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 major cereals and soybean production at provincial and national level as well as summer crops production and total annual outputs (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 describe trade prospects (import/export) of major crops . 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 2019, with temperature and radiation increasing above average by 0.3℃ and 4%, respectively, and rainfall down by 4%. As a result, the maximum VCI was rather high at 0.95 with the nationwide CALF average 2% above average. These results indicate favorable crop condition in China during this season.

At the regional scale, rainfall was above average by 8% and 36%, respectively, in Inner Mongolia and Northeast China. As shown by Figure 4.1, 9% of planted areas experienced excess rainfall (about 210 mm above average) in early July, including the middle part of Southern China, eastern part of south-western China, and some parts in the Lower Yangtze Region (southeast Guizhou Province, northern Guangxi Province, southern part of Hunan Province, northern part of Fujian, and most parts of Jiangxi and Zhejiang Provinces).

Rainfall was below average in Huanghuaihai (26%), the Loess region (6%), Lower Yangtze Region (13%), and Southern China (2%) which thus suffered from water deficits to varying extents (Table 4.1), mainly around middle August and late September.

In all regions temperatures were close to average, with the positive anomalies not exceeding 0.8°C. However, temperature departures fluctuated widely in most of China over the monitoring period (Figure 4.2). Temperature was more than 2.0°C above average during early and late September, and more than 1.5°C below average in mid-August for 34.8% of planted areas, mainly located in some parts of the Loess Region, Huanghuaihai and North-east China. In addition, temperature in the central part of China and some parts in the Loess Region, accounting for 26.4% of cropped areas, was more than 1.7°C above average during early and late September but more than 0.7°C below average during mid-September and mid-October.

As shown in Figure 4.3, almost all the arable land 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 north-eastern China and some parts of the Loess Region. The maximum VCI in other regions was also relatively high, with the values between 0.5 and 1. The VHIn map shows that high values (51-100) were mainly located in South-west and North-east 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, eastern Hubei province, Shandong province, Jiangsu province and southern Hebei province), implying these areas might have been exposed to drought. The Cropping Intensity (CI) map shows the expected spatial distribution, and all mentioned AEZs have increased CI values relative to the 5YA.

Table 4.1 CropWatch agroclimatic and agronomic indicators for China, July - October 2019, departure from 5YA and 15YA

Region	Agroclimatic indicators				Agronomic indicators		
	Departure from 15YA (2004-2018)				Departure from 5YA (2014-2018)		Current period
	RAIN (%)	TEMP (°C)	RADPAR (%)	BIOMSS (%)	CALF (%)	Cropping intensity (%)	Maximum VCI
Huanghuaihai	-26	0.8	4	-1	-1	3	0.89
Inner Mongolia	8	0.3	0	-1	8	4	0.97
Loess region	-6	0	2	2	9	4	0.9
Lower Yangtze	-13	0.4	8	5	-1	5	0.94
Northeast China	36	0.1	-1	-5	0	1	0.99
Southern China	-2	0.2	6	2	0	17	0.97
Southwest China	0	0.1	1	0	0	6	0.97

Figure 4.1 China spatial distribution of rainfall profiles, July - October 2019

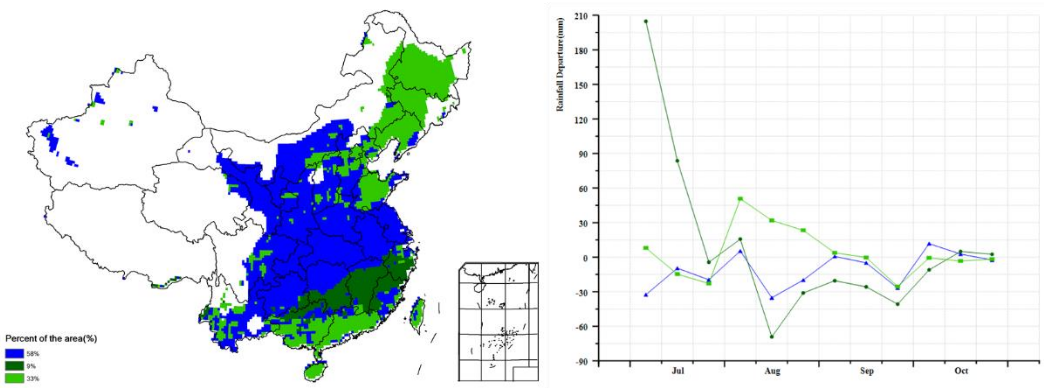


Figure 4.2 China spatial distribution of temperature profiles, July - October 2019

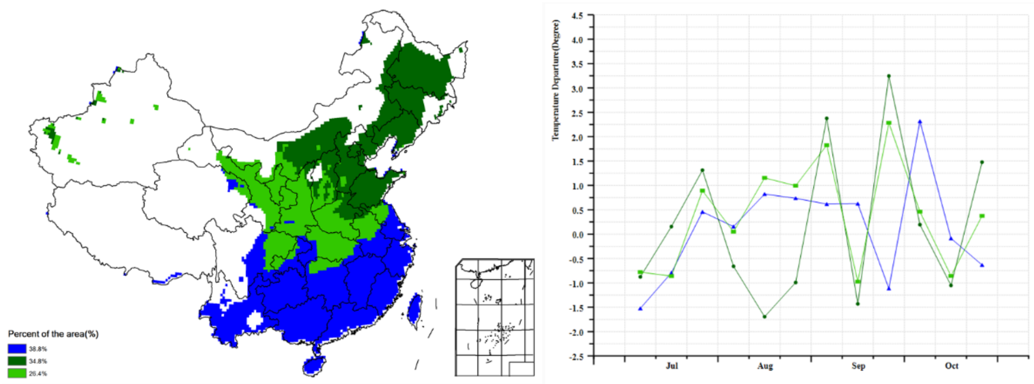


Figure 4.3 China cropped and uncropped arable land, by pixel, July - October 2019

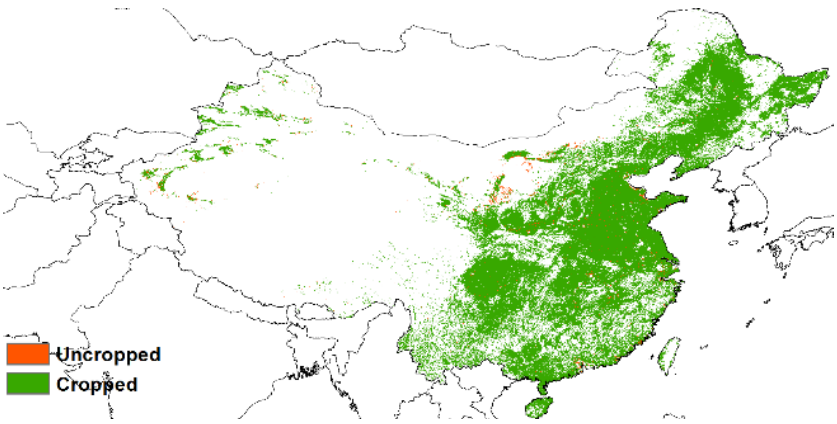


Figure 4.4 China maximum Vegetation Condition Index (VCIx), by pixel, July - October 2019

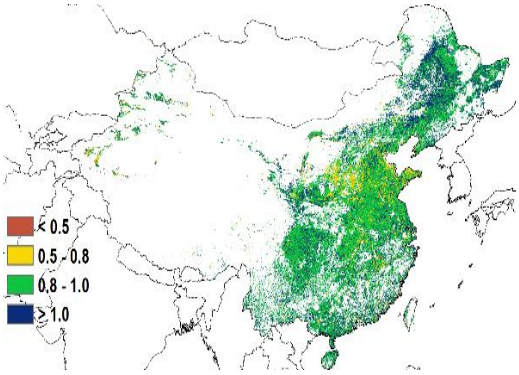


Figure 4.5 China minimum Vegetation Health Index (left), by pixel, July - October 2019

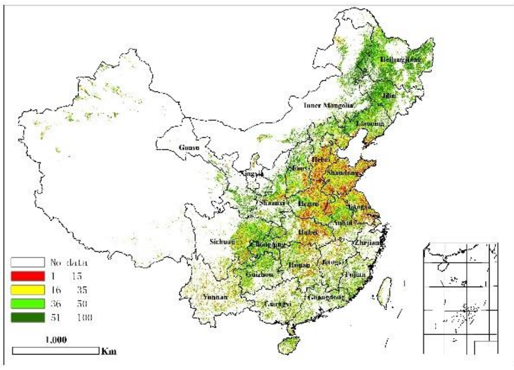
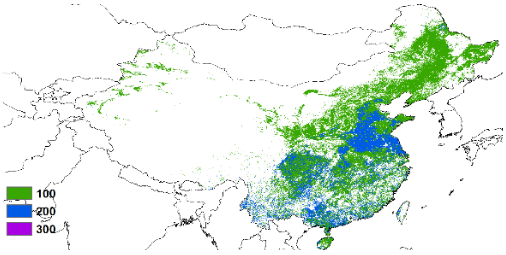


Figure 4.6 China cropping intensity, by pixel, in 2019 China Vegetation Health Index Minimum (VHIn), by pixel, July - October 2019



4.2 China's winter crops production

Based on the comprehensive utilization of multi-source remote sensing data as well as the latest agrometeorological information and a large number of field measurements, the yield of maize, rice, wheat and soybean in China in 2019 was revised by integration of remote sensing index model, agrometeorological yield model and crop planting and crop type proportion method.

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.

Table 4.2 China 2019 production of maize, rice, wheat, and soybean, and percentage change from 2018, by province.

	Maize		Rice		Wheat		Soybean	
	2019	Change (%)	2019	Change (%)	2019	Change (%)	2019	Change (%)
Anhui	3553	3	17422	3	10807	1	1052	0
Chongqing	2087	3	4699	3	1064	-3		
Fujian			2786	-2				
Gansu	5543	4			3064	12		
Guangdong			11123	-1				
Guangxi			10446	-2				
Guizhou	5149	5	5644	6				
Hebei	18108	0			10550	-4	180	-4
Heilongjiang	41920	3	21512	3	434	0	5172	8
Henan	15047	-2	3716	-2	26309	3	777	2
Hubei			15644	0	3868	-10		
Hunan			25355	0				
Inner Mongolia	23512	2			1994	2	1186	6

Jiangsu	2164	2	16455	2	10053	2	747	-2
Jiangxi			16829	-1				
Jilin	30943	5	5804	1			798	10
Liaoning	17474	3	4364	1			408	2
Ningxia	1594	-5	412	-7	795	-4		
Shaanxi	3775	5	1050	5	3934	-6		
Shandong	18308	-2			22450	5	658	-1
Shanxi	8528	-5			2273	-6	149	-9
Sichuan	7130	2	14735	2	5016	9		
Xinjiang	6355	-5						
Yunnan	6370	1	5875	3				
Zhejiang			6498	2				
Sub total	217560	1	190367	1	102612	2	11127	5
China*	224345	1	203084	3	123516	2	14441	3

* Production of Taiwan province is not included.

Maize

The final revision of the production of maize at the national level was at 224.3 million tons, 1% above 2018. Early forecasts in August presented 1.7% year-on-year yield drop of maize while agroclimatic conditions over major maize producing regions were favorable for maize and revised maize yield was 1.4% above 2018. The Typhoon "Likima" in early August brought heavy rainfall to the eastern coastal provinces (Shandong, Jiangsu, etc.), alleviating drought and causing floods at local areas. Maize production drop in percentage in Henan and Shandong narrowed to 2% thanks to the rainfall since August. "Likima" also brought sufficient rainfall for Northeast China (Heilongjiang, Jilin and Liaoning) which are beneficial for summer crops. Maize yield in Heilongjiang, Jilin, Liaoning and Inner Mongolia were 2.6%, 5.0%, 3.1%, and 1.9% above 2018. Ningxia, Shanxi and Xinjiang also present large drop in maize yield mainly due to the unevenly distributed rainfall at spatial and temporal scale.

Rice

The total output of rice in China was revised t0 203.1 million tons, 3% above last year. The planting area of rice in China was 32472.6 thousand hectares, an increase of 29.8 thousand hectares, or 0.1% increase over 2018. Increased production of single rice and late rice contributed to a bumper production of all rice with different cropping practices. The yield of semi-late rice/single rice was up by 3% to 133.19 million tons, an increase of 4392 thousand tons. It is mainly due to the 2.8% increment of yield from 2018 thanks to the overall favorable agrometeorological conditions since peak growing season to maturity stage. It is noteworthy that late rice production increased by 6% to 36.66 million tons because of increasement of both yield and cultivated area. Although many farmers intend to reduce the double cropping rice (early rice followed by late rice), single cropping late rice cultivated also become more popular in several provinces such as Zhejiang and Guangdong.

Table 4.3 China 2019 early rice, single rice/semi-late rice, and late rice production and percentage difference from 2018, by province.

	Early rice		Single rice/Semi-late rice		Late rice	
	2019	Change (%)	2019	Change (%)	2019	Change (%)
Anhui	1851	1	13832	3	1739	3
Chongqing			4716	3		
Fujian	1512	-6			1273	2
Guangdong	4860	-6			6263	3
Guangxi	4891	-5			5555	2
Guizhou			5369	1		
Heilongjiang			21443	3		
Henan			3923	3		
Hubei	2346	1	10455	0	2877	0
Hunan	8315	4	8768	1	8548	0
Jiangsu			16704	4		
Jiangxi	7342	-5	3007	4	6480	1

Jilin			5926	4		
Liaoning			4316	0		
Ningxia			473	6		
Shaanxi			1038	4		
Sichuan			14799	2		
Yunnan			5781	1		
Zhejiang	794	-3	4822	2	882	6
Sub total	31911	-2	125372	2	33616	1
China*	33237	-2	133190	3	36657	6

* Production of Taiwan province is not included.

Wheat

Wheat production stays at the same level as August estimates at 123.5 million tons, increased 2% compared with that in 2018. Minor revision was done for some spring wheat producing provinces such as Heilongjiang and Inner Mongolia to a lower production compared with August estimates mainly due to the insufficient radiation during flowering stage.

Soybean

The national soybean cultivated area and production output remained at same level as August prediction. Soybean production is estimated at 14.44 million tons, with a year-on-year increase of 2.9%. As already pointed out in August Bulletin, this has been the fourth consecutive years for the increasement of soybean planted area and soybean production. The November Bulletin revised the yield prediction for all major soybean producing provinces and inter-annual production changes. The sufficient rainfall after the peak growing season not only alleviated drought during previous monitoring period especially in Huang-Huai-Hai region but also provide favorable moisture conditions for soybean. As the major soybean producing areas, soybean performed well in Northeast China with 8.1% increased of production in Heilongjiang, the No. 1 soybean producer in China. At the same time, Inner Mongolia and Jilin produced 5.8% and 10.2% more soybean compared with 2018 as a result of both increased planted area and yield. The largest drop in soybean produced was observed in Shanxi province where irrigation is a big issue. Soybean production in Jiangsu and Hebei decreased by different ranges.

Total food production

CropWatch puts the total 2019 output of summer crops (including maize, semi-late rice / single rice, late rice, spring wheat, soybean, tuber crops, and other minor summer crops) 466.78 million tons, 2.4% above that in 2018. This is mainly due to the revised up in maize and rice production. The total annual crop production is estimated at 628.06 million tons, up 1.9% from 2018. The total annual output is listed by province in table 4.4. It is worth mentioning that the top three crop producing provinces, Heilongjiang, Henan, and Shandong, all presented good performance with 1% to 3% above 2018.

Table 4.4 China 2019 winter crops, summer crops and total annual crop production and percentage difference from 2018, by province

	Winter crops		Summer crops		Total#	
	2019	Change (%)	2019	Change (%)	2019	Change (%)
Anhui	11852	0	20607	3	34310	2
Chongqing	2259	-3	8144	3	10402	2
Fujian			4771	2	6284	0
Gansu	3590	12	6618	4	10208	6
Guangdong			8121	3	12981	-1
Guangxi			9961	2	14853	-1
Guizhou			12456	3	12456	3
Hebei	12297	-3	20632	0	32929	-1
Heilongjiang			70642	3	70642	3
Henan	26952	3	25594	-1	52546	1

Hubei	5380	-7	17882	0	25608	-1
Hunan			20153	1	28467	1
Inner Mongolia			29899	2	29899	2
Jiangsu	10280	1	20496	3	30776	3
Jiangxi			10517	2	17859	-1
Jilin			38434	5	38434	5
Liaoning			22687	2	22687	2
Ningxia			2884	-2	2884	-2
Shaanxi	4001	-6	6710	4	10711	0
Shandong	24916	5	20127	-2	45043	2
Shanxi	2311	-4	9252	-5	11563	-5
Sichuan	5866	7	27231	2	33097	3
Yunnan			14873	1	14873	1
Zhejiang			6396	3	7190	2
Sub total	109702	1.5	435994	1.7	577607	1.4
China*	128044	1.4	466776	2.4	628057	1.9

4.3 Regional analysis

Figures 4.7 through 4.13 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 2019 to the previous season, to the five-year average (5YA), and to the five-year maximum; (c) Spatial NDVI patterns for July - October 2019 (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 2019. Additional information about agro-climatic indicators and BIOMSS for China is provided in Annex A.

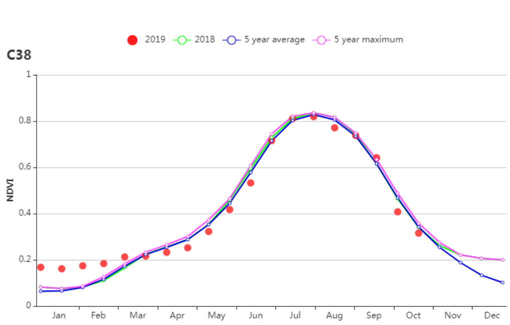
Northeast region

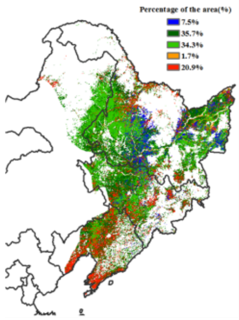
The current monitoring season (July to October) covers the harvest of all spring crops in North-east China. Maize, rice and soybeans reached maturity in August and September in Heilongjiang, Jilin and Liaoning Provinces, and the harvest will be over by the end of October.

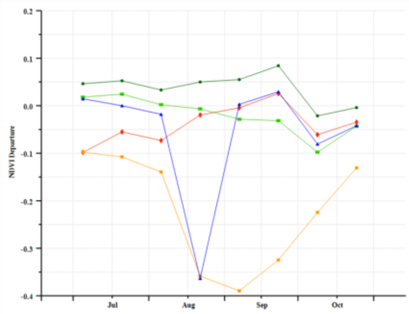
Precipitation was 35% higher than average, temperature was 0.1℃ lower, and the photosynthetic active radiation was 1% down. Temperatures from July to October were basically average throughout the monitoring period, except for a cold and very wet spell in August brought by Typhoon Lekima (section 5.2 for details). Altogether, agro-climatic conditions resulted in 5% below average potential biomass, reaching 10% in the North-east and West of Heilongjiang. Although Heilongjiang province was affected by several typhoons, they also brought excessive precipitation which are beneficial for crop development and grain-filling.

According to the spatial clusters of NDVI departure from average, the major rice producing areas in the north-eastern Heilongjiang and western Jilin Provinces had above average crop condition. However, in the southern and western Liaoning Province, NDVI was below average before August and recovered to average in early September. The VCIx map shows that higher VCIx values were mostly located in the western and northern parts of the region, with values above 1.0. This is an indication of favorable crop condition at peak growing season. VCIx exceeds 0.8 over almost the whole region. In general, crops did well in North-east China with overall good prospects for crop yield.

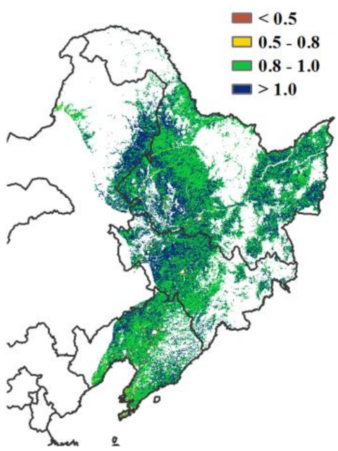
Figure 4.7 Crop condition China Northeast region, July - October 2019

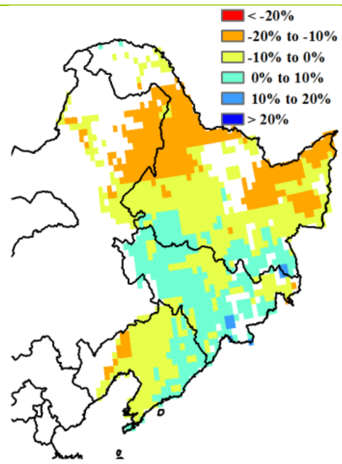






(a) Crop condition development graph based on NDVI (b) Spatial NDVI patterns compared to 5YA (c) NDVI profiles



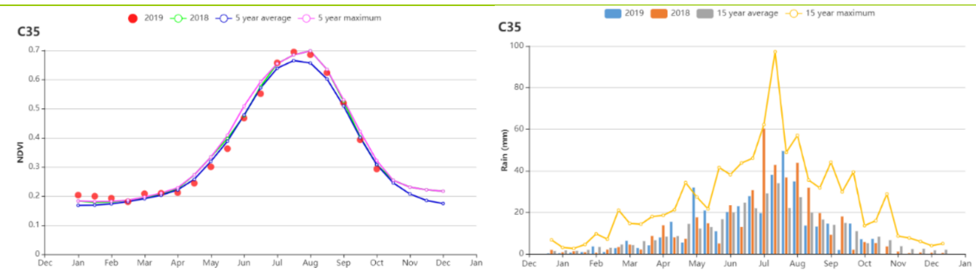


(d) Maximum VCI (e) Biomass departure

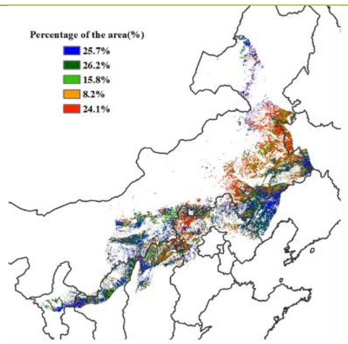
Inner Mongolia

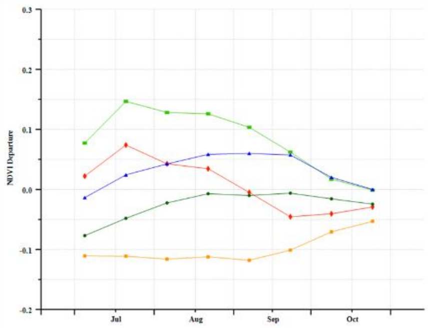
During the reporting period, the main summer crops in Inner Mongolia were maize and soybean. Generally, their condition was favorable. Rainfall was above average (RAIN +8%), TEMP was slightly higher than average by 0.3°C, and RADPAR was just average. The resulting BIOMSS was close to average as well (-1%). The NDVI development graph indicates good crop condition from June to August, almost at the same level as the maximum of the 5YA. This is also confirmed by high maximum VCI values in the whole region. National VCIx averages 0.97. In July, about 34.4% of the region was below average, in particular central and eastern Inner Mongolia, northern Hebei, northern Shanxi and western Liaoning, which suffered from moderate drought. Thereafter, crop condition improved and reached— and sometimes exceeded — the maximum of the 5YA from July to August. Favorable rainfall boosted crop growth, as clearly shown by above-average NDVI and confirmed by the spatial NDVI patterns and profiles in the area mentioned above. After September, as crops were reaching ripeness, weather conditions had limited effects on crop yield. CALF in this region was above average by 8% compared to the 5YA. At the same time, cropping intensity was 4% above average at 94%. On the whole, good production is expected from Inner Mongolia.

Figure 4.8 Crop condition China Inner Mongolia, July - October 2019



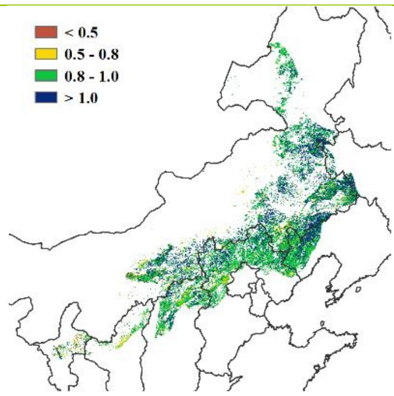
(a) Crop condition development graph based on NDVI (left) and rainfall profiles (right)

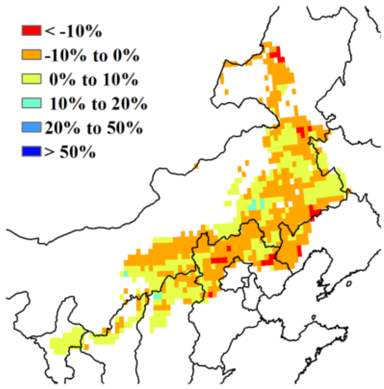




(b) Spatial NDVI patterns compared to 5YA

(c) NDVI profiles





(d) Maximum VCI

(e) Biomass departure

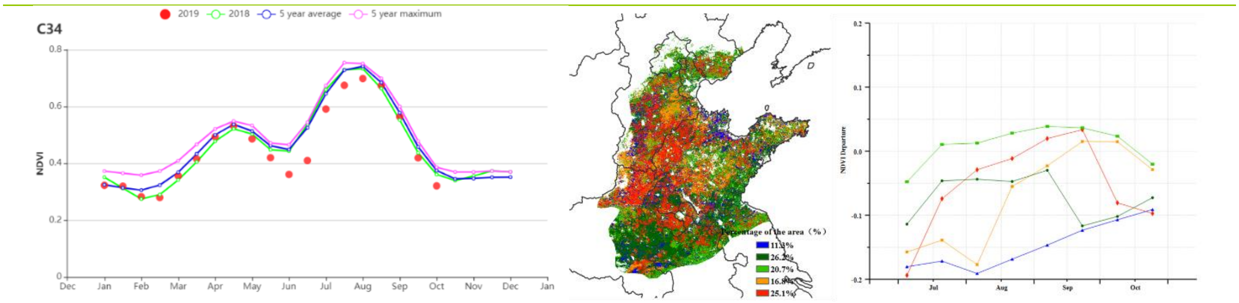
Huanghuaihai

The monitoring period covers the whole cycle of summer maize from July to late September, as well as the sowing and early growing season of winter wheat from early October. The NDVI development graph displays generally slightly below-average crop condition.

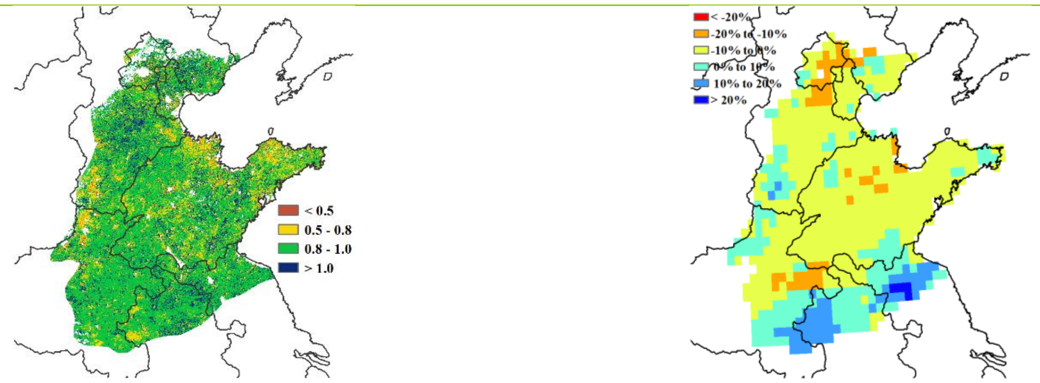
The NDVI values were below 5YA from July to early August, but then improved to 5YA until harvesting. For early October, coinciding with early stage of winter wheat, NDVI values fell slightly to below 5YA again. Agro-climatic conditions include a 26% decline in precipitation compared to average, affecting mainly early growth of maize. The temperature and the radiation rose by 0.8℃ and 4% compared to 15YA, respectively. The slight drop in NDVI during the growing season of maize may be influenced mainly by poor precipitation, which led directly to a 1% drop in BIOMSS. Besides, low NDVI values in early October had no effect on the BIOMSS index. The maximum VCI value for Huanghuaihai was 0.89.As shown by NDVI clusters and profiles, 20.7% of cropland over northern Anhui and Jiangsu, as well as some scattered areas across the whole region, displays average condition during almost the whole period. 41.9% of cropland over southern Hebei, western Shandong and northern Henan suffered below-average condition before August and recovered to average during September. Remaining areas had negative NDVI departure values all the time. The spatial distribution of biomass departures displays a drop not exceeding 10%; more significant reductions are noted in Beijing and some scattered areas in Shandong and Henan. Increases only occur in eastern Henan and northern Anhui and Jiangsu.

In general, crop condition in Huanghuaihai was below average due to severe water stress at early growing stage, but recovered to average level since mid-August.

Figure 4.9 Crop condition China Huanghuaihai, July - October 2019



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

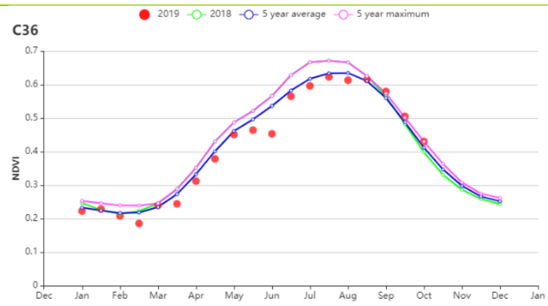


(d) Maximum VCI (e) Biomass departure

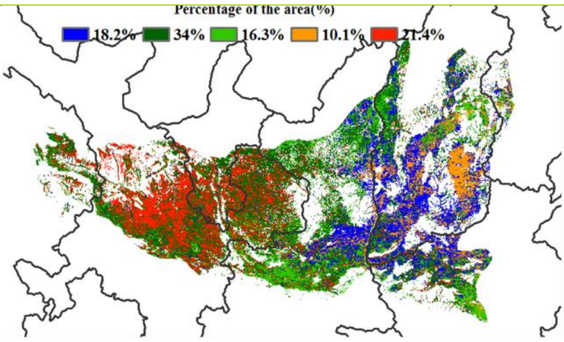
Loess region

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 NDVI development graph, crops started maturing from August to early September, after which they were harvested from mid-September to the end of the monitoring period. The temperature was average while precipitation was below average (RAIN -6%). Slightly above average radiation (RADPAR +2%) resulted in potential biomass production (BIOMSS) being above average as well (2%). In most of the area, the analyses based on spatial NDVI clusters and profiles are consistent with VCIx. The most favorable crop condition (compared to the five-year average) occurred mainly in the southern part of Ningxia, most of Gansu, the south-central part of Shaanxi and some regions in the South-west and North-east of Shanxi, and in western of Henan from July to October. In contrast, because of drought during the monitoring period (as confirmed by the maps of potential biomass)—crops were in inauspicious condition in north-east Shaanxi and central Shanxi. Altogether, with the cropped arable land fraction (CALF) up 9% compared with recent years, the crop production outlook for the region is positive.

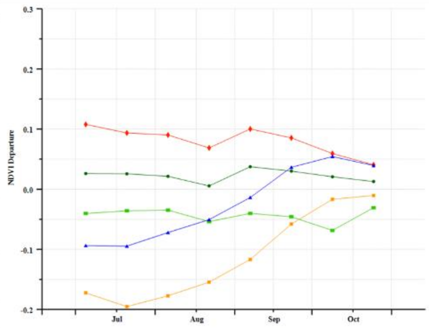
Figure 4.10 Crop condition China Loess region, July - October 2019



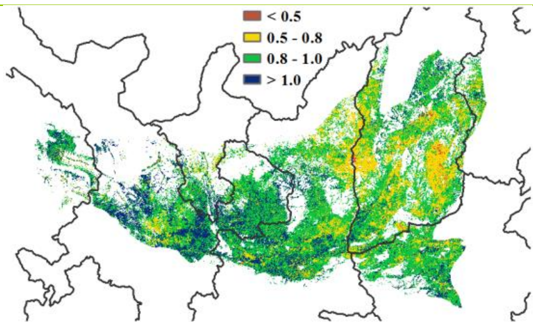
(a) Crop condition development graph based on NDVI



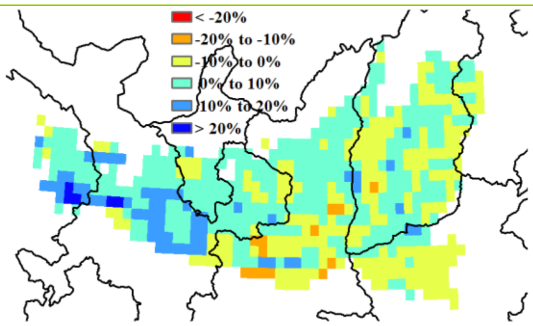
(b) Spatial NDVI patterns compared to 5YA



(c) NDVI profiles



(d) Maximum VCI



(e) Biomass departure

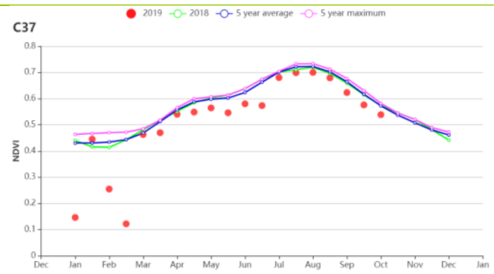
Lower Yangtze region

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 NDVI development graph, crops started maturing from August to early September, after which they were harvested from mid-September to the end of the monitoring period.

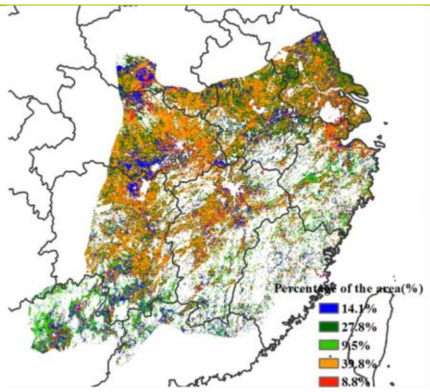
The temperature was average while precipitation was below average (RAIN -6%). Slightly above average radiation (RADPAR +2%) resulted in potential biomass production (BIOMSS) being above average as well (2%). In most of the area, the analyses based on spatial NDVI clusters and profiles are consistent with VCIx. The most favorable crop condition (compared to the five-year average) occurred mainly in the southern part of Ningxia, most of Gansu, the south-central part of Shaanxi and some regions in the South-west and North-east of Shanxi, and in western of Henan from July to October. In contrast, because of drought during the monitoring period (as confirmed by the maps of potential biomass)—crops were in inauspicious condition in north-east Shaanxi and central Shanxi.

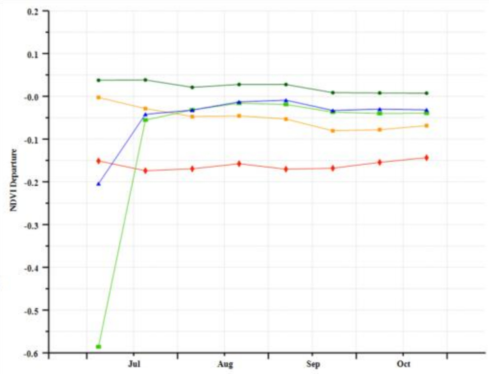
Altogether, with the cropped arable land fraction (CALF) up 9% compared with recent years, the crop production outlook for the region is positive.

Figure 4.11 Crop condition Lower Yangtze region, July - October 2019



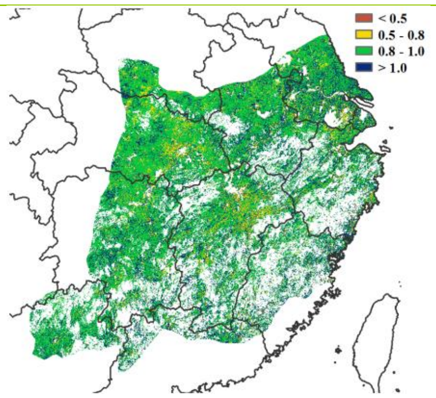
(a) Crop condition development graph based on NDVI

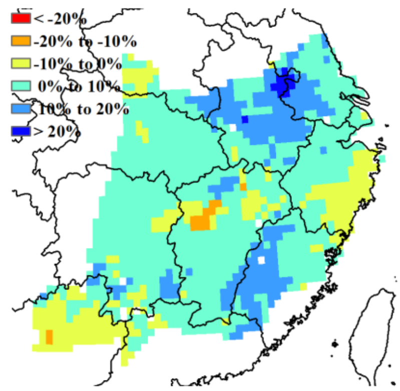




(b) Spatial NDVI patterns compared to 5YA

(c) NDVI profiles





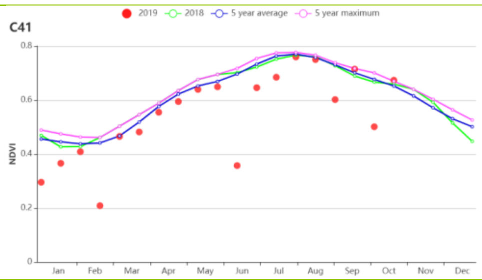
(d) Maximum VCI

(e) Biomass departure

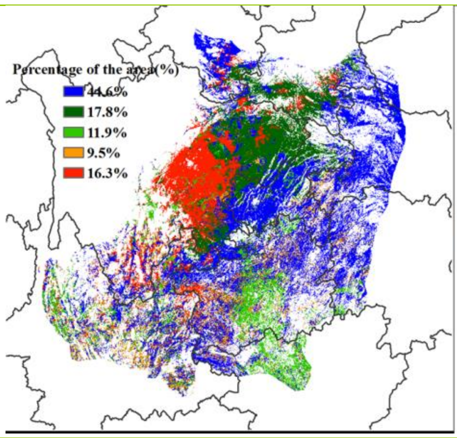
Southwest China

The reporting period covers the sowing of winter wheat in southwestern China, at a time when summer crops (including semi-late rice and maize) have reached maturity. According to the regional NDVI profile, crop condition was generally below the 5-year average, but close to average in late-August and October. On average, rainfall remained at the same level as the previous fifteen years and radiation was slightly below average (RADPAR -1%). Temperature was close to average as well (TEMP + 0.1 °C). The resulting BIOMSS was 7% below average. Even the cropped arable land fraction remained at the same level as the previous five years. According to the spatial NDVI profiles, values were close to average in July, except in Northern Yunnan and neighboring areas in south-eastern Guizhou. In mid-August, the overall NDVI in the region was close to the average level. In eastern Sichuan, NDVI was below average in September and October. Average NDVI throughout the monitoring period was observed in Chongqing, in spite of both precipitation and radiation being significantly above average (Annex A.11). The maximum VCI reached 0.97 at the peak of the growing season. The value is comparable with the previous five years. The mixture of positive and negative departures of indicators show generally unfavorable crop condition.

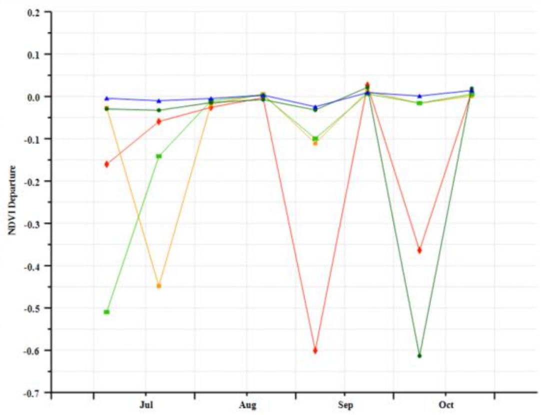
Figure 4.12 Crop condition Southwest China region, July - October 2019



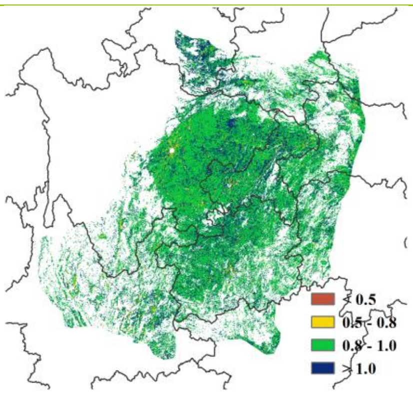
(a) Crop condition development graph based on NDVI



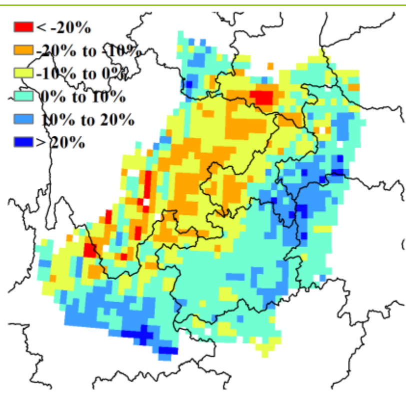
(b) Spatial NDVI patterns compared to 5YA



(c) NDVI profiles



(d) Maximum VCI

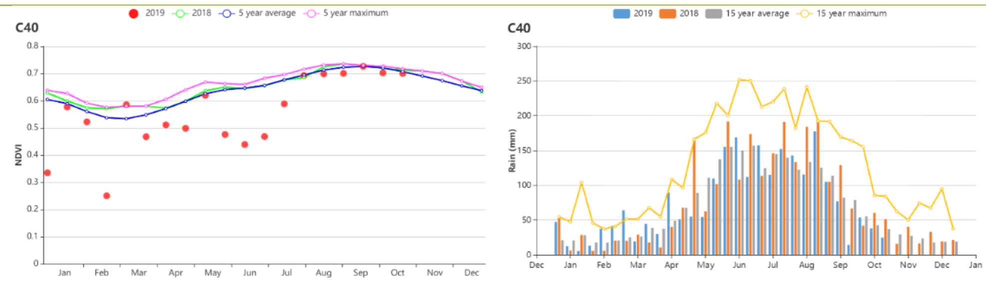


(e) Biomass departure

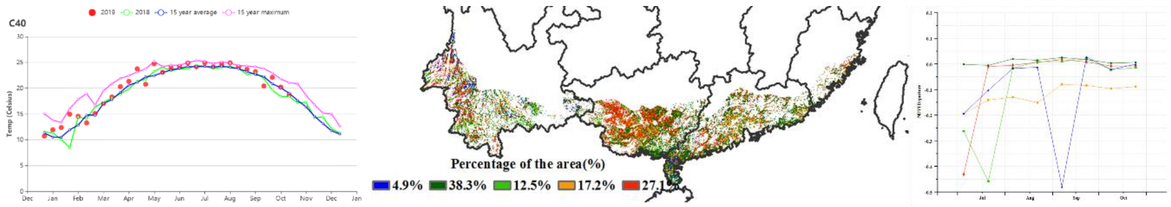
Southern China

Late rice completed its complete cycle from sowing to harvesting in southern China during the monitoring period. The condition of the crop was generally close to but below average, according to the NDVI development curves. Regionally, rainfall reached 1172 mm, which was 2% lower than the average; provincial departures were the following: +4% in Guangdong, +3% in Yunnan, -5% in Fujian, and +5% in Guangxi. In Guangdong and Guangxi, RAIN exceeded 1100 mm, while in Yunnan and Fujian it exceeded 900 mm. The average temperature during the monitoring period in South China was 22.3 ° C, which was above average by 0.2° C. BIOMSS was 2% higher than average. The biomass index of Fujian, Guangdong and Yunnan increased by 8%, 1% and 8%, respectively, while Guangxi recorded a 3% drop. At the provincial level, biomass changes are consistent with sunlight (RADPAR), which is the dominant limiting factor for crop growth when water supply is sufficient. The average VCIx of the South China region during the monitoring period was 0.90, and almost all regions presented above 0.80 VCIx during this monitoring period. NDVI departure clustering analysis revealed the continuous below average condition crops were mostly located in south-western Guangdong Province, covering 17.2% of the total cropland area. Overall, the crops in Southern China was slightly below average.

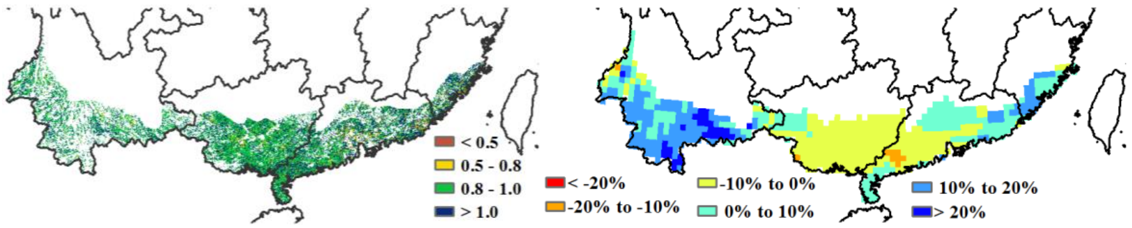
Figure 4.13 Crop condition Southern China region, July - October 2019



(a) Crop condition development graph based on NDVI (b) Rainfall profiles



(c) Temperature profiles (d) Clustering analysis of NDVI departure from 5 years average



(d) Maximum VCI (e) Biomass departure

4.4 Pest and diseases monitoring

1. Rice pests and diseases

The impact of pests and diseases was moderate during mid-late September 2019 in the main rice regions of China. The temperature of most cropland equaled or exceeded values of previous years and so did precipitation in Northeast China, South China and Southwest China. This provided suitable conditions for rice plant-hopper (Nilaparvata lugens) and rice leaf roller (Cnaphalocrocis medinalis) migration, and rice sheath blight (Rhizoctonia solani) dispersal.

Rice plant hopper

The distribution of rice plant-hopper during the second half of September 2019 is shown in Figure 4.14 and Table 4.5. The total area affected reached 6.1 million hectares, with severe occurrence in Heilongjiang, North Zhejiang, central Anhui, North Hunan and central Guizhou. Moderate occurrence affected East Jiangsu, South Anhui, South Hubei, central Hunan and North Guangxi, and slight occurrence in central Jiangxi, central Hubei, South-west Liaoning and South-east Henan.

Figure 4.14 Distribution of rice plant hopper in China (mid-late September 2019)

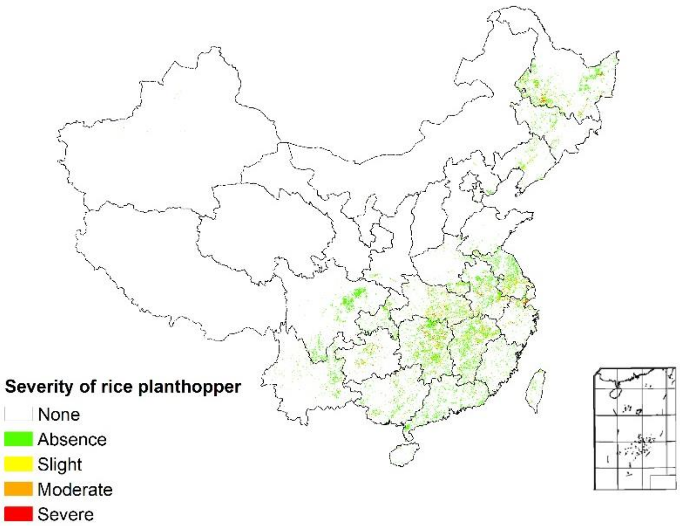


Table 4.5 Statistics of rice plant hopper in China (mid-late September 2019)

Region	Occurrence ratio / %			
	None	Slight	Moderate	Severe
Huanghuaihai	87	8	3	2
Inner Mongolia	66	29	4	1
Loess region	82	14	3	1
Lower Yangtze	74	15	7	4
Northeast China	77	13	6	4
Southern China	92	4	3	1
Southwest China	89	6	3	2

Rice leaf roller

Rice leaf roller (Figure 4.15 and Table 4.6) damaged around 5.2 million hectares, severely in South-west Heilongjiang, North Hunan, central Anhui and North Zhejiang, moderately in North-east Heilongjiang, central Jiangsu, central Guizhou and North Guangxi, and only slightly in South Hunan, central Hubei, central Jiangxi and South Henan.

Figure 4.15 Distribution of rice leaf roller in China (mid-late September 2019)

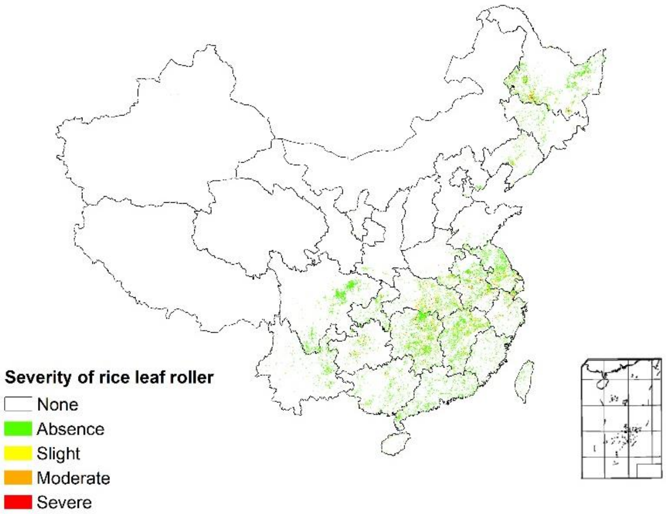


Table 4.6 Statistics of rice plant hopper in China (mid-late September 2019)

Region	Occurrence ratio/%			
	None	Slight	Moderate	Severe
Huanghuaihai	91	6	2	1
Inner Mongolia	72	24	3	1
Loess region	87	10	2	1
Lower Yangtze	77	13	6	4
Northeast China	81	11	5	3
Southern China	93	4	2	1
Southwest China	91	5	2	2

Rice sheath blight

Of the 3.9 million hectares damaged by Rice sheath blight (Figure 4.16 and Table 4.7) South-west Heilongjiang, South Henan, North-east Zhejiang, North Hunan, central Hubei and North-west Jiangxi suffered severely. Moderate impact occurred in North-east Heilongjiang, central Anhui, central Jiangsu, central Guizhou and North-west Chongqing, while slight incidence occurred in West Hunan, North Fujian, central Jiangsu, South Anhui, central Hubei and central Chongqing.

Figure 4.16 Distribution of rice sheath blight in China (mid-late September 2019)

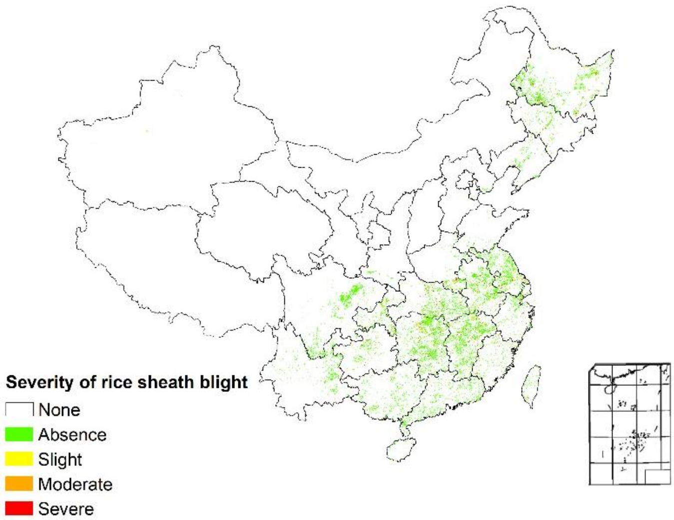


Table 4.7 Statistics of rice sheath blight in China (mid-late September 2019)

Region	Occurrence ratio/%			
	None	Slight	Moderate	Severe
Huanghuaihai	92	4	2	2
Inner Mongolia	94	2	1	3
Loess region	95	2	1	2
Lower Yangtze	87	6	4	3
Northeast China	86	7	4	3
Southern China	94	3	2	1
Southwest China	90	7	2	1

2. Maize pests and diseases

Maize suffered moderate pest and disease attacks during mid-late September 2019 in the main production regions. Heavy rains and high humidity in Southwest China, Northeast China, North China and eastern China were conducive to maize armyworm (Mythimna separata) reproduction and maize northern leaf blight (Setosphaeria turcica) dispersal.

Maize armyworm

The distribution of maize armyworm in mid-late September 2019 is shown in Figure 4.17 and Table 4.8. Heilongjiang, central Jilin, East Inner Mongolia, North Shandong, central Shaanxi and East Hebei suffered severely, with more moderate impacts in North Jilin, South-west Liaoning, North Henan, North Jiangxi, South Shanxi and North Hunan, and only slight incidence in central Liaoning, South Hebei, central Henan and East Shandong. The total area affected by armyworm is estimated to have reached 3.2 million hectares.

Figure 4.17 Distribution of maize armyworm in China (mid-late September 2019)

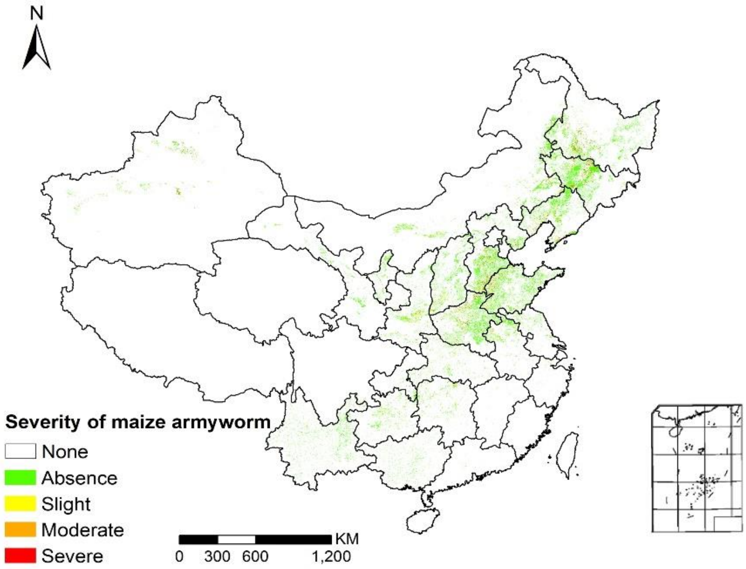


Table 4.8 Statistics of maize armyworm in China (mid-late September 2019)

Region	Occurrence ratio/%			
	None	Slight	Moderate	Severe
Huanghuaihai	90	5	2	3
Inner Mongolia	87	5	5	3
Loess region	87	7	4	2
Lower Yangtze	84	10	4	2
Northeast China	89	4	4	3
Southern China	97	1	1	1
Southwest China	93	4	2	1

Maize northern leaf blight

Maize northern leaf blight (Figure 4.18 and Table 4.9) damaged around 1.8 million hectares, with the disease severely occurring in Heilongjiang, South Jilin, central Liaoning, North Shandong, central Shaanxi and East Hebei. Moderate impact is assessed for North Jilin, West Liaoning, East Inner Mongolia, West Hebei and North Anhui. Central Hebei, North Shanxi, South-west Henan, central Guizhou and North-west Hunan were only slightly impacted.

Figure 4.18 Distribution of maize northern leaf blight in China (mid-late September 2019)

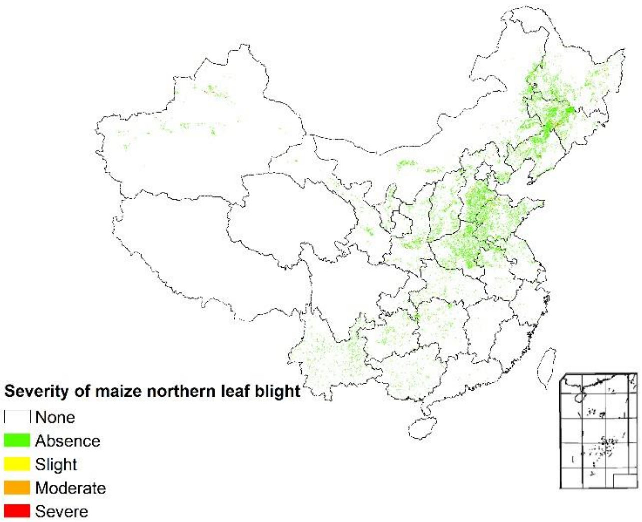


Table 4.9 S Statistics of maize northern leaf blight in China (mid-late September 2019)

Region	Occurrence ratio/%			
	None	Slight	Moderate	Severe
Huanghuaihai	95	3	1	1
Inner Mongolia	92	3	3	2
Loess region	94	3	2	1
Lower Yangtze	95	3	1	1
Northeast China	93	3	2	2
Southern China	97	2	1	0
Southwest China	93	5	1	1

4.5 Major crops trade prospects

This section analyzes the import and export situation of maize, rice, wheat, and soybean in the first three quarters of 2019 in China.

In the first three quarters of 2019, the total imports of rice in China were 1.7288 million tons, a decrease of 22.8% compared to the previous year. The imported rice mainly stems from Thailand, Pakistan, Vietnam and Myanmar, respectively accounting for 25.1%、25.0%、21.9% and 15.2% of imports. The expenditure for rice import was US$889 million. Total rice exports over the period were 2,153,700 tons, an increase of 58.5% compared to the last year, mainly exported to Egypt, Côte d'Ivoire and Turkey (accounting for 20.7%, 13.0% and 9.9%, respectively). The value of the exports was US$813 million.

In the first three quarters of 2019, Chinese **wheat** imports totaled 2.2603 million tons, down by 9.7% year-on-year. The main sources include Canada (64.4%), Kazakhstan (14.2%), and France (5.8%). Imports amounted to US$664 million. Wheat exports (225,100 tons), up 3.8% compared to the last year, went mainly to the Democratic People's Republic of Korea (71.0%), Hong Kong (22.4%) and Ethiopia (3.3%). The generated income was US$89 million.

Maize imports reached 3,867,400 tons, an increase of 33.1% over 2018. The main suppliers were Ukraine, the United States, Myanmar and Russia, accounting for 90.9%、5.1%、2.2% and 1.1% of imports respectively. Imports amounted to US$843 million. Maize exports (15,400 tons), went mainly to the

Democratic People's Republic of Korea (88.3%), Hong Kong (7.1%) and Ethiopia(3.2%). The generated income for **Maize** export was US$4.2177 million.

In the first three quarters of 2019, the total imports of **soybean** in China were down 7.8% to 64,582,700 tons. Brazil, the United States and Argentina respectively contributed 70.0%, 16.0% and 7.9%, for a total value of US$2.5814 million. Soybean exports were 85,000 tons, down by 17.2%.

Trade prospects for major cereals and oil crop in China for 2019

Based on the remote sensing data of grain crop monitoring in major countries in the world in 2019, according to the major impact of agriculture and policy simulation model, it is predicted that the import of major grain crop varieties will increase slightly in 2019. The details are as follows:

According to the result of the model, **rice** imports will increase by 3.1%, while exports will decrease by 4.6% in 2019. The supply and demand of the global rice market is basically balanced. The CIF price of international rice is lower than that of domestic rice, and the price gap is further expanding. It is expected that the rice import will maintain a slight increase in 2019.

According to the forecasts, **wheat** imports are projected to increase by 2.6%, while exports will decrease by 3.9%. It is expected that the global wheat output will increase steadily, the international wheat price will rise, the price gap between home and abroad will continue to narrow, and the wheat import is expected to increase slightly in 2019.

Maize imports are forecast to increase (+15.1%) in 2019, while exports should decrease 5.2%. Global maize production has increased slightly, inventory has been further reduced, international maize prices have rebounded slightly, and China's maize import growth is expected to slowdown in 2019.

Soybean imports and exports will decrease by 4.6% and 2.1%, respectively. Global soybean production is slightly reduced, but stocks are still high. China-US economic and trade consultations have made positive progress, boosting the international market, but uncertainty still exists. It is expected that China's soybean import will decrease in the year.

Figure 4.19 Rate of change of imports and exports for rice, wheat, maize, and soybean in China in 2019 compared to those for 2018(%).