# 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 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 trade prospects for major crops (4.4) and outlook for domestic prices (4.5). Finally, 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

During the monitoring period, winter wheat was harvested and summer crops (maize and soybean) were planted in the north of China. Figures 4.1 to 4.5 illustrate China's spatial distribution of rainfall (figure 4.1) and temperature profiles (figure 4.2), and maps of cropped and uncropped arable land (figure 4.3), maximum VCI (figure 4.4.), and minimum VHI (figure 4.5). Table 4.1 presents an overview of CropWatch indicators for the monitoring period.

Rainfall (RAIN) was 36% above average, while temperature (TEMP) and radiation (RADPAR) decreased by 0.5°C and 3%, respectively, when compared with average. The prevailing agroclimatic conditions lead to above average biomass. In more than 70% of the country, mostly in central and northern China, rainfall in the past seven months was average up to June, while it fluctuated widely in the southeast of China. Temperature also fluctuated across the whole of China during the monitoring period.

In Huanghuaihai, Loess region, Inner Mongolia, Lower Yangtze, Southern China, and Southwest China, above average RAIN resulted in high BIOMSS. In Northeast China, below average rainfall lead to a potential BIOMSS decrease of 4% compared to the recent five-year average. High VCIx values mostly occur in Southwest China, central Shanxi province, and in Northeast China. Low VCIx values mainly occur in Northwest China and the Huanghuaihai region, in particular the south of Jiangsu and north of Ningxia and Gansu provinces. Crop condition in Southwest China is above average (VCIx is 0.89), as rainfall is higher than average and temperature is just slightly below.

**Table 4.1. CropWatch agroclimatic and agronomic indicators for China, April-July 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 (%) | Maximum VCI |
| Huanghuaihai | 14% | -0.5 | -5% | 20% | 0 | 0.86 |
| Inner Mongolia | 46% | -0.4 | 0% | 11% | -3 | 0.88 |
| Loess region | 41% | -0.6 | -3% | 23% | -7 | 0.80 |
| Lower Yangtze | 60% | -0.7 | -7% | 16% | 0 | 0.84 |
| Northeast China | -11% | -0.6 | -3% | -4% | 0 | 0.87 |
| Southern China | 12% | -0.3 | 2% | 12% | -1 | 0.89 |
| Southwest China | 31% | -0.3 | -2% | 14% | 0 | 0.90 |

*Note:* Departures are expressed in relative terms (percentage) for all variables, except for temperature, for which absolute departure in degrees Celsius is given. Zero means no change from the average value; relative departures are calculated as (C-R)/R*100, with C=current value and R=reference value, which is the five (5YA) or fifteen-year average (15YA) for the same period (April-July).

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

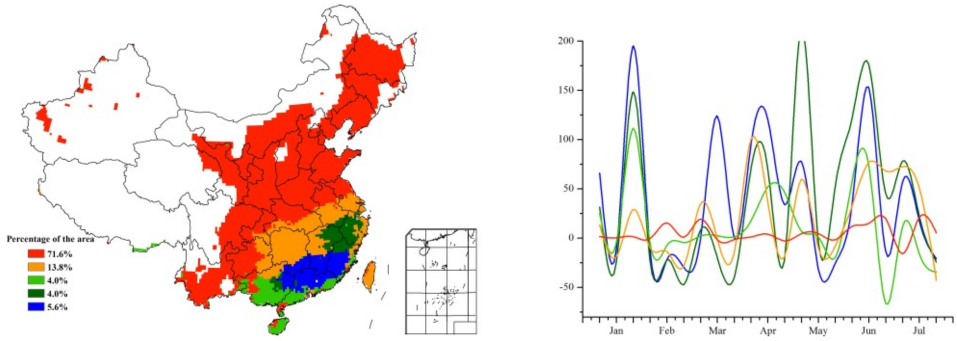



**Figure 4.2. China spatial distribution of temperature profiles, April-July 2016**

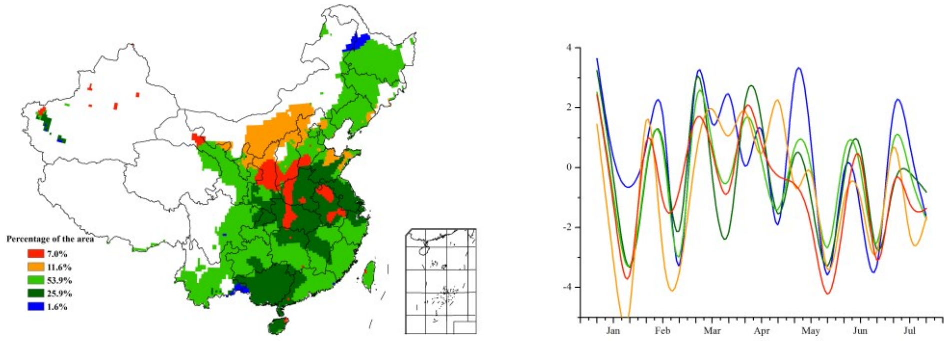



**Figure 4.3. China cropped and uncropped arable land, by pixel, April-July 2016**

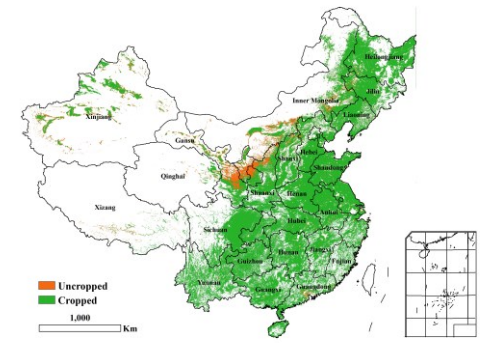



**Figure 4.4. China maximum Vegetation Condition Index (VCIx), by pixel, April-July 2016**

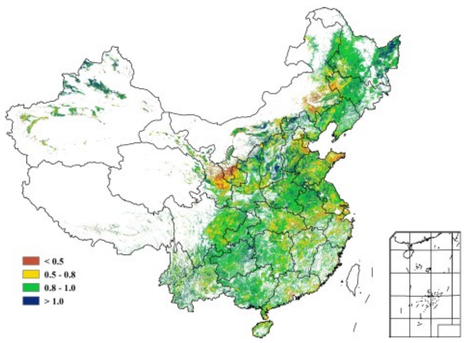
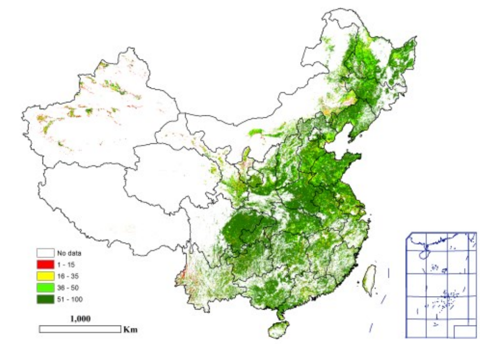



**Figure 4.5. China minimum Vegetation Health Index (VHI), by pixel, April-July 2016**



During the monitoring period, uncropped arable land was mainly distributed in the northwest of the country, such as central Gansu and Ningxia provinces. In Huanghuaihai, Lower Yangtze, Northeast China, and Southwest China, CALF was average, while in Inner Mongolia, Loess Region, and Southern China, the drop in CALF was 1%, 5% and 1%, respectively, which may be the result of the low temperature. The results for minimum VHI indicate that most areas did not experience water stress. Some major production zones, however, suffered from drought, including the southwest of Yunnan, central Ningxia, and the east of Inner Mongolia province (figure 4.5).

## 4.2 China's crop production

Unfavorable conditions negatively affected the outcome of the 2015-16 winter crops season (referred to below as "2016"), of which close to 91.3% is winter wheat. Nevertheless, thanks to average conditions from early May up to the time of harvest, in Hebei, Shanxi, and Gansu yields increased compared to previous forecasts. As a result, the total estimated 2016 production of all winter crops for China has been revised to 122 million tons, 2.7% below last year's production (table 4.2).

**Table 4.2. China 2015-16 winter crops production (in '000 tons) and variation (%) from 2014-15, by province**

| | 2014-15 production ('000 tons) | 2015-16 | | | |
|---|---|---|---|---|---|
| | | Area change (%) | Yield change (%) | Production change (%) | Production ('000 tons) |
| Hebei | 10989 | -1.2 | -1.4 | -2.6 | 10825 |
| Shanxi | 2184 | 2.2 | -2.2 | 0.0 | 2218 |
| Jiangsu | 10050 | -8.6 | 8.5 | -0.8 | 9971 |
| Anhui | 11764 | 0.8 | 1.6 | 2.4 | 12044 |
| Shandong | 23062 | -3.3 | -0.2 | -3.5 | 22252 |
| Henan | 26139 | 0.6 | -3.8 | -3.2 | 25305 |
| Hubei | 5865 | 0.6 | -0.4 | 0.2 | 5875 |
| Chongqing | 2323 | -2.4 | -0.8 | -3.2 | 2249 |
| Sichuan | 5626 | -1.0 | -0.5 | -1.5 | 5541 |
| Shaanxi | 4395 | -5.4 | -1.8 | -7.1 | 4085 |
| Gansu | 3067 | -1.0 | -3.0 | -3.9 | 3002 |
| **subtotal** | **105465** | **-** | **-** | **-2.0** | **103367** |
| Other provinces | 19921 | - | - | -6.6 | 18613 |
| **China** | **125386** | **-1.8** | **-0.9** | **-2.7** | **121980** |

The first 2016 CropWatch forecasts for maize, rice, wheat, and soybean production in China are listed in table 4.3. Detailed production estimates for different types of rice (different growing seasons) are shown in table 4.4. As illustrated in these tables, the production of maize and soybean is 1% above 2015, while overall for rice and wheat, the drop is 1% below 2015 levels.

Reasons for the changes in production include the release, by China's government, of a new policy that encourages farmers to shift from maize to other, more suitable crops in regions where maize cultivation is not well suited because of for example soil fertility or climatic conditions. The policy, however, has not resulted in much change in terms of planted area, with the most significant decreases in maize planted area occurring in Inner Mongolia and Heilongjiang provinces where areas have decreased by respectively 222 and 103 thousand hectares, or 7% and 2% compared to 2015. The expected 1% increase in soybean production stems from a recovery in the soybean planted area, contributing to the first increase in soybean production in China over the last 12 years. Other significant changes in production in China include those for maize in Hebei (+7%, both yield and area increased), Inner Mongolia (-8%, due to reduced planted area), Liaoning (+8%, a recovery from last year's severe drought), and Shandong (+6%, both yield and area increased), while also rice production in Jilin, Liaoning, and Yunnan present significant change (+12%, -10%, and 6%, respectively). The decrease in the estimated production of wheat and rice by 1% each mainly stems from unfavorable conditions. In terms of rice production for different rice types, production of early rice and late rice is 4% and 3% below that of 2015 due to the continuous trend of conversion of double rice cropping to single rice cropping. Although the planted area for single rice increased, conditions were unfavorable for the crop, resulted in a similar output as 2015.

CropWatch puts the total 2016 output of summer crops (including maize, single rice (one rice crop per year), late rice, spring wheat, soybean, minor cereals, and tubers) at 408.3 million tons, only a slight increase (+0.4%) from 2015 but still representing a 1445 thousand tons in production increase. The total annual crop production is at 564.4 million tons, a 0.6% drop from 2015. As late rice is still at an early growing stage, and maize and single rice are at grain filling stage, the production for each crop type as well as total summer crops production and annual outputs will be revised in the November 2016 bulletin using updated remote sensing data.

**Table 4.3. China 2016 production of maize, rice, wheat, and soybean, and % change from 2015, by province**

| | Maize | | Rice | | Wheat | | Soybean | |
|---|---|---|---|---|---|---|---|---|
| | **2016** | **Change (%)** | **2016** | **Change (%)** | **2016** | **Change (%)** | **2016** | **Change (%)** |
| Anhui | 3457 | -4 | 16639 | -4 | 11340 | 2 | 1067 | -4 |
| Chongqing | 2137 | -1 | 4733 | -3 | 1110 | -1 | | |
| Fujian | | | 2847 | -1 | | | | |
| Gansu | 4795 | 0 | | | 2562 | -3 | | |
| Guangdong | | | 10819 | -2 | | | | |
| Guangxi | | | 10911 | -3 | | | | |
| Guizhou | 5105 | 3 | 5404 | 4 | | | | |
| Hebei | 18485 | 7 | | | 10832 | 0 | 189 | 5 |
| Heilongjiang | 26800 | -3 | 20290 | 0 | | | 4519 | -1 |
| Henan | 17102 | 2 | 3937 | 0 | 25160 | -3 | 789 | 2 |
| Hubei | | | 15397 | -4 | 4330 | 0 | | |
| Hunan | | | 24868 | -2 | | | | |
| Inner Mongolia | 15969 | -8 | | | | | 1041 | 26 |
| Jiangsu | 2162 | -4 | 16691 | -2 | 9729 | 1 | 766 | -3 |
| Jiangxi | | | 16979 | -3 | | | | |
| Jilin | 24931 | 4 | 5685 | 12 | | | 712 | 6 |
| Liaoning | 16339 | 8 | 4359 | -10 | | | 399 | -23 |
| Ningxia | 1681 | -3 | 538 | -1 | | | | |
| Shaanxi | 3810 | 5 | 1071 | 2 | 4011 | 1 | | |
| Shandong | 19999 | 6 | | | 21893 | -4 | 715 | 6 |
| Shanxi | 8692 | -1 | | | 2132 | 1 | 169 | -3 |
| Sichuan | 7196 | 0 | 14954 | 0 | 4646 | -1 | | |
| Xinjiang | 6977 | 5 | | | | | | |
| Yunnan | 5986 | 3 | 5642 | 6 | | | | |
| Zhejiang | | | 6252 | -3 | | | | |
| **Sub total** | **191623** | **2** | **188014** | **-1** | **101041** | **-1** | **10365** | **1** |
| Other provinces | 10393 | -15 | 12333 | 7 | 17550 | 1 | 2775 | 2 |
| **China** | **202016** | **1** | **200347** | **-1** | **118591** | **-1** | **13141** | **1** |

**Table 4.4. China 2016 early rice, single rice, and late rice production and percentage difference from 2015, by province**

| | Early rice | | Single rice | | Late rice | |
|---|---|---|---|---|---|---|
| | **2015** | **Change (%)** | **2015** | **Change (%)** | **2015** | **Change (%)** |
| Anhui | 1782 | -3 | 13195 | -4 | 1662 | -7 |
| Chongqing | | | 4733 | -3 | | |
| Fujian | 1712 | -1 | | | 1135 | -1 |
| Gansu | | | | | | |
| Guangdong | 5224 | -2 | | | 5595 | -2 |
| Guangxi | 5418 | -3 | | | 5493 | -3 |
| Guizhou | | | 5404 | 4 | | |
| Hebei | | | | | | |
| Heilongjiang | | | 20290 | 0 | | |
| Henan | | | 3937 | 0 | | |
| Hubei | 2273 | -2 | 10453 | -4 | 2671 | -5 |
| Hunan | 8243 | 0 | 8444 | -1 | 8181 | -5 |
| Jiangsu | | | 16691 | -2 | | |
| Jiangxi | 7284 | -1 | 2871 | 0 | 6824 | -5 |
| Jilin | | | 5685 | 12 | | |
| Liaoning | | | 4359 | -10 | | |
| Ningxia | | | 538 | -1 | | |
| Shaanxi | | | 1071 | 2 | | |
| Sichuan | | | 14954 | 0 | | |
| Yunnan | | | 5642 | 6 | | |
| Zhejiang | 791 | -4 | 4625 | -3 | 836 | -6 |
| **Sub total** | **32728** | **-1** | **122891** | **-1** | **32395** | **-4** |
| **China** | **34087** | **-3** | **132021** | **0** | **34239** | **-4** |

## 4.3 Pests and diseases monitoring

Over the reporting period, several pests and diseases affected crops in China. This section presents an overview of pests and diseases affecting wheat, rice, and maize.[1]

*Wheat*

During late May and early June 2016, the main wheat regions of China were severely affected by wheat diseases and pests. South of the Yellow River (including southern Huanghuaihai, Lower Yangtze, and most of Southwest China), the crop had generally reached maturity, while it was still at the grain filling stage in areas north of the Yellow River (including northern Huanghuaihai and the Loess region). The development of the crop canopy after winter was conductive to the occurrence of powdery mildew and aphids. Due to abundant precipitation in May, especially in Northwest China where rainfall exceeded the average by 20% to 50%, the humidity created ideal conditions for diseases and pests dispersal.

The distribution of winter wheat aphid in late May 2016 is shown in figure 4.6 and table 4.5. In China, the total wheat area exposed to aphids reached 6.7 million hectares, severely affecting most of Hebei, northern Henan, and northern Shandong, and, to a lesser extent, southern Gansu and central Shaanxi. Powdery mildew (figure 4.7 and table 4.6) damaged around 4.7 million hectares in the main winter wheat

[1] This section has been contributed by Wenjiang Huang, Yingying Dong, Yue Shi, Linyi Liu, Fang Xu, and Wenjing Liu.

region of China, severely affecting wheat in southern Gansu, central Shaanxi, and southern Shanxi, and moderately in most of Hebei and northern Shandong areas. For winter wheat sheath blight (figure 4.8 and table 4.7) the infection area is about 2.7 million hectares, with the disease moderately occurring in northern Henan and most of Hebei, and slightly in other regions.

**Figure 4.6. Distribution of winter wheat aphid in China (late May 2016)**

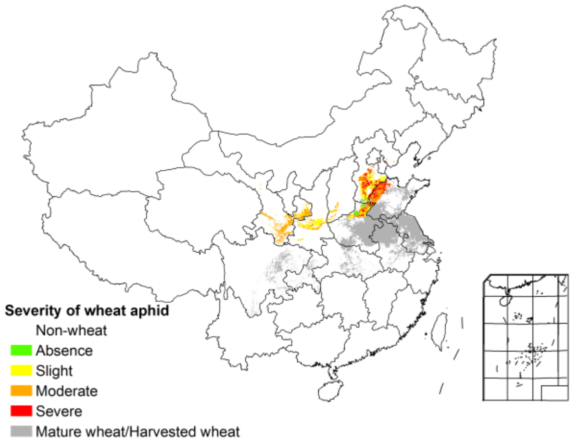



**Figure 4.7. Distribution of winter wheat powdery mildew in China (late May 2016)**

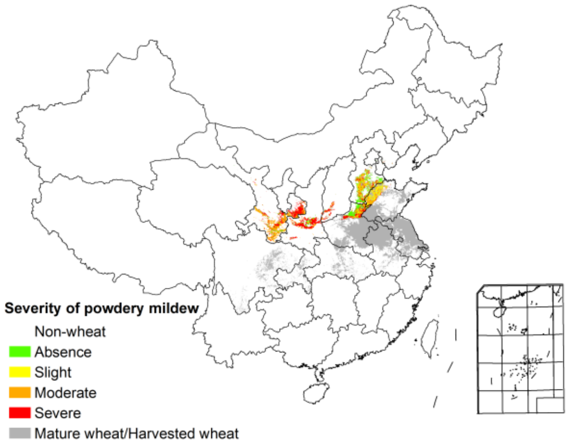



**Figure 4.8. Distribution of winter wheat sheath blight in China (late May 2016)**

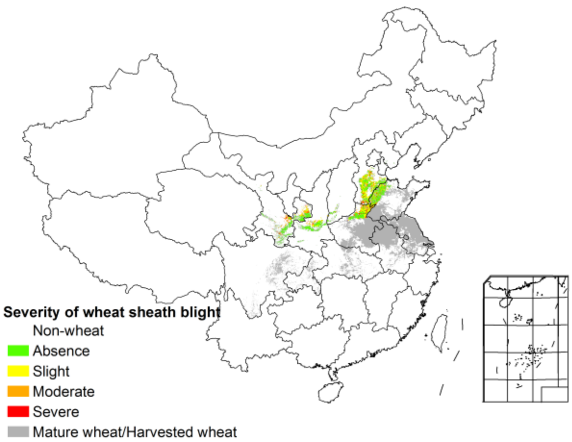



**Table 4.5. Occurrence of winter wheat aphid in China, late May 2016**

| Region | Occurrence ratio (%) | | | | Total area (thousand hectares) |
|---|---|---|---|---|---|
| | Absence | Slight | Moderate | Severe | |
| Huanghuaihai | 30% | 21% | 29% | 20% | 6661 |
| Loess region | 27% | 29% | 31% | 13% | 2709 |
| Southwest China | 30% | 21% | 29% | 20% | 416 |

**Table 4.6. Occurrence of winter wheat powdery mildew in China, late May 2016**

| Region | Occurrence ratio (%) | | | | Total area (thousand hectares) |
|---|---|---|---|---|---|
| | Absence | Slight | Moderate | Severe | |
| Huanghuaihai | 59% | 16% | 15% | 10% | 6661 |
| Loess region | 31% | 16% | 27% | 26% | 2709 |
| Southwest China | 39% | 7% | 40% | 14% | 416 |

**Table 4.7. Occurrence of winter wheat sheath blight in China, late May 2016**

| Region | Occurrence ratio (%) | | | | Total area (thousand hectares) |
|---|---|---|---|---|---|
| | Absence | Slight | Moderate | Severe | |
| Huanghuaihai | 73% | 10% | 12% | 5% | 6661 |
| Loess region | 77% | 12% | 7% | 4% | 2709 |
| Southwest China | 79% | 6% | 9% | 6% | 416 |

*Rice*

The impact of pests on rice was relatively severe during late July and early August 2016 in the main rice regions of China. In Huanghuaihai and Northeast China, single cropped rice[2] was in its jointing and booting stage; for the lower Yangtze River area, late rice was in its full-tillering stage, while for Southwest China, most of the rice was in booting and heading stage. Rainfall in July exceeded the long-term average, especially in the east of Southwest China, Huanghuaihai, and lower Yangtze River; high temperature and high humidity were conducive to planthopper and rice leaf roller reproduction.

The distribution of rice planthopper in late July 2016 is shown in figure 4.9 and table 4.8. The total area plagued by rice planthopper reached 8.6 million hectares, with the pest severely damaging most of Jiangsu, central Anhui, northern Jiangxi, and western Heilongjiang; central Hubei, most of Hunan, central Yunnan, and northern Guangdong areas were only moderately affected.

Rice leaf roller (figure 4.10 and table 4.9) damaged around 4.7 million hectares in the country, most severely in extensive areas of Jiangsu, central Anhui, and northern Jiangxi, and only moderately in most of Hunan, eastern Sichuan, and northern Guangdong.

**Figure 4.9. Distribution of rice planthopper in China (late July 2016)**

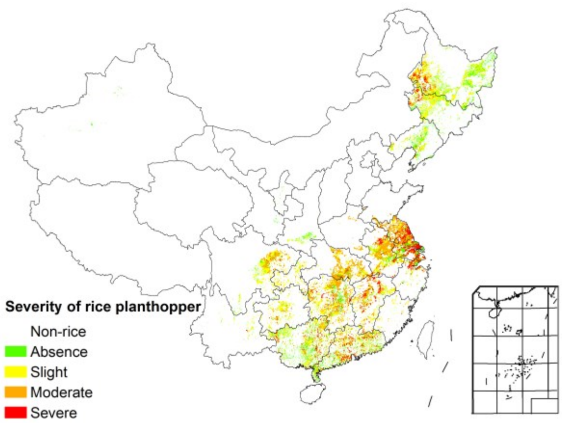
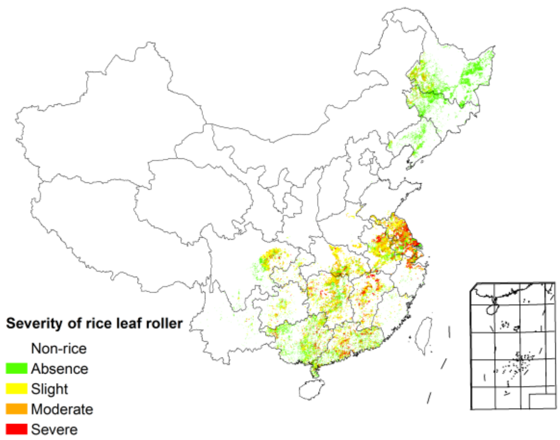



**Figure 4.10. Distribution of rice leaf roller in China (late July 2016)**




[2] Single cropped rice refers to areas where only one rice crop is grown per year.

**Table 4.8. Occurrence of rice planthopper in China, late July 2016**

| Region | Occurrence ratio (%) | | | | Total area (thousand hectares) |
|---|---|---|---|---|---|
| | Absence | Slight | Moderate | Severe | |
| Huanghuaihai | 47% | 7% | 44% | 2% | 1618 |
| Inner Mongolia | 65% | 16% | 14% | 5% | 291 |
| Loess region | 56% | 19% | 24% | 1% | 143 |
| Lower Yangtze | 55% | 12% | 24% | 9% | 9480 |
| Northeast China | 69% | 21% | 7% | 3% | 4261 |
| Southern China | 67% | 16% | 12% | 5% | 2257 |
| Southwest China | 65% | 22% | 11% | 2% | 4821 |

**Table 4.9. Occurrence of rice leaf roller in China, late July 2016**

| Region | Occurrence ratio (%) | | | | Total area (thousand hectares) |
|---|---|---|---|---|---|
| | Absence | Slight | Moderate | Severe | |
| Huanghuaihai | 72% | 16% | 10% | 2% | 1618 |
| Inner Mongolia | 81% | 9% | 6% | 4% | 291 |
| Loess region | 75% | 14% | 10% | 1% | 143 |
| Lower Yangtze | 72% | 12% | 11% | 5% | 9480 |
| Northeast China | 89% | 6% | 3% | 2% | 4261 |
| Southern China | 82% | 9% | 6% | 3% | 2257 |
| Southwest China | 85% | 10% | 4% | 1% | 4821 |

*Maize*

Maize was doing well during late July and early August 2016 in its main production areas; the crop suffered only slightly from pest and disease attacks. In mid and late July, heavy rainfalls and high humidity in Northeast China, Huanghuaihai, and lower Yangtze were conducive to armyworm reproduction and northern leaf blight dispersal.

**Figure 4.11. Distribution of maize armyworm in China (late July 2016)**

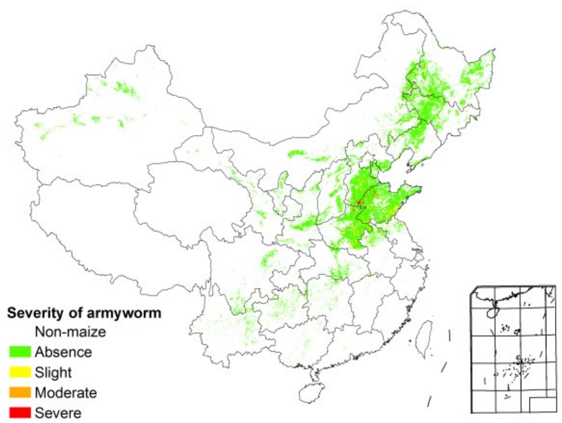
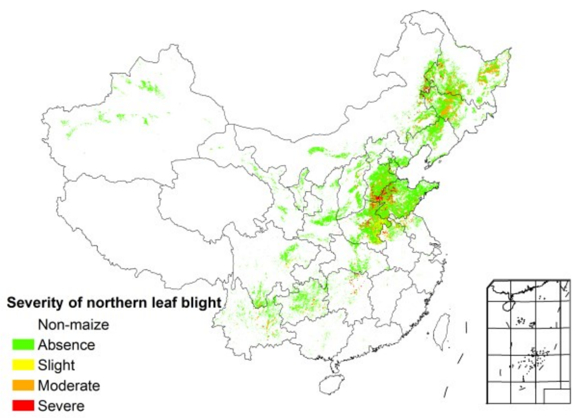



**Figure 4.12. Distribution of northern leaf blight in China (late July 2016)**




The distribution of maize armyworm in late July 2016 is shown in figure 4.11 and table 4.10. Nationwide, the total area affected by armyworms reached 3.3 million hectares, moderately affecting areas in some parts of Northeast China, Huanghuaihai, and the lower Yangtze region, and slightly in the other regions. Finally, northern leaf blight (figure 4.12 and table 4.11) damaged around 6 million hectares, severely so in eastern Inner Mongolia, southern Hebei, and northern Shandong, and moderately in most of Heilongjiang and Jilin.

**Table 4.10. Occurrence of maize armyworm in China, late July 2016**

| Region | Occurrence ratio (%) | | | | Total area (thousand hectares) |
|---|---|---|---|---|---|
| | Absence | Slight | Moderate | Severe | |
| Huanghuaihai | 85% | 9% | 3% | 3% | 16098 |
| Inner Mongolia | 96% | 1% | 1% | 2% | 2426 |
| Loess region | 98% | 1% | 1% | 0% | 2289 |
| Lower Yangtze | 96% | 2% | 1% | 1% | 2009 |
| Northeast China | 96% | 1% | 2% | 1% | 9916 |
| Southern China | 100% | 0% | 0% | 0% | 103 |
| Southwest China | 99% | 1% | 0% | 0% | 2136 |

**Table 4.11. Occurrence of northern leaf blight on maize in China, late July 2016**

| Region | Occurrence ratio (%) | | | | Total area (thousand hectares) |
|---|---|---|---|---|---|
| | Absence | Slight | Moderate | Severe | |
| Huanghuaihai | 77% | 14% | 5% | 4% | 16098 |
| Inner Mongolia | 92% | 3% | 3% | 2% | 2426 |
| Loess region | 97% | 2% | 1% | 0% | 2289 |
| Lower Yangtze | 92% | 5% | 2% | 1% | 2009 |
| Northeast China | 82% | 8% | 9% | 1% | 9916 |
| Southern China | 98% | 1% | 1% | 0% | 103 |
| Southwest China | 88% | 6% | 4% | 2% | 2136 |

## 4.4 Trade prospects for major crops

**Grain import and export in China in the first half of 2016**

*Maize*

During the first half of 2016, China has imported 2.9 million tons of maize, an increase of 9.6% over the same period in 2015. Ukraine (91.1%), the United States (6.6%) and Russia (2.2%) were the main sources for the maize imports, the value of which reached US$560 million--11.9% below the value for the first semester in 2015. Maize exports over this year's first half (1,320.75 tons) decreased by 80.8% and went primarily to the Democratic People's Republic of Korea (75.7%), Russia (22.8%), and the Republic of Korea (ROK, 1.5%). The export earned US$ 471,300, down 75.0%.

*Rice*

In the first half of 2016, the total import of rice in China was 2.006 million tons, an increase of 40.4% compared to the previous year. The imported rice mainly stems from Vietnam, Thailand, and Pakistan, respectively accounting for 42.7%, 27.0%, and 25.1% of imports. The expenditure for rice import was US$909 million, reflecting a year-on-year growth of 36.9%. Total rice export over the period was 127,100 tons, up by 8.9%, mainly exported to the ROK, Japan, and Hong Kong (48.1%, 19.5%, and 6.9%, respectively). The value of the export was US$129 million, an increase of 14.5% over 2015.

*Wheat*

During the first semester of 2016, Chinese wheat imports reached 1.79 million tons, an increase of 26.6% over 2015. The main sources include Australia (45.3%), Canada (27.5%), the United States (14.2%), and neighboring Kazakhstan (12.5%). Notwithstanding the increase in volume, the total expenditure of US$431 million was a decrease of 4.7% compared with 2015. Wheat exports over the same period rose

9.4% to reach 55,800 tons. Hong Kong (2.4%), Ethiopia (18.9%), and Macao (5%) were the main destinations of Chinese wheat exports.

*Soybean*

The total import of soybean was up by 9.7% to 38,562,300 tons in China during the first half of 2016. Brazil, the United States, and Argentina respectively contributed 54.1%, 40.9%, and 2.3%, for a total value of US$14.836 billion, down 6.5% compared to the first six months of 2015. Soybean exports of 70,800 tons (-16.7%) earned US$62.205 million (-24.9%).

**Import prospects for major grains in China in 2016**

Based on the latest monitoring results, China grain imports are projected to increase. The projections below (see also figure 4.13) are based on remote sensing data and the Major Agricultural Shocks and Policy Simulation Model, which derived from the standard GTAP (Global Trade Analysis Project).

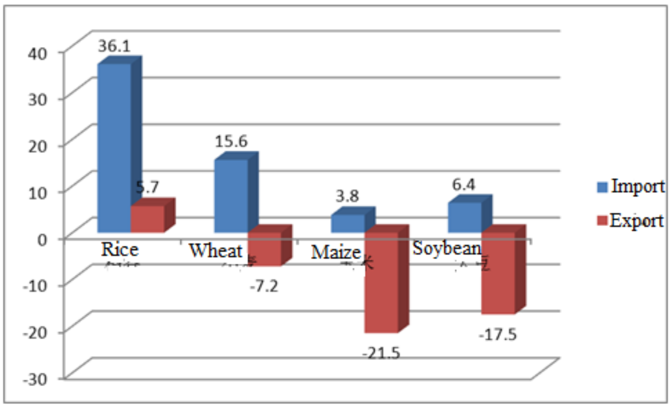
*Maize*

According to the projections, national maize imports will go up 3.8%, while exports will decrease by 21.5% in 2016. In July, a drop in international maize price enlarged the gap between domestic and international prices, which will result in an increase of imports. However, because little difference exists between domestic supply and demand, the volume of imports is unlikely to exceed the quota of 7.2 million tons. Significant volumes of maize alternatives will also be imported.

*Rice*

China's 2016 rice imports are expected to increase by 36.1% compared to 2015, while exports will go up 5.7%. As the recent Cost, Insurance and Freight (CIF) price for rice was consistently lower than domestic prices, a substantial increase of imports occurred in the first half of 2016. With the gradual decrease of the difference between international and domestic prices, imports will decrease as well in the second half of this year. 2016 rice imports are expected to increase later in the year, but will be within the limits imposed by prevailing quotas.

**Figure 4.13. Rate of change of imports and exports for rice, wheat, maize, and soybean in China in 2016 compared to those for 2015 (%)**




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

*Wheat*

China's wheat imports will increase by 15.6 percent, but exports are projected to drop 7.2% compared with those of 2015. The rate of increase for wheat imports, however, is expected to slow down in the second half of the year because: (i) the rate of decline for the international wheat price was larger than for domestic prices since the second half of this year, and (ii) the price gap of quality wheat between domestic and abroad also narrowed in July.

*Soybeans*

Soybean imports will increase by 6.4% while exports will be reduced by 17.5% in 2016, according to the projections. Because the gap between domestic and international prices narrowed since July and because the share of sorghum among Chinese crops changed in China recently, the imported amount of soybean will be only slightly greater than that for the previous year.

## 4.5 Outlook for the domestic price of four major crops

The following analysis of domestic prices for maize, hybrid wheat, rice, and soybean in China is based on the following three sources: (i) nationwide monthly grain price data between January 2004 and June 2016 provided by the price information center of China's National Development and Reform Commission (NDRC); (ii) China's grain production, inventory, and consumption predicted by USDA's monthly world agricultural supply and demand estimates (WASDE) reports;[3] and (iii) price trend forecasts and early warning obtained by Fang Jingxin's price-spiral model.

The statements below describe China's domestic prices—paid to the farmer—as of June 2016; all listed prices refer to 50 kg. Current prices and outlook for the four crops are as follows:

- *Maize price.* The average price of maize in June was unsatisfactory at 87.17 Yuan. The consumption rate (use/production) has broken away from the "non-boom" interval to an equilibrium range.
- *Hybrid wheat price.* The price of hybrid wheat at 113.41 Yuan represented a decrease as a result of reduced consumption. At its lowest, the price of hybrid wheat is expected to drop to 104.66 Yuan.
- *Rice price.* The average purchase price of rice was 136.09 Yuan. A large price increase is expected, with prices likely reaching 143.73 Yuan; price monitoring continues.
- *Soybean.* On average, soybean was bought at 190.38 Yuan, with price and consumption rates in equilibrium; the crop is estimated to be in a boom state. Since the consumption rate has been approaching the equilibrium interval, the price is close to the drop trend line, which means the price can go up or down.

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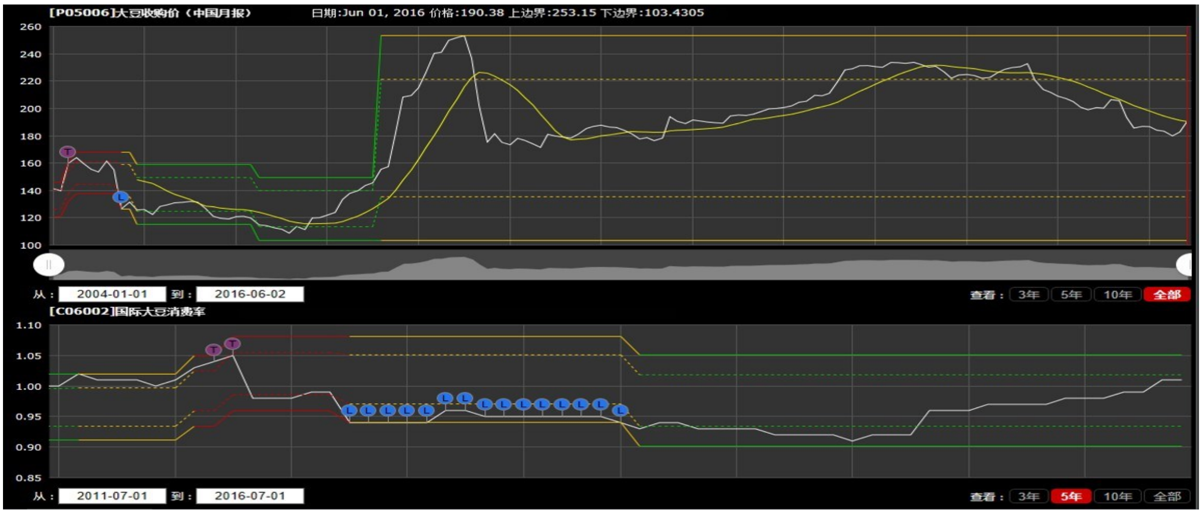
[3] http://www.usda.gov/oce/commodity/wasde/

**Figure 4.14. Fluctuations in soybean price, July 2011 to June 2016**




*Note:* The graph illustrates the price of soybean for the last 12.5 years since January 1 2004 (upper graph) and for the last five years from July 1 2011 to July 1 2016 (lower graph).

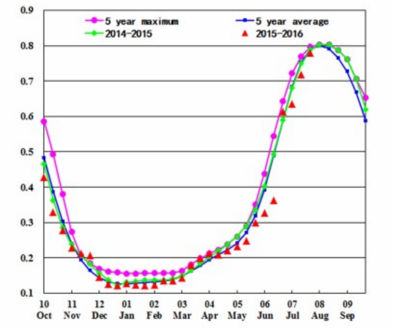
## 4.6 Regional analysis

Figures 4.15 through 4.21 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 July 2016 to the previous season, to the five-year average (5YA), and to the five-year maximum; (b) Spatial NDVI patterns from April to July 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 April to July 2016. Additional information about agroclimatic indicators and BIOMSS for China is provided in Annex A, table A.11.

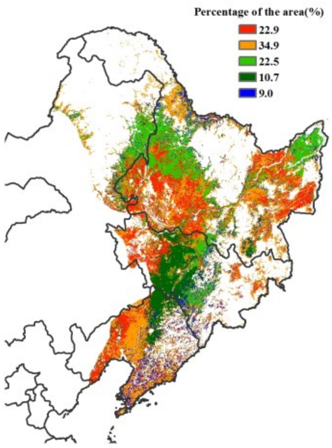
# Northeast region

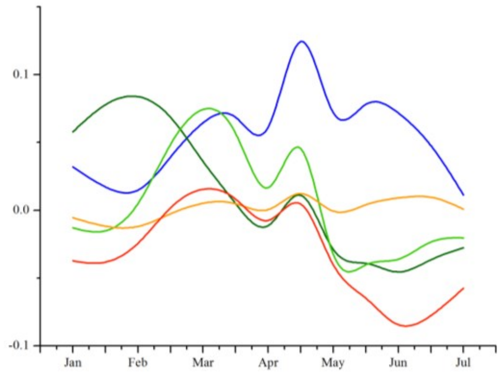
In China's Northeast, the monitoring period from April to July mainly covers the cultivation of spring maize, spring wheat, one-season rice, and soybean. Overall and over most of the monitoring period, crop condition was below the recent five-year average. Besides, the NDVI clusters and profiles show that in the west of Liaoning, Jilin, and the west of Heilongjiang, the crop condition was constantly lower than the average. It should be noted that, in these areas, the biomass (BIOMSS) is 20% lower than average with low VCIx, showing poor crop conditions because of the shortage of rain. The CropWatch agroclimatic and agronomic indicators show that overall the region suffered an 11% drop in rainfall (RAIN) compared to average, while temperature (TEMP) and PAR (RADPAR) accumulation were just below average. Biomass accumulation (BIOMSS) was 4% below the five-year average. Crop condition is mixed and the area needs close monitoring this year.

**Figure 4.15. Crop condition China Northeast region, April-July 2016**

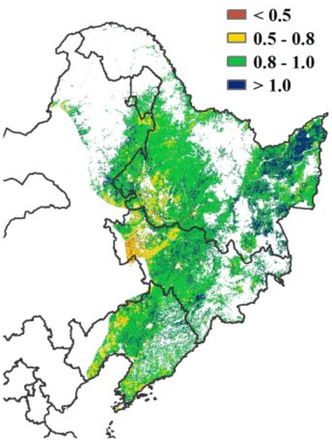


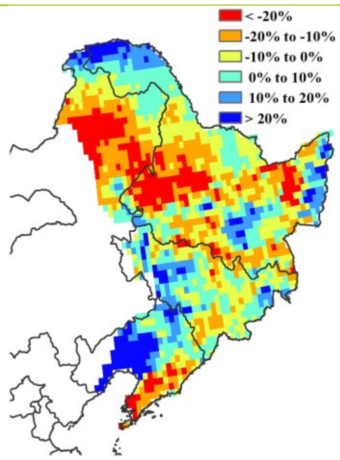

(a) Crop condition development graph based on NDVI




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



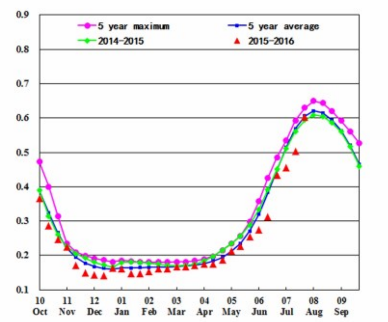

(d) Maximum VCI (e) Biomass

# Inner Mongolia

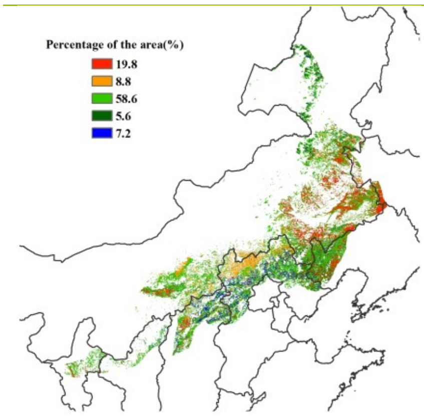
The condition of spring crops was generally unfavorable in Inner Mongolia for the current reporting period. Among the CropWatch agroclimatic indicators, RAIN was well above average (+46%), but its temporal and spatial distribution was not homogeneous; temperature was below average (TEMP, -0.4°C) with no change in radiation, which resulted in an increase of the biomass accumulation potential (BIOMSS) of about 11%.

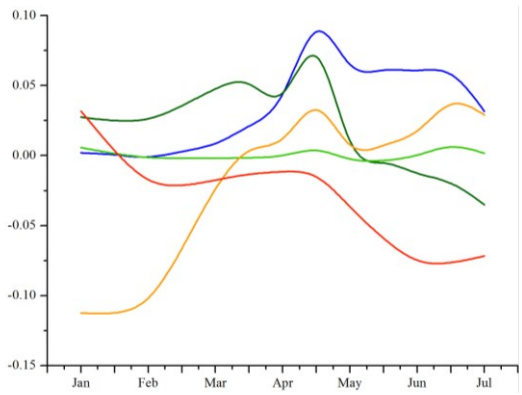
As a result, conditions were almost average for the sowing and growing of spring crops, as illustrated in the crop development graph from April to early May. Since late May, however, reduced rainfall affecting crop growth is clearly shown by decreasing NDVI profiles, and detailed information is displayed in spatial NDVI patterns and profiles. Until late July, crop condition was close to average. Southeast of Inner Mongolia (mainly in Chifeng) and central Ningxia suffered unfavorable vegetation condition according to spatial NDVI patterns and the VCIx map (the maximum value was below 0.5). The potential biomass was poor as well in the area mentioned above. Generally, crop condition was unfavorable from April to July. If unfavorable conditions are maintained over the whole cycle, crop growth will be restricted and the outcome may be a poor season.

**Figure 4.16. Crop condition China Inner Mongolia, April-July 2016**



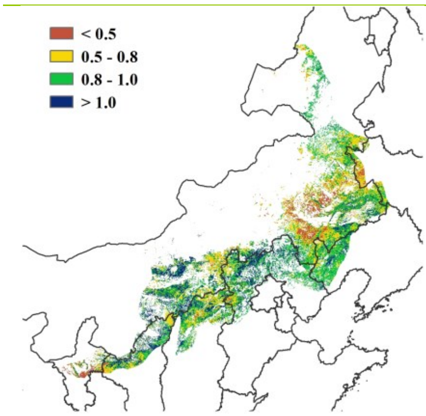

(a) Crop condition development graph based on NDVI

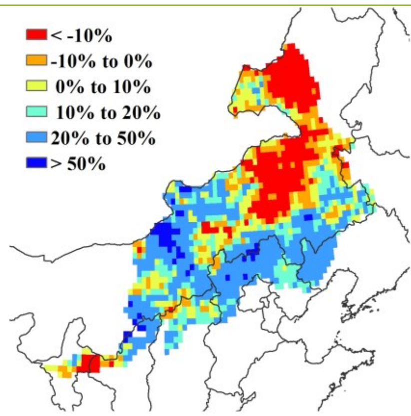



(b) Spatial NDVI patterns compared to 5YA

(c) NDVI profiles



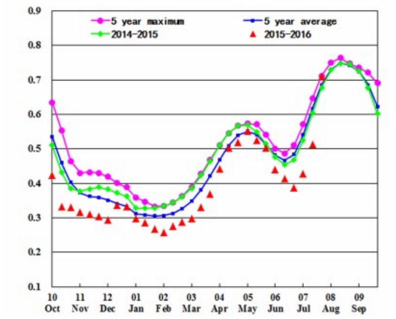

(d) Maximum VCI

(e) Biomass

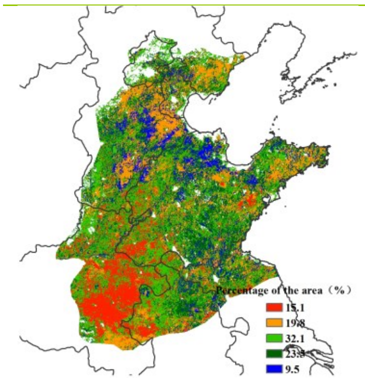
# Huanghuaihai

Crop condition in Huanghuaihai was below the recent five-year average. Currently, crops in the region are mainly winter wheat, which was harvested in June, while maize was planted in April and is still growing. As shown by the NDVI development graph, crop condition was generally average during April and May, but sharply declined in early June and up to July (when compared with both the five-year average and the previous year), which may be related to the low radiation (RADPAR, -5%). In spite of this, favorable climatic conditions with 14% above average precipitation provided adequate soil moisture for crops and led to an increase in the biomass potential (BIOMSS, +20%). BIOMSS was favorable across the region with the exception of eastern Shandong. Over the last four months, crop conditions were below average in Henan, western Shandong, and other scattered regions around Bohai bay where VCIx values consistently below 0.5 were observed. Prospects for winter crops are mixed.

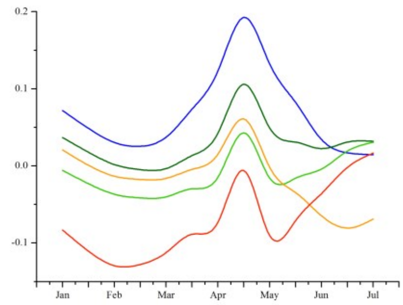
**Figure 4.17. Crop condition China Huanghuaihai, April-July 2016**



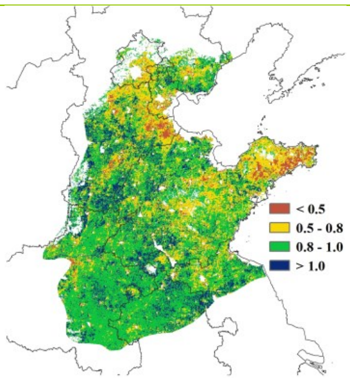

(a) Crop condition development graph based on NDVI



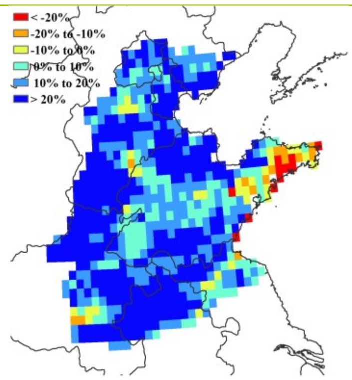

(b) Spatial NDVI patterns compared to 5YA




(c) NDVI profiles




(d) Maximum VCI

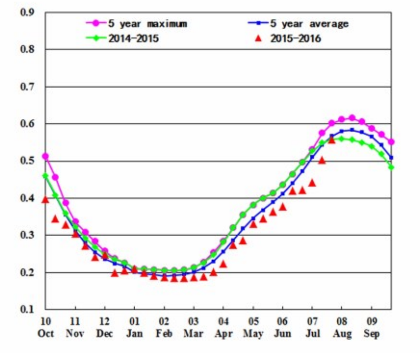



(e) Biomass

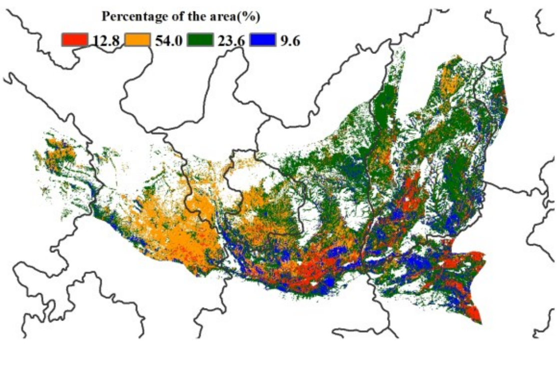
# Loess region

In the Loess region, winter wheat was harvested from early to mid-June, while summer maize has been planted during the monitoring period. When compared to average, RAIN increased 41%, PAR accumulation (RADPAR) dropped by 3%, and temperature (TEMP) by 0.6°C. The BIOMSS production potential was 23% above the average as a result of ample rainfall. Up to June, condition of crops was below the five-year average and last year's level, with a VCIx value of 0.80. The spatial NDVI clusters and profiles indicate that crop condition fluctuated widely over time and according to areas. Condition was unfavorable in Fen-Wei Plain, central-eastern Gansu, and southern Ningxia, coinciding with a low VCIx in those regions. The fraction of arable land actually cropped decreased 5 percentage points, which leads to a pessimistic crop production outlook for the region.

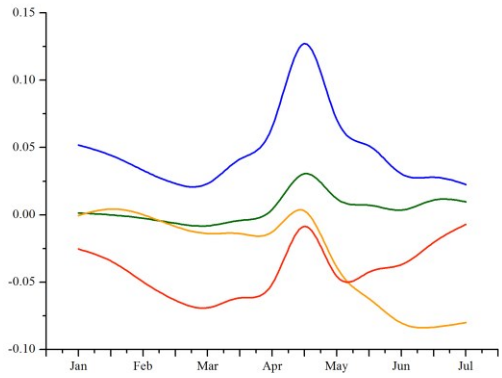
**Figure 4.18. Crop condition China Loess region, April-July 2016**



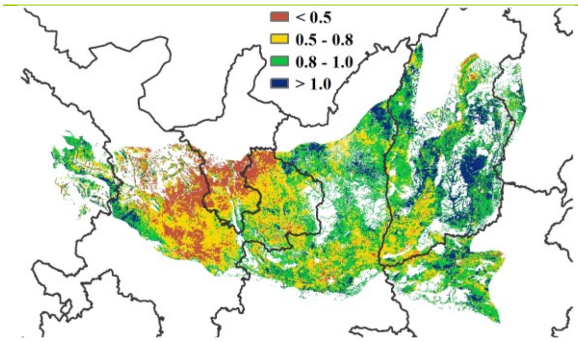

(a) Crop condition development graph based on NDVI



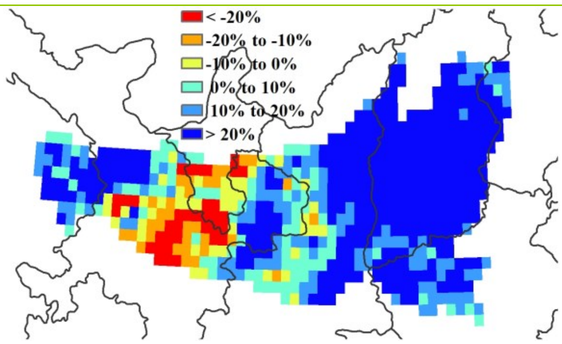

(b) Spatial NDVI patterns compared to 5YA




(c) NDVI profiles




(d) Maximum VCI

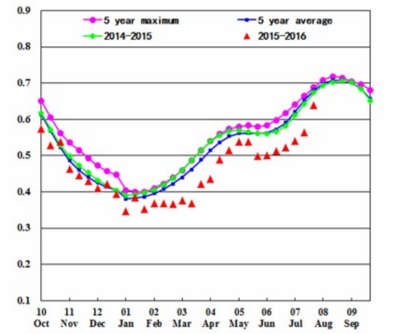



(e) Biomass

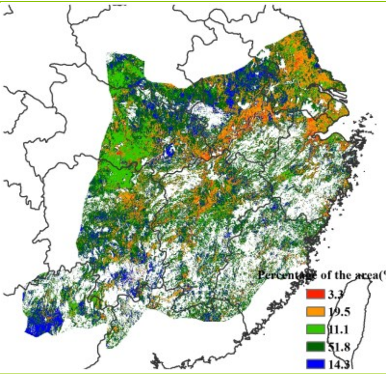
# Lower Yangtze region

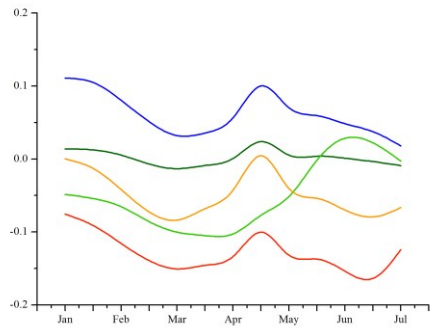
Crop condition was below the average of the past five years in the Lower Yangtze region. During the monitoring period, the winter wheat harvest was completed in the north of the region including Henan, Jiangsu, and Anhui provinces. Early rice was also harvested, while the semi-late and late rice is still growing in the south and center (including Fujian, Jiangxi, Hunan, and Hubei provinces). Accumulated rainfall was significantly above average (RAIN, +60%), but radiation and temperature were below (RADPAR, -7% and TEMP, -0.7°C respectively). Although most of the region suffered from floods, the biomass production potential was above the recent five-year average (BIOMSS, +16%). According to the VCIx map, crop condition was usually fair, while the BIOMSS map shows that biomass was above or close to the average in most of the region. Finally, NDVI profiles show that crop condition was mostly poor in 33.9% of the region's cropped areas, in south of Jiangsu, middle of Hubei, north of Zhejiang, and regions along the Yangtze river. Based on the above analysis, the yield of crops in this region is expected to be below but close to the average.

**Figure 4.19. Crop condition Lower Yangtze region, April-July 2016**



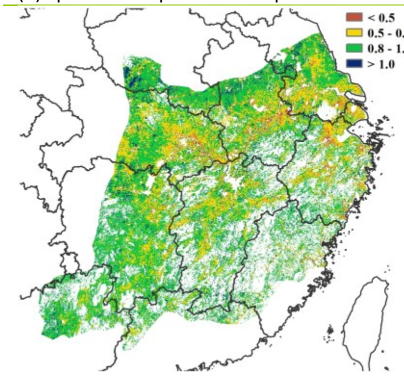

(a) Crop condition development graph based on NDVI

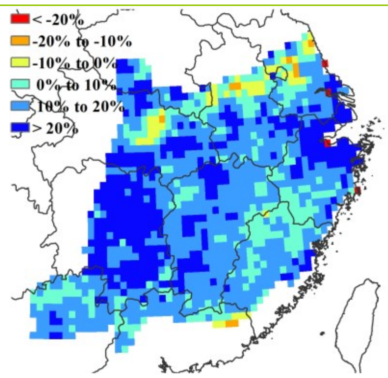



(b) Spatial NDVI patterns compared to 5YA

(c) NDVI profiles




(d) Maximum VCI

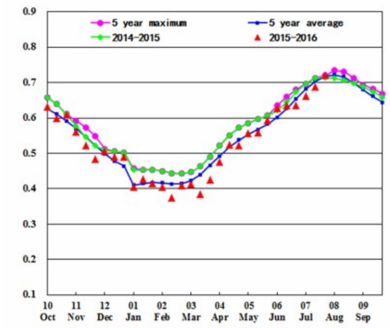
(e) Biomass

# Southwest China

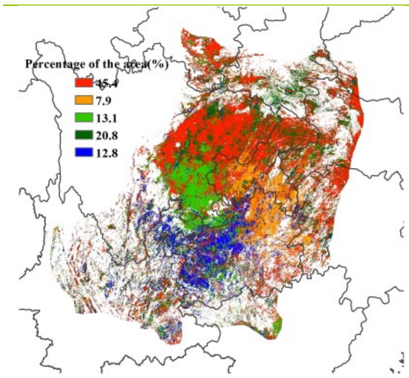
Precipitation exceeded the average by 31% with average temperature (TEMP, -0.3°C) and decreased radiation (RADPAR, -2%). This led to a small increase in the potential biomass accumulation (BIOMSS, 14%) compared to the recent five-year average. Few differences existed among the provinces for rainfall: Guizhou RAIN, +38%, Chongqing +46%, Sichuan +28%, Hubei +54%, and Hunan +53%.

The spatial NDVI pattern and profiles both show average to slightly above average condition for southwestern regions. The potential biomass map indicates that eastern Sichuan was below average condition. All indicators point at average to slightly above average crops.

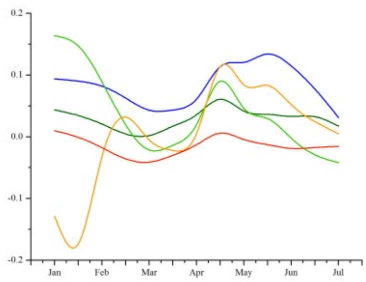
**Figure 4.20. Crop condition Southwest China region, April-July 2016**



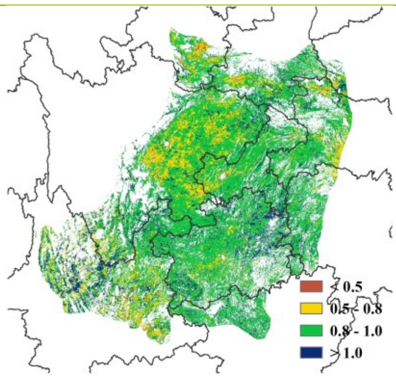

(a) Crop condition development graph based on NDVI



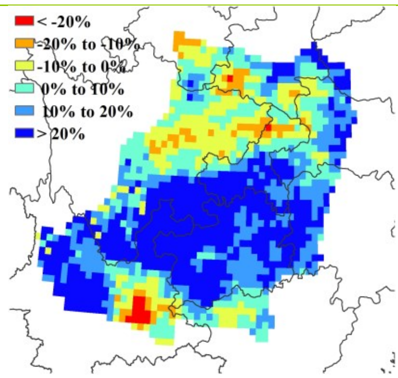

(b) Spatial NDVI patterns compared to 5YA




(c) NDVI profiles




(d) Maximum VCI




(e) Biomass

# Southern China

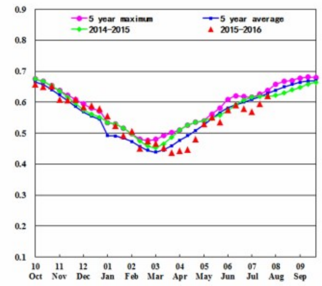
Crop condition was generally average in southern China during the entire period. Precipitation (RAIN) was 12% above average, with the following values at the provincial level: Fujian RAIN, +55%, Guangxi +36%, and Guangdong +19%. Temperature (TEMP) dropped by 0.3°C, while radiation (RADPAR) increased by 2%. As a result, potential accumulated biomass BIOMSS increased by 12% on the whole, compared to the five-year average.

The crop condition development graph based on NDVI shows crop condition in the region was below average in April but recovered in May. Although condition dropped again to below average in June, it generally returned to average in July. Nearly all arable land was actually cropped over the region, with the cropped arable land fraction (CALF) decreasing by only 1 percentage point compared to its average.

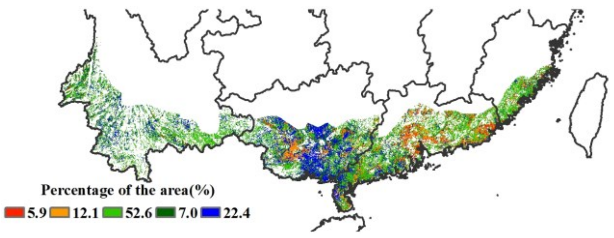
The spatial NDVI pattern and profiles indicate overall average condition, except for the central and eastern parts of southern Guangdong and some limited areas in Guangxi, where the crop condition was below average with a somewhat lower VCIx of 0.5-0.8. The affected area makes up about 12.9% of arable land in the region.

Overall, with the maximum VCI reaching 0.89, crop prospects for the region are at average level.

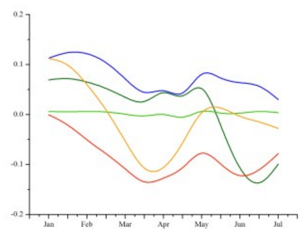
**Figure 4.21. Crop condition Southern China region, April-July 2016**



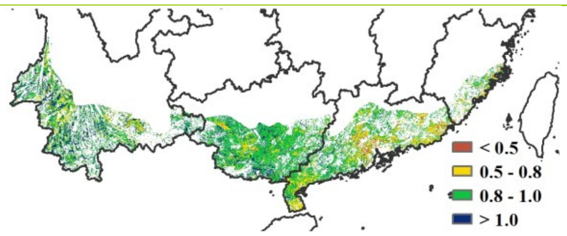

(a) Crop condition development graph based on NDVI



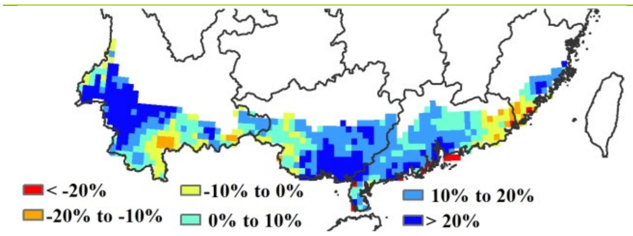

(b) Spatial NDVI patterns compared to 5YA



(c) NDVI profiles




(d) Maximum VCI




(e) Biomass