZ: Agro-climatic and agronomic indicators, February 2018 to April 2018.	23
Figure 2.2. North America MPZ: Agroclimatic and agronomic indicators, February 2018 to April 2018.	24
Figure 2.3. South America MPZ: Agro-climatic and agronomic indicators, February 2018 to April 2018.	26
Figure 2.4. South and Southeast Asia MPZ: Agroclimatic and agronomic indicators, January-April 2018.....	28
Figure 2.5. Western Europe MPZ: Agroclimatic and agronomic indicators, February 2018 to April 2018.	31
Figure 2.6. Central Europe-Western Russia MPZ: Agroclimatic and agronomic indicators, February 2018 to April 2018.	33
Figure 2.7. Distribution of some winter wheat cultivation areas in north Hemisphere (2018)	34
Figure 2.8. Distribution of winter wheat diseases in the northern Hemisphere (early May 2018).....	35
Figure 2.9. Distribution of winter wheat pest for in the northern Hemisphere (early May 2018).....	35
Figure 3.1. Global map of January to April 2018 rainfall (RAIN) by country and sub-national areas, departure from 15YA (percentage).....	41
Figure 3.2. Global map of January to April 2018 temperature (TEMP) by country and sub-national areas, departure from 15YA (degrees)	41
Figure 3.3. Global map of October January to April 2018 PAR (RADPAR) by country and sub-national areas, departure from 15YA (percentage).....	41
Figure 3.4. Global map of January to April 2018 biomass (BIOMSS) by country and sub-national areas, departure from 15YA (percentage).....	42
Figure 3.5 : Dependence of percent BIOMSS departure from 2013-17 average on RAIN percent departure from 2003-2017 average.	42
Figure 3.6: Dependence of percent BIOMSS departure from 2013-17 average on TEMP percent departure from 2003-2017 average.	43
Figure 4.1. China spatial distribution of rainfall profiles, January - April 2018	164
Figure 4.2. China spatial distribution of temperature profiles, January - April 2018	164
Figure 4.3. China cropped and uncropped arable land, by pixel, January - April 2018	165
Figure 4.4. China maximum Vegetation Condition Index (VCIx), by pixel, January - April 2018	165
Figure 4.5. China minimum Vegetation Health Index (VHI _n), by pixel, January - April 2018	165
Figure 4.6. Crop condition China Northeast region, January - April 2018.....	168
Figure 4.7. Crop condition China Inner Mongolia, January - April 2018	169
Figure 4.8. Crop condition China Huanghuaihai, January - April 2018.....	170
Figure 4.9. Crop condition China Loess region, January - April 2018	171
Figure 4.10. Crop condition Lower Yangtze region, January - April 2018	172
Figure 4.11. Crop condition Southwest China region, January - April 2018.....	173
Figure 4.12. Crop condition Southern China region, January - April 2018	174
Figure 4.13. Distribution of wheat yellow rust (a), sheath blight (b) and aphids (c) in China (mid May 2018).....	176
Figure 4.14. Rate of change (%) of imports and exports for rice, wheat, maize, and soybean in China in 2018 compared to those for 2017.	179
Figure 5.1. "Center" of March-April heatwave	185
Figure 5.2. Track of cyclone Gita.....	186
Figure 5.3. Excess of annual rainfall over annual potential evapotranspiration (mm) over the Mediterranean area. Based on rainfall from Hijmans et al (2005) and PET from Trabucco et al (2009)	188
Figure 5.4. Irrigated areas x over the Mediterranean basin. Values are expressed in % of pixel area. Based on data from GMIA 2016	188
Figure 5.5. A near-empty water reservoir in Cyprus in 2016. Source: Guardian 2016.....	189

Figure 5.6. (A) Olive trees are very long lived and often become huge and spectacularly beautiful. Two 6000 years old olive trees growing in Bechealeh in northern Lebanon. They are part of a group of 16 nicknamed “the sisters” (Sisters 2018); (B) An olive tree infected by <i>Xylella fastidiosa</i> in southern Italy (New York Times 2018).....	192
Figure 5.7. relative share of inland fisheries among the three main Mediterranean freshwater fish producers ...	193
Figure 5.8. Monthly SOI-BOM time series from April 2017 to April 2018.....	194
Figure 5.9. Map of NINO Region	195

Abbreviations

5YA	Five-year average, the average for the four-month period for January from 2013 to 2017 to April next year; one of the standard reference periods.
15YA	Fifteen-year average, the average for the four-month period from January from 2013 to 2017 to April 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 January and April 2018, 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 109th such publication issued by the CropWatch group at the Institute of Remote Sensing and Digital Earth (RADI) at 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, 41 major agricultural countries which include 30 countries in previous bulletins and 11 newly increased countries (Afghanistan, Angola, Belarus, Hungary, Italy, Kenya, Sri Lanka, Morocco, Mongolia, Mozambique, Zambia), and 148 Agro-Ecological Zones (AEZs) for those 30 key countries (no sub-national regions are for these newly increased 11 countries in this bulletin). 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	41 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 Mediterranean Agriculture, 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

This quarterly CropWatch bulletin is based mainly on current remote sensing inputs in addition to detailed and spatially accurate reference data about crops and their management. The scope is global and comprehensive.

The bulletin focuses on crops that were either growing or harvested between January and April 2018. It 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. The bulletin also describes the current crop situation globally - including detailed analyses for China - and presents a first quantitative estimate for crops to be harvested throughout 2018. The estimate is based on partial data and will be updated in the next two CropWatch 2018 bulletins as more countries reach harvest.

The current CropWatch bulletin is prepared jointly by several institutes of the Chinese Academy of Sciences (CAS) under the overall coordination of the Digital Agriculture Division of the Institute of Remote Sensing and Digital Earth (RADI). Several changes were introduced in this issue: 11 countries were added to improve the focus on Africa and Asia, which brings to total from 30 + 1 (China) to 41 +1, including at least 80% of production of the three main cereals (maize, rice, wheat) and soybean. Another new section covers major wheat pests in seven northern hemisphere countries where wheat development is currently in full swing after the end of the cold season dormancy.

Global agroclimatic conditions

Global agroclimatic conditions are monitored using CropWatch agroclimatic indices which are spatial averages over agricultural land only, giving more weight to areas with a large production potential. The indices are referred to as RAIN, TEMP, RADPAR for solar radiation and BIOMSS for the biomass production potential.

At the global scale, RAIN was 8% above the average value of the 15-year reference period (2003-2017). TEMP was average (-0.1°C) while RADPAR was well below average (-5%) in the majority of land areas. Above average RAIN and lower than average RADPAR are the continuation of a pattern that started one year ago and which is bound to negatively affect photosynthesis. Eight Indian States and Bangladesh had a sunshine deficits in excess of 10%. Low sunshine was one of the major and largest global features of the reporting period.

Another dominant and continent-wide feature was cooler than average Equatorial and tropical areas. A more intense cold wave hit western Russia and Kazakhstan extending as far west as Morocco, while a serious heatwave area centred around Iran occurred in late March and early April, extending from Syria to North India while Areas of drought (RAIN values below average) include parts of central, south and east Asia and surrounding areas (-49% in Indian Punjab, -16% in Pakistan, -24% in Yunnan, -23% in Fujian), parts of southern Africa (Malawi -22%, Swaziland -16%) and the Mediterranean (Montenegro -32%, Tunisia -50%), some major agricultural areas centred around north Argentina (-41% in the provinces of the Pampas and Entre Rios) as well as parts of north America including some major wheat producing areas (Manitoba -23%, Oregon -22%, Nebraska -27%, Kansas -58%). For Canada and for the USA as a whole, the percent decrease in cropped area was significant at the end of April: -49% and -25%, respectively, as assessed by the CropWatch Cropped Arable Land Fraction (CALF) indicator. For Argentina,

Canada and the USA, the CropWatch Vegetation Condition Index (VCIx) reaches 0.66, 0.62 and 0.65 indicating average crop condition at best.

Positive rainfall anomalies are mentioned mainly for east Africa and some semi-arid areas in central and eastern Asia, the central Gulf of Guinea and the general Caribbean area including Mexico.

Production outlook

The final outcome of the 2018 season will depend on agroclimatic conditions up to the end of the year: for crops that are still growing, the listed estimates assume that environmental and phytosanitary conditions will be average between the time of reporting and harvest.

CropWatch estimates the global 2018 production of the major commodities at 1045 million tonnes of maize, up 1.8% over 2017, 745 millions for rice (up 0.6%), 697 million tonnes of wheat (a 3.2% drop below 2017) and 323 million tonnes of soybeans, virtually equivalent to 2017 (-0.1%). The share of the “minor producers” (142 countries that together contribute less than 20% of world production) has decreased by up to 5.6 percentage points (wheat); soybeans are down 1.3 percentage points illustrating the trend towards the consolidation of the position of the major producers. In terms of 2018 production change compared to 2017, major producers outperform “minor producers” for maize and rice (1.8% Vs. 1.4% and 0.6% Vs. 0.3%, respectively) while minor producers outperform the major producers for wheat (0.5% Vs. -3.5%) and especially soybean (6.4% Vs. -0.5%) as more countries are trying to join the closed club of soybean producers dominated by the USA, Argentina and Brazil and some of their south-American neighbours.

Countries that experienced large **maize production** increases include Brazil (+3.1%), one of the largest global suppliers of the crop (3rd exporter worldwide). The second largest exporter (Argentina) suffered a drop in maize output of 3.8% due to drought in the northern provinces, which affected as well adjoining areas in Uruguay and Brazil. Mixed conditions prevail in southern Africa where maize is a main staple. South Africa is an important exporter (10th worldwide) but suffered a reduced output 6.8% below last year's. Mexico had a drop in maize production of 1.8% and the Philippines are up 2.2%.

Rice suffered a generalised drop in production in South-East Asia, starting with Cambodia (-2.2%), Indonesia (-1.1%), Thailand (-5.2%) and Vietnam (-1.4%). It is not evident what caused the drop, although reduced sunshine may have played a part. Countries further to the north (Bangladesh, India, Myanmar, Philippines) increased their output by 3.2%, 2.6%, 1.5% and 3.8%, respectively.

Reductions in **wheat production** exceeding 5.0 % occurred on all continents, affecting some of the major global producers such as Canada (-13.0 %) and the United States (-13.5 %) due to unfavourable weather including poor sunshine, drought, water logging and cold waves. Other major producers such as India, Kazakhstan and Russia suffered a drop in production reaching 6.3%, 12.9% and 7.9%, respectively. It is mostly the poor performance of the large global producers of wheat that are responsible for the global drop of production mentioned above (-3.2%). Countries with positive outcomes include Iran and Turkey (respectively +6.2% and +7.9%, a welcome change in both countries after a run of bad or mixed seasons), Belarus, Poland and Romania (+9.7%, +11.9% and +6.5%, respectively), and Egypt (+7.0%) where the good rice crop comes in addition to increased maize and rice productions.

In the northern hemisphere the **soybean crop** was just planted or is still to be planted. In Argentina the soybean crop production is down (-8.2%) while, in comparison, Brazil did relatively well (+0.8%).

The analysis of the performance of major importers and exporters of cereals and soybean shows that some difficulties may arise with wheat supply if the situation does not improve in the USA and Canada as the projected production deficit of the top 10 exporters reaches just above 17 million tonnes.

China

China experienced mixed weather conditions as both rainfall and RADPAR dropped by 8% compared to average at the national scale. CALF was 14% below the average of the previous 5 years and VCIx was rather low at 0.54 indicating both reduced planting and low yield expectations. At the regional scale several northern regions had positive RAIN anomalies in excess of 30% while the Lower Yangtze and Southern China had deficits close to 20%. The highest VCIx values occur in the central part of China.

The unfavourable agro-climatic conditions resulted in a 1.4% decrease in wheat yield compared to the previous season. Winter wheat production is forecast at 112.7 million tons, a decrease of 3.3 million tons or 2.8% below 2017. CropWatch puts the total winter crop production at 122.8 million tons, a 2.8 percent decrease from the 2017's bumper production. Planted areas decreased 1% for Hebei, Jiangsu, Shandong and Henan and 2% in Sichuan. The largest increases of winter wheat hectarage was observed in the provinces of Shanxi (+3%) and Shaanxi (+5%). In addition to poor weather, wheat sheath blight and aphids were widespread: the first causes concern especially in southern China and the Lower Yangtze region where 7% or areas are severely affected; aphids occur in all regions to the extent that more than 35% of fields are infested in southern and south-west China, 10% severely so in the latter.

The largest winter wheat production inter-annual change (+11%) occurred in Shaanxi as a result of both increased planted area and yield. The top three winter wheat producing provinces (Henan, Shandong and Hebei) all suffered from unfavourable conditions and report large production drops of 2%, 6% and 2%, respectively. Hebei mainly suffered from drought while the decreased production for Shandong and Henan was mostly due to delayed crop development.