Chapter 4. China

Chapter 4 presents a detailed analysis for China, focusing on the seven most productive agro-ecological regions of the east and south. After a brief overview of the agroclimatic and agronomic conditions over the monitoring period (section 4.1), section 4.2 presents an update on CropWatch estimates for 2016 crop production in China. Section 4.3 reports on ongoing pest and diseases monitoring, while the next two sections focus on domestic prices (4.4) and grain and soybean imports and exports for the country (4.5). Finally, an analysis for individual regions is provided in section 4.6. Additional information on the agroclimatic indicators for agriculturally important Chinese provinces are listed in table A.11 in Annex A.

4.1 Overview

Overall, China enjoyed crop conditions similar to last year's. At the national scale, the conditions that prevailed during the monitoring period (TEMP, -0.1°C and RADPAR, -4%) were largely average. Together with favorable rainfall (RAIN, +14%) they resulted in above average potential biomass (BIOMSS, +11%). TEMP was close to average everywhere, with the largest—but still moderate—departures occurring in the Loess region (+0.3°C) and in Northeast China (-0.4°C). RAIN was much higher than expected in the Inner Mongolia region (+57%), while the Lower Yangtze region and the Loess region respectively recorded increases of +33% and +14%. At the provincial level, high precipitation was reported from Hebei (+46%) and Jiangxi (+46%). Almost all of the major agricultural areas of China suffered from low temperatures during late-July and late-October and also low rainfall in October. Figures 4.1-4.6 and table 4.1 illustrate the distribution of the various CropWatch indicators.

Table 4.1. CropWatch agroclimatic and agronomic indicators for China, July-October 2016, departure from 5YA and 15YA

Region	Agroclimatic indicators			Agronomic indicators			
	Departure from 15YA (2001-2015)			Departure from 5YA (2011-2015)			Current
	RAIN (%)	TEMP (°C)	RADPAR (%)	BIOMSS (%)	CALF (%)	Cropping Intensity (%)	Maximum VCI
Huanghuaihai	-5	0.1	-4	1	0	-2	1.34
Inner Mongolia	57	-0.3	-3	33	3	0	0.91
Loess region	14	0.4	-3	7	-5	-4	0.94
Lower Yangtze	33	-0.1	-8	16	-1	5	0.80
Northeast China	-1	-0.4	-2	4	0	-1	0.98
Southern China	9	0.0	-3	7	-1	-1	0.59
Southwest China	-3	0.1	-1	-5	-	-9	0.89

Figure 4.1. China spatial distribution of rainfall profiles, July-October 2016

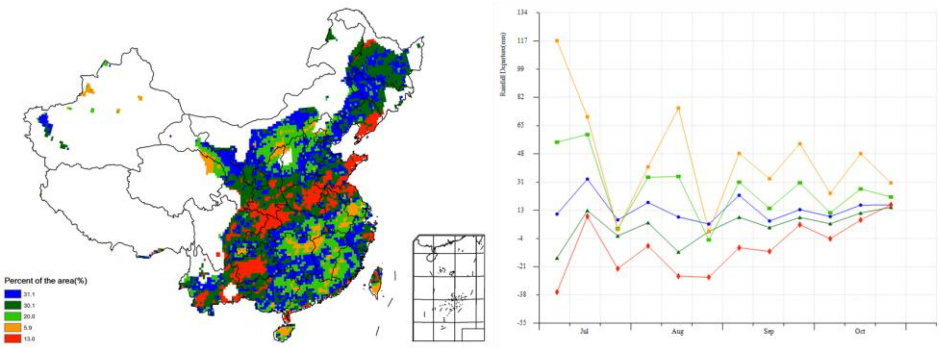


Figure 4.2. China spatial distribution of temperature profiles, July-October 2016

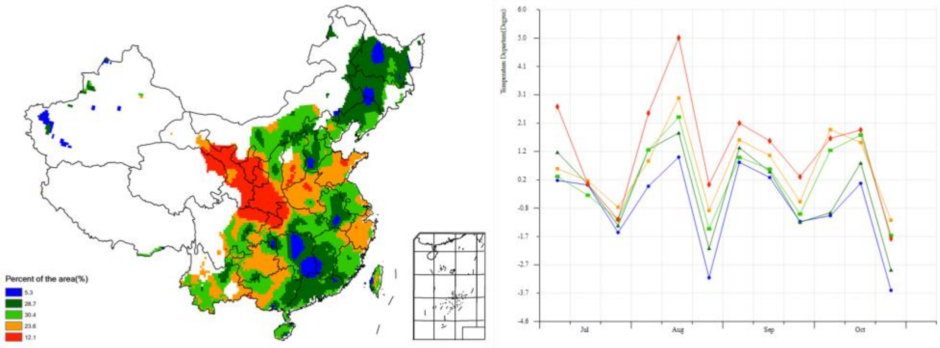


Figure 4.3. China cropped and uncropped arable land, by pixel, July-October 2016

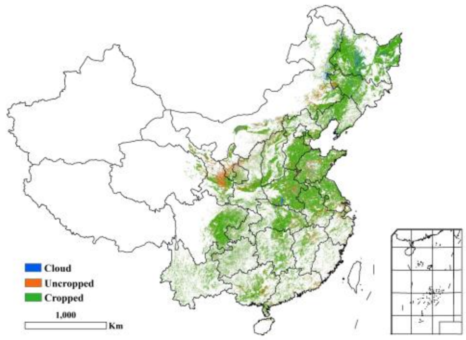


Figure 4.4. China maximum Vegetation Condition Index (VCIx), by pixel, July-October 2016

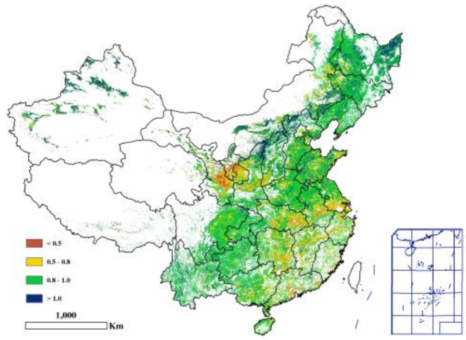


Figure 4.5. China minimum Vegetation Health Index (VHI), by pixel July-October 2016

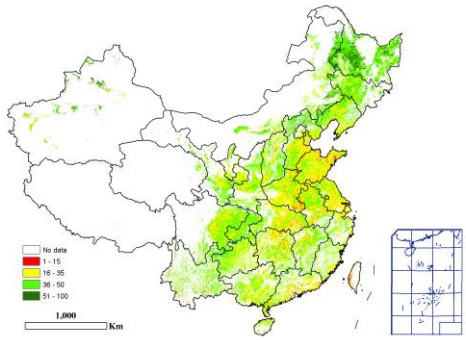
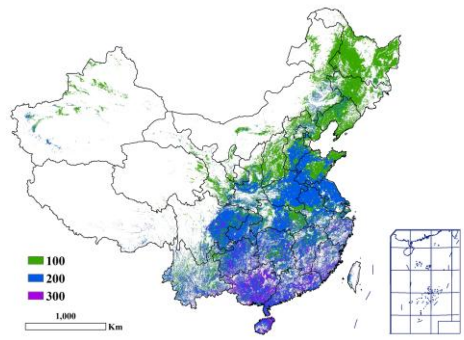


Figure 4.6. China Cropping Intensity, July-October 2016



High VCIx values occurred mostly in China's southwest and in the Northeast region. Low VCIx values affected central and southeast China, particularly the center of Ningxia and the east of Gansu province. Crop condition in the northeast was above average, although agroclimatic conditions were just average. At the regional and provincial scales, BIOMSS was above average in the seven regions, especially in the Lower Yangtze (+16%) and Inner Mongolia (+33%) regions. At the provincial level, the highest values occurred in Fujian (+29%), Jiangxi (+25%), and Inner Mongolia (+29%). Low BIOMSS was only recorded for southwest China (-5%).

During the monitoring period, the cropped arable land fraction (CALF) overall remained stable in comparison with last year. For two of the seven monitored regions, CALF was about equal to the five-year average, while slightly negative values were recorded for the Lower Yangtze region and Southern China (-1%). In the Loess region, CALF decreased by 5%, indicating that less arable land was cultivated. The cropped arable land was mainly distributed in the center of Gansu and Shandong, east of Henan and Inner Mongolia. Cropping intensity increased by 5% in the Lower Yangtze region, but was average in Inner Mongolia; it decreased in the other five regions. Cropping intensity showed that single crops were mainly confined to Northeast China; double crops were located in the center of the country, while the three-season crops can only be grown in Southern China. Finally, the minimum VHI values indicate that almost all provinces in central and eastern China suffered from water stress, including southeast Henan, central Jiangsu, central Shanxi, and the east of Shandong (figure 4.6).

4.2 China's crop production

The harvest of maize, rice, wheat, and soybean in China was completed by the end of October. Based on the latest remote sensing and field sampling data, the revised CropWatch estimate of China's production is listed in table 4.2. For rice, a more detailed production estimate is presented in table 4.3, taking into account complex regional patterns.

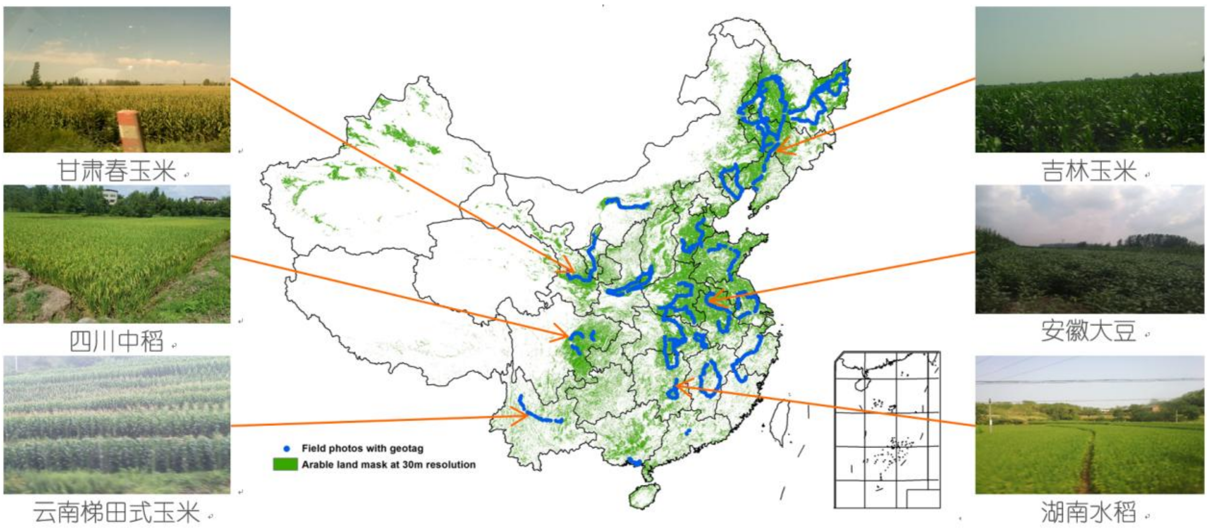
Table 4.2. China's maize, rice, wheat, and soybean production (thousand tons) in 2016 and percentage change from 2015 by province

	Maize		Rice		Wheat		Soybean	
	2016	**Δ(%)**	**2016**	**Δ(%)**	**2016**	**Δ(%)**	**2016**	**Δ(%)**
Anhui	3608	0	16689	-4	11340	2	1092	-1
Chongqing	2103	-3	4733	-3	1110	-1		
Fujian			2873	0				
Gansu	4795	0			2562	-3		
Guangdong			10999	0				
Guangxi			11287	0				
Guizhou	5105	3	5404	4				
Hebei	17944	4			10832	0	186	3
Heilongjiang	27195	-2	20923	3	452	4	4594	0
Henan	16808	0	3852	-2	25160	-3	788	2
Hubei			15453	-3	4330	0		
Hunan			24709	-3				
Inner Mongolia	16206	-7			2056	10	1019	23
Jiangsu	2186	-3	16610	-2	9729	1	781	-1
Jiangxi			16751	-4				
Jilin	24324	2	5670	12			706	5
Liaoning	15707	4	4409	-9			420	-18
Ningxia	1719	0	553	2	788	1		
Shaanxi	3428	-6	1017	-3	4011	1		
Shandong	19217	2			21893	-4	698	3
Shanxi	8666	-1			2132	1	167	-4
Sichuan	7212	0	14937	0	4646	-1		
Xinjiang	6727	1						
Yunnan	6135	5	5642	6				
Zhejiang			6252	-3				
Sub total	189085	0	188763	-1	101041	-1	10451	1
Other provinces*	**11276**	**-8**	**11769**	**2**	**17550**	**1**	**2836**	**4**
China*	**200361**	**0**	**200532**	**-1**	**118591**	**-1**	**13287**	**2**

Note: * Production of Taiwan province is not included.

Maize. For maize, the Chinese government's recent decision to end procurement of the crop at a guaranteed minimum purchasing prices is resulting in farmers shifting to other, more suitable crops in regions where maize cultivation is marginal due to soil or climatic conditions. The policy, however, has not resulted in much change in terms of national total maize planted area. According to an area estimation based on an integration of 16 meter resolution remote sensing imagery and big data analysis techniques for the 40 thousand field photos collected nationwide (See figure 4.7), this year's maize area was only 0.8% below 2015, with the most significant decreases occurring in Inner Mongolia and Heilongjiang provinces (areas shrinking by respectively 222 and 103 thousand hectares, or 7% and 2% compared to 2015). Maize production for other major provinces (maize production above 1500 ktons) increased as a result of favorable agroclimatic conditions; in particular, production in Liaoning is up 4% over 2015, recovering from last year's severe drought. Other significant changes in production are also observed in Shaanxi (-6%, mainly due to the decreased planted area) and Yunnan (+5%, due to yield increase). At the national level, maize production is estimated at 200.4 million tons, a marginal decrease compared with 2015.

Figure 4.7. Location of geo-tagged field photos collected during the summer crops growing season



Soybean. CropWatch revised its estimates for soybean yield, putting it slightly above the previous forecast. With the increased planted area, soybean production is set to 13,287 ktons, up 2% from last year and up 147 ktons compared to the August forecast. The most significant increase occurred in Inner Mongolia (a 23% increase) where the planted area increased 26.5% over 2015. Interestingly, while the average yield in Liaoning recovered by 7% from the drought year in 2015, production still decreased by 18% due to the smaller planted area.

Rice. CropWatch now puts the total rice production for China at 200.5 million tons, a 1% decrease from last year, with a marginal change in single rice production and 3% and 2% decreases of early rice and late rice production, respectively. Due to the excessive rainfall in some areas and below average RADPAR, pest and diseases impacts are more severe than during both an average year and 2015. Abundant rainfall coupled with storms and typhoons also lead to localized flooding that damaged rice fields in central and southern China. Fortunately, the unfavorable conditions were not widespread and their impacts remained limited for national single rice production. The 2% decrease in late rice production was mainly due to the decrease in planted area compared with 2015, in line with the trend to convert double cropping to single rice cropping. Significant changes in rice production are also observed for rice in Jilin, Liaoning, and Yunnan (+12%, -9%, and +6%, respectively), with those changes in production resulting mainly from the variation in planted area compared with 2015.

Wheat. Because the wheat harvest in China for 2016 was already completed before the start of the current reporting period, CropWatch estimates for wheat remain unchanged at 118.6 million tons.

Overall, CropWatch puts the total 2016 output of summer crops (including maize, single rice, late rice, spring wheat, soybean, minor cereals, and tubers) at 414.3 million tons, a marginal decrease (-0.4%) from 2015. The total annual crop production (including cereals, tubers, and legumes) is 570.3 million tons, a 1.0% drop or 5.9 million tons less compared with 2015. Detailed information of seasonal aggregated production by province is listed in table 4.4.

Table 4.3. China, 2016 single rice, early rice and late rice production (thousand tons) and percentage change from 2015 by province

	Early rice		Single rice		Late rice	
	2016	**∆(%)**	**2016**	**∆(%)**	**2016**	**∆(%)**
Anhui	1782	-3	13195	-4	1712	-4
Chongqing			4733	-3		
Fujian	1712	-1			1160	1
Guangdong	5224	-2			5775	1
Guangxi	5418	-3			5869	3
Guizhou			5404	4		
Heilongjiang			20923	3		
Henan			3852	-2		
Hubei	2273	-2	10481	-4	2699	-4
Hunan	8243	0	8194	-4	8272	-4
Jiangsu			16610	-2		
Jiangxi	7284	-1	2721	-5	6746	-6
Jilin			5670	12		
Liaoning			4409	-9		
Ningxia			553	2		
Shaanxi			1017	-3		
Sichuan			14937	0		
Yunnan			5642	6		
Zhejiang	791	-4	4625	-3	836	-6
Sub total	32728	-1	122965	-1	33068	-2
Other provinces*	**1359**	**-30**	**8538**	**11**	**1874**	**0**
China*	**34087**	**-3**	**131503**	**0**	**34942**	**-2**

*Note:** production of Taiwan province is not included.

Table 4.4. Aggregate crop production (thousand tons) per harvest season for major agricultural provinces, China 2016

	Winter crops		Early rice		Summer crops		Total(#)	
	2016	**∆(%)**	**2016**	**∆(%)**	**2016**	**∆(%)**	**2016**	**∆(%)**
Anhui	12044	2	1782	-3	20252	-3	34078	-1
Chongqing	2249	-3			8181	-3	10430	-3
Fujian			1712	-1	4234	1	5946	0
Gansu	3002	-2			5928	0	8930	-1
Guangdong			5224	-2	7531	1	12755	0
Guangxi			5418	-3	10423	3	15841	1
Guizhou					12347	3	12347	3
Hebei	10825	-1			18129	4	28954	2
Heilongjiang					53791	0	53791	0
Henan	25305	-3			26110	0	51415	-2
Hubei	5875	0	2273	-2	18196	-4	26344	-3
Hunan			8243	0	19109	-4	27352	-3
Inner Mongolia					21424	-4	21424	-4
Jiangsu	9971	-1			21012	-2	30983	-2
Jiangxi			7284	-1	9692	-6	16977	-4
Jilin					30700	3	30700	3
Liaoning					20537	1	20537	1
Ningxia					3094	0	3094	0
Shaanxi	4085	-7			6218	-5	10303	-6
Shandong	22252	-4			21226	2	43478	-1
Shanxi	2218	2			9147	-1	11365	-1
Sichuan	5541	-2			26768	0	32309	0
Yunnan					14382	6	14382	6
Zhejiang			791	-4	6363	-3	7155	-3
Sub total	103367	-2.0	32727	-1.4	394794	-0.2	530890	-0.6
Other provinces*	**18613**	**-6.6**	**1359**	**-30.0**	**19455**	**-3.0**	**39427**	**-5.9**
China*	**121980**	**-2.7**	**34086**	**-3.0**	**414249**	**-0.4**	**570317**	**-1.0**

Note: * Production of Taiwan province is not included. # Crops are sorted into winter crops (sown before winter the previous year), early rice (sown in late spring and harvested in summer), and summer crops (sown in summer and harvested in autumn). Total annual crop production is the sum of the winter crops, early rice, and summer crops production.

4.3 Pests and diseases monitoring

The impact of pests and diseases was relatively severe during mid to late September 2016 in the main rice regions of China. In Huanghuaihai and Northeast China, double cropped late rice was mainly in its booting and heading stages, while in Southwest China and the Lower Yangtze River regions single cropped late rice was in heading and filling stages. Typhoon Meranti brought heavy rainstorms to the rice regions of Huanghuaihai, Southern China, and the Lower Yangtze. As a result, from mid to late September habitat conditions were conducive to the migration of planthoppers and rice leaf rollers, as well as to the dispersal of sheath blight.

Rice planthopper

The distribution of rice planthopper in mid to late September is shown in figure 4.8 and table 4.5. The total area affected has reached 14.7 million hectares, with the pest severely occurring in most of Jiangsu, central Anhui, central Hubei, most of Fujian, most of Guangdong, and most of Guangxi. Moderate attacks occurred in central Hunan, central Yunnan, and eastern Guizhou, most of Jiangxi, western Heilongjiang, and central Liaoning.

Figure 4.8. Distribution of rice planthopper in China (mid to late September 2016)

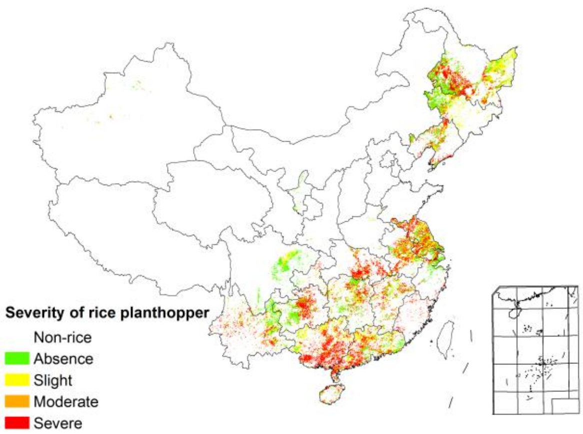


Table 4.5. Occurrence and affected area for the rice planthopper in China (mid to late September 2016)

Region	Occurrence ratio in % of the cultivated area				Total area/ thousand hectares
	Absence	Slight	Moderate	Severe	
Huanghuaihai	19	24	26	31	1618
Inner Mongolia	40	23	22	15	291
Loess region	60	10	23	7	143
Lower Yangtze	22	23	21	34	9480
Northeast China	31	24	21	24	4261
Southern China	16	23	19	42	2257
Southwest China	32	16	18	34	4821

Rice leaf roller

Nationwide, the rice leaf roller (figure 4.9 and table 4.6) damaged around 10 million hectares, most severely in northern Jiangsu, central Anhui, most of Hubei, southern Guangxi, and southern Guangdong. Attacks were moderate in most of Hunan and Yunnan, as well as in central Guizhou and central Heilongjiang.

Figure 4.9. Distribution of rice leaf roller in China (mid to late September 2016)

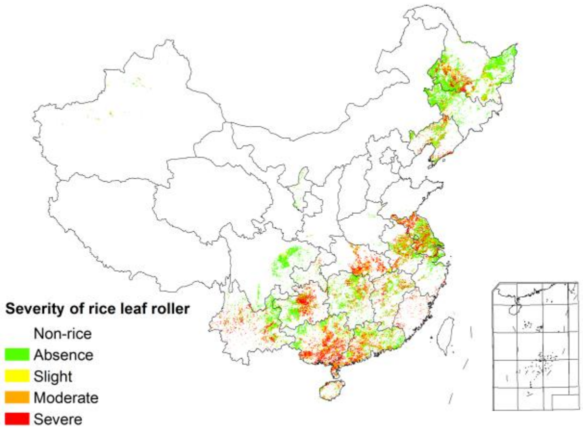


Table 4.6. Occurrence and affected area for the rice leaf roller in China (mid to late September 2016)

Region	Occurrence ratio in % of the cultivated area				Total area/ thousand hectares
	Absence	Slight	Moderate	Severe	
Huanghuaihai	37	16	23	24	1618
Inner Mongolia	65	12	15	8	291
Loess region	68	7	19	6	143
Lower Yangtze	38	16	22	24	9480
Northeast China	61	13	15	11	4261
Southern China	29	18	21	32	2257
Southwest China	40	13	17	30	4821

Rice sheath blight

For the country as a whole, rice sheath blight (figure 4.10 and table 4.7) damaged around 13.3 million hectares. The pest occurred in most of Jiangsu, central Anhui, central Jiangxi, southern Guangxi, and southern Guangdong where it caused severe damage. Its impact was more limited in southern Heilongjiang, western Jilin, central Hunan, central Hubei, and central Guizhou.

Figure 4.10. Distribution of rice sheath blight in China (mid to late September 2016)

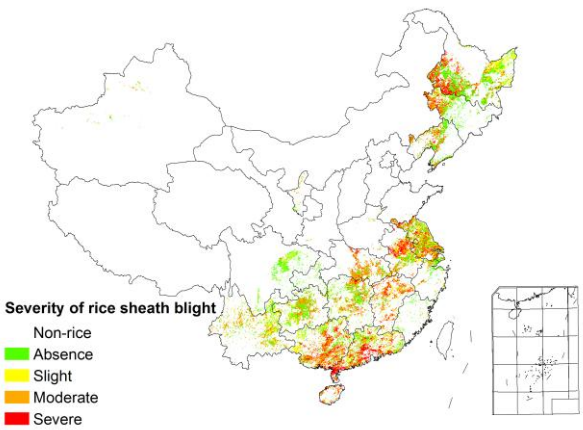


Table 4.7. Occurrence and affected area for rice sheath blight in China (mid to late September 2016)

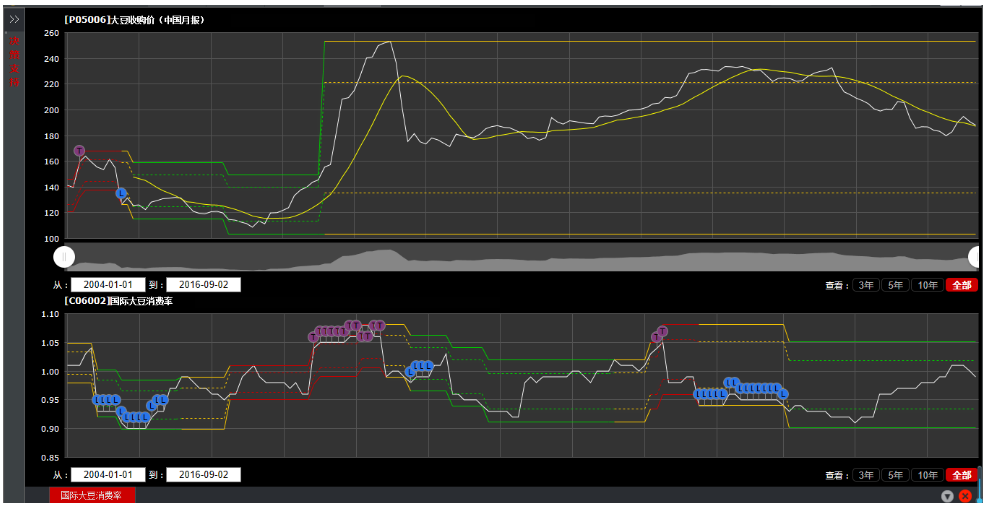
Region	Occurrence ratio in % of the cultivated area				Total area/ thousand hectares
	Absence	Slight	Moderate	Severe	
Huanghuaihai	31	19	22	28	1618
Inner Mongolia	45	10	20	25	291
Loess region	63	10	20	7	143
Lower Yangtze	33	17	21	29	9480
Northeast China	45	15	17	23	4261
Southern China	28	18	20	34	2257
Southwest China	49	18	24	9	4821

4.4 Outlook for the domestic price of four major crops

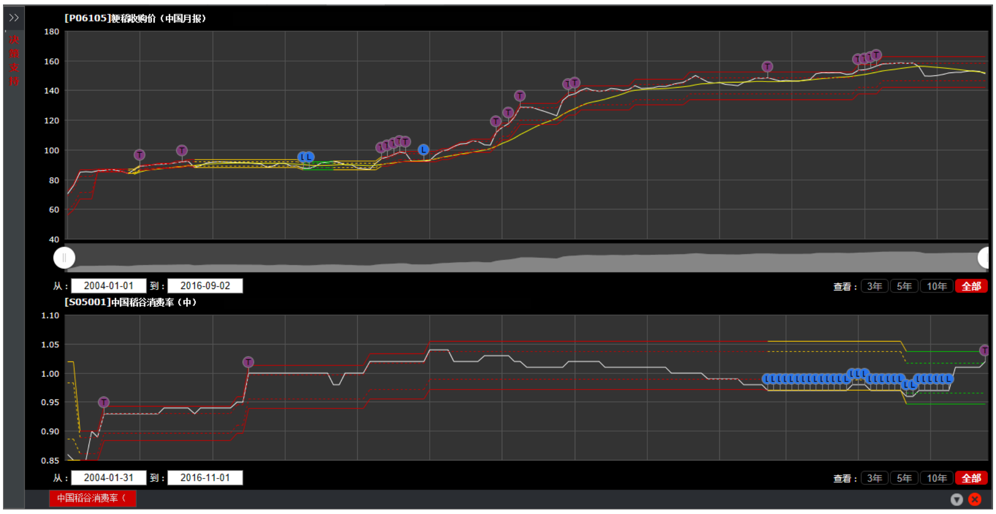
The following analysis of domestic prices for soybean, maize, japonica rice, and wheat in China is based on (i) nationwide monthly grain price data between January 2004 and September 2016 provided by the price information center of China's National Development and Reform Commission (NDRC) and (ii) price trend forecasts and early warning obtained by Fang Jingxin's price-spiral model, in addition to other national and international ancillary data sources. The outlook is as follows:

- *Soybean.* At present, both the international soybean consumption rate and the domestic soybean price are in the equilibrium range. As the price of soybean has already been running above the trend line, its fluctuations will be reinforced.
- *Maize.* In terms of consumption, the current maize consumption rate has been entering the top of the consumption tension state. Although its price trend was still falling, it has entered the non-equilibrium range. As some signs suggest maize prices are bottoming out, they are expected to rebound in the near future.
- *Japonica rice.* The current rate for Japonica rice consumption is similar to the one for maize. Its recent downward trend will slow down along with changes in supply and demand.
- *Wheat.* The current wheat consumption rate is in the equilibrium range, while its price is in the non-equilibrium range. The wheat price trend is downward, but is expected to gradually slow down.

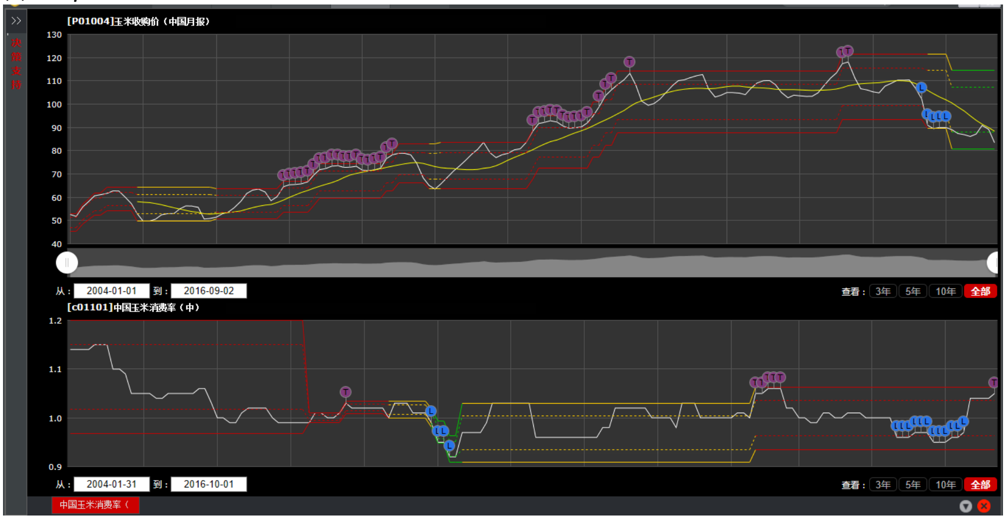
Figure 4.11. Fluctuations in wheat price, January 2004 to October 2016



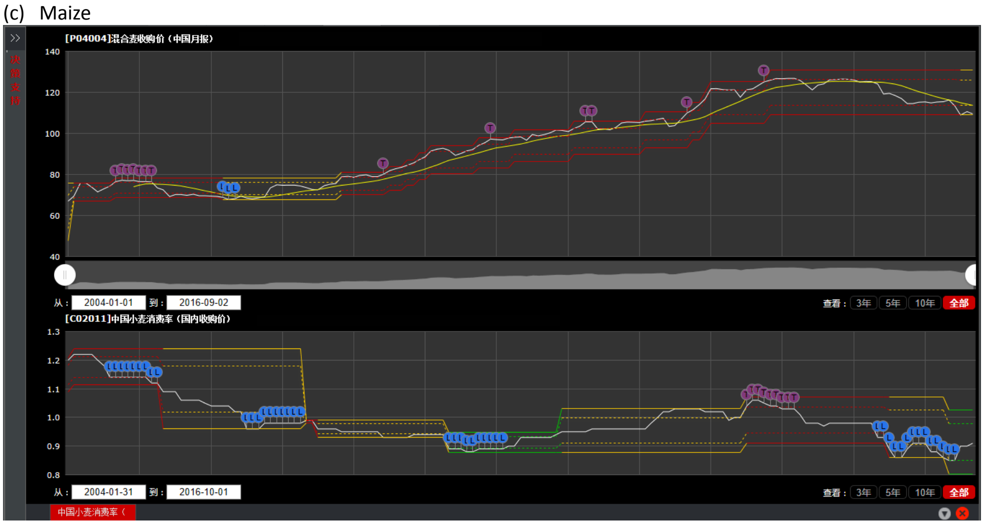
(a) soybean



(b) *Japonica rice*



(c) Maize



(d) wheat

Note: The graph illustrates the price of wheat for the last 12.5 years since January 1 2004.

4.5 Grain and soybean imports and exports of China

Chinese grain and soybean imports and exports from January to September 2016

Maize

From January to September 2016, China imported 2.97 million tons of maize, which represented a decrease of 34.3% over the same period in 2015. Ukraine (89.3%), the United States (6.9%), and Russia (2.1%) were the main sources for the imports, the value of which reached US$ 579million—44.6% below the value for the same period in 2015. Maize exports over this year's first three quarters (1,725.75 tons) decreased by 79.8% and went primarily to the Democratic People's Republic of Korea (82.6%), Russia (17.4%), and the Republic of Korea (1.5%). The exports earned US$ 617.8 million, down 75.3% from 2015.

Rice

Over the same January to September period, China imported 2.5643 million tons of rice, an increase of 9.9% compared to the previous year. The imports stemmed from Vietnam, Thailand, and Pakistan, respectively accounting for 49.1%, 24.9%, and 20.3% of the total volume. The expenditure for rice import was US$1169 million, reflecting a year-on-year growth of 11.3%. Over the period total exports reached 238.600 tons, up 15.5%, mainly to the Republic of Korea, Japan, and Hong Kong (41.7%, 12.6%, and 10.4%, respectively). The value of the exports was US$211 million, an increase of 15.5% over 2015.

Wheat

Wheat imports reached 2.87 million tons, an increase of 27.2% over 2015. The main sources include Australia (41.5%), Canada (25.4%), the United States (23.6%), and neighboring Kazakhstan (9.0%). Notwithstanding the increase in volume, the total expenditure of US$697 million was an increase of just 0.1% compared with 2015. Wheat exports over the same period dropped 10.5% to reach 82,000 tons. Hong Kong (75.4%), Ethiopia (12.9%), and Macao (5.4%) were the main destinations for the exported wheat.

Soybean

The total import of soybean went up by 2.5% to 61,185,000 tons between January and September of 2016. Brazil, the United States, and Argentina respectively contributed 52.3%, 41.8%, and 6.0%, for a total value of US$24.46 billion, down 6.6% compared to the period of 2015. Soybean exports of 92,600 tons (-17.5%) earned US$79.38 million (-24.8%).

Import prospects for major grains and soybeans

Based on the latest monitoring results, China grain and soybean imports are projected to increase. The projections below (see also figure 4.12) are based on remote sensing data and the Major Agricultural Shocks and Policy Simulation Model, which derives from the standard GTAP (Global Trade Analysis Project).

Maize

According to the projections, national imports will go down 18.2% and exports will decrease by 30.4% in 2016. The gap between domestic and international prices tends to tighten. Also because of sufficient domestic supply, maize imports continue to decrease and will hardly exceed the 7.2 million tons of prevailing quotas.

Rice

China's 2016 imports are expected to increase by 21.3% compared to 2015, while exports will go up 8.2% according to the model prediction. With the gradual increase of the difference between international and domestic prices and sufficient domestic supply, imports will increase throughout the year but will be within the limits imposed by prevailing quotas.

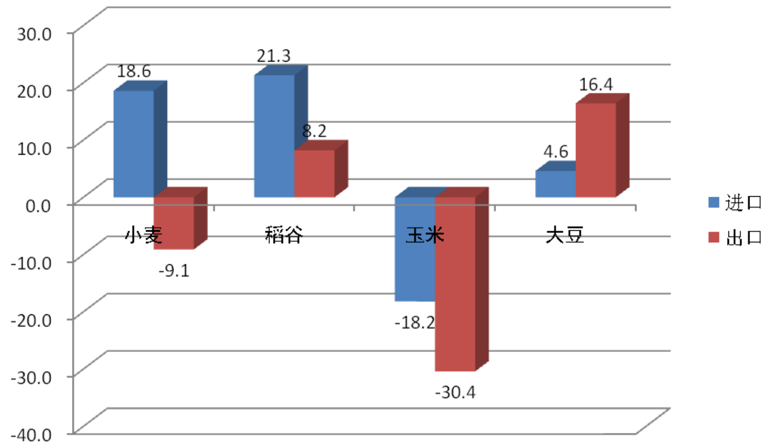
Wheat

China's wheat imports are expected to increase by 18.6%, but exports are projected to drop 9.1% compared to 2015. As the rate of decline for the international wheat price was larger than for domestic prices from the second half of this year and the price gap of quality wheat between domestic and abroad also narrowed, the rate of increase for wheat imports is expected to slow down and wheat imports will increase slightly.

Soybeans

Soybean imports will increase by 4.6% while exports will be reduced by 16.4% in 2016, according to the projections. Because the gap between domestic and international prices narrowed and because the share of soybean among crops changed recently in China, the imported volume will be only slightly greater than that for the previous year.

Figure 4.12. Rate of change of imports and exports for rice, wheat, maize, and soybean in China in 2016 compared to 2015 values (%)



Source: Authors based on CropWatch remote sensing data and results from the Major Agricultural Shocks and Policy Simulation Model.

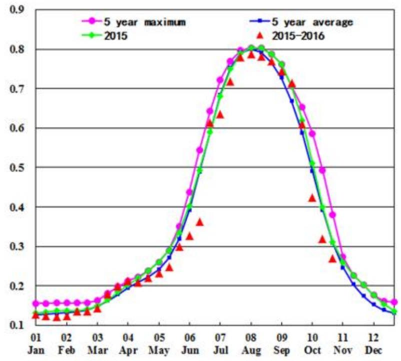
4.6 Regional analysis

Figures 4.13 through 4.19 present crop condition information for each of China's seven agricultural regions. The provided information is as follows: (a) Crop condition development graph based on NDVI, comparing the current season up to October 2016 to the previous season, to the five-year average (5YA), and to the five-year maximum; (b) Spatial NDVI patterns from July to October 2016 (compared to the (5YA); (c) NDVI profiles associated with the spatial patterns under (b); (d) maximum VCI (over arable land mask); and (e) biomass for July-October 2016. Additional information about agroclimatic indicators and BIOMSS for China is provided in Annex A, table A.11.

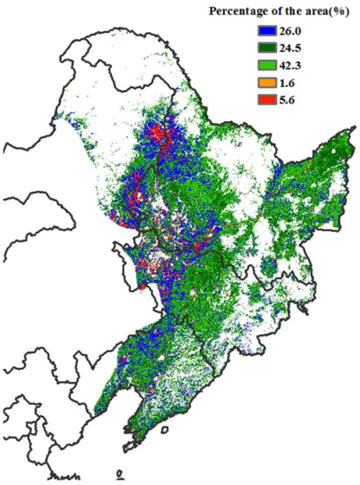
Northeast region

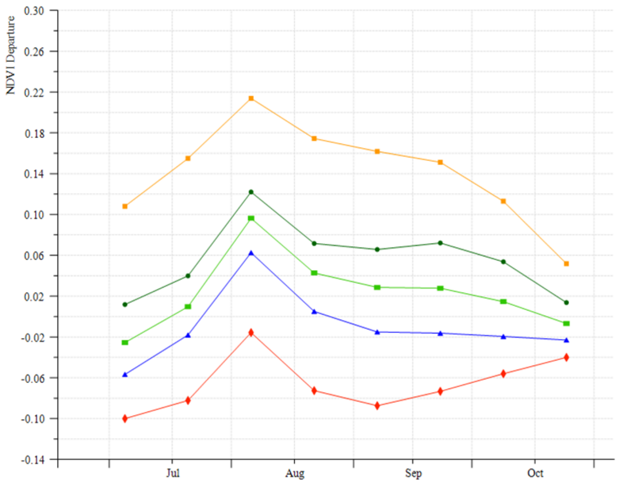
CropWatch agroclimatic and agronomic indicators describe around average conditions over most of the region during the reporting period. The spring crops (including wheat, maize, rice, and soybean) reached the grain filling to maturity stages from late July to late September and the harvest was concluded in October. As shown in the spatial NDVI patterns, compared to their recent five-year average and the corresponding cluster profiles, most crops (over 50% of the area) were at a slightly above average condition except for a small area in the west near the Greater Hinggan mountains (about 30% of the total area) where condition was below average after August. In Heilongjiang province, VCIx >0.8 confirms the favorable condition of crops. The output expected from the region is better than average.

Figure 4.13. Crop condition China Northeast region, July-October 2016

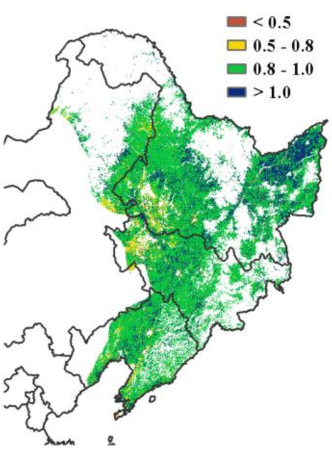


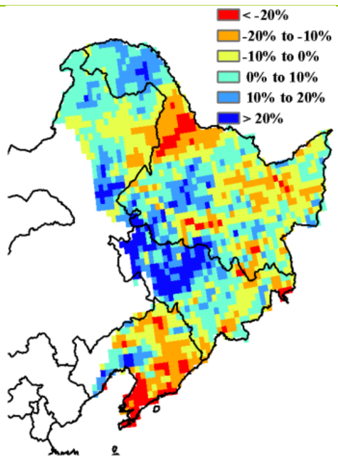
(a) Crop condition development graph based on NDVI





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





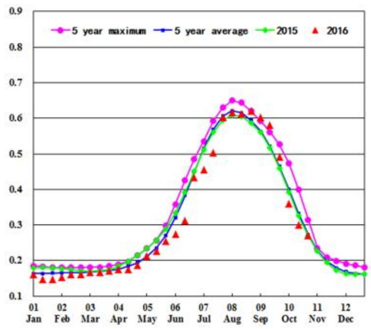
(d) Maximum VCI (e) Biomass

Inner Mongolia

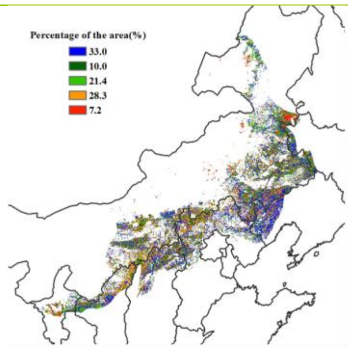
The condition of maize and soybean, the main summer crops in Inner Mongolia, was generally unfavorable during the reporting period. Rainfall was well above average (RAIN, +57%), but its temporal and spatial distribution was not homogeneous; both the east and the west of the region suffered dry weather from June. Temperature (TEMP) and radiation (RADPAR) were low but close to average (+0.4°C and +3% respectively). Altogether, the region experienced a large potential biomass (BIOMSS) increase of 33% compared to the recent five years.

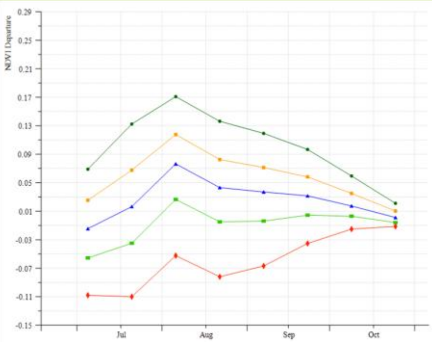
The crop development graph indicates poor crop condition from June but average NDVI at the peak growing season. East and northeast Inner Mongolia, central Ningxia, and north Shaanxi suffered from drought, which affected crop growth; below average NDVI profiles started in July in about 29% of the region. The potential biomass was poor as well in the area mentioned above. Until mid-August, decreased rainfall affecting crop growth is clearly shown by below-average NDVI, which is confirmed by the spatial NDVI patterns and profiles in about 7% of the region. Thereafter, crop condition improved and reached—and sometimes exceeded—the maximum of the last five years from late August to mid-September. The relief, however, came late and the drought at critical growing periods may eventually influence the crops' condition and yield on a local scale. From late September, below average conditions had little effect as the crops had reached maturity and were ready to harvest, even if excess rainfall locally hampered harvesting. According to the CropWatch indicators, maize production decreased by 7% in Inner Mongolia mainly due to the reduced planted area, and by 6% in Shaanxi compared with the previous season mainly because of both decreased yield and planted area.

Figure 4.14. Crop condition China Inner Mongolia, July-October 2016



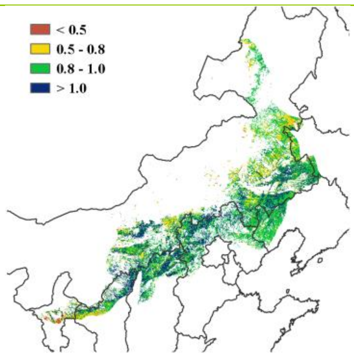
(a) Crop condition development graph based on NDVI

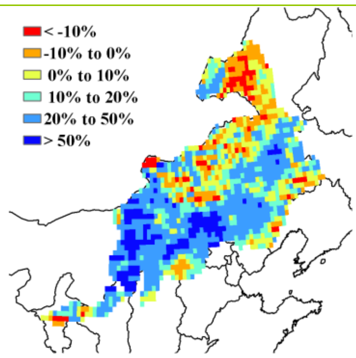




(b) Spatial NDVI patterns compared to 5YA

(c) NDVI profiles





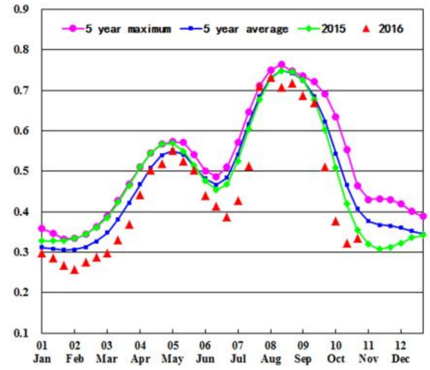
(d) Maximum VCI

(e) Biomass

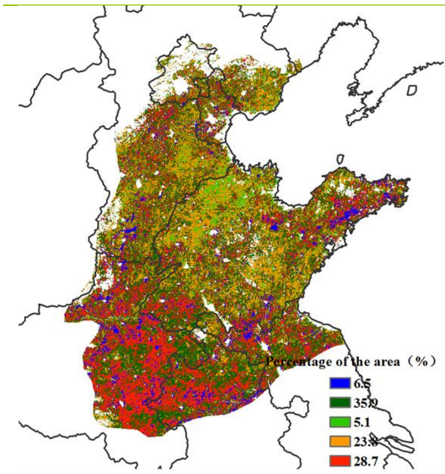
Huanghuaihai

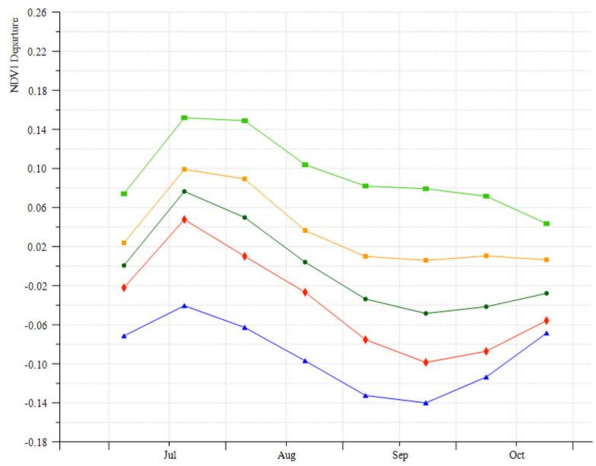
The main crop in Huanghuaihai during the current monitoring period is maize, of which the condition was below the recent five-year average and even worse than the previous year. Unfavorable weather has impacted the sowing and development periods. Poor precipitation (5% below average) somewhat hindered the germination of maize, which is shown by the well below average values in July and August in the NDVI development graph. In addition, RADPAR was 4% lower than average. According to the spatial NDVI patterns, crop condition was below average from the middle of July in almost the whole region. In northern Hebei, Henan, southern Anhui and eastern Shandong, crop condition was consistently below average, being worst during mid-August. Biomass showed a slight increase (1%) but these changes were not homogeneous. The maximum VCI presents low values in some patches, which is consistent with the spatial distribution of NDVI and the biomass production potential.

Figure 4.15. Crop condition China Huanghuaihai, July-October 2016



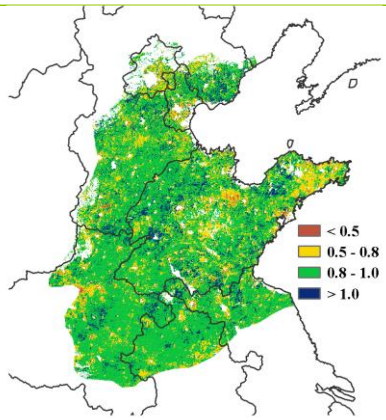
(a) Crop condition development graph based on NDVI

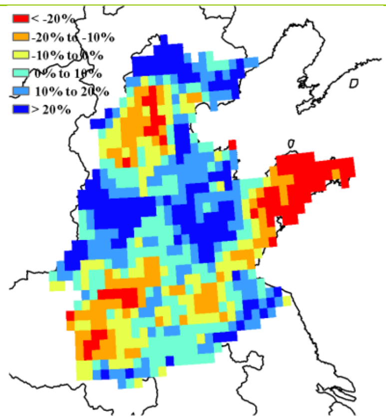




(b) Spatial NDVI patterns compared to 5YA

(c) NDVI profiles





(d) Maximum VCI

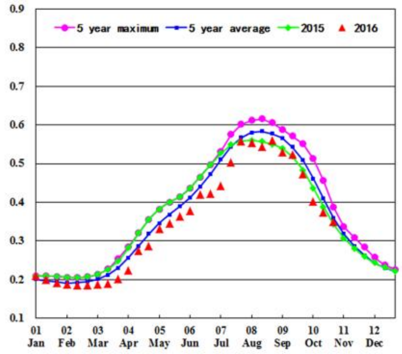
(e) Biomass

Loess region

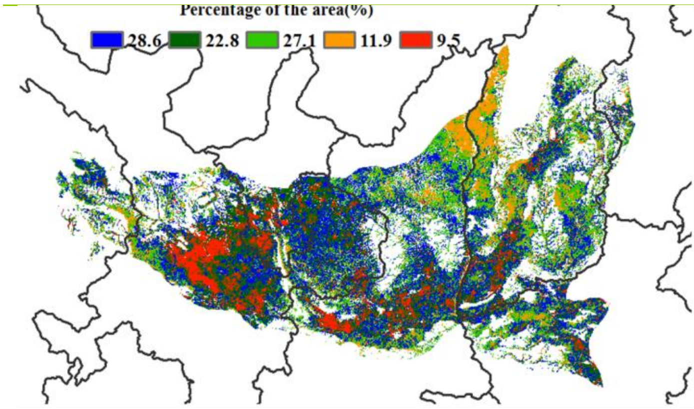
Maize in this area was harvested in late September and early October, and winter wheat has been planted during the monitoring period. From the beginning of July, crop condition was inferior to last year's and below the five-year average. Radiation was below average, while precipitation and temperature were above average (RAIN, +14%), resulting in potential biomass (BIOMSS) to be slightly above average (+7%).

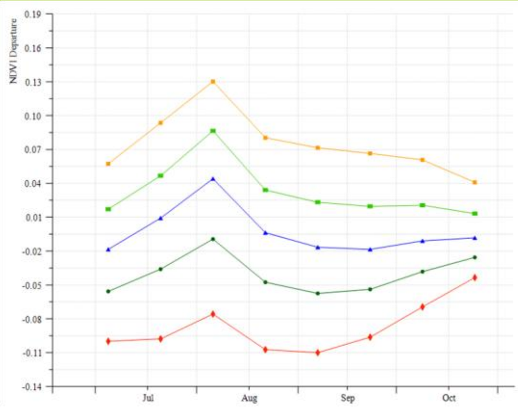
In most of the area, the analyses based on spatial NDVI clusters and profiles are consistent with VCIx. The most favorable conditions occurred mainly in the north of Shanxi and Shaanxi provinces from July to October, due to the abundant rainfall and suitable sunlight. On the contrary—and mostly because of drought during the monitoring period (as confirmed by the maps of potential biomass)—crops were in poor condition (compared to the five-year average) in the provinces of Gansu and Ningxia. Although crop condition in some areas seemed below average in late September, this may be as a result of early harvest rather than a poor crop. The area of cultivated land (CALF) decreased by 5 percentage points compared with recent years.

Figure 4.16. Crop condition China Loess region, July-October 2016



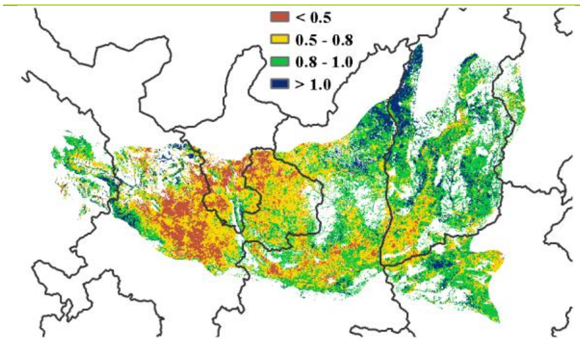
(a) Crop condition development graph based on NDVI

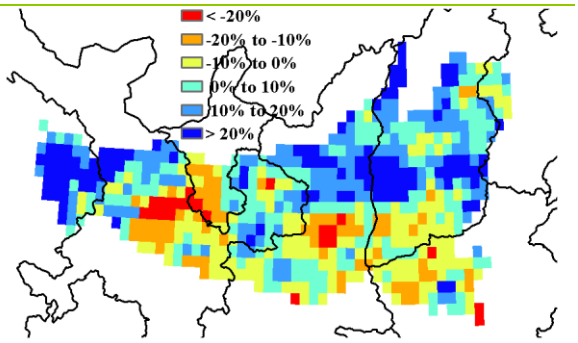




(b) Spatial NDVI patterns compared to 5YA

(c) NDVI profiles





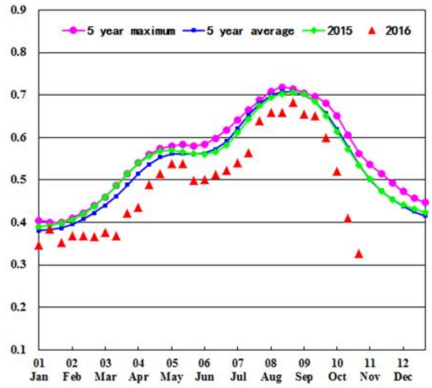
(d) Maximum VCI

(e) Biomass

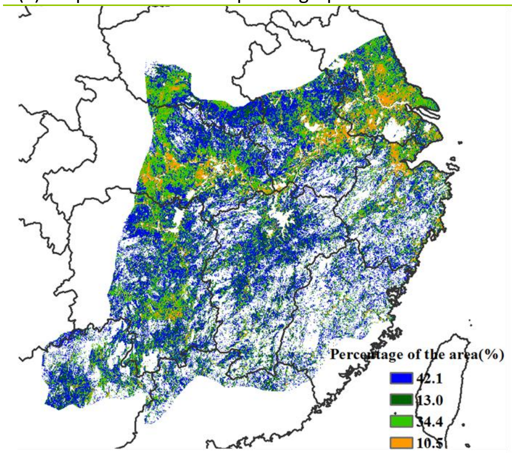
Lower Yangtze region

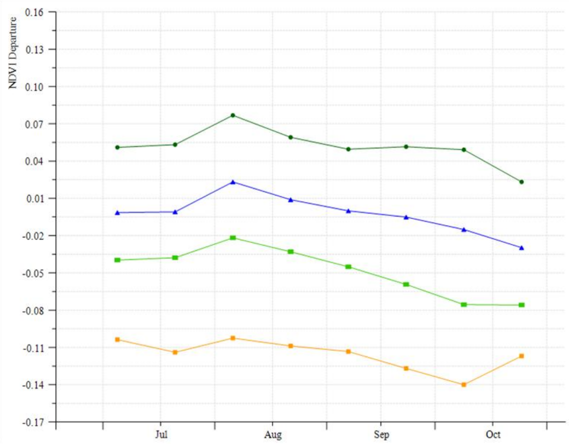
In the Lower Yangtze region, the monitoring period from July to October mainly covers the harvest of semi-late rice and the maturity of late rice. In general, crop condition was below the recent five-year average according to the crop condition development graph. The CropWatch agroclimatic and agronomic indicators show that rainfall (RAIN) was significantly above average (33%), while temperature (TEMP) was close to average (-0.1°C). The region also suffered a very significant drop in PAR (RADPAR -8%) but the BIOMSS production potential was above the recent five-year average (+16%). Profiles of NDVI departure clusters show that crop condition was well below average in 11.1% of the agricultural areas, including the south of Jiangsu, middle of Anhui and Hubei, and the north of Zhejiang province. The BIOMSS map further indicates that the biomass was lower or close to average in the northeast of Zhejiang, west of Anhui, south of Henan, and east of Hubei provinces. CropWatch estimates that production in the Lower Yangtze region is to be below but close to average.

Figure 4.17. Crop condition Lower Yangtze region, July-October 2016



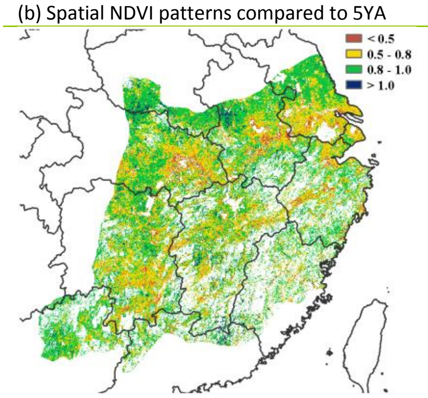
(a) Crop condition development graph based on NDVI

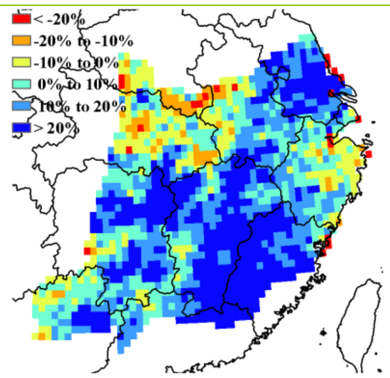




(b) Spatial NDVI patterns compared to 5YA

(c) NDVI profiles





(d) Maximum VCI

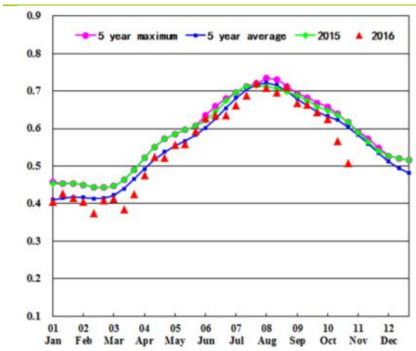
(e) Biomass

Southwest China

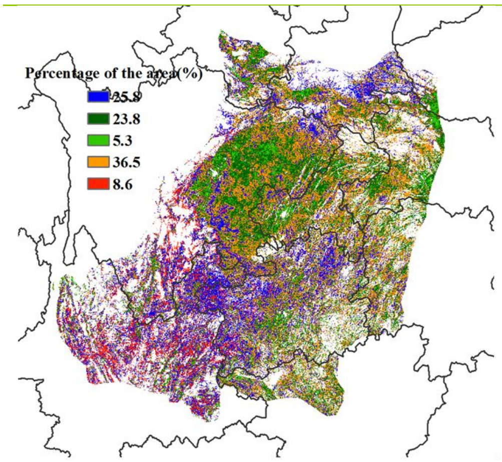
The condition of crops was partly below average in Southwest China between July and October. The period coincides with the region's harvest season for maize and single cropped rice and the planting of winter wheat. NDVI profiles kept close to their average five-year level from July to the end of September, but then fell rapidly below average in October. The NDVI in eastern Sichuan, most of Chongqing and southern Gansu was a little below the five-year average level. The maximum VCI in southern Gansu was in the range of 0.5-0.8 or below. The following areas should be paid attention to: eastern Sichuan, northern Chongqing, southern Gansu, western Hubei, and western Guizhou. CropWatch found below average precipitation in Chongqing (RAIN, -12%) and Guizhou (-9%), which will have a negative impact on crop condition.

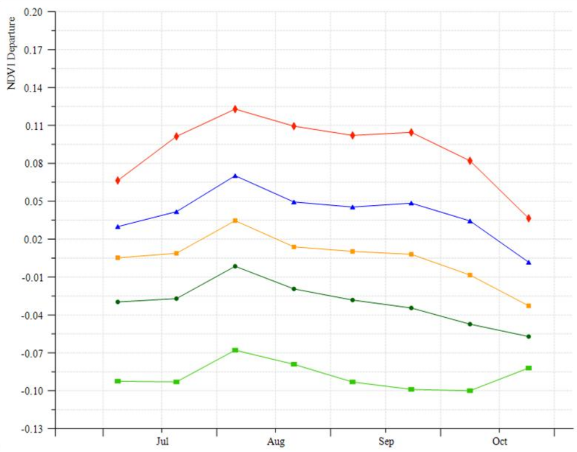
Although the fraction of cropped arable land (CALF) remained average during the monitoring period, the cropping intensity in Southwestern China decreased by 9%, which is expected to negatively influence production.

Figure 4.18. Crop condition Southwest China region, July-October 2016



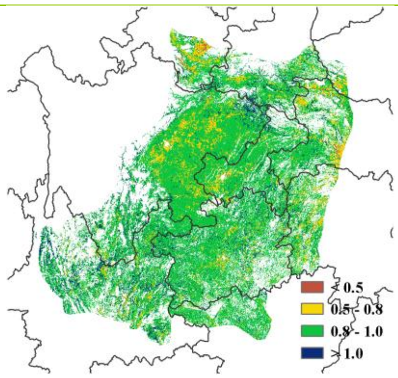
(a) Crop condition development graph based on NDVI

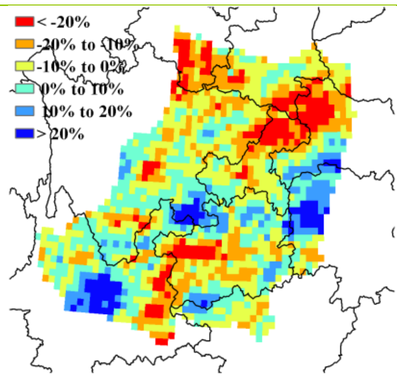




(b) Spatial NDVI patterns compared to 5YA

(c) NDVI profiles





(d) Maximum VCI

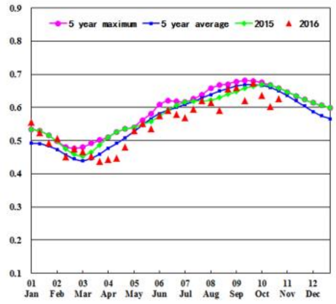
(e) Biomass

Southern China

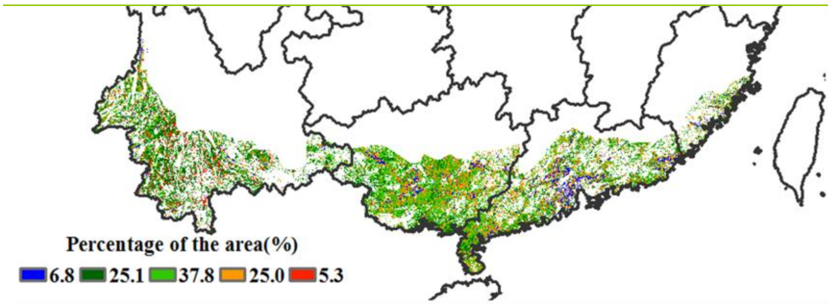
Below average crop condition prevailed in parts of southern China during the reporting period, which covers the end of the early rice harvest and the planting and harvest of late rice. Crop condition was below average from July to the beginning of August, recovered to average in August, but dropped to below average again in September and October. In the center and south of Guangdong and in central Guangxi, NDVI was below the average five-year level with a maximum VCI in the range of 0.5-0.8 or less, while in most of southern Yunnan, NDVI kept close to average and VCIx varied from 0.8 to 1.0. Both CALF and the cropping intensity were almost unchanged compared with the reference value (CALF, -1%; cropping intensity, -1%).

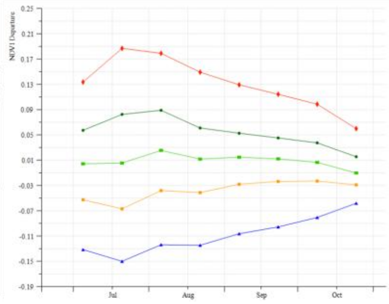
The double-cropped and late rice in central and southern Guangdong and in central Guangxi should be paid attention to because of the unfavorable NDVI profile, possibly due to the excessive rainfall (Guangdong RAIN, +18%; Guangxi, +18%) brought by a series of cyclones and storms during the monitoring period.

Figure 4.19. Crop condition Southern China region, July-October 2016



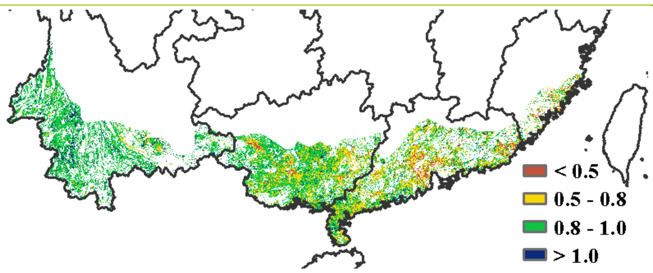
(a) Crop condition development graph based on NDVI



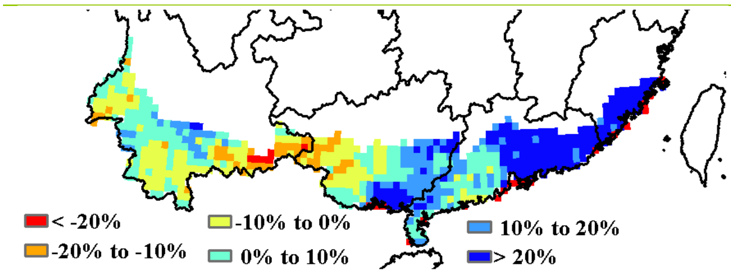


(b) Spatial NDVI patterns compared to 5YA

(c) NDVI profiles



(d) Maximum VCI



(e) Biomass