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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	15
1.1 INTRODUCTION TO CROPWATCH AGROCLIMATIC INDICATORS (CWAIS)	15
1.2 GLOBAL OVERVIEW	15
1.3 RAINFALL (FIGURE 1.2)	17
1.4 TEMPERATURES (FIGURE 1.3)	18
1.5 RADPAR (FIGURE 1.4)	19
1.5 BIOMSS (FIGURE 1.5)	20
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	26
2.5 SOUTH AND SOUTHEAST ASIA	28
2.6 WESTERN EUROPE	30
2.7 CENTRAL EUROPE TO WESTERN RUSSIA	32
CHAPTER 3. CORE COUNTRIES	35
3.1 OVERVIEW	35
3.2 COUNTRY ANALYSIS	42
CHAPTER 4. CHINA	177
4.1 OVERVIEW	177
4.2 CHINA'S WINTER CROPS PRODUCTION	179
4.3 REGIONAL ANALYSIS	182
4.4 PEST AND DISEASES MONITORING	190
4.5 MAJOR CROPS TRADE PROSPECTS	194
CHAPTER 5. FOCUS AND PERSPECTIVES	196
5.1 CROPWATCH FOOD PRODUCTION ESTIMATES	196
5.2 DISASTER EVENTS	201
5.3 UPDATE ON EL NIÑO	206
ANNEX A. AGROCLIMATIC INDICATORS AND BIOMSS	208
ANNEX B. QUICK REFERENCE TO CROPWATCH INDICATORS, SPATIAL UNITS AND METHODOLOGIES	216
DATA NOTES AND BIBLIOGRAPHY	224
ACKNOWLEDGMENTS	228
ONLINE RESOURCES	229

LIST OF TABLES

TABLE 1.1 DEPARTURES FROM THE RECENT 15-YEAR AVERAGE OF CROPWATCH AGRO-CLIMATIC INDICATORS OVER REGIONAL MRU GROUPS.....	16
TABLE 3.1 AFGHANISTAN’S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	46
TABLE 3.2 AFGHANISTAN’S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019.....	46
TABLE 3.3 ANGOLA AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	49
TABLE 3.4 ANGOLA AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	49
TABLE 3.5 ARGENTINA’S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 15YA, JULY – OCTOBER 2019	52
TABLE 3.6 ARGENTINA’S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 5YA, JULY – OCTOBER 2019	52
TABLE 3.7 AUSTRALIA’S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 15YA, JULY – OCTOBER 2019	55
TABLE 3.8 AUSTRALIA’S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	55
TABLE 3.9 BANGLADESH’S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 15YA, JULY – OCTOBER 2019	57
TABLE 3.10 BANGLADESH’S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	58
TABLE 3.11 BELARUS’S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019.....	61
TABLE 3.12 BELARUS’S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019.....	61
TABLE 3.13 BRAZIL’S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	65
TABLE 3.14 BRAZIL’S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	66
TABLE 3.15 CANADA’S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	68
TABLE 3.16 CANADA AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	69
TABLE 3.17 GERMANY AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 15YA, JULY-OCTOBER 2019.....	73
TABLE 3.18 GERMANY’S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUE AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	73
TABLE 3.19 EGYPT’S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	75
TABLE 3.20 EGYPT’S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019.....	75
TABLE 3.21 ETHIOPIA’S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	78
TABLE 3.22 ETHIOPIA’S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	78
TABLE 3.23 FRANCE’S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	81
TABLE 3.24 FRANCE’S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUE AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019.....	82
TABLE 3.25 UNITED KINGDOM’S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON’S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019.....	84

TABLE 3.26 UNITED KINGDOM'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	85
TABLE 3.27 HUNGARY'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	87
TABLE 3.28 HUNGARY'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	88
TABLE 3.29 INDONESIA'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	90
TABLE 3.30 INDONESIA'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUE AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	91
TABLE 3.31 INDIA'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	94
TABLE 3.32 INDIA'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019.....	95
TABLE 3.33 IRAN'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	98
TABLE 3.34 IRAN'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUE AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019.....	98
TABLE 3.35 ITALY'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	100
TABLE 3.36 ITALY'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUE AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019.....	101
TABLE 3.37 KAZAKHSTAN AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	104
TABLE 3.38 KAZAKHSTAN, AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	104
TABLE 3.39 KENYA'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	107
TABLE 3.40 KENYA'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	107
TABLE 3.41 CAMBODIA AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	110
TABLE 3.42 CAMBODIA, AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	110
TABLE 3.43 SRI LANKA'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	113
TABLE 3.44 SRI LANKA'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	113
TABLE 3.45 MOROCCO'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	116
TABLE 3.46 MOROCCO'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	116
TABLE 3.47 MEXICO'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	119
TABLE 3.48 MEXICO'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	119
TABLE 3.49 MYANMAR'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	122
TABLE 3.50 MYANMAR'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	122
TABLE 3.51 MONGOLIA'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	125
TABLE 3.52 MONGOLIA'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	125
TABLE 3.53 MOZAMBIQUE'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	128

TABLE 3.54 MOZAMBIQUE'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	128
TABLE 3.55 NIGERIA'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	131
TABLE 3.56 NIGERIA'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	131
TABLE 3.57 PAKISTAN'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	134
TABLE 3.58 PAKISTAN'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	134
TABLE 3.59 PHILIPPINES'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY - OCTOBER 2019	137
TABLE 3.60 PHILIPPINES'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY - OCTOBER 2019	137
TABLE 3.61 POLAND'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY-OCTOBER 2019.....	140
TABLE 3.62 POLAND'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY-OCTOBER 2019.....	140
TABLE 3.63 ROMANIA'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY-OCTOBER 2019.....	143
TABLE 3.64 ROMANIA'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY-OCTOBER 2019.....	143
TABLE 3.65 RUSSIA'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY-OCTOBER 2019.....	148
TABLE 3.66 RUSSIA'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY-OCTOBER 2019.....	148
TABLE 3.67 THAILAND'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY-OCTOBER 2019.....	151
TABLE 3.68 THAILAND'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY-OCTOBER 2019.....	151
TABLE 3.69 TURKEY'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY-OCTOBER 2019.....	154
TABLE 3.70 TURKEY'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY-OCTOBER 2019.....	154
TABLE 3.71 UKRAINE'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY-OCTOBER 2019.....	156
TABLE 3.72 UKRAINE'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY-OCTOBER 2019.....	156
TABLE 3.73 UNITED STATES'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY-OCTOBER 2019.....	161
TABLE 3.74 UNITED STATES'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY-OCTOBER 2019.....	161
TABLE 3.75 UZBEKISTAN'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY-OCTOBER 2019.....	164
TABLE 3.76 UZBEKISTAN'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY-OCTOBER 2019.....	165
TABLE 3.77 VIETNAM'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JANUARY -APRIL 2019	168
TABLE 3.78 VIETNAM'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA/15YA, JANUARY -APRIL 2019	168
TABLE 3.79 SOUTH AFRICA'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY -OCTOBER 2019	171
TABLE 3.80 SOUTH AFRICA'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY -OCTOBER 2019	171
TABLE 3.81 ZAMBIA'S AGROCLIMATIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 15YA, JULY -OCTOBER	173

TABLE 3.82 ZAMBIA'S AGRONOMIC INDICATORS BY SUB-NATIONAL REGIONS, CURRENT SEASON'S VALUES AND DEPARTURE FROM 5YA, JULY -OCTOBER 2019	174
TABLE 4.1 CROPWATCH AGROCLIMATIC AND AGRONOMIC INDICATORS FOR CHINA, JULY - OCTOBER 2019, DEPARTURE FROM 5YA AND 15YA	178
TABLE 4.2 CHINA 2019 PRODUCTION OF MAIZE, RICE, WHEAT, AND SOYBEAN, AND PERCENTAGE CHANGE FROM 2018, BY PROVINCE.	179
TABLE 4.3 CHINA 2019 EARLY RICE, SINGLE RICE/SEMI-LATE RICE, AND LATE RICE PRODUCTION AND PERCENTAGE DIFFERENCE FROM 2018, BY PROVINCE.	180
TABLE 4.4 CHINA 2019 WINTER CROPS, SUMMER CROPS AND TOTAL ANNUAL CROP PRODUCTION AND PERCENTAGE DIFFERENCE FROM 2018, BY PROVINCE	181
TABLE 4.5 STATISTICS OF RICE PLANT HOPPER IN CHINA (MID-LATE SEPTEMBER 2019)	190
TABLE 4.6 STATISTICS OF RICE PLANT HOPPER IN CHINA (MID-LATE SEPTEMBER 2019)	191
TABLE 4.7 STATISTICS OF RICE SHEATH BLIGHT IN CHINA (MID-LATE SEPTEMBER 2019)	192
TABLE 4.8 STATISTICS OF MAIZE ARMYWORM IN CHINA (MID-LATE SEPTEMBER 2019).....	193
TABLE 4.9 STATISTICS OF MAIZE NORTHERN LEAF BLIGHT IN CHINA (MID-LATE SEPTEMBER 2019)	194
TABLE 5.1 2019 CEREAL AND SOYBEAN PRODUCTIONS ESTIMATES IN THOUSANDS TONNES.	197
TABLE 5.2 COMPARISON OF 2019 AND 2018 PRODUCTION OF MAJOR IMPORTERS	200
TABLE A.1 JULY 2019 - OCT 2019 AGROCLIMATIC INDICATORS AND BIOMASS BY GLOBAL MONITORING AND REPORTING UNIT (MRU)	208
TABLE A.2 JULY 2019 - OCT 2019 AGROCLIMATIC INDICATORS AND BIOMASS BY COUNTRY	210
TABLE A.3 ARGENTINA, JULY - OCT 2019 AGROCLIMATIC INDICATORS AND BIOMASS (BY PROVINCE)	211
TABLE A.4 AUSTRALIA, JULY - OCT 2019 AGROCLIMATIC INDICATORS AND BIOMASS (BY STATE)	211
TABLE A.5 BRAZIL, JULY - OCT 2019 2019 AGROCLIMATIC INDICATORS AND BIOMASS (BY STATE)	211
TABLE A.6 CANADA, JULY - OCT 2019 2019 AGROCLIMATIC INDICATORS AND BIOMASS (BY PROVINCE)	212
TABLE A.7 INDIA, JULY - OCT 2019 2019 AGROCLIMATIC INDICATORS AND BIOMASS (BY STATE)	212
TABLE A.8 KAZAKHSTAN, JULY - OCT 2019 2019 AGROCLIMATIC INDICATORS AND BIOMASS (BY OBLAST)	213
TABLE A.9 RUSSIA, JULY - OCT 2019 2019 AGROCLIMATIC INDICATORS AND BIOMASS (BY OBLAST, KRAY AND REPUBLIC)	213
TABLE A.10 UNITED STATES, JULY - OCT 2019 2019 AGROCLIMATIC INDICATORS AND BIOMASS (BY STATE)	214
TABLE A.11 CHINA, JULY - OCT 2019 2019 AGROCLIMATIC INDICATORS AND BIOMASS (BY PROVINCE).....	214

LIST OF FIGURES

FIGURE 1.1 GLOBAL DEPARTURE FROM RECENT 15 YEAR AVERAGE OF THE RAIN, TEMP AND RADPAR INDICATORS SINCE 2017 JASO PERIOD (AVERAGE OF 65 MRUs, UNWEIGHTED)	16
FIGURE 1.2 GLOBAL MAP OF RAINFALL ANOMALY (AS INDICATED BY THE RAIN INDICATOR) BY CROPWATCH MAPPING AND REPORTING UNIT: DEPARTURE OF JULY TO OCTOBER 2019 TOTAL FROM 2004-2018 AVERAGE (15YA), IN PERCENT.	17
FIGURE 1.3 GLOBAL MAP OF TEMPERATURE ANOMALY (AS INDICATED BY THE TEMP INDICATOR) BY CROPWATCH MAPPING AND REPORTING UNIT: DEPARTURE OF JULY TO OCTOBER 2019 AVERAGE FROM 2004-2018 AVERAGE (15YA), IN °C	19
FIGURE 1.4 GLOBAL MAP OF PHOTOSYNTHETICALLY ACTIVE RADIATION ANOMALY (AS INDICATED BY THE RADPAR INDICATOR) BY CROPWATCH MAPPING AND REPORTING UNIT: DEPARTURE OF JULY TO OCTOBER 2019 TOTAL FROM 2004-2018 AVERAGE (15YA), IN PERCENT.	19
FIGURE 1.5 GLOBAL MAP OF PHOTOSYNTHETICALLY ACTIVE VRADIATION ANOMALY (AS INDICATED BY THE RADPAR INDICATOR) BY CROPWATCH MAPPING AND REPORTING UNIT (MRU), DEPARTURE FROM 15YA BETWEEN JANUARY AND APRIL 2019.....	20
FIGURE 2.1 WEST AFRICA MPZ: AGROCLIMATIC AND AGRONOMIC INDICATORS, JULY TO OCTOBER 2019.....	23
FIGURE 2.2 NORTH AMERICA MPZ: AGROCLIMATIC AND AGRONOMIC INDICATORS, JANUARY TO APRIL 2019.	25
FIGURE 2.3 SOUTH AMERICA MPZ: AGROCLIMATIC AND AGRONOMIC INDICATORS, JULY TO OCTOBER 2019.....	27
FIGURE 2.4 SOUTH AND SOUTHEAST ASIA MPZ: AGROCLIMATIC AND AGRONOMIC INDICATORS, JULY TO OCTOBER 2019.....	29
FIGURE 2.5 WESTERN EUROPE MPZ: AGROCLIMATIC AND AGRONOMIC INDICATORS, JULY TO OCTOBER 2019.	31
FIGURE 2.6 CENTRAL EUROPE-WESTERN RUSSIA MPZ: AGROCLIMATIC AND AGRONOMIC INDICATORS, JULY TO OCTOBER 2019.	33
FIGURE 3.1 NATIONAL AND SUBNATIONAL RAINFALL ANOMALY (AS INDICATED BY THE RAIN INDICATOR) OF JULY TO OCTOBER 2019 TOTAL RELATIVE TO THE 2004-2018 AVERAGE (15YA), IN PERCENT.	38

FIGURE 3.2 NATIONAL AND SUBNATIONAL TEMPERATUTE RAINFALL ANOMALY (AS INDICATED BY THE RAIN INDICATOR) OF JULY TO OCTOBER 2019 AVERAGE RELATIVE TO THE 2004-2018 AVERAGE (15YA), IN °C	39
FIGURE 3.3 NATIONAL AND SUBNATIONAL SUNSHINE ANOMALY (AS INDICATED BY THE RADPAR INDICATOR) OF JULY TO OCTOBER 2019 TOTAL RELATIVE TO THE 2004-2018 AVERAGE (15YA), IN PERCENT.	40
FIGURE 3.4 NATIONAL AND SUBNATIONAL BIONASS PRODUCTION POTENTIAL ANOMALY (AS INDICATED BY THE BIOMSS INDICATOR) OF JULY TO OCTOBER 2019 TOTAL RELATIVE TO THE 2004-2018 AVERAGE (15YA), IN PERCENT.	40
FIGURE 3.5 AFGHANISTAN’S CROP CONDITION, JULY - OCTOBER 2019.....	45
FIGURE 3.6 ANGOLA’S CROP CONDITION, JULY – OCTOBER 2019.....	47
FIGURE 3.7 ARGENTINA’S CROP CONDITION, JULY - OCTOBER 2019	50
FIGURE 3.8 AUSTRALIA’S CROP CONDITION, JULY - OCTOBER 2019	53
FIGURE 3.9 BANGLADESH’S CROP CONDITION, JULY - OCTOBER 2019.....	56
FIGURE 3.10 BELARUS’S CROP CONDITION, JULY - OCTOBER 2019.....	59
FIGURE 3.11 BRAZIL’S CROP CONDITION, JULY - OCTOBER 2019.....	63
FIGURE 3.12 CANADA’S CROP CONDITION, JULY - OCTOBER 2019	67
FIGURE 3.13 GERMANY’S CROP CONDITION, JULY-OCTOBER 2019	71
FIGURE 3.14 EGYPT’S CROP CONDITION, JULY - OCTOBER 2019	74
FIGURE 3.15 ETHIOPIA’S CROP CONDITION, JULY - OCTOBER 2019	77
FIGURE 3.16 FRANCE’S CROP CONDITION, JULY - OCTOBER 2019	80
FIGURE 3.17 UNITED KINGDOM CROP CONDITION, JULY - OCTOBER 2019.....	83
FIGURE 3.18 HUNGARY’S CROP CONDITION, JULY - OCTOBER 2019.	86
FIGURE 3.19 INDONESIA’S CROP CONDITION, JULY - OCTOBER 2019	89
FIGURE 3.20 INDIA’S CROP CONDITION, JULY - OCTOBER 2019	93
FIGURE 3.21 IRAN’S CROP CONDITION, JULY - OCTOBER 2019	96
FIGURE 3.22 ITALY’S CROP CONDITION, JULY - OCTOBER 2019.....	99
FIGURE 3.23 KAZAKHSTAN’S CROP CONDITION, JULY - OCTOBER 2019	102
FIGURE 3.24 KENYA’S CROP CONDITION, JULY – OCTOBER 2019	106
FIGURE 3.25 CAMBODIA’S CROP CONDITION, JULY – OCTOBER 2019	108
FIGURE 3.26 SRI LANKA’S CROP CONDITION, JULY - OCTOBER 2019.....	112
FIGURE 3.27 MOROCCO’S CROP CONDITION, JULY - OCTOBER 2019	114
FIGURE 3.28 MEXICO’S CROP CONDITION, JULY - OCTOBER 2019.....	118
FIGURE 3.29 MYANMAR’S CROP CONDITION, JULY - OCTOBER 2019.....	121
FIGURE 3.30 MONGOLIA’S CROP CONDITION, JULY - OCTOBER 2019	123
FIGURE 3.31 MOZAMBIQUE’S CROP CONDITION, JULY - OCTOBER 2019	126
FIGURE 3.32 NIGERIA’S CROP CONDITION, JULY - OCTOBER 2019.....	130
FIGURE 3.33 PAKISTAN’S CROP CONDITION, JULY - OCTOBER 2019.....	132
FIGURE 3.34 PHILIPPINES’S CROP CONDITION, JULY - OCTOBER 2019.....	136
FIGURE 3.35 POLAND’S CROP CONDITION, JULY-OCTOBER 2019	138
FIGURE 3.36 ROMANIA’S CROP CONDITION, JULY-OCTOBER 2019.....	142
FIGURE 3.37 RUSSIA’S CROP CONDITION, JULY-OCTOBER 2019.....	145
FIGURE 3.38 THAILAND’S CROP CONDITION, JULY-OCTOBER 2019.....	149
FIGURE 3.39 TURKEY’S CROP CONDITION, JULY-OCTOBER 2019	152
FIGURE 3.40 UKRAINE’S CROP CONDITION, JULY-OCTOBER 2019	155
FIGURE 3.41 UNITED STATES’S CROP CONDITION, JULY-OCTOBER 2019	159
FIGURE 3.42 UZBEKISTAN’S CROP CONDITION, JULY - OCTOBER 2019	163
FIGURE 3.43 VIETNAM’S CROP CONDITION, JULY - OCTOBER 2019	167
FIGURE 3.44 SOUTH AFRICA’S CROP CONDITION, JULY - OCTOBER 2019.....	170
FIGURE 3.45 ZAMBIA’S CROP CONDITION, JULY - OCTOBER 2019	172
FIGURE 3.46 KYRGYZSTAN’S CROP CONDITION, JULY - OCTOBER 2019.....	175
FIGURE 4.1 CHINA SPATIAL DISTRIBUTION OF RAINFALL PROFILES, JULY - OCTOBER 2019.....	178
FIGURE 4.2 CHINA SPATIAL DISTRIBUTION OF TEMPERATURE PROFILES, JULY - OCTOBER 2019.....	178
FIGURE 4.3 CHINA CROPPED AND UNCROPPED ARABLE LAND, BY PIXEL, JULY - OCTOBER 2019	178
FIGURE 4.4 CHINA MAXIMUM VEGETATION CONDITION INDEX (VCIX), BY PIXEL, JULY - OCTOBER 2019	179
FIGURE 4.5 CHINA MINIMUM VEGETATION HEALTH INDEX (LEFT), BY PIXEL, JULY - OCTOBER 2019.....	179
FIGURE 4.6 CHINA CROPPING INTENSITY, BY PIXEL, IN 2019CHINA VEGETATION HEALTH INDEX MINIMUM (VHIN), BY PIXEL, JULY - OCTOBER 2019.....	179
FIGURE 4.7 CROP CONDITION CHINA NORTHEAST REGION, JULY - OCTOBER 2019	183
FIGURE 4.8 CROP CONDITION CHINA INNER MONGOLIA, JULY - OCTOBER 2019.....	184

FIGURE 4.9 CROP CONDITION CHINA HUANGHUIHAI, JULY - OCTOBER 2019	185
FIGURE 4.10 CROP CONDITION CHINA LOESS REGION, JULY - OCTOBER 2019	186
FIGURE 4.11 CROP CONDITION LOWER YANGTZE REGION, JULY - OCTOBER 2019	187
FIGURE 4.12 CROP CONDITION SOUTHWEST CHINA REGION, JULY - OCTOBER 2019.....	188
FIGURE 4.13 CROP CONDITION SOUTHERN CHINA REGION, JULY - OCTOBER 2019.....	189
FIGURE 4.19 RATE OF CHANGE OF IMPORTS AND EXPORTS FOR RICE, WHEAT, MAIZE, AND SOYBEAN IN CHINA IN 2019	195
FIGURE 5.1 TRACK OF CYCLONE IDAI: THE BEGINNING OF A FIRE IN SHERMAN OAKS, CALIFORNIA, FILLS THE SKYLINE WITH SMOKE.	202

Abbreviations

5YA	Five-year average, the average for the four-month period from July from 2014 to 2018 to October next year; one of the standard reference periods.
15YA	Fifteen-year average, the average for the four-month period from July from 2004 to 2018 to October 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 2019, a period referred to in this bulletin as the JASO (July, August, September and October) period or just the “reporting period.” The bulletin is the 115th 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 indicators

CropWatch analyses are based mostly on several standard as well as new ground-based and remote sensing indicators, following a hierarchical approach.

In parallel to an increasing spatial precision of the analyses, indicators become more focused on agriculture as the analyses zoom in to smaller spatial units. CropWatch uses two sets of indicators: (i) agroclimatic indicators—RAIN, TEMP, RADPAR, and potential BIOMSS, which describe weather factors and its impacts on crops; and (ii) agronomic indicators—VHIn, CALF, and VCIx, Cropping Intensity, and vegetation indices, 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. (ii) PAY indicators: planted area, yield and production.

For each reporting period, the bulletin reports on the departures for all seven indicators, which (with the exception of TEMP) are expressed in relative terms as a percentage change compared to the average value for that indicator for the last five or fifteen years (depending on the indicator). For more details on the CropWatch indicators and spatial units used for the analysis, please see the quick reference guide in Annex B, as well as online resources and publications posted at www.cropwatch.com.cn.

CropWatch analysis and indicators

The analyses cover large global zones; major producing countries of maize, rice, wheat, and soybean; and detailed assessments for Chinese regions, 41 major agricultural countries, and 201 Agro-Ecological Zones (AEZs).

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	42 key countries (main producers and exporters) and 205 AEZs	As above plus NDVI and GVG survey
Chapter 4	China and regions	As above plus high resolution images; Pest and crops trade prospects
Chapter 5	Production outlook, and updates on disaster events and El Niño.	

Regular updates and online resources

The bulletin is released quarterly in both English and Chinese. E-mail cropwatch@radi.ac.cn to sign up for the mailing list or visit CropWatch online at www.cropwatch.com.cn, <http://cloud.cropwatch.com.cn/>

Executive summary

The current CropWatch bulletin describes world-wide crop condition and food production as appraised by data up to the end of October 2019. It is prepared by an international team coordinated by the Institute of Remote Sensing and Digital Earth (RADI), Chinese Academy of Sciences.

The assessment is based mainly on remotely sensed data. It covers prevailing weather conditions, including extreme factors, at different spatial scales, starting with global patterns in Chapter 1. Chapter 2 focuses on agro-climatic and agronomic conditions in major production zones in all continents. Chapter 3 covers the major agricultural countries that, together, make up at least 80% of production and exports (the “core countries”) while chapter 4 zooms into China. Special attention is paid to the major producers of maize, rice, wheat, and soybean for which the bulletin presents a global production estimate for crops harvested throughout 2019 (Chapter 5.1).

The bulletin is issued at a time when virtually all 2019 crops have been harvested in the temperate northern hemisphere, while in many tropical areas in both hemispheres rice crops are growing (to be harvested in early 2020) or are close to harvest. In the southern hemisphere the summer season/monsoon season is ongoing.

Agro-climatic conditions (Chapter 1)

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

The current reporting period was globally warm and dry, and this is confirmed by numerous fires listed in the section on Disasters (Chapter 5.2) on almost all continents. CropWatch uses 65 large spatial units (referred to as MRU) to assess global agro-climatic patterns, Most MRUs experienced average RAIN, 57% had above average temperature and 66% had above average sunshine.

On a continental basis, RAIN anomalies were largest in north America (+24% above average), central Asia (+22%) and in Oceania (down 38% compared with average). Low precipitation in southern and especially central America (-9%) is directly associated with a very tense situation in the “drought corridor” (refer to Chapter 5.2 on Disasters).

In North America, TEMP was 0.4°C below average. Positive anomalies occurred in central and eastern Asia (+0.3°C compared with average) where almost all MRUs has consistently warmer than average weather positive over their agricultural areas (89% and 100%, respectively). RADPAR was generally close to average except in South and Central America (+3%) and Oceania (+6%), where all MRUs were affected. The largest BIOMSS increase occurred in central Asia (+5%)

Acutely abnormal or damaging weather conditions are described in Chapters 3.1 by country and in Chapter 5.2 impact type. They include several tropical cyclones in different Basins: Kyarr, in the Indian Ocean, affected southern Asia and the Horn of Africa; Dorian created havoc in the Caribbean and the western Pacific, Lekima, Faxai and Hagibis affected eastern Asia and south-east Asia.

Global Agricultural production estimates (Chapter 5.1)

The bulletin provides the second revised global estimate by the CropWatch team for 2019 production of the major commodities. About 90% of the production is actually modeled and about 10% is trend-based.

The volumes produced in 2019 include 1055 million tonnes of maize, up 0.5% from 2018, 754 millions for rice (as paddy; up 4.2%), 716 million tonnes of wheat (a 0.9% increase) and 324 million tonnes of soybeans, 1.0% lower than last year's output.

The largest net cereal production increases in million tonnes occurred in India (13.3, in spite of a drop in wheat output), China (10.6), United States (9.7), Pakistan (5.2) followed by Bangladesh (3.7), Argentina (3.3), Myanmar (2.6) and several central and western Asian countries where wheat did well after several years of poor performance (2.0 to 2.4 in Afghanistan, Iran and Uzbekistan). The largest net cereal production decreases in excess of 1 million tons affected Australia (-5.4 due to poor wheat), Kazakhstan (-3.5, wheat), South Africa (-1.7, maize), Indonesia (-1.6, rice) and Ukraine (-1.4, maize and wheat). As described in the country narratives in Chapter 3, the listed situations are directly related to prevailing environmental conditions

China (Chapter 4)

The total 2019 annual crop production is estimated at 628 million tons, up 2% from 2018. For summer crops (including maize, semi-late rice / single rice, late rice, spring wheat, soybean, tuber crops, and other minor summer crops) the output is put at 467 million tons, a 2% increase. This is mainly due to the good performance of maize and rice, the production of which reached 224 million tons, 1% above the 2018 output. Maize yields in Heilongjiang, Jilin, Liaoning and Inner Mongolia were up 3%, 5%, 3%, and 2%, respectively. In contrast, Both Henan and Shandong maize production dropped by 2% due to drought at early growing stage.

At 203 million tons, rice production (mostly single rice and late rice) was 3% above last year's output. Yield increase due to favorable late season weather was the main factor behind the improved production. The wheat production estimate of 126 million tons was up 2% over 2018.

Soybean output (14441 thousand tons) underwent a year-on-year increase of 3%. 2019 was the fourth consecutive year of increased soybean hectareage and production. In Heilongjiang, the main soybean region of China, production was up 8%. This is exceeded in Jilin where increased planted area and yield resulted in an 10% increase in output. .