Chapter 4. China

After a brief overview of the agroclimatic and agronomic conditions in China over the reporting period (section 4.1), Chapter 4 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 (4.2). Section 4.3 presents the results of ongoing pests and diseases monitoring, while sections 4.4 describes trade prospects (import/export) of major crops. Additional information on the agroclimatic indicators for agriculturally important Chinese provinces are listed in table A.11 in Annex A.

4.1 Overview

Agroclimatic conditions were mostly unfavourable in China between October 2017 and January 2018. Rainfall, temperature and RADPAR decreased below their averages by 5%, 0.3 °C and 12%, respectively. At the sub-national scale, rainfall was significantly above average in Huanghuaihai, Inner Mongolia and Loess region, whereas the Lower Yangtze and South-West China experienced the largest deficits (table 4.1). Rainfall was close to average in North East China and Southern China.

The spatial distribution of rainfall profiles shows that the variable was relatively stable and close to average for 62.2% of cropping areas of China, mainly located in the northeast and southwest part of the country (figure 4.1). The Loess region and some parts of Huanghuaihai and Southwest China (accounting for 28.9% of planted areas) experienced above-average rainfall up to October but close to average from November. On the contrary, 8.9% of croplands distributed in the southeast were generally below average during the whole monitoring period except for early January when significant above average (+90mm) precipitation was recorded, mostly as snow. During the reporting period, temperature was slightly below average in all regions, with departures ranging between -0.7 °C and -0.2 °C. Temperature fluctuated largely as indicated by figure 4.2 and table 4.1. Similar to temperature, RADPAR was also below average in all parts of China, with the departures between -4% and a very significant and potentially harmful -18% in the Lower Yangtze region.

BIOMSS increased by 7% while CALF declined by 3% compared to average. BIOMSS was above average in almost all agroecological zones of China except in Lower Yangtze region and Southwest China. In contrast, CALF was below average in most regions of China except in Loess region. As shown by figure 4.3, the uncropped arable lands are mainly located in the northern parts of Gansu and Shaanxi province, Shanxi province, Hebei province, central and southern Henan province, and northern Anhui province. Cropped areas include essentially the winter crop areas. The VCIx map shows that low values of this indicator (0.5-0.8) occurred in Northeast China, Inner Mongolia, the Loess region and Huanghuaihai, and Xinjiang province. Interestingly, the lowest values (below 0.5) occur in southern Henan and northern Anhui provinces because the planted areas were covered by snow in January, which is confirmed with the CALF pattern (figure 4.3). Values larger than 0.8 occur in other parts of China and follow a pattern that is highly consistent with those of uncropped and cropped arable land.

Table 4.1. CropWatch agroclimatic and agronomic indicators for China, October 2017 to January 2018, departure from 5YA and 15YA

Region	Agroclimatic indicators			Agronomic indicators		
	Departure from 15YA (2002-2016)			Departure from 5YA (2012-2016)		Current
	RAIN (%)	TEMP (°C)	RADPAR (%)	BIOMSS (%)	CALF (%)	Maximum VCI
Huanghuaihai	47	-0.3	-14	36	-20	0.65
Inner Mongolia	27	-0.3	-4	20	-	0.62
Loess region	113	-0.3	-12	67	14	0.83
Lower Yangtze	-24	-0.4	-18	-12	-1	0.73
Northeast China	-1	-0.7	-4	1	-	0.70
Southern China	1	-0.2	-13	4	-1	0.68
Southwest China	-18	-0.3	-13	-5	-1	0.74

Figure 4.1. China spatial distribution of rainfall profiles, October 2017 to January 2018

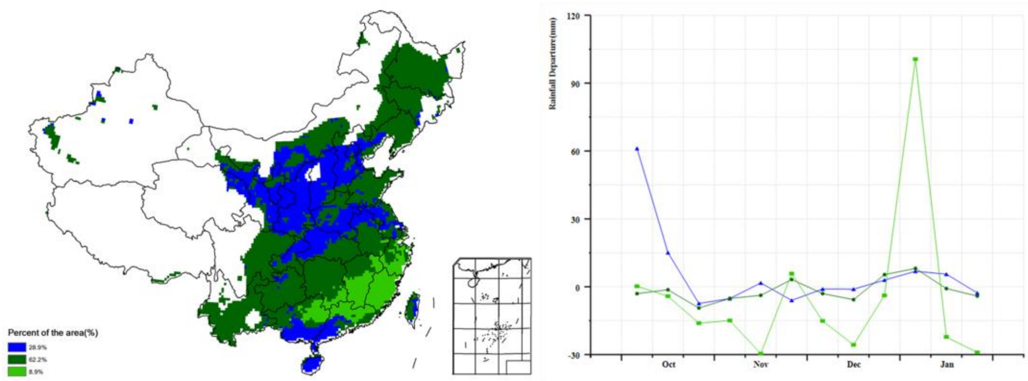


Figure 4.2. China spatial distribution of temperature profiles, October 2017 to January 2018

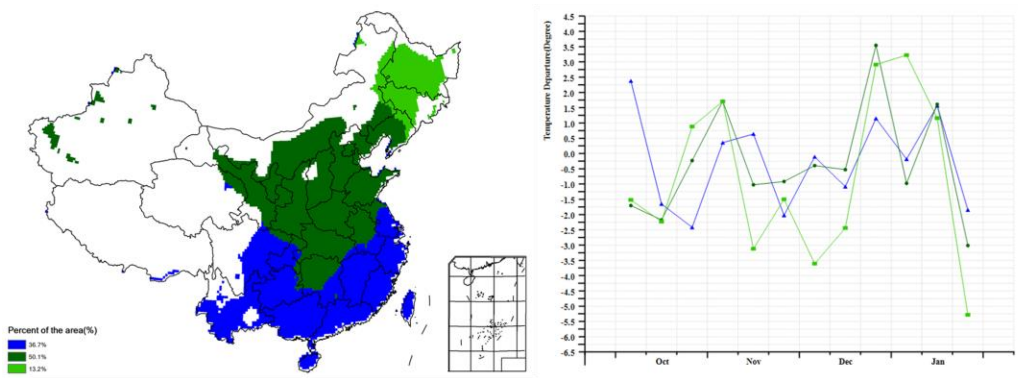


Figure 4.3. Cropped and uncropped arable land over winter crops producing provinces, by pixel, October 2017 to January 2018

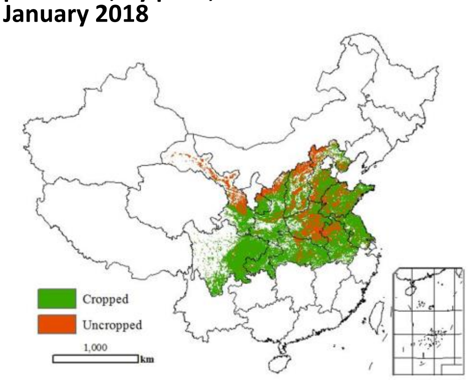
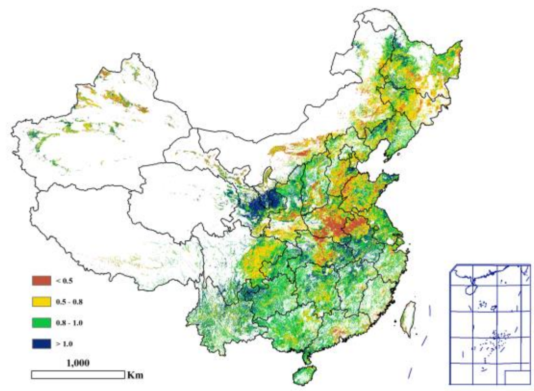


Figure 4.4. China maximum Vegetation Condition Index (VCIx), by pixel, October 2017 to January 2018



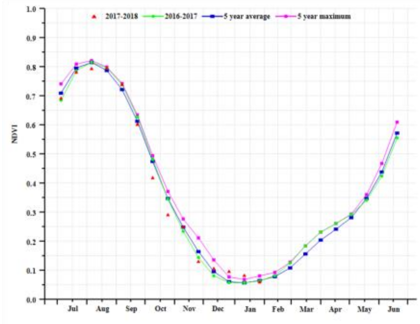
4.2 Regional analysis

Figures 4.5 through 4.11 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 January 2018 to the previous season, to the five-year average (5YA), and to the five-year maximum; (c) Spatial NDVI patterns for October 2017 to January 2018 (compared to the (5YA)); (d) NDVI profiles associated with the spatial patterns under (c); (e) maximum VCI (over arable land mask); and (f) biomass for October 2017 to January 2018. Additional information about agroclimatic indicators and BIOMSS for China is provided in Annex A.

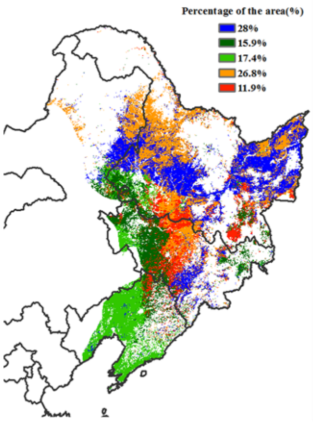
Northeast region

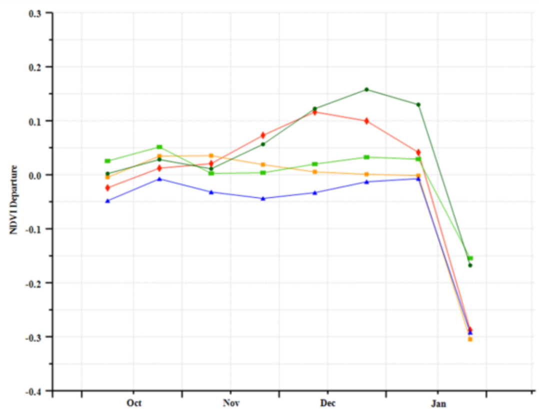
No crops are grown between late October and January in Northeast China due to low temperatures. For the period under consideration, agro-climatic conditions were average, which could benefit crops to be planted in April. Rainfall was average (-1%) and RADPAR dropped 4%. Temperature was slightly below average (-0.7°C). The agro-climatic conditions resulted in 1% above average potential biomass in the region. The Liaohe Plain shows below average BIOMSS due to the shortage of rainfall since the previous monitoring period. In general, normal snow in the region will ensure good soil moisture, which will benefit spring crops in 2018.

Figure 4.5. Crop condition China Northeast region, October 2017 to January 2018

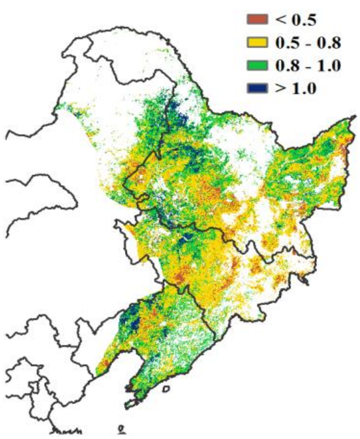


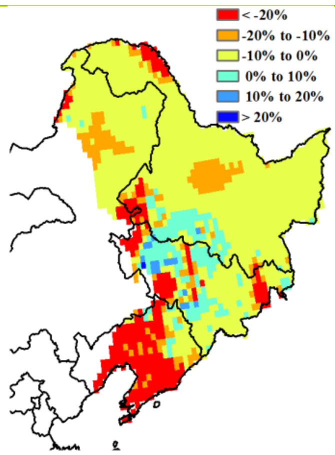
(a) Crop condition development graph based on NDVI





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





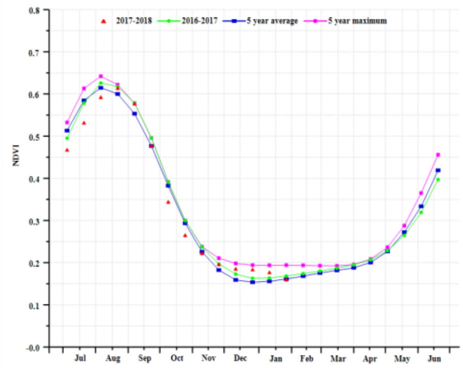
(d) Maximum VCI (e) Biomass

Inner Mongolia

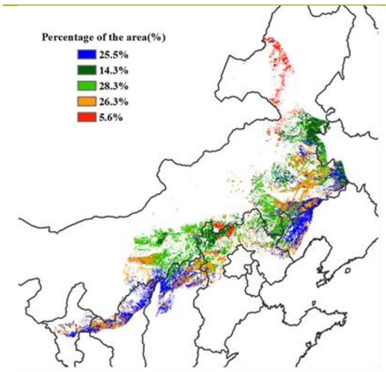
Due to very low temperatures no crops are in the field in Inner Mongolia during most of October to January, but very favourable winter conditions will benefit the forthcoming spring crops. Compared with average conditions, the CropWatch agroclimatic indicators show a marked increase of RAIN (+27%) and a decrease of RADPAR (-4%), but average TEMP (-0.4Â°C). Much water fell as snow since December. BIOMSS is significantly above the five-year average for the same period (+20%).

In October, below average conditions had little effect as the crops had reached maturity, even if excess rainfall locally hampered harvesting activities. VCIx was below 0.5 in the north; the observation is consistent with the potential biomass distribution (values more than 10% below average). In general, abundant snow will provide adequate soil moisture for the land preparation and early growth of 2018 spring crops.

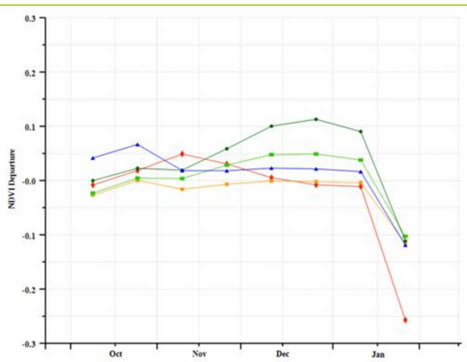
Figure 4.6. Crop condition China Inner Mongolia, October 2017 to January 2018



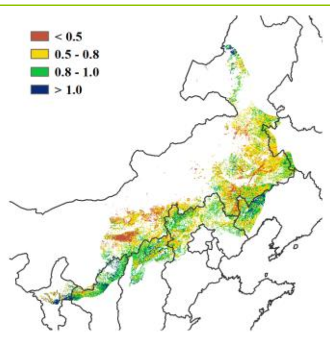
(a) Crop condition development graph based on NDVI



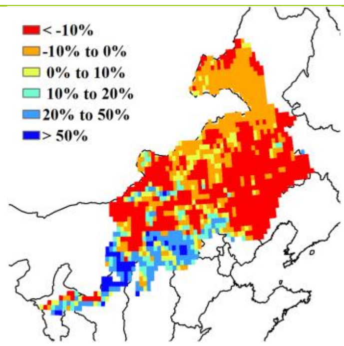
(b) Spatial NDVI patterns compared to 5YA



(c) NDVI profiles



(d) Maximum VCI



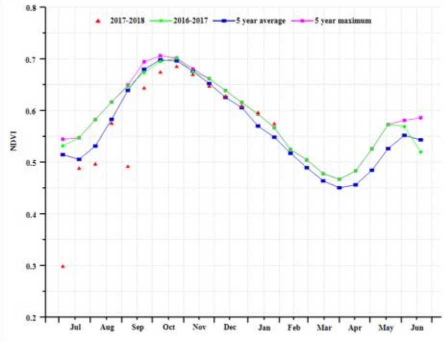
(e) Biomass

Huanghuaihai

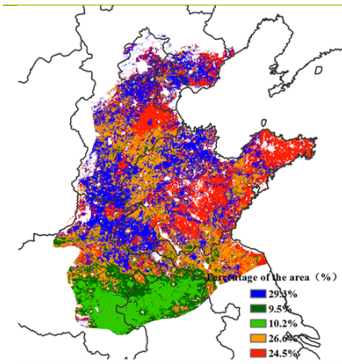
Crop condition in Huanghuaihai was generally above the recent five-year average. The main crop during the monitoring period is Winter wheat - currently overwintering -, which was planted in early October after the harvesting of summer maize. The crop condition development graph based on NDVI, generally closely followed the five-year average during the entire period and exceeded the five-year maximun in January. Winter wheat suffered from excess precipitation: RAIN was 43% above average. While temperature was average (TEMP +0.3 °C above average), RADPAR was significantly below reference values (-14%). The abundant precipitation will benefit the wheat crop when it will break dormancy in spring. The BIOMSS index increased 36% above average.

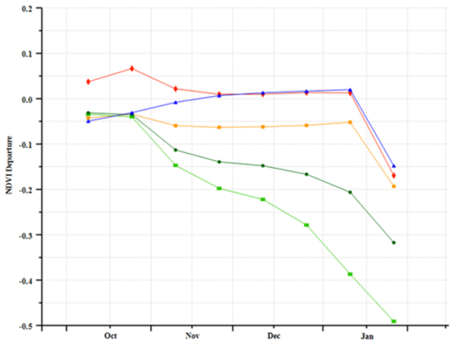
Regarding spatial distribution, many scattered areas over the region display below average condition, especially in the south. Eastern Henan and Northern Anhui were well below the average throughout the period. In other areas, indices fluctuated around the average and decreased sharply in January. The situation is also confirmed by the VCIx map.

Figure 4.7. Crop condition China Huanghuaihai, October 2017 to January 2018



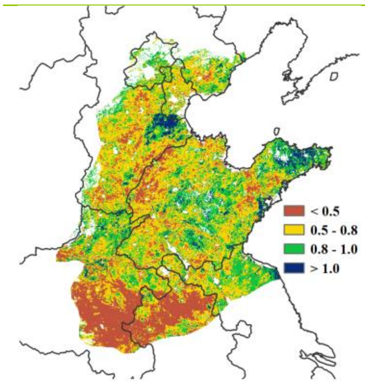
(a) Crop condition development graph based on NDVI

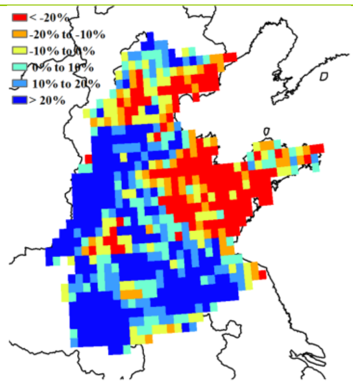




(b) Spatial NDVI patterns compared to 5YA

(c) NDVI profiles





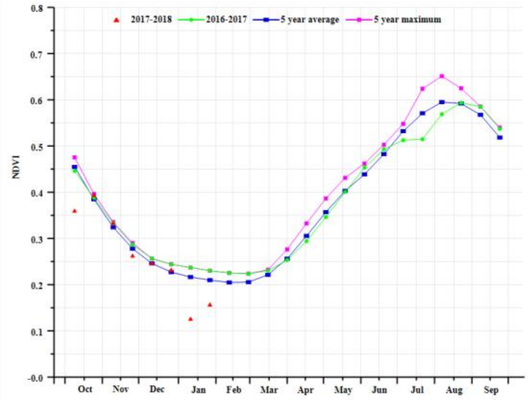
(d) Maximum VCI

(e) Biomass

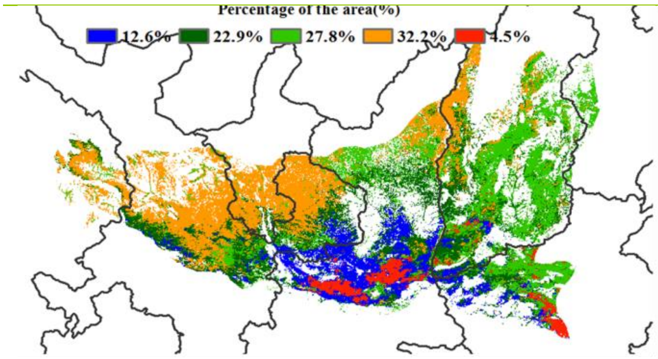
Loess region

The most relevant crop during the monitoring period was the currently hibernating Winter wheat. Crop condition was inferior to last yearâ€™s except for late October and early November. However, in late October, early November and late December, crop condition recovered to slightly exceed the five-year average. Radiation (RADPAR, -12%) was below average for the region, and so was temperature (TEMP, -0.3°C). Precipitation (RAIN, +113%) was far above average, which resulted in the potential biomass (BIOMSS) above average as well (+67%). In most of the region, the analyses based on spatial NDVI clusters and profiles are consistent with VCIx. The most favorable conditions occurred mainly in the middle and east of Gansu province and in the south of Ningxia province, due to the abundant rainfall. Moreover, the cropped arable land fraction (CALF) increased by 14% compared with recent years, which shows a favorable crop prospects in the region.

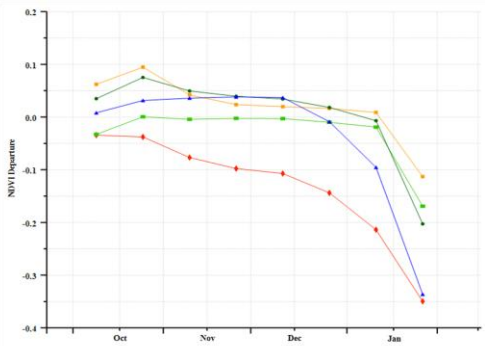
Figure 4.8. Crop condition China Loess region, October 2017 to January 2018



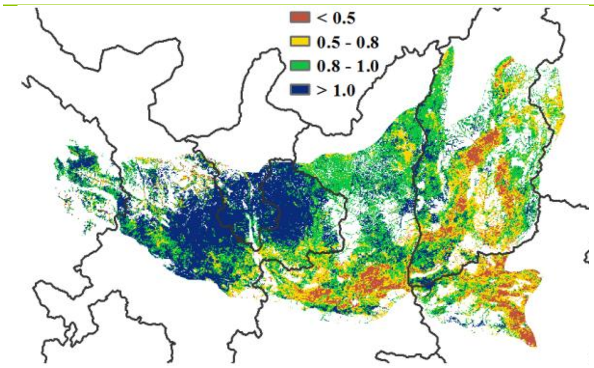
(a) Crop condition development graph based on NDVI



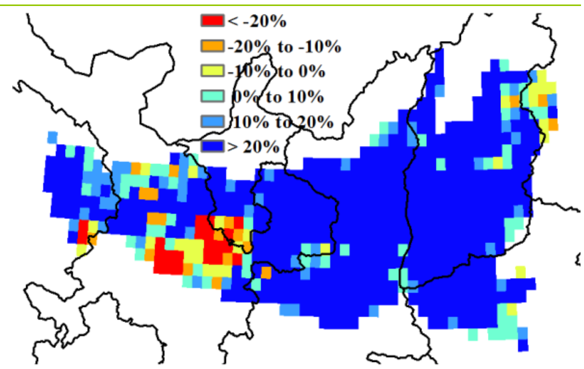
(b) Spatial NDVI patterns compared to 5YA



(c) NDVI profiles



(d) Maximum VCI

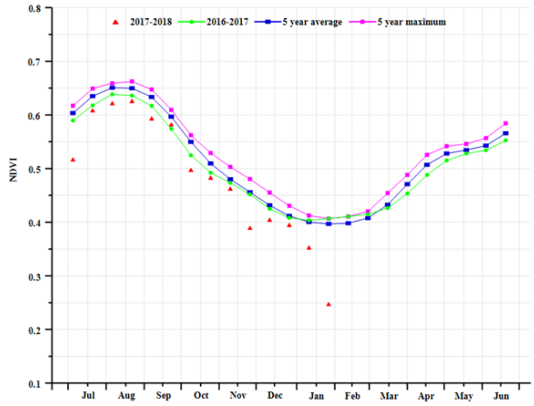


(e) Biomass

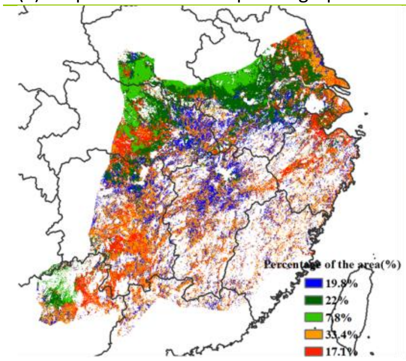
Lower Yangtze region

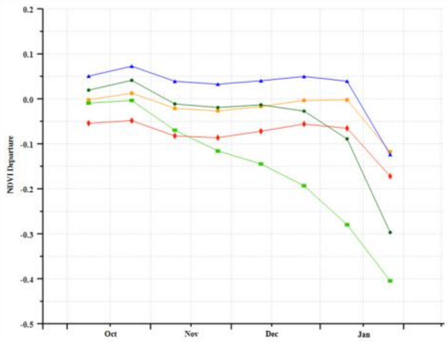
Few crops were in the field except for Winter wheat growing in the northeastern and northern parts of the region. Crop condition in Lower Yangtze region was generally below the recent five-year average. According to the CropWatch agroclimatic indicators, Rainfall (RAIN, -24%), radiation (RADPAR, -18%) and temperature (TEMP,-0.4°C) were all below average, which may lead to unfavorable crop condition according to biomass production potential (BIOMSS, -12%). Based on NDVI, crop condition was below average compared to the five-year average. The BIOMSS map shows that most of this region suffered a marked decrease of 20% in BIOMSS, while an increase of 20% occurred in the south of Henan, Jiangsu, middle of Anhui and north of Hubei province. NDVI profiles show that the crop condition in 92.1% of this region was close to average until December, but it deteriorated at beginning of January. Overall crop prospects in this region are unfavorable at this time of the season.

Figure 4.9. Crop condition Lower Yangtze region, October 2017 to January 2018



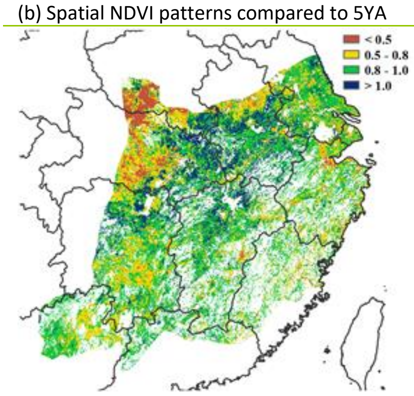
(a) Crop condition development graph based on NDVI

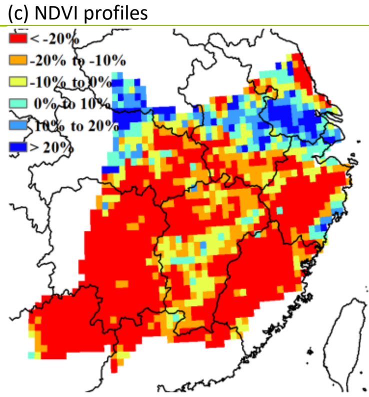




(b) Spatial NDVI patterns compared to 5YA

(c) NDVI profiles





(d) Maximum VCI

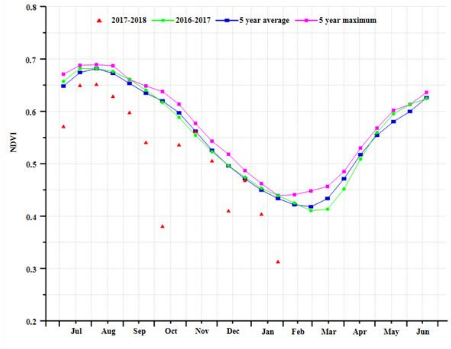
(e) Biomass

Southwest China

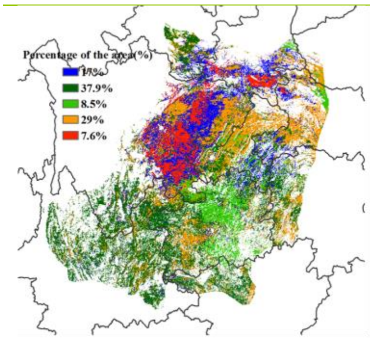
The reporting period covers the planting and early stages of Winter wheat. According to the regional NDVI profile, crop condition was partly below average during the reporting period in Southwest China, but was about average in late-October and late-December. Rainfall and sunshine were low compared to their averages (RAIN -18%, RADPAR -13%) while temperature was average (TEMP - 0.3 °C).

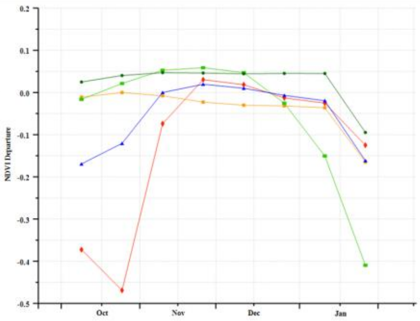
The cropped arable land fraction stayed at an average level, decreasing just 1% below the 5YA. As shown by NDVI clusters and maps, very low NDVI values occurred in some parts of eastern Sichuan and southern Shaanxi. This was due to early harvest of maize and single cropped rice last year, accounting for about 7.6% of the region (red curve). The situation turned average from the end of November. The east of northeastern Sichuan is a lowland area (300m-500m) and the most heavily irrigated area in Southwest China. Therefore, although the rainfall in Sichuan was low compared to the average (RAIN -11%), the irrigation has made up for the necessary agricultural water. The apparently low NDVI in January for north central, central and south central Guizhou was due to the heavy snow and rainfall which led to waterlogging. CropWatch will closely monitor these regions.

Figure 4.10. Crop condition Southwest China region, October 2017 to January 2018



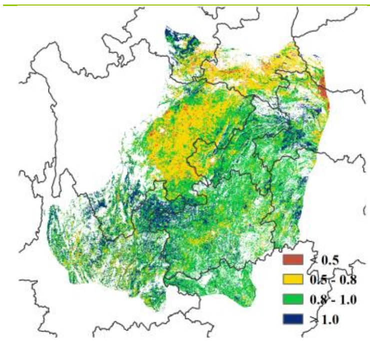
(a) Crop condition development graph based on NDVI

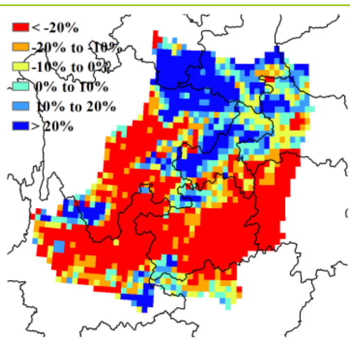




(b) Spatial NDVI patterns compared to 5YA

(c) NDVI profiles





(d) Maximum VCI

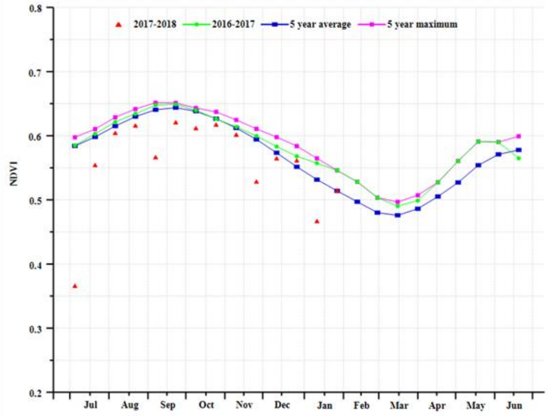
(e) Biomass

Southern China

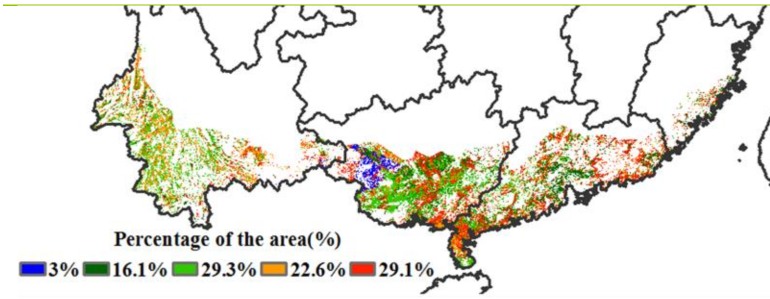
Based mostly on the regional NDVI profile, CropWatch assesses the condition of crops in Southern China as below the 5YA. NDVI value was below average in October, November, December, and January, although it was just only above average or remaining average in late-December and late-January. According to weather data, Southern China suffered from heavy snowfall and cold temperature during reporting period.

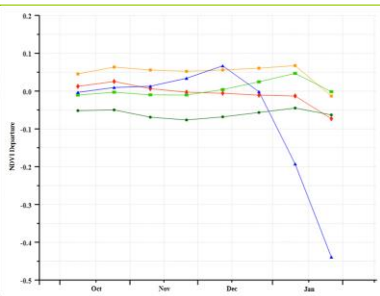
According to the agroclimatic and agronomic indexes, Southern China experienced average rainfall and temperature (RAIN, +1%; TEMP,-0.2°C). The radiation (RADPAR) was significantly below average (-13%). The potential biomass was close to average too (BIOMSS,+4%) and so was the cropped arable land fraction (CALF,-1%). The maximum VCI was 0.68 indicating an unfavorable crop condition. The averages hide a lot of sub-regional variability and differences. As shown by NDVI clusters and maps, NDVI was close average from October to December throughout the region. Only about 3% (a small zone in Guangxi) had a drop in NDVI in January. This behavior may be related to deficit in rainfall (RAIN, -13%), inadequate radiation (RADPAR -21%) but average temperature (-0.4°C) in Guangxi. In Guangdong, rainfall and biomass were both 10% above average while TEMP was average (-0.3°C). RADPAR was well below expectations (-15%). Similar situations also occurred in Yunnan and Fujian. According to VCIx and the biomass anomaly map, crop condition was poor in Southern China.

Figure 4.11. Crop condition Southern China region, October 2017 to January 2018



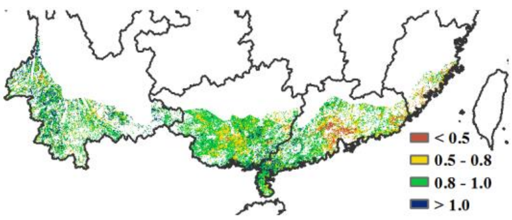
(a) Crop condition development graph based on NDVI

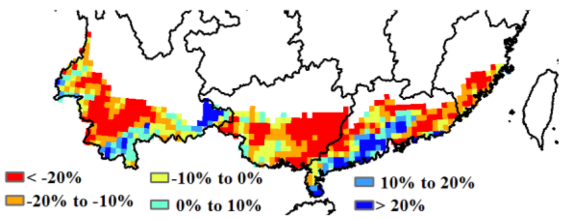




(b) Spatial NDVI patterns compared to 5YA

(c) NDVI profiles





(d) Maximum VCI

(e) Biomass

4.3 Pest and diseases monitoring

Compared with previous years, the incidence of pests and diseases was relatively large during the 2017/18 winter in the main wheat regions of China. Good wheat growth condition were brought about by high temperature and high humidity due to the heavy snow in winter. Meanwhile, weather conditions were also conducive to pest and disease reproduction. Moreover, record temperature and rainfall are forecast for the 2018 spring, which will provide favourable conditions for pest and disease development. Altogether, the wheat pest and disease damage forecast for 2018 indicates potential for more serious than previous years, and the total area affected by wheat yellow rust, sheath blight and aphids may reach 18.7 million hectares.

Wheat yellow rust

The forecast distribution of wheat yellow rust in 2018 is shown in Figure 4.12 and Table 4.2. The total area affected by the yellow rust may reached 2.5 million hectares, with the disease mainly occurring in Huanghuaihai, Loess region and Lower Yangtze, including Ningxia, Gansu, Hebei, Henan, Shandong, Anhui and Jiangsu provinces.

Figure 4.12. Distribution of wheat yellow rust in China (2018)

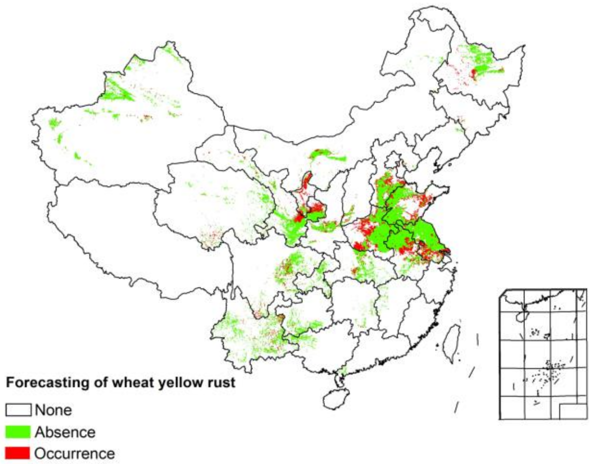


Table 4.2. Statistics of wheat yellow rust in China (2018)

Region	Percentage of areas where the pest is absent or present	
	Absence	Present
Huanghuaihai	89	11
Inner Mongolia	92	8
Loess region	89	11
Lower Yangtze	90	10
Northeast China	94	6
Southern China	99	1
Southwest China	92	8

Wheat sheath blight

Wheat sheath blight (Figure 4.13 and Table 4.3) is predicted to damage around 7.3 million hectares in 2018, with the disease mainly occurring in Huanghuaihai and Lower Yangtze, including Hebei, Henan, Shandong, Anhui and Jiangsu provinces.

Figure 4.13. Distribution of wheat sheath blight in China (2018)

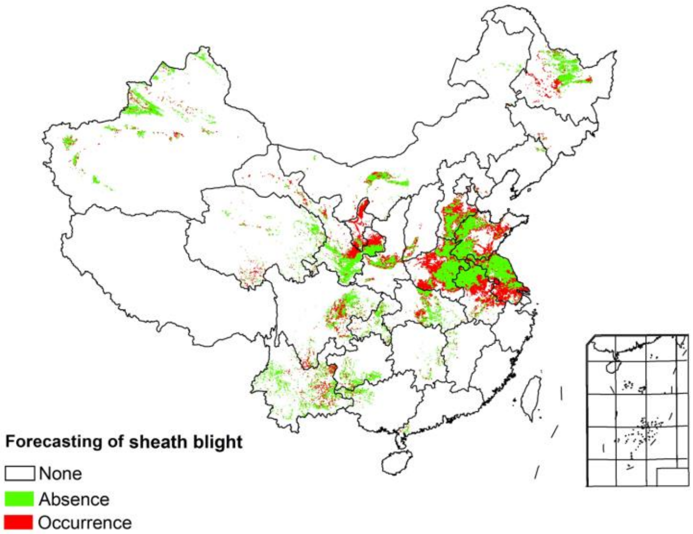


Table 4.3. Statistics of wheat sheath blight forecasts in China (2018)

Region	Percentage of areas where the pest is absent or present	
	Absence	**Present**
Huanghuaihai	**68**	**32**
Inner Mongolia	**75**	**25**
Loess region	**70**	**30**
Lower Yangtze	**70**	**30**
Northeast China	**81**	**19**
Southern China	**91**	**9**
Southwest China	**79**	**21**

Wheat aphids

In 2018, wheat aphids (Figure 4.14 and Table 4.4) are expected to affect around 8.7 million hectares, with the pest mainly occurring in Huanghuaihai, Loess Region and Lower Yangtze, including Gansu, Hebei, Henan, Shandong, Anhui, Jiangsu and Heilongjiang provinces.

Figure 4.14. Distribution of wheat aphids in China (2018)

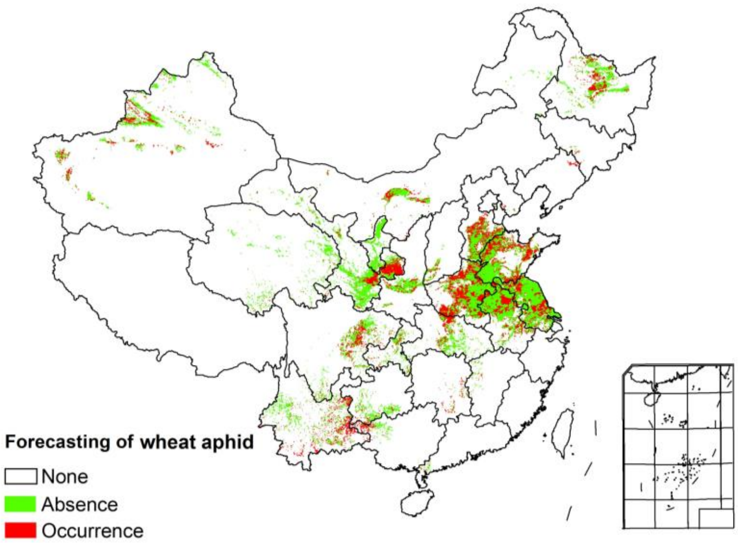


Table 4.4. Statistics of wheat aphids forecasting in China (2018)

Region	Percentage of areas where the pest is absent or present	
	Absence	Present
Huanghuaihai	63	37
Inner Mongolia	63	37
Loess region	66	34
Lower Yangtze	63	37
Northeast China	62	38
Southern China	60	40
Southwest China	66	34

4.4 Major crops trade prospects

Grain imports and exports in China in 2017

Rice

In 2017, the total import of rice in China was 4.0252 million tons, an increase of 13.0% compared to the previous year. The imported rice mainly stems from Vietnam, Thailand, and Pakistan, respectively accounting for 56.3%, 28.5%, and 6.8%. The corresponding expenditure reached US$1860 million. Total rice exports over the period were 1196,500 tons, mainly to the CÃ´te d'Ivoire, Republic of Korea, and Turkey (25.8%, 14.0%, and 6.2%, respectively). The value of the exports was US$597 million.

Wheat

Wheat imports reached 4452,500 tons, an increase of 29.6% over 2016. The main suppliers were Australia, the United States, and Canada, accounting respectively for 43.1%, 35.2%, and 11.8%. Imports amounted to US$ 1083 million. Korea (44.7%) and Hong Kong (43.4%) were the main destinations of the exports, which reached to 182600 tons for a value of US$85 million.

Maize

The country imported 2.8252 million tons of maize (down by 10.8% year-on-year) for a value of US$ 600 miilion. The main sources include Ukraine (64.5%) and the United States (26.8%). Maize exports went to Korea (60.0%), Japan (23.5%), and the Netherlands (6.8%). The value of exports was US$19.9133 million.

Soybean

The total volume of soybean imports was up by 14.8% to 95,536,600 tons. Brazil, the United States, and Argentina respectively contributed 53.3%, 34.4%, and 6.9%, for a total value of US$3973,600 million. Soybean exports were 113,900 tons, down 11.2%.

Import prospects for major grains in China for 2018

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

Rice

According to the forecast, rice imports and exports will increase by 9.7% and 20.4% respectively. Due to the increase of rice production in 2017, the loose global market supply and demand, the decreasing trend of international rice prices, and the price differences at home and abroad, rice imports in 2018 will maintain their growth momentum within the quota range.

Wheat

Wheat imports and exports are forecast to increase by 10.6% and 26.9%, respectively. At present, the global wheat production slightly increased, and the global supply and demand is in a relaxed pattern. But the persistence of wheat price difference at home and abroad still exists. In 2018, wheat imports will increase slightly, while exports increase rapidly.

Maize

Maize imports are projected to increase by 16.9% in 2018, but export will decrease by 8.5%. Due to the slackening global supply and demand of maize, the trend of falling prices, the new anti-dumping and countervailing duties investigations launched against imported U.S. sorghum, and the expanded price differences at home and abroad, maize imports are expected to increase while exports decrease.

Soybean

The model foresees increasing imports (up 4.7%) while exports will be reduced by 3.3%. With abundant soybean supply in the world, China's soybean imports will remain at a high level. However, under the impetus of the structural adjustment policies for planting, the space for the growth of imported soybean will narrow. It is estimated that the soybean imports will increase slightly in 2018.

Figure 4.15. Rate of change of imports and exports for rice, wheat, maize, and soybean in China in 2018 compared to those for 2017(%)