Chapter 4. China

After a brief overview of the agro-climatic and agronomic conditions in China over the reporting period (section 4.1), Chapter 4 presents an updated estimate of national winter crop production (4.2) and describes the situation by region, focusing on the seven most productive agro-ecological regions of the east and south: Northeast China, Inner Mongolia, Huanghuaihai, Loess region, Lower Yangtze, Southwest China, and Southern China (4.3). Section 4.4 presents the results of ongoing pests and diseases monitoring, while sections 4.5 and 4.6 describe trade prospects (import/export) of major crops (4.5) and an updated outlook for domestic prices of maize, rice, wheat and soybean (4.6). Additional information on the agro-climatic indicators for agriculturally important Chinese provinces are listed in table A.11 in Annex A.

4.1 Overview

Weather was generally favorable in China from July to October 2018, with rainfall and radiation increasing above average by 4% and 1%, respectively, and temperature slightly down by 0.4°C. As a result, the maximum VCI was rather high at 0.94. Moreover, the mean of CALF for the whole country was 2% above average. These results indicated favorable situation of crop production in China during this season, which was confirmed by the relatively high yields of main crops, with those of maize, wheat and soybean increasing 1.5%, 1.4% and 1.5%, respectively, above their 2017 values. Rice yield, however, was slightly reduced (-0.9%).

At the regional scale, rainfall was above average by 28%, 9%, 15% and 12% in Inner Mongolia, Lower Yangtze, Northeast China and Southern China, whereas Huanghuahai, the Loess region and Southwest China might have suffered from water deficit, with precipitation drops in these regions amounting to 10%, 8% and 9%, respectively, compared with average (Table 4.1). As shown by Figure 4.1, 14.9% of planted areas experienced excess rainfall (about 120 mm above average) in early August, including the southern part of Northeast China (southern Jilin province and most parts of Liaoning province), Shandong province, Anhui province and Jiangsu province. On the contrary, 39% of cropped areas suffered from serious water deficits in early July, with rainfall short by more than 45 mm, most of them located in Southwest China (especially Guizhou province and Chongqing city) and Lower Yangtze (Hubei province, Jiangxi province and Zhejiang province). Temperatures in all regions were close to average, with the anomalies ranging between -0.9°C and +0.3°C. However, temperature departures fluctuated obviously in most of China over time (Figure 4.2). Temperature was more than 1.5°C above average during early and late July while more than 3°C below average in mid-September for 51.2% of planted areas, mainly located in the central part of China. In addition, temperature in the southern part of China, accounting for 34.8% of cropped areas, was 0.75°C above average during early July but 2.5 below average during mid-September and early October.

Table 4.1. CropWatch agroclimatic and agronomic indicators for China, July - October 2018, departure from 5YA and 15YA

Region	Agroclimatic indicators			Agronomic indicators			
	Departure from 15YA (2003-2017)			Departure from 5YA (2013-2017)			Current
	RAIN (%)	TEMP (°C)	RADPAR (%)	BIOMSS (%)	CALF (%)	Cropping intensity (%)	Maximum VCI
Huanghuaihai	-10	0.3	6	-22	-1	-1	0.90
Inner Mongolia	28	-0.4	-2	-4	9	0	0.97
Loess region	-8	-0.2	4	-24	10	-2	0.97

Region	Agroclimatic indicators			Agronomic indicators			
	Departure from 15YA (2003-2017)			Departure from 5YA (2013-2017)			Current
	RAIN (%)	TEMP (°C)	RADPAR (%)	BIOMSS (%)	CALF (%)	Cropping intensity (%)	Maximum VCI
Lower Yangtze	9	-0.6	4	17	-1	4	0.92
Northeast China	15	0.1	-3	-13	0	-1	0.96
Southern China	12	-0.9	-5	-2	-1	-1	0.94
Southwest China	-9	-0.6	1	-6	0	-1	0.94

As shown by Figure 4.3, almost all the arable land in China was cropped, mainly because this monitoring period is the peak of farming in China. According to the maximum VCI map (Figure 4.4), very high values (greater than 1) occurred in northern and northeastern China. The maximum VCI in other regions was also relatively high, with the values between 0.5 and 1.The VHIm map shows that high values (51-100) were mainly located in Inner Mongolia and Northeast China, with moderate values (16-50) appearing in most other regions (Figure 4.5). However, low values (1-15) sporadically occurred in the central part of China (northern Anhui and Henan province and southern Hebei province), implying these areas might have been exposed to drought.

Figure 4.1. China spatial distribution of rainfall profiles, July - October 2018

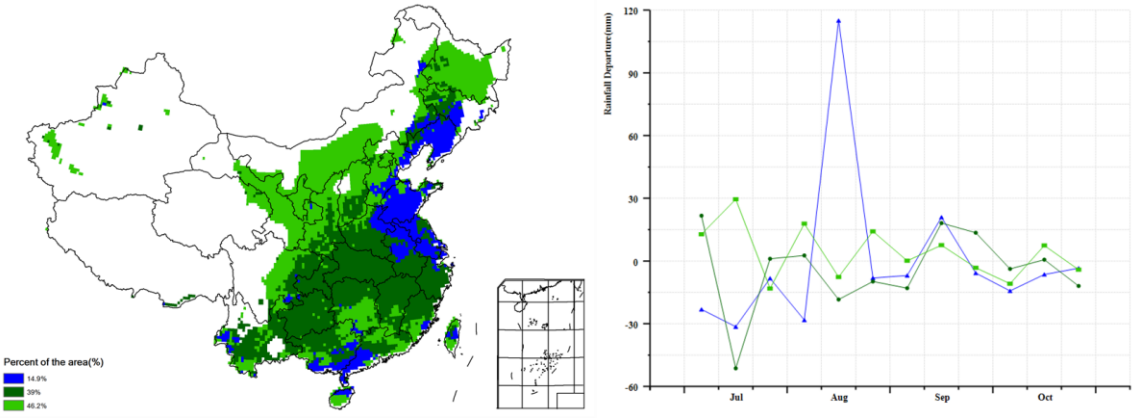


Figure 4.2. China spatial distribution of temperature profiles, July - October 2018

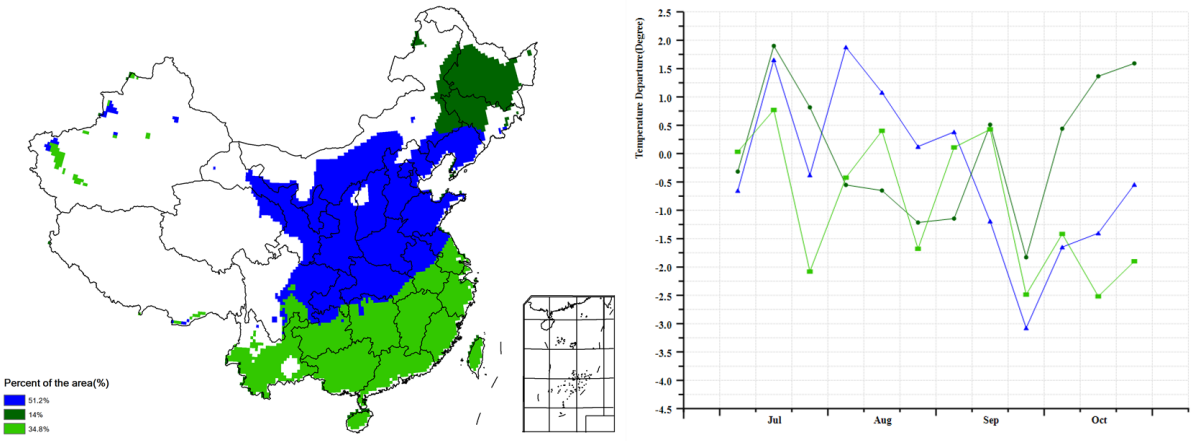


Figure 4.3. China cropped and uncropped arable land, by pixel, July - October 2018

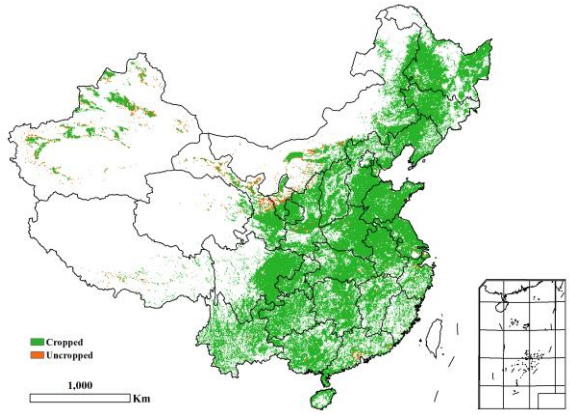


Figure 4.4. China maximum Vegetation Condition Index (VCIx), by pixel, July - October 2018

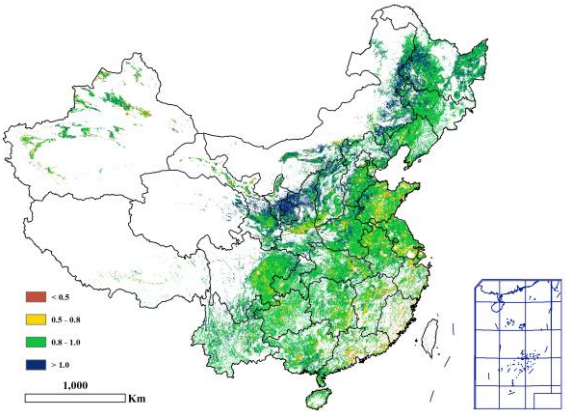
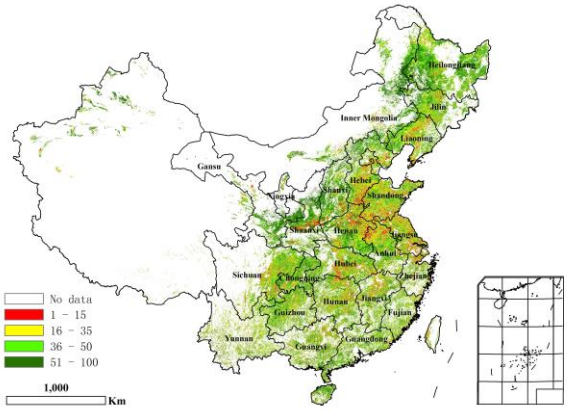
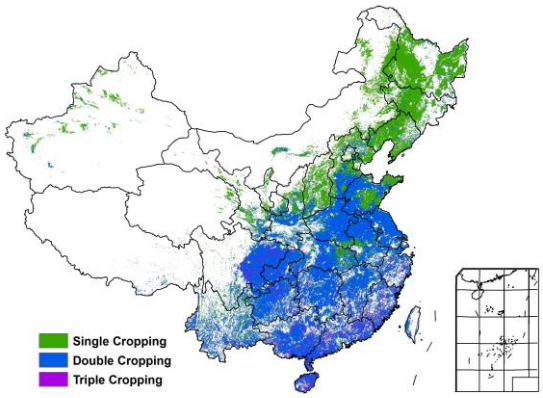


Figure 4.5. China minimum Vegetation Health Index (VHIn), by pixel, July - October 2018





4.2 China crop production

The final CropWatch estimates for maize, rice, wheat, and soybean production in China are listed in Table 4.2 by province. Additional estimates for different types of rice (grouped by growing seasons) are shown in table 4.3. The final revision of the production of major crops at the national level remains close to the August forecast. Compared with 2017 rice is down 2%. Wheat production stays at the same level with 121.5 million tons. Maize production is 1% up thanks to the 1.5% increase in average yield. Soybean production is up 2% due 1.5% increase in yield and 0.6% increase of planted area. Soybean production was revised down by 167 thousand tons from August forecast mainly due to the yield increase having been revised down. Altogether, however, the soybean production still reached a record level since 2012.

Table 4.2. China 2018 production of maize, rice, wheat, and soybean, and percentage change from 2017, by province.

	Maize		Rice		Wheat		Soybean	
	2018	Change (%)	2018	Change (%)	2018	Change (%)	2018	Change (%)
Anhui	3458	-2	16932	-1	10736	5	1051	-1
Chongqing	2028	-3	4571	-4	1092	0		
Fujian			2855	2				
Gansu	5349	8			2728	7		
Guangdong			11281	2				
Guangxi			10625	-5				

Guizhou	4921	-2	5312	-2				
Hebei	18174	1			10956	3	187	0
Heilongjiang	31899	4	20907	0	433	-8	4783	2
Henan	15298	-1	3806	-2	25599	0	761	1
Hubei			15620	-2	4308	1		
Hunan			25237	2				
Inner Mongolia	14917	-2			1963	-7	1121	4
Jiangsu	2121	-4	16097	-6	9816	3	763	-2
Jiangxi			17018	-3				
Jilin	22763	-3	5721	1			724	4
Liaoning	15416	1	4323	-1			399	-3
Ningxia	1671	-1	445	-15	831	6		
Shaanxi	3609	5	1002	-2	4165	8		
Shandong	18651	-3			21337	-4	668	-4
Shanxi	8978	7			2421	7	163	2
Sichuan	7014	0	14506	0	4612	-1		
Xinjiang	6665	-1						
Yunnan	6304	3	5727	2				
Zhejiang			6361	-2				
Sub total	189235	0	188345	-1	100999	1	10621	1
Other provinces	7149	42	8980	-11	20529	-3	3415	6
China*	196384	1	197325	-2	121528	0	14036	2

*** Production for Taiwan province is not included.**

Maize

As a result of the suppression of maize price subsidization three years ago, the planted area continued to decrease but only marginally so (-0.2%) compared to 2017. CropWatch puts the final yield at the same level as the August forecast, i.e. 1.5% above 2017. The favorable conditions in Northeast China and the Loess Region benefited rainfed maize development and grain filling. The most significant increase of maize production was observed in the semi-arid Loess Region, including Gansu (+8%), Shaanxi (5%), and Shanxi (7%). The main maize producing province – Heilongjiang – also produced 4% more maize compared to 2017. Maize production of most other provinces remained stable or dropped since 2017.

Rice

CropWatch sets the overall rice production for China at 197.3 million tons, 2% below 2017 mainly due to the decrease of planted area. The final estimate of rice production is about 919 thousand tons above the August prediction because of area cultivated in single and late rice was revised up. The national single rice production was 2% below 2017values because both yield and planted area are estimated at a lower level compared with 2017. The largest drop of single rice production was observed in Ningxia province (-15%) which contributes only little to the total output. Top producers such as Heilongjiang, Hunan and Sichuan slightly increased production compared to 2017. A large drop for single rice production was observed in Chongqing, Jiangsu and Hubei. Late rice production remains at the same level as 2017 but the relative share of provinces changed, with drops in Anhui (4%), Guangxi (6%), Jiangsu (9%) and Zhejiang (4%).

Table 4.3. China 2018 early rice, single rice, and late rice production and percentage difference from 2017, by province.

	Early rice		Single rice		Late rice	
	2018	Change (%)	2018	Change (%)	2018	Change (%)
Anhui	1824	0	13418	-1	1690	-4
Chongqing			4571	-4		
Fujian	1606	-4			1249	11
Guangdong	5178	-1			6103	5
Guangxi	5153	-4			5472	-6
Guizhou			5312	-2		
Heilongjiang			20907	0		
Henan			3806	-2		
Hubei	2323	-1	10425	-3	2872	1
Hunan	8025	-2	8703	7	8508	3
Jiangsu			16097	-6		
Jiangxi	7712	2	2891	3	6415	-9
Jilin			5721	1		
Liaoning			4323	-1		
Ningxia			445	-15		
Shaanxi			1002	-2		
Sichuan			14506	0		
Yunnan			5727	2		
Zhejiang	820	0	4710	-2	831	-4
Sub total	32641	-1	122563	-1	33141	-1
China*	34046	-1	128797	-2	34481	0

* Production for Taiwan province is not included.

Wheat

Wheat production is almost same as the August estimates except for some spring wheat producing provinces such as Heilongjiang, Inner Mongolia, Ningxia and Gansu. CropWatch puts China's annual wheat production for 2018 at 121.5 million tons, the same volume as during as during 2017.

Soybean

China's total soybean production for 2018 is revised to 14 million tons, 167 thousand tons down or 1.2% below the August prediction. Among the major producing provinces, Anhui, Jiangsu, Liaoning and Shandong reduced outputs compared to 2017 while the two top producers (Heilongjiang and Inner Mongolia), were 2% and 4% above 2017, respectively.

Total food production

CropWatch puts the total 2018 output of summer crops (including maize, single rice, late rice, spring wheat, soybean, minor cereals, and tubers) at 418.8 million tons, at the same level as 2017. The total annual crop production is estimated at 579.1 million tons; down 0.1% from 2017 (397 thousand tons decrease). The total annual output is listed by province in table 4.4. A remarkable feature is the poor performance of Shandong province with all crops (winterwheat, maize, soybean, or total winter crops and summer crops) producing less than during 2017.

Table 4.4. China 2018 winter crops, earlyrice, summer crops and total annual crop production and percentage differencefrom 2017, by province

	Winter crops		Early rice		Summer crops		Total	
	2018	Δ(%)	2018	Δ(%)	2018	Δ(%)	2018	Δ(%)
Anhui	11839	2	1824	0	20037	-1	33700	0
Chongqing	2319	1			7899	-3	10218	-2
Fujian			1606	-4	4680	11	6285	7
Gansu	3211	7			6387	8	9598	8
Guangdong			5178	-1	7914	5	13092	2
Guangxi			5153	-4	9813	-6	14966	-5
Guizhou					12117	-2	12117	-2
Hebei	12655	3			18302	1	30957	2
Heilongjiang					59629	2	59629	2
Henan	26224	0			25748	-1	51973	-1
Hubei	5755	0	2323	-1	17836	-2	25914	-1
Hunan			8025	-2	20031	5	28056	3
Inner Mongolia					21148	-1	21148	-1
Jiangsu	10171	2			19832	-6	30003	-3
Jiangxi			7712	2	9143	-6	16854	-2
Jilin					29942	-2	29942	-2
Liaoning					20616	0	20616	0
Ningxia					2951	-5	2951	-5
Shaanxi	4279	10			6429	3	10708	6
Shandong	23687	-5			20502	-3	44189	-4
Shanxi	2419	7			9747	7	12165	7
Sichuan	5507	0			26724	0	32231	0
Yunnan					14725	2	14725	2
Zhejiang					6213	-2	6213	-2
Sub total	108068	0.8	820	-0.3	398363	-0.3	507251	-0.1
Other provinces*	18160	-4.7	32641	-1.3	20499	7.3	71301	0.1
China*	126228	0	34046	-1.2	418862	0	579137	-0.1

4.3 Pest and diseases monitoring

1. Rice pests and diseases

The impact of pests and diseases was moderate during mid-September 2018 in the main rice regions of China. The temperature was lower than during the previous year in central and north-east China; precipitation was higher in central China, and south China. North China, east China, and southwest China were affected by typhoons and the resulting abundant rain provided suitable conditions for the migration of rice plant hopper (Nilaparvata lugens) and rice leaf roller (Cnaphalocrocis medinalis) and the dispersal of rice sheath blight (Rhizoctonia solani).

Rice plant hopper

The distribution of rice plant hopper during mid-September 2018 is shown in Figure 1.1 and Table 1.1. The total area affected reached 5.7 million hectares, with the pest severely occurring in north-eastern Sichuan, and western Heilongjiang, moderately in central Hunan, northern Jiangxi, central Jiangsu, and eastern Anhui and only slightly in central Yunnan, central Guangxi, and central Hubei.

Figure 4.6 Distribution of rice plant hopper in China (mid-September 2018)

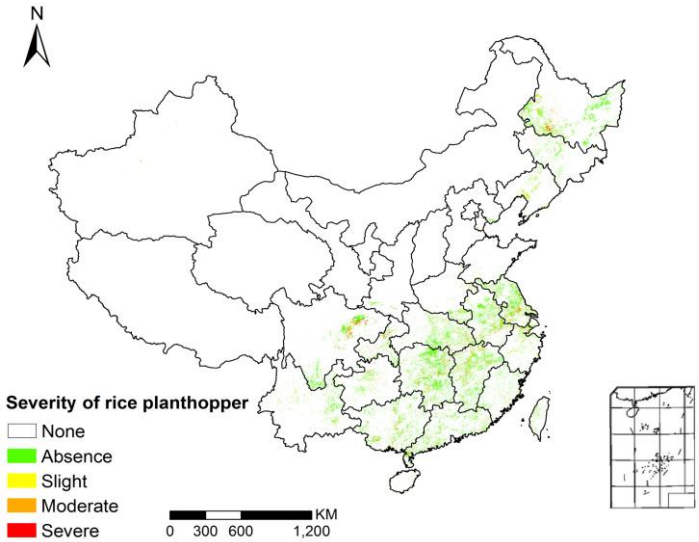


Table 4.5 Statistics of rice plant hopper in China (mid-September 2018)

Region	Occurrence ratio / %			
	None	Slight	Moderate	Severe
Huanghuaihai	83	11	4	2
Inner Mongolia	96	3	1	0
Loess region	100	0	0	0
Lower Yangtze	81	9	6	4
Northeast China	78	12	6	4
Southern China	82	6	7	5
Southwest China	79	8	7	6

Rice leaf roller

Rice leaf roller (Figure 1.2 and Table1.2) damaged around 5.0 million hectares, with severe infestations in north-eastern Sichuan, southern Jiangsu, and central Hunan, moderate infestation in eastern Anhui, central Guangxi, and central Jiangxi. Only slight impacts affected eastern Yunnan, and western Heilongjiang.

Figure 4.7 Distribution of rice leaf roller in China (mid-September 2018)

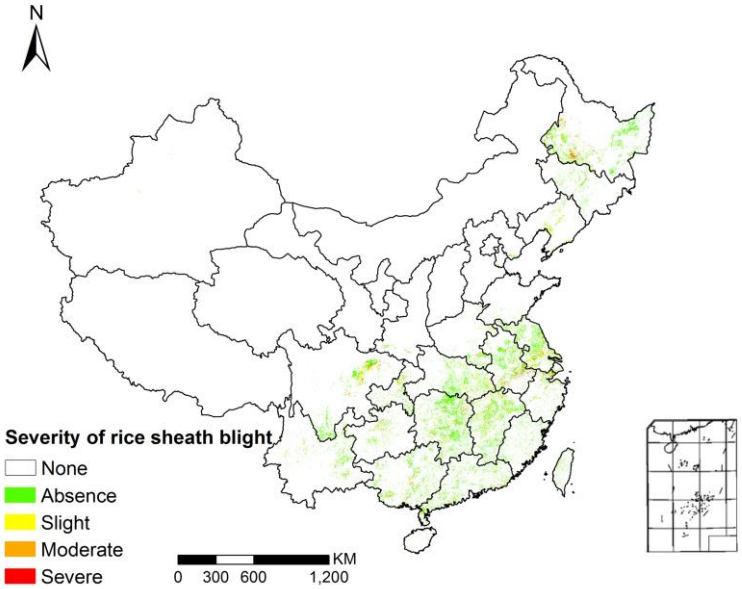


Table 4.6 Statistics of rice leaf roller in China (mid-September 2018)

Region	Occurrence ratio/%			
	None	Slight	Moderate	Severe
Huanghuaihai	85	9	4	2
Inner Mongolia	96	3	1	0
Loess region	100	0	0	0
Lower Yangtze	84	8	5	3
Northeast China	81	13	4	2
Southern China	84	6	6	4
Southwest China	82	9	5	4

Rice sheath blight

Rice sheath blight (Figure 1.3 and Table1.3) damaged around 7.3 million hectares, mostly in eastern Sichuan, western Heilongjiang, central Hunan, and eastern Anhui (severe impact), but to a lesser extent in central Guangxi, central Jiangxi, and central Jiangsu where moderate impact occurred. Central Hubei, central Jilin and eastern Yunnan had light infestations.

Figure 4.8 Distribution of rice sheath blight in China (mid-September 2018)

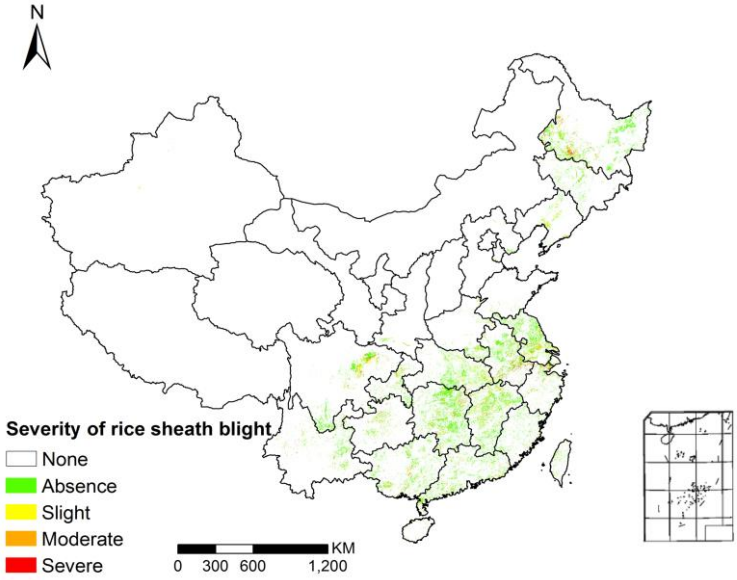


Table 4.7 Statistics of rice sheath blight in China (mid-September 2018)

Region	Occurrence ratio/%			
	None	Slight	Moderate	Severe
Huanghuaihai	80	13	5	2
Inner Mongolia	94	5	1	0
Loess region	100	0	0	0
Lower Yangtze	77	13	6	4
Northeast China	75	14	7	4
Southern China	79	10	7	4
Southwest China	76	14	6	4

2. Maize pests and diseases

Maize suffered moderately from pest and disease attacks during mid-September in the main production areas. Low temperature and high humidity in southern and northern China were suitable to armyworm (Mythimna separata) reproduction and northern leaf blight (Setosphaeria turcica) dispersal.

Maize armyworm

The distribution of maize army worm in mid-September 2018 is shown in Figure1.4 and Table 1.4. The total area affected reached 3.9 million hectares, with the pest severely affecting central Jilin, southern Heilongjiang, northern Henan and southern Hebei. North-western Shandong, central Shaanxi, and southern Liaoning where moderately affected while southern Shanxi, northern Hunan and central Xinjiang suffered only lightly.

Figure 4.9 Distribution of maize armyworm in China (mid-September 2018)

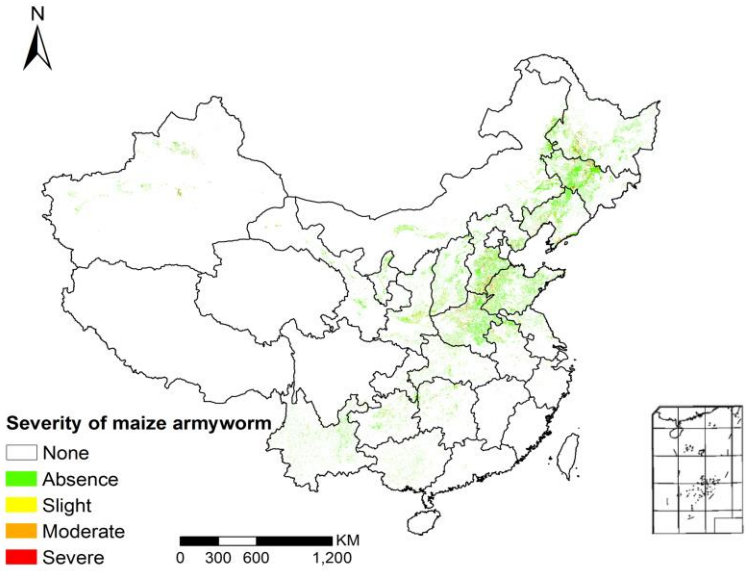


Table4.8 Statistics of maize armyworm in China (mid-September 2018)

Region	Occurrence ratio/%			
	None	Slight	Moderate	Severe
Huanghuaihai	86	5	5	4
Inner Mongolia	90	7	2	1
Loess region	83	10	5	2
Lower Yangtze	85	8	5	2
Northeast China	86	5	5	4
Southern China	91	4	3	2
Southwest China	89	5	3	3

Maize northern leaf blight

Maize northern leaf blight (Figure 1.5 and Table 1.5) damaged around 2.3 million hectares, with the disease severely occurring in central Jilin, southern Heilongjiang and western Shandong; moderately in northern Liaoning, southern Hebei and only slightly in central Inner Mongolia, northern Henan, and southern Shanxi.

Figure 4.10 Distribution of maize northern leaf blight in China (mid-September 2018)

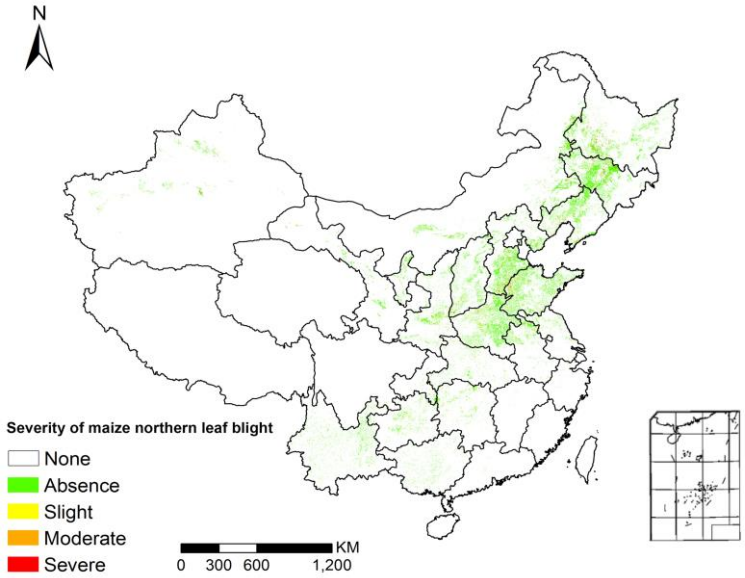


Table 4.9. Statistics of maize northern leaf blight in China (mid-September 2018)

Region	Occurrence ratio/%			
	None	Slight	Moderate	Severe
Huanghuaihai	93	4	2	1
Inner Mongolia	94	2	3	1
Loess region	90	6	3	1
Lower Yangtze	91	6	2	1
Northeast China	92	3	3	2
Southern China	95	2	2	1
Southwest China	94	4	1	1

4.4 Major crops trade prospects

Based on the latest monitoring results, China grain imports are projected to increase. The projections are based on remote sensing data and the Major Agricultural Shocks and Policy Simulation Model, which is derived from the standard GTAP (Global Trade Analysis Project).

Maize

According to the model forecast, maize imports will increase by 10.5% in China in 2018, but exports will decrease by 16.4%. Chinese maize output has increased, but the price of maize is up because of the strong demand. China intends to reduce the maize planted area, but the production still retains its growth with decreasing imports.

Rice

According to the model forecast, rice imports and exports will increase by 12.6% and 13.5% respectively in 2018. The rice supply and demand stay balanced globally. Domestic markets are in a weak condition in which rice price has a trend of continuous weakening. The rice import in 2018 will remain stable due to the lack of price advantage. Exports will remain at a low growth rate.

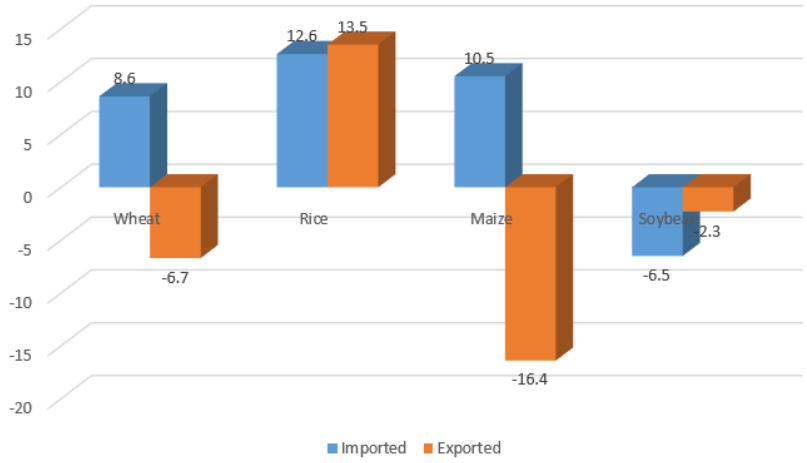
Wheat

According to the model forecast, wheat imports will increase by 8.6%, while exports will decrease by 6.7%. According to remote sensing estimates, global wheat production fell marginally, but the inventory consumption ratio is still at a high level. Wheat output decreased slightly in China. The price gap between home and abroad will expand further, and imports of wheat are expected to increase in 2018.

Soybean

Soybean imports and exports will decrease by 6.5% and 2.3%, respectively. At present, the global soybean supply is sufficient. The international price of soybean is weak due to the influence of Sino-US trade friction. The soybean production has increased in china, while the price gap at home and abroad has narrowed. China's soybean imports will be reduced further.

Figure 4.11. Rate of change of imports and exports for rice, wheat, maize, and soybean in China in 2018 compared to those for 2017(%).



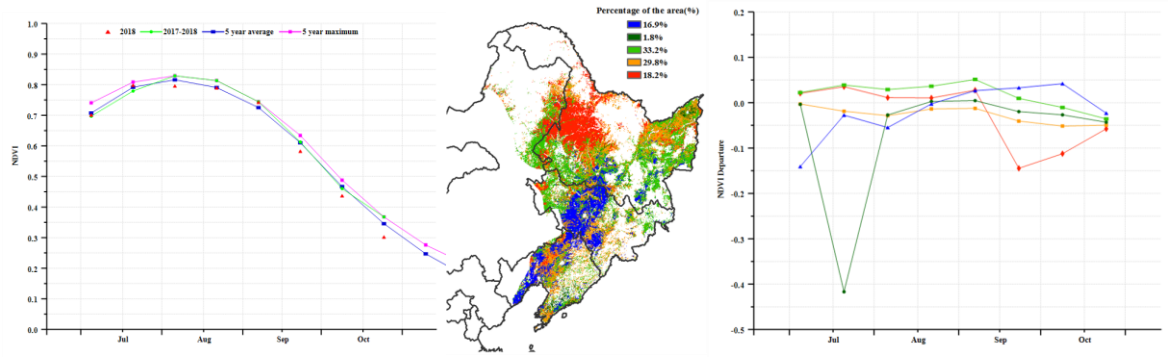
4.5 Regional analysis

Figures 4.6 through 4.12 present crop condition information for each of China's seven agricultural regions. The provided information is as follows: (a) Phenology of major crops; (b) Crop condition development graph based on NDVI, comparing the current season up to October 2018 to the previous season, to the five-year average (5YA), and to the five-year maximum; (c) Spatial NDVI patterns for July - October 2018 (compared to the (5YA)); (d) NDVI profiles associated with the spatial patterns under (c); (e) maximum VCI (over arable land mask); and (f) biomass for July - October 2018. Additional information about agro-climatic indicators and BIOMSS for China is provided in Annex A.

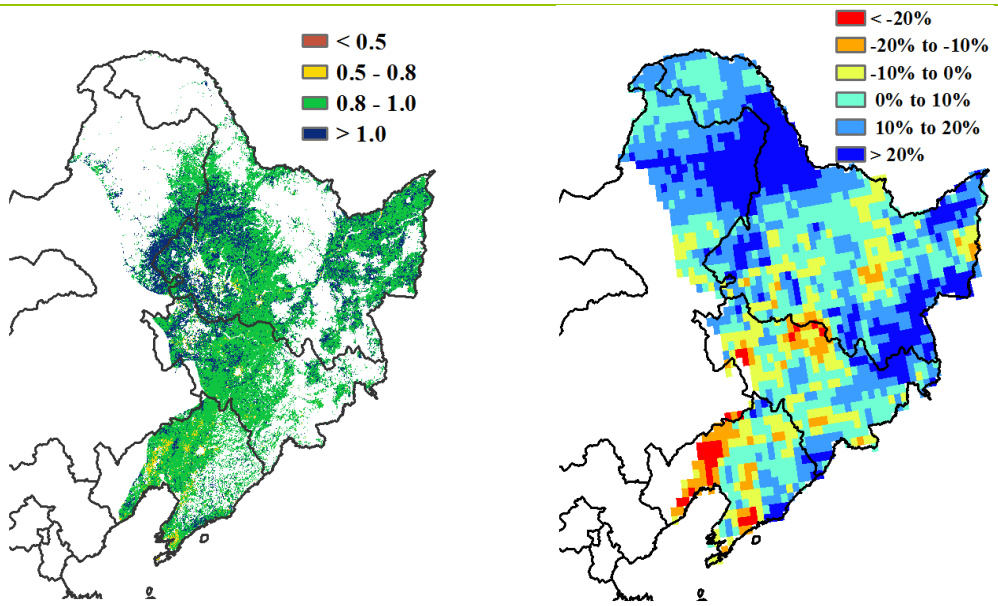
Northeast region

For the Northeast region, the current monitoring period (August to October) covers the harvest of all spring crops, which was almost over in October in three provinces. “Single crops” (including maize, rice, and soybean) reached the grain-filling to maturity stages in August to late September. The overall condition of crops was very satisfactory before September but deteriorated below the five-year average since then. Rainfall exceeded the average by +15% in the whole Northeastern region. There was a 27% increase of rainfall in Heilongjiang and 4% in Jilin province, but average condition in Liaoning. Rainy and cloudy (+0.1°C of TEMP and -3% PAR) weather combined with abundant water supply lead to a -13% drop in biomass in all three provinces, which could be explained by low sunshine and water logging, and probably poor quality of RS images. The NDVI profiles for the entire region turned below the five-year average from early September. According to the VCIx distribution map of Northeast China, almost all the area enjoyed a favorable VCIx (over 0.8), which indicates a promising crop. Only small part of cropland in central and west Liaoning (near Shenyang City) suffered a decrease in biomass caused by slight local drought. NDVI clusters also indicate satisfactory, close to average crop condition. The only exception is 1.8% of area which may be caused by poor quality of the satellite imagery. Overall, crop condition and yield in Northeast China in 2018 is satisfactory and slightly above average.

Figure 4.12. Crop condition China Northeast region, July - October 2018



(a) Crop condition development graph based on NDVI (b) Spatial NDVI patterns compared to 5YA (c) NDVI profiles

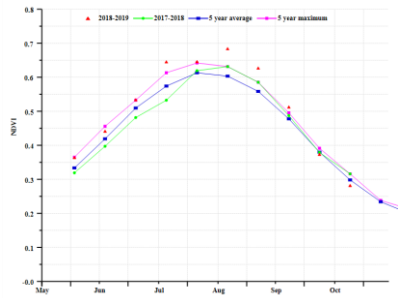


(d) Maximum VCI (e) Biomass

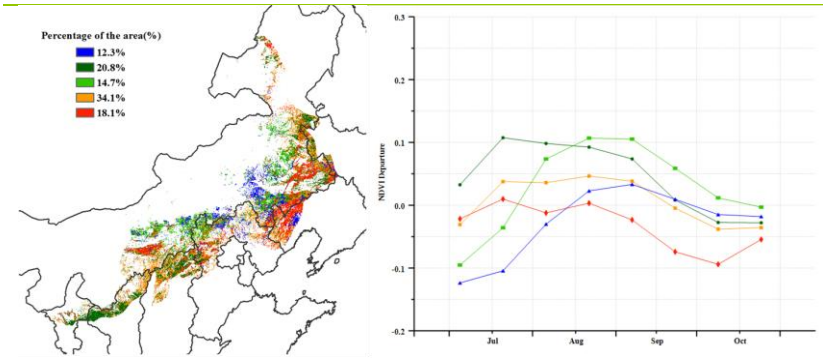
Inner Mongolia

The main summer crops in Inner Mongolia are maize and soybean, the condition of which was generally favorable during the reporting period. Rainfall was well above average (RAIN,+28%), temperature (TEMP) and radiation (RADPAR) were lower than average (-0.4°C and -2% respectively). Altogether, the region experienced a small potential biomass (BIOMSS) decrease of 4% compared to the recent five years. The NDVI development graph indicates good crop condition around June, close to the maximum of the last five years, which is confirmed by high maximum VCI values in whole region (average is 0.97). Only 12% of the region was below average, in particular central Inner Mongolia, north Hebei and West Liaoning which suffered from drought. Thereafter, general crop condition improved and reached—and sometimes exceeded—the maximum of the last five years from early July to early September. Favorable rainfall accelerated crop growth as clearly shown by above-average NDVI, which is confirmed by the spatial NDVI patterns and profiles in the area mentioned above. From late September, crop condition became poor according to the spatial NDVI patterns and profiles in 18% of the region, scattered throughout the region. The late below average condition had little influence on crop yields: from late September, the crops reached maturity and were ready to harvest.

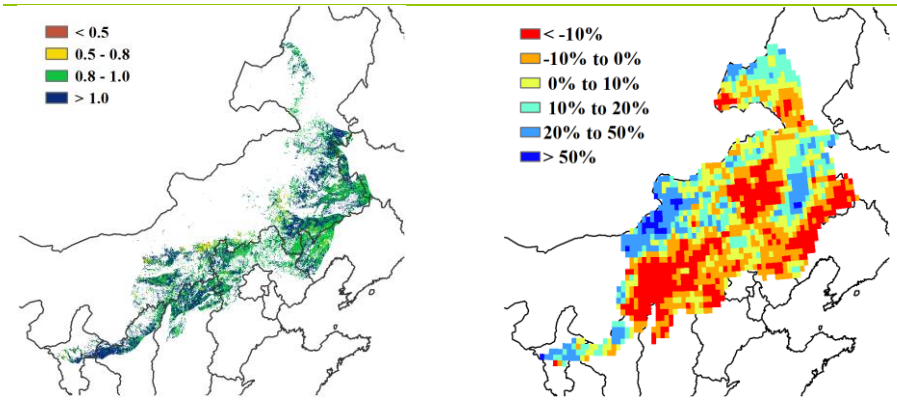
Figure 4.13. Crop condition China Inner Mongolia, July - October 2018



(a) Crop condition development graph based on NDVI



(b) Spatial NDVI patterns compared to 5YA (c) NDVI profiles

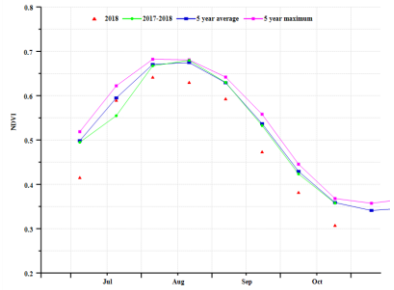


(d) Maximum VCI (e) Biomass

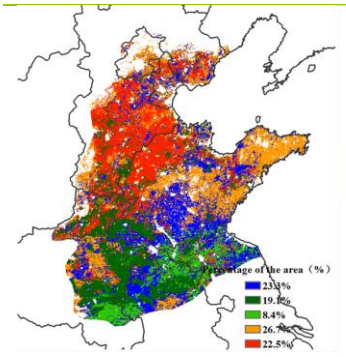
Huanghuaihai

Crop condition in Huanghuaihai during the monitoring period was generally below both the average of the recent five years average and 2017. The main crop in the region was summer maize, which was planted during mid-June after the harvest of winter wheat and which completed its full cycle by September. According to the crop condition development graph based on NDVI, crop condition remained below the 5-year average during the entire period except for late July. Unfavorable condition may be related to scarce precipitation over the region. According to the CropWatch agro-climatic indicators RAIN decreased by 10% compared with average while temperature and radiation over the region rose by 0.3℃ and 6%, respectively. The drier than average weather may have depressed maize yield. The BIOMSS index fell 22% below the 5-year average as a result. Regarding spatial distribution of crop condition, almost the whole region had below average condition during the monitoring period. Hebei was above average during mid-July to mid-August. Shandong peninsula was exactly on average during the whole period. The others all suffered poor condition throughout the period. The south of Huanghuaihai, including Henan, Anhui and Jiangsu, even departed a lot from average in early July and late September. This pattern is confirmed by the distribution map of VCIx map and the biomass departure map. The maximum VCI value for Huanghuaihai is 0.90, nevertheless a satisfactory value.

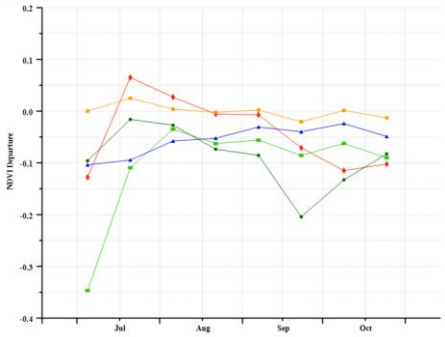
Figure 4.14. Crop condition China Huanghuaihai, July - October 2018



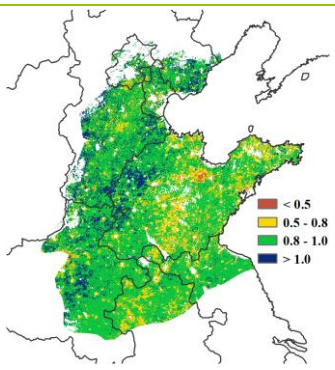
(a) Crop condition development graph based on NDVI



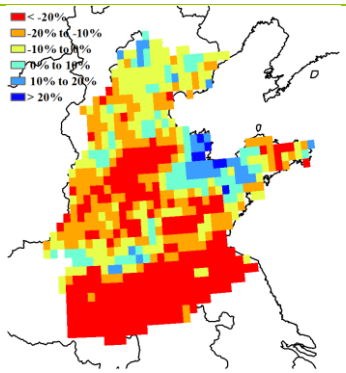
(b) Spatial NDVI patterns compared to 5YA



(c) NDVI profiles



(d) Maximum VCI

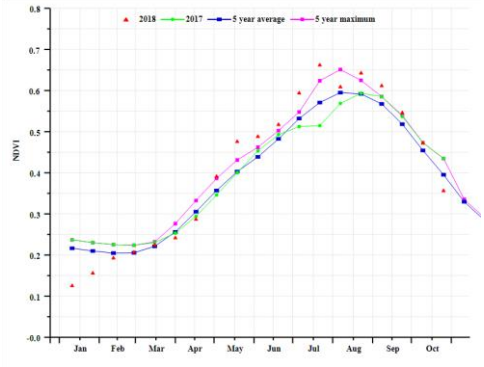


(e) Biomass

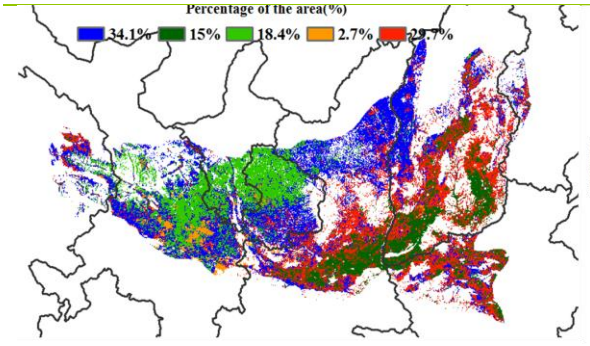
Loess region

Maize was harvested in late September and early October, and winter wheat has been planted at the end of the monitoring period. According to the crop condition development graph based on NDVI, crops were gradually ripening from August to early September, after which they were harvested from mid-September to the end of the monitoring period. The temperature (TEMP, -0.2℃) was slightly below average while radiation was above average (RADPAR, +4%). Shortage of precipitation (RAIN -8%) resulted in potential biomass production (BIOMSS) to be below average (-24%). In most of the area, the analyses based on spatial NDVI clusters and profiles are consistent with VCIx. The most favorable conditions occurred mainly in the southern part of Ningxia, the eastern part of Gansu, the north central part of Shaanxi and some regions in western Shanxi from July to October, due to favorable agroclimatic conditions. On the contrary—and mostly because of drought during the monitoring period (as confirmed by the maps of potential biomass)—crops were in unpromising condition (compared to the five-year average) in south central Gansu and southern Shanxi. Moreover, the cropped arable land fraction (CALF) increased by 10% compared with recent years, resulting in a relatively promising crop production outlook for the region, which is also confirmed by figure 4.3.

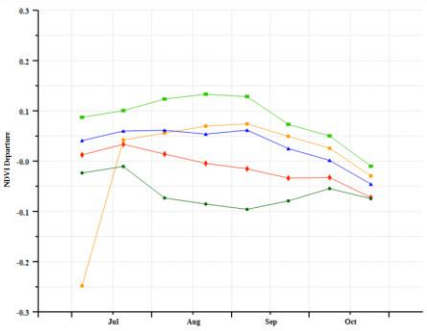
Figure 4.15. Crop condition China Loess region, July - October 2018



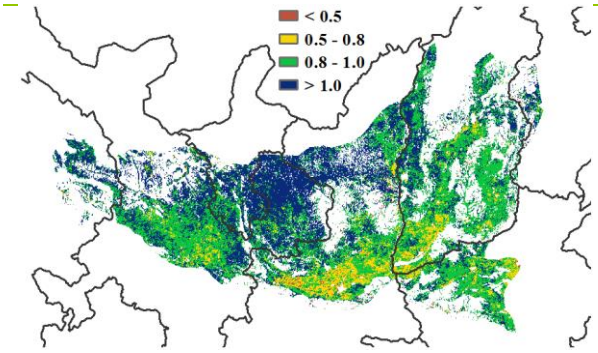
(a) Crop condition development graph based on NDVI



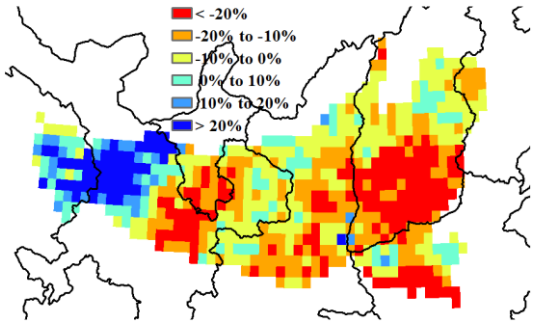
(b) Spatial NDVI patterns compared to 5YA



(c) NDVI profiles



(d) Maximum VCI

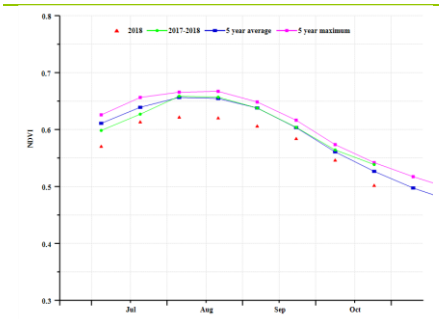


(e) Biomass

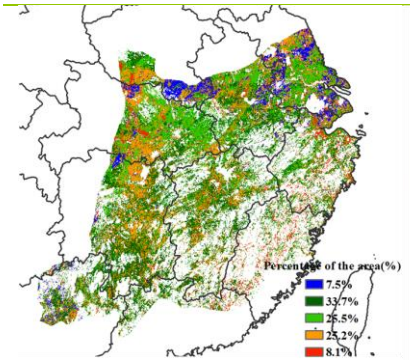
Lower Yangtze region

From July to October, the late rice matured in the center of the region including in Hubei, Fujian, Jiangxi and Hunan provinces, while semi-late rice and maize have been harvested in the north of the region. Crop condition was not favorable compared with the recent five-year average in the crop condition development graph. According to CropWatch agroclimatic and agronomic indicators, the accumulated rainfall and radiation increased by 9% and 4%, respectively, while the temperature was slightly below its fifteen-year average (TEMP,-0.6℃)/. This brought about an increase of the production potential (BIOMSS, 17%). As shown in BIOMSS map, values were 20% below average in the north of this region including Hubei, Jiangsu, Henan province, while it was above average in the south, including east of Hunan, north of Guangdong and Fujian province and south of Jiangxi province. According to NDVI profiles, the crop condition was close to average in 33.7% of the area, mostly distributed in the south of the region including Hunan, Jiangxi and Guangxi province. The crops in the remaining areas suffered from unfavorable condition compared. 8.1% of the total area was significantly below average level, which coincides with the situation depicted by the VCIx map. Overall, the production of crops in the Lower Yangtze region is anticipated to be below but close to average.

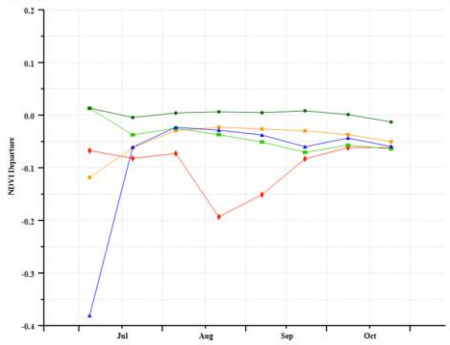
Figure 4.16. Crop condition Lower Yangtze region, July - October 2018



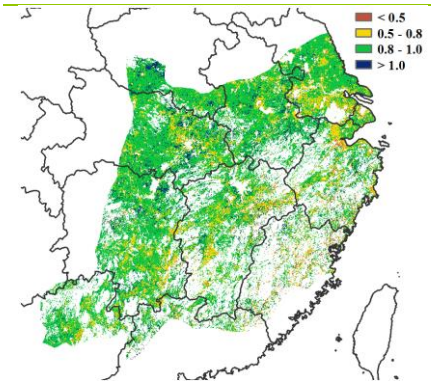
(a) Crop condition development graph based on NDVI



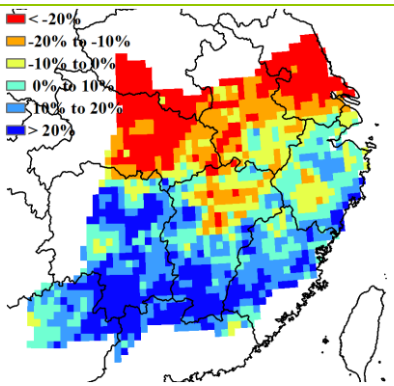
(b) Spatial NDVI patterns compared to 5YA



(c) NDVI profiles



(d) Maximum VCI

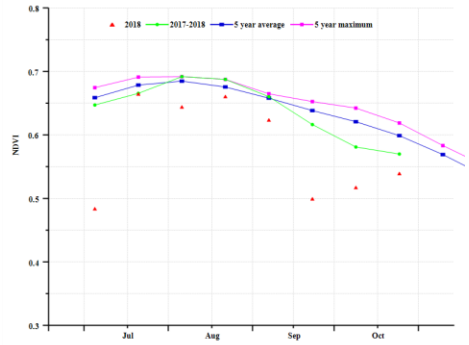


(e) Biomass

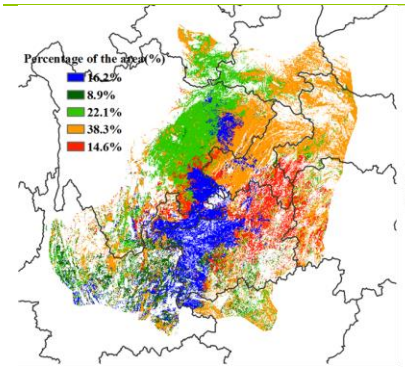
Southwest China

The reporting period covers the sowing of winter wheat in southwestern China. According to the regional NDVI profile, crop condition was partly below average and only close to average in late July. Overall, the crop growth was unfavorable. According to the agroclimatic and agronomic indices, compared to the average of the past 15 years, rainfall was below average (RAIN -9%), sunshine was high (RADPAR +1%) while the temperature was slightly lower than the average by 0.6 °C. Compared to the average of the past 5 years, the cropped arable land fraction has not changed and the potential biomass production index was low (BIOMSS -6%). As shown by NDVI clusters and maps, NDVI in the region was close to average from Mid-August to Mid-September, except in Northeastern Yunnan and neighboring areas in Western Guizhou. Both recorded very low NDVI due to low RAIN (-5% and -20%, respectively. In Chongqing, precipitation has not changed from the average level but sunshine was high (RADPAR +2%). Sichuan Province has slightly lower than average indicators, starting with precipitation. Even the NDVI was slightly below average, but the maximum VCI at 0.94 indicating the crop growth status at peak of the growing season was still comparable with the previous five years.

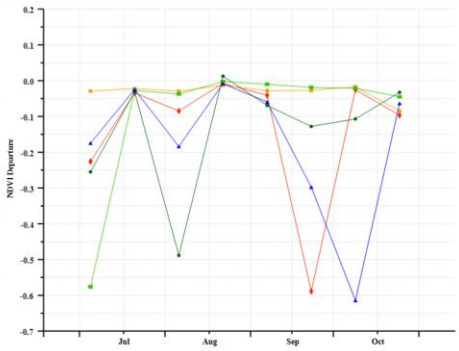
Figure 4.17. Crop condition Southwest China region, July - October 2018



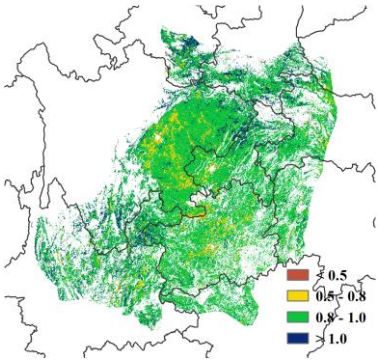
(a) Crop condition development graph based on NDVI



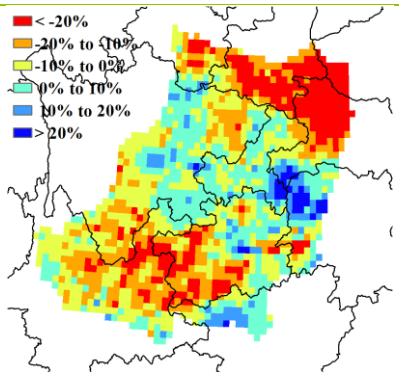
(b) Spatial NDVI patterns compared to 5YA



(c) NDVI profiles



(d) Maximum VCI



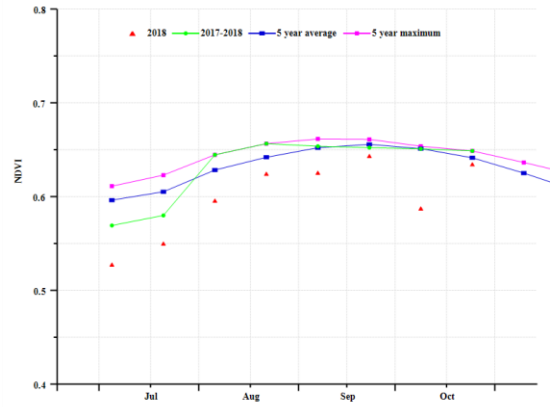
(e) Biomass

Southern China

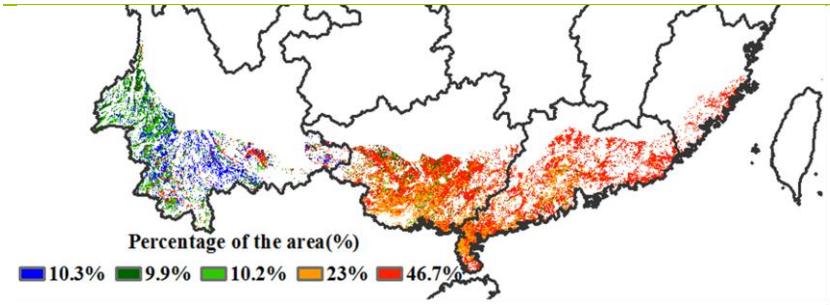
As shown by the spatial NDVI patterns and profiles map, crop condition was below average in Southern China. Rainfall increased 12% above average, while the temperature and the radiation were below (TEMP -0.9°C, RADPAR -5%). As result of the unfavorable weather conditions, the biomass was below average, and so was the cropped arable land fraction (BIOMSS, -2%; CALF, -1%).

Southern China covers four provinces, namely Fujian, Guangdong, Guangxi and Yunnan. The spatial NDVI patterns indicated the crop production was below average in Fujian, Guangdong and Guangxi. In these three provinces, both the temperature and radiation were below or close to average. Yunnan suffered a shortage of rainfall and temperature (RAIN -5%, TEMP -0.7°C), which led to below average biomass (-11%). In conclusion, the weather conditions were not favorable for crop production.

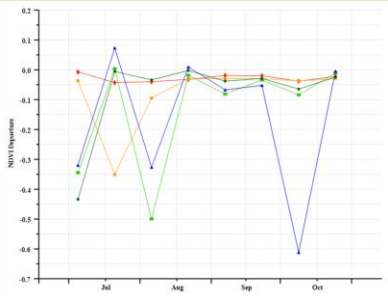
Figure 4.18. Crop condition Southern China region, July - October 2018.



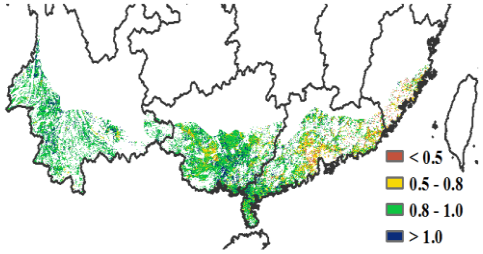
(a) Crop condition development graph based on NDVI



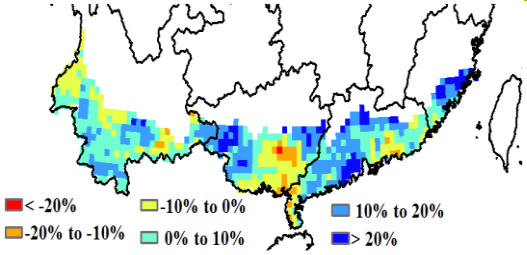
(b) Spatial NDVI patterns compared to 5YA



(c) NDVI profiles



(d) Maximum VCI



(e) Biomass