Chapter 4. China

This chapter starts with a brief overview of the agro-climatic and agronomic conditions in China over the reporting period (section 4.1). Section 4.2 provides detailed analysis of the winter wheat planted area, projected yield and production as well as the total winter crops production. The early rice planted area is also estimated by integration of optical and SAR data over the major producing provinces. Next it describes the situation by region, focusing on the seven most productive agro-ecological regions of the east and south: Northeast China, Inner Mongolia, Huanghuaihai, Loess region, Lower Yangtze, Southwest China, and Southern China (4.3). Section 4.4 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

This report covers the main growing period of winter wheat and rapeseed. The sowing of the first summer crops, such as spring maize and early rice started in March. Half cropland in China is irrigated and agro-meteorological conditions play important role for the rest crops. Rainfall is not the major influential factor on irrigated cropland.

Generally speaking, agro-climatic conditions over the major winter crops producing regions were favorable. For China, RAIN and TEMP increased by 19% and 0.3℃, respectively, as compared to the 15-year average, whereas RADPAR decreased by 2%. Consequently, BIOMSS was 7% above average. During the reporting period, rainfall in China's main winter crop producing areas was 6% lower than average and temperature was 0.5℃ higher. Sowing of winter crops was delayed in the North China Plain due to excessive soil moisture. After mid April, thanks to above average solar radiation and optimal temperatures, as well as optimal crop management, crop growth in the North China Plain was significantly higher than in previous years. In early May, crop conditions were better than average in most of the main production provinces and regions.

National CALF increased 1% and VCIx was quite favorable, with a value of 0.92.

Spatially, 66.7% of the arable land (marked in light green) experienced close-to-average precipitation throughout the monitoring period. Arable land in the remaining regions all went through some rainfall fluctuations. The blue marked areas (21.2% of the cropland), mainly distributed in northern part of Southwest China and northern part of Lower Yangtze region, experienced negative rainfall anomalies (more than 30 mm/dekad below average) in early April, and positive rainfall anomalies (more than 60 mm/dekad above average) in late April. The dark green marked areas (12.1% of the cropland), mainly distributed in southern part of Southwest China, southern part of Lower Yangtze region, had the biggest positive rainfall departure (approximately +80 mm/dekad) in middle Feburary, and the biggest negative rainfall departure (approximately -45 mm/dekad) in early April. Temperature anomalies varied over time across the whole country. The light green marked areas, including some parts of Heilongjiang, Jilin, and Inner Mongolia, had the biggest positive temperature departure (more than 4.5℃ above average) in early March. The blue marked areas, including southern Inner Mongolia, western Loess region, southern Lower Yangtze region, most parts of Southwest China, and Southern China, had the biggest negative temperature departure (more than 3.0℃ below average) in early and late Feburary. Uncropped areas mainly occurred in the North-west and North-east regions and some parts in Inner Mongolia, Gansu, Ningxia, Shaanxi, Shanxi, and Hebei.

In April, the cropping season was well underway in southern and central China. According to the spatial VCIx patterns, favorable crop conditions (VCIx larger than 0.8) occurred widely across China; values between 0.5 and 0.8 were observed for some parts in Inner Mongolia, Gansu, Ningxia, Shaanxi, Shanxi, and

Hebei, where cropland was not fully cultivated during the monitoring period according to the CALF map. The potential biomass showed significant variability across regions. Positive anomalies (more than 20%, marked in blue) occurred in central Northeast China, southern Inner Mongolia, western Loess region, southern Huanghuaihai, and most parts of Southwest China, while negative anomalies (-20% or more) were mainly observed in some parts of Shanxi, Shaanxi, Hebei, Shandong, Henan, Ningxia, Jiangsu, and Anhui. When it comes to VHIn, high values (above 36%) are widespread in China, indicating limited water deficit effects on most of the winter crops.

As for the main producing regions at the sub-national level, rainfall was above average, ranging from +10% to +31%, except for Huanghuaihai (-6%). TEMP was all at or above average, and the range of temperature departures is from +0.0°C to +0.7°C, with the highest positive departure in Northeast China. RADPAR was below average, except for Southern China. Consequently, BIOMSS increased in almost all the regions compared to average with the anomalies ranging from 3% to 15%, except for Huanghuaihai. CALF in all regions was all slightly above average but still lower than same period in 2021 except for Loess Region where CALF was 3% below average. Almost no crops are in field in Northeast China and Inner Mongolia during this monitoring period, CALF values are not representative. As for VCIx, the values were quite high for all the regions, ranging between 0.85 and 0.99, with values less than 0.9 occurred in Loess region and Northeast China mainly related to the reduced cultivated areas.

Table 4.1 CropWatch agroclimatic and agronomic indicators for China, January - April 2022, departure from 5YA and 15YA

Region	Agroclimatic indicators				Agronomic indicators		
	Departure from 15YA (2004-2018)				Departure from 5YA (2014-2018)		Current period
	RAIN (%)	TEMP (°C)	RADPAR (%)	BIOMSS (%)	CALF (%)	Cropping intensity (%)	Maximum VCI
Huanghuaihai	-6	0.5	-2	-11	8	0.94	-6
Inner Mongolia	10	0.0	-2	6	/	0.94	10
Loess region	10	0.5	-4	3	-3	0.85	10
Lower Yangtze	19	0.3	-2	6	1	0.93	19
Northeast China	16	0.7	-3	15	/	0.89	16
Southern China	13	0.0	4	7	1	0.94	13
Southwest China	31	0.1	-6	12	1	0.99	31

Figure 4.1 China crop calendar

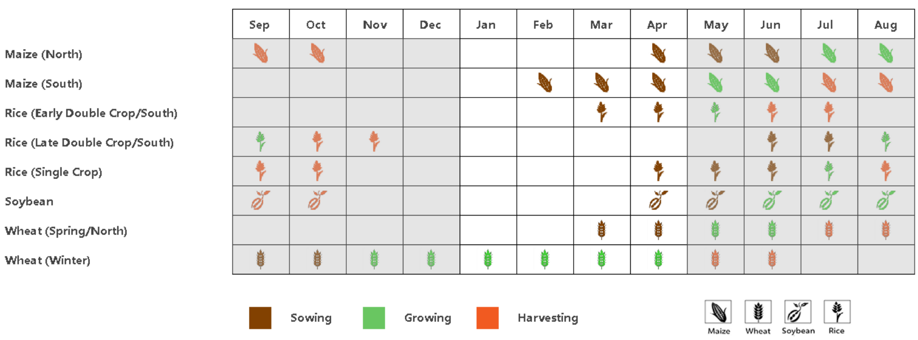


Figure 4.2 China spatial distribution of rainfall profiles, January - April 2022

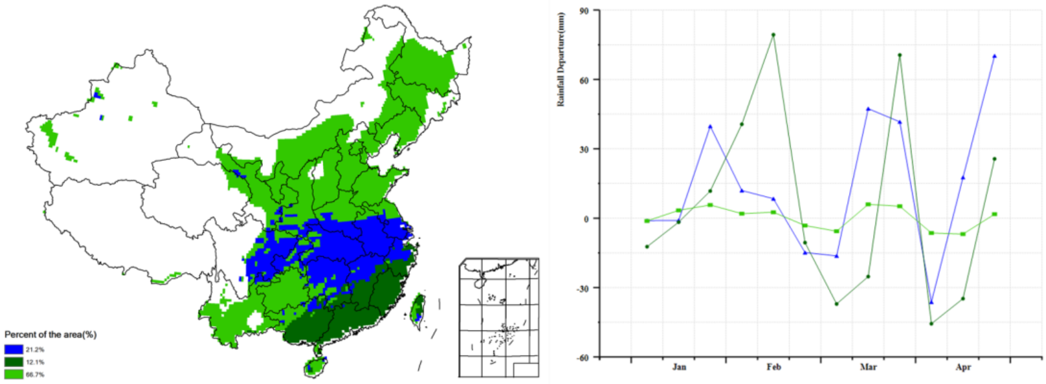
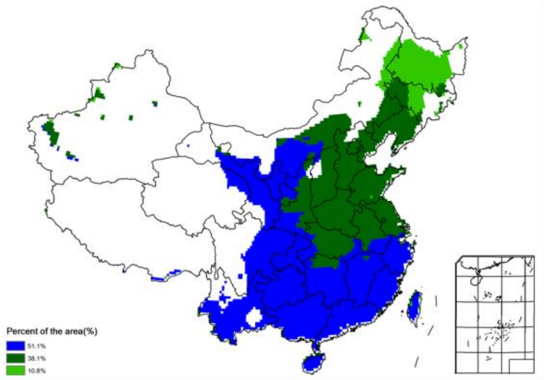


Figure 4.3 China spatial distribution of temperature profiles, January - April 2022



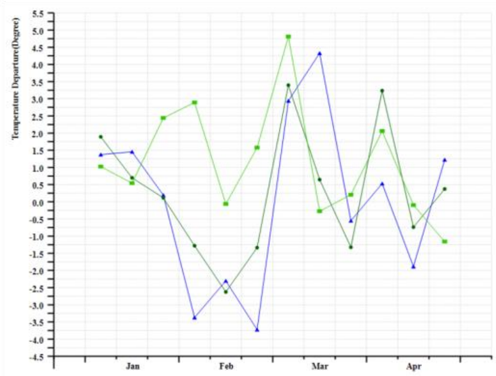
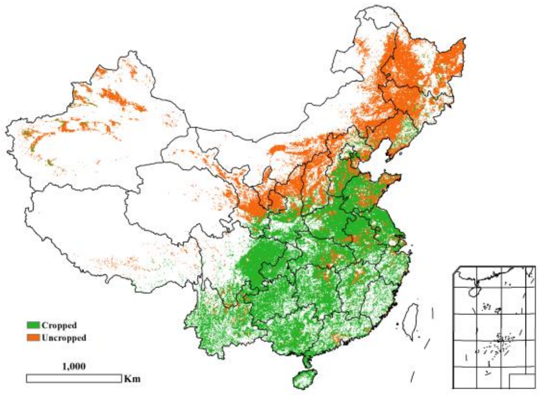


Figure 4.4 China cropped and uncropped arable land, by pixel, January - April 2022

Figure 4.5 China maximum Vegetation Condition Index (VCIx), by pixel, January - April 2022



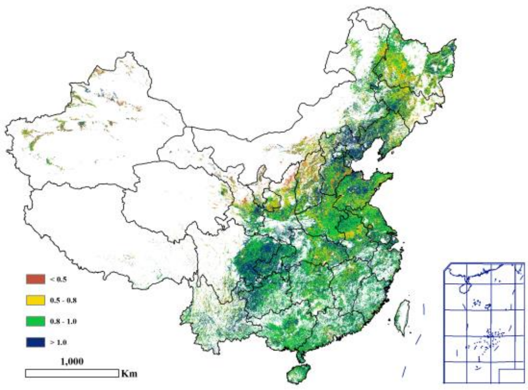
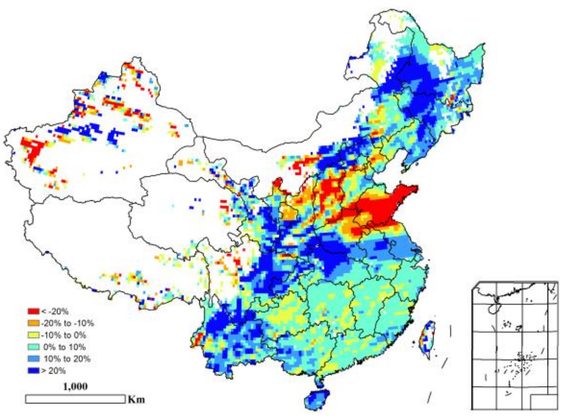
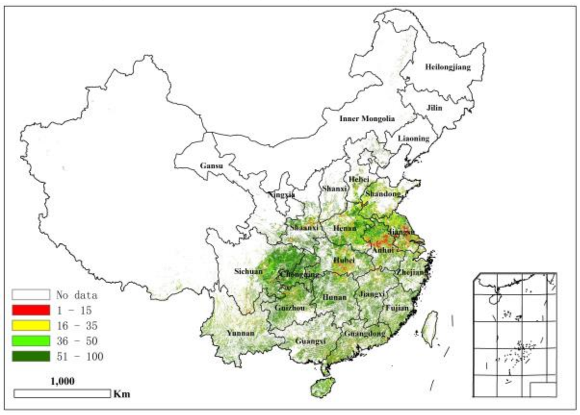


Figure 4.6 China biomass departure map from 15YA, by pixel, January - April 2022

Figure 4.7 China minimum Vegetation Health Index (VHIn), by pixel, January - April 2022





4.2 China's crop production

(1)Winter crop production

The total winter crop production of China is expected to be 141.57 million tonnes in 2022, with a decrease by 1.64 million tonnes (-1.1%). Winter wheat sown area was 1.9% lower than 2021. The increases in crop yield by 0.8%, failed to offset the impact of reduction in area planted.

Table 4.2 winter crop production (million tonnes) and annual variation (%) in China's major winter crop-producing provinces and cities in 2021

	Production in 2021 (Thousand tonnes)	2022 Area variation (%)	2022 Yield variation (%)	2022 production variation (%)	2022 winter crop production (Thousand tonnes)
Hebei Province	12764	-3.5	1.6	-2.0	12508
Shanxi Province	2241	1.3	2.8	4.2	2334
Jiangsu Province	13964	-1.5	1.7	0.2	13988
Anhui Province	15096	-2.5	-1.4	-3.9	14509
Shandong Province	27249	-2.2	1.9	-0.4	27152
Henan Province	33188	-3.7	1.7	-2.1	32493
Hubei Province	6226	-2.1	1.2	-0.9	6168
Sichuan Province	5820	-0.6	2.8	2.2	5950
Shannxi Province	4135	-0.9	-0.8	-1.7	4065
Gansu Province	3517	0.9	0.4	1.3	3563
Xinjiang Province	5077	-1.3	2.1	0.8	5118
Subtotal	129278			-1.1	127849
Other Provinces*	13925			-1.5	13719
National*	143203	-1.9	0.8	-1.1	141567

*Note: winter crop from Taiwan Province are not included in the total production of other provinces and the country.

Due to the regional flooding that caused excessively wet soil conditions, the area sown of winter crops in North China Plain decreased in Henan (-3.7%), Hebei (-3.5%), Shandong (-2.2%) and Anhui (-2.5%). The area reduction led to a production decrease in Henan (-690 thousand tonnes), Hebei (-260 thousand tonnes), Shandong (-100 thousand tonnes) and Anhui (-590 thousand tonnes). Although the winter crop planting area in Sichuan Province also shrank by 0.6%, the weather conditions were generally favorable. Winter crop yield of Sichuan increased by 2.8% and the production increased by 130 thousand tonnes, which is the largest increase among major winter crop-producing provinces. Changes in production levels in other major provinces were within ± 100 thousand tonnes.

(2) Remote sensing-based winter wheat planted area estimation

For the 2021-22 season, China's winter wheat planted area was 23,292.5 thousand hectares, down 546.9 thousand hectares or 2.3% year-on-year (Table 4.2, Figure 4.8), mainly due to severe flooding in some areas of northern China during the winter wheat sowing period in the autumn of 2021. Continuous heavy rainfall led to excessively wet soil conditions and delayed wheat sowing. Some fields had remained very wet for a prolonged period and could not be planted anymore before the window for winter wheat sowing closed. Out of the 11 winter wheat producing provinces and regions, 8 provinces and regions had a decrease in wheat planted area. Winter wheat area increased slightly in Shaanxi, Gansu and Xinjiang

Table 4.3 Remote sensing monitoring of acreage of winter wheat planted in main producing provinces in 2022

Province	Planted area (thousand hectares)		Area changes (Thousands of hectares)	Variation(%)
	2021	2022		
Hebei	2165.9	2089.6	-76.3	-3.5
Shanxi	411.5	416.9	5.4	1.3
Jiangsu	2741.9	2678.4	-63.4	-2.3
Anhui	3027.3	2978.1	-49.2	-1.6
Shandong	4186.6	4093.7	-92.9	-2.2
Henan	5488.4	5287.0	-201.4	-3.7
Hubei	1113.3	1094.5	-18.8	-1.7
Sichuan	492.5	492.1	-0.4	-0.1
Shaanxi	805.6	797.0	-8.6	-1.1
Gansu	503.3	529.4	26.1	5.2
Xinjiang	582.9	588.2	5.3	0.9
Subtotal	21519.2	21044.9	-474.2	-2.2
Other*	2320.2	2247.6	-72.6	-3.1
China*	23839.4	23292.5	-546.9	-2.3

*Note: The estimated planted area does not include Taiwan Province.

Figure 4.8 National winter wheat planting distribution in 2022

The five provinces with the largest reductions in wheat planted areas were: Henan (-201.4 thousand hectares), Shandong (-92.9 thousand hectares), Hebei (-76.3 thousand hectares), Jiangsu (-63.4 thousand hectares) and Anhui (-49.2 thousand hectares). The reduced winter wheat planted area in those five major producing provinces accounted for 88.4% of the reduction in winter wheat area of China.

Henan Province, as the largest winter wheat producer, planted a total of 5287.0 thousand hectares of wheat in 2022, 3.7% less than in 2021. During the weeks leading up to the sowing period in 2021, Henan Province suffered heavy rainfall and in some regions, the soil was too wet for tillage and planting. The regions with the largest decreases in winter wheat planted area were in Nanyang and Shangqiu.

The winter wheat planted area in Shandong Province is 4093.7 thousand hectares, down 2.2% compared to 2021. As in Henan, the decreased winter wheat planted area also resulted from the heavy rainfall and localized flooding along the Yellow River, mainly in Heze (-30.9 thousand hectares), Dezhou (32.0 thousand hectares) and Liaocheng (37.0 thousand hectares). Winter wheat planted area in Linyi, Binzhou, Qingdao, Weifang and other places increased from 2021, which to a certain extent offset the impact of reduced planting area in western Shandong.

In Hebei province, 2022 winter wheat planting area was 2089.6 thousand hectares, a decrease by 3.5%. The areas with a decline were concentrated near the three cities of Handan, Hengshui and Xingtai, out of which Handan had the largest decline. Reasons for the decline were the wet soil conditions, as well as the winter crop rotation fallow guide issued by the local water conservation agency. Conversion of cropland to built-up land was one of the reasons for the decline in Quzhou County, Qiu County, Feixiang and other places.

In the Anhui Province, the 2022 winter wheat planting area was 2978.1 thousand hectares, a year-on-year reduction of 1.6%. The reduction in wheat planting area mainly occurred in the region of northern Liu'an Huoqiu County and Shou County, Chuzhou County in the west of Dingyuan County and the eastern city of Tianchang. No significant change in wheat acreage in the main winter wheat producing areas north of the Huai River were observed.

(3) Winter wheat production forecast

Based on multi-source remote sensing data, including Sentinel 1/2, Landsat 8 as of mid-May 2022, in combination with the latest agro-meteorological information and ground truth samples, as well as 10m resolution cropland mask, a remote sensing-based crop yield model and big data method for crop planted area estimation method were used to monitor the winter wheat yield in China in 2022. We systematically assessed the impact of the delayed autumn sowing in 2021 and of the cold wave that hit the northern region in the spring of 2022 on the growth and yield of winter wheat.

Total national winter wheat production in 2022 is estimated at 127.64 million tonnes, a decrease of 1.53 million tonnes or 1.2% from 2021 (Table 4.3). Aided by warming temperatures and ideal soil moisture conditions, even late sown wheat caught up to average levels observed in previous years by the time it had reached the heading stage. Low rates of diseases incidence, as well as relatively sunny skies and average temperatures created favorable conditions for wheat growth and the grain filling period, which started in mid April. Out of the total wheat area, the crop status for 12% was below that of last year. These areas were scattered throughout the main production areas. On about 7% of the area, winter wheat growth was better than in the same period of last year, mainly in northwestern Shandong, central and northeastern Jiangsu, Shaanxi and south-central Shanxi. For the remaining 81%, the status was close to the average level of the past five years. Thus, most of the wheat fields were able to compensate for the late sowing.

The forecasted average winter wheat yield for 2022 is 5,480 kg/ha, 1.1% higher than in 2021, mainly due to favorable weather conditions starting in mid to late April. They were conducive for grainfilling, resulting in an increase in wheat yields year-on-year; however, due to a 2.3% year-on-year contraction in winter wheat planted area, the national winter wheat production was still lower than last year. The total winter wheat production increased in only four non-core wheat-producing provinces in Shaanxi, Sichuan, Gansu and Xinjiang out of the the 11 main provinces.

The wheat production situation varies significantly among the major winter wheat-producing provinces and regions. Anhui and Shaanxi had more precipitation in late April, which improved the growth. But the lack of rain in early and mid May was not conducive for grain growth. Peak vegetation cover was lower than last year, and the yield dropped by 1.5% in Anhui and 0.7% in Shaanxi. The provinces of Henan, Shandong and Hebei in the Yellow Huaihai Plain area had below average precipitation starting in early April. But the irrigation facilities in the main wheat producing areas of the three provinces are well developed. Thanks to timely irrigation and ideal temperature and solar radiation conditions, the crop growth rate was higher than in previous years starting in mid-April. Yield increases were 1.7% in Henan, 1.9% in Shandong and 1.6% in Hebei. Similarly, conditions were favorable in Sichuan as well, aided by ideal weather conditions, resulting on a yield increase by 2.7% year-on-year. In Shanxi, precipitation was near average. Wheat growth exceeded the rates of last year and the yield is expected to increase by 2.8%.

In general winter wheat was in above average conditions starting from the heading stage, resulting in higher yields. But the year-on-year reduction in planted area still led to a year-on-year reduction by more than 100,000 tonnes of production in the four provinces of Henan (-680,000 tonnes), Shandong (-450,000 tonnes), Hebei (-250,000 tonnes) and Anhui (-100,000 tonnes). These reductions accounted for 97% of the total reduction in production.

In general, the prospects for the upcoming wheat harvest period are favorable.

Table 4.4 Area (thousand ha), yield (kg/ha), production (million tonnes) and variation (%) of winter wheat by province in China in 2022

	Area		Yield		production		
	2022	Variation	2022	Variation	2022	Variation	Variation
	(Thousands hectares)	(%)	(kg/ha)	(%)	(Thousand tonnes)	(%)	(Thousand tonnes)
Hebei	2090	-3.5	5838	1.6	12200	-2	-250
Shanxi	417	1.3	5420	2.8	2260	4.2	90
Jiangsu	2678	-2.3	5068	1.7	13570	-0.6	-80
Anhui	2978	-1.6	4710	-1.5	14030	-3.1	-450
Shandong	4094	-2.2	6573	1.9	26910	-0.4	-100
Henan	5287	-3.7	6119	1.7	32350	-2.1	-680
Hubei	1095	-1.7	4072	1.3	4460	-0.4	-20
Sichuan	492	-0.1	4002	2.7	1970	2.6	50
Shaanxi	797	-1.1	3891	-0.7	3100	-1.8	-60
Gansu	529	5.2	4129	1.8	2190	7.1	140
Xinjiang	588	0.9	5608	0.4	3300	1.3	40
Subtotal	21045	-2.2	5528	1.1	116330	-1.1	-1310
Other*	2248	-3.1	5031	1.3	11310	-1.8	-210
National*	23293	-2.3	5480	1.1	127640	-1.2	-1530

*Note: Winter wheat in Taiwan Province is not included.

(4)Early rice planted area

The preparation and transplanting of early rice in China’s major early rice producing provinces was completed in late April. The total area of early rice was 6404.7 thousand hectares with an increase of 22.4 thousand hectares from 2021 (6382.3 thousand hectares).

Early rice sown area in Anhui and Hubei provinces both decreased, while it increased in the other six major rice production provinces. Two reasons led to the increase of early rice area in the four top provinces Hunan(+1.0%), Jiangxi (+1.6%), Guangxi (+1.7%) and Guangdong (+0.8%): 1) the government raised the minimum price line of rice and issued a bonus on double-season rice pattern. 2) Covid-19 has prevented some farmers from holding a job in a town and therefore, they focus more on field work.

Table 4.5 Remote sensing monitoring results of early rice preparation and transplanting area in China's main winter crop-producing provinces and regions in 2022

	Area (thousand hectares)		variation (%)	Area variation (Thousands of hectares)
	2021	2022		
Fujian	155.8	159	2	3.2
Zhejiang	111.8	113.9	1.9	2.1
Jiangxi	1144.7	1163.1	1.6	18.4
Guangxi	931.2	947.1	1.7	15.9
Hunan	1522.3	1537.9	1	15.5
Anhui	185.2	179.3	-3.2	-5.9
Hubei	150.7	147.8	-1.9	-2.9
Guangdong	828.1	834.7	0.8	6.6
Subtotal	5029.9	5082.7	1.1	52.8
National	6382.3	6404.7	0.4	22.4

4.3 Regional analysis

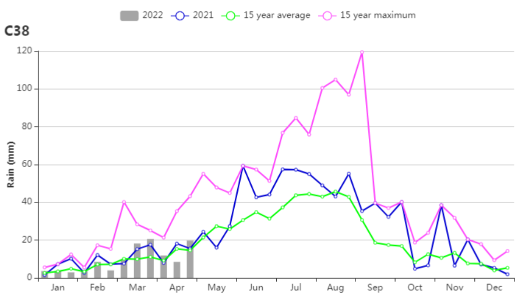
Figures 4.10 through 4.16 present crop condition information for each of China’s seven agricultural regions. The provided information is as follows: (a) Phenology of major crops; (b) Crop condition development graph based on NDVI, comparing the current season up to January 2022 to the previous season, to the five-year average (5YA), and to the five-year maximum; (c) Spatial NDVI patterns for January to April 2022 (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 January to April. Additional information about agro-climatic indicators and BIOMSS for China is provided in Annex A.

Northeast region

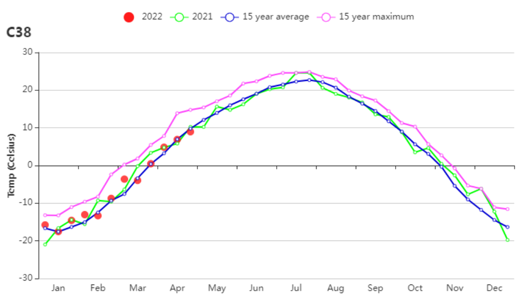
Due to the cold winter weather, this monitoring season (January to April 2022) was ahead of crop sown in the northeast region of China. CropWatch Agroclimatic Indicators (CWAIs) show that the precipitation greatly deviated from the average level. The total precipitation increased by 16%. It was above average level in mid-March and late-March. The photosynthetically active radiation was below average (RADPAR - 3%) and the temperatures were above average (TEMP +0.7°C). Altogether, the potential biomass was 15% above the fifteen-year average level.

Overall, higher precipitation and warmer temperatures are beneficial to the spring sowing in the northeast region of China. However, sowing dates in some low-lying areas in the region were delayed about a week due to waterlogging caused by above average rainfall. Warmer temperatures in May will facilitate the germination and good establishment of the summer crops.

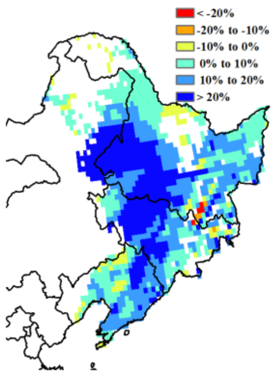
Figure 4.9 Crop condition China Northeast region, January - April 2022



(a) Time series rainfall profile



(b) Time series temperature profile



(c) Potential biomass departure from 15YA

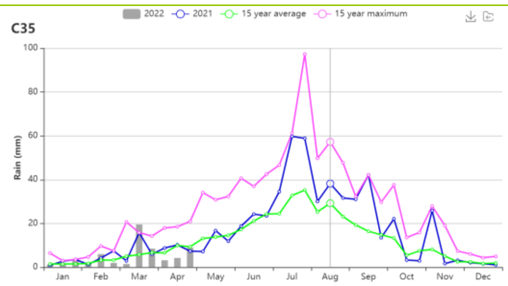
(d) Waterlogged fields of Zhaoguang farm in HeiLongjiang province （2022-5-14）

(e) Waterlogged fields of Wudalianchi City in HeiLongjiang province （2022-5-14）

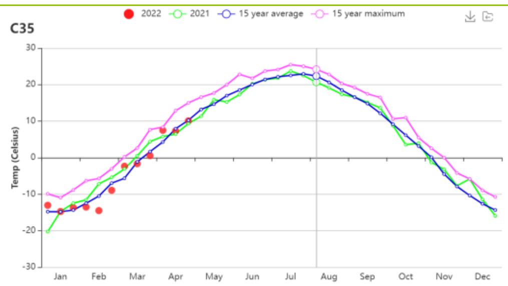
Inner Mongolia

During the first three months of this year, no crops were grown in Inner Mongolia due to the cold temperatures. Sowing activities gradually started in late April. Agro-climatic indicators of the reporting period show that rainfall was above average (RAIN +10%), TEMP was close to the 15YA, while RADPAR was slightly below average (-2%). The resulting BIOMSS was above average (+6%). Though the average of VCIx was 0.94 for the whole area, it is of limited agronomic significance at this time of the year. The rainfall, which was significantly higher than the historical average will be beneficial to the germination of crops and grazing lands. Current prospects for the region are favorable, but weather conditions in the following months are very critical.

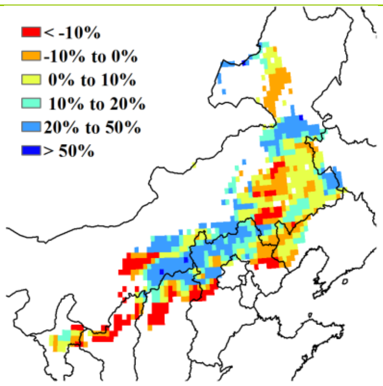
Figure 4.10 Crop condition China Inner Mongolia, January – April 2022



(a) Time series rainfall profile



(b) Time series temperature profile



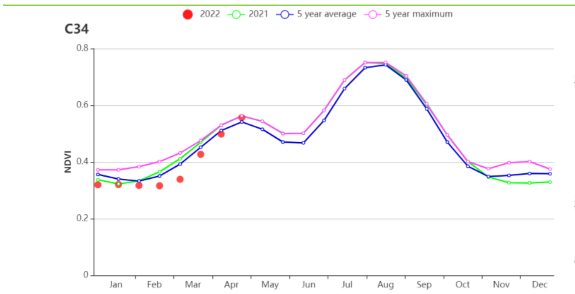
(c) Biomass departure

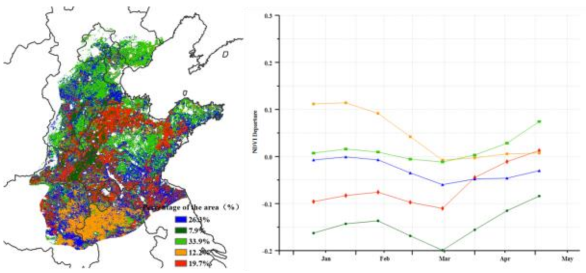
Huanghuaihai

The monitoring period (January to April) covers the spring green-up and jointing stages of winter wheat in Huanghuaihai. Due to the delayed sowing last year, the harvest time will be delayed by about 1 week. Agro-climate indicators showed that precipitation (-6%) and radiation (-2%) in this area were below the 15YA, but temperature (+0.5°C) was above. The combination of these weather parameters led to a decrease of potential biomass by 11%. The CALF exceeded the 5YA by 8% but still lower than 2021 JFMA, and the maximum VCI value was 0.94.

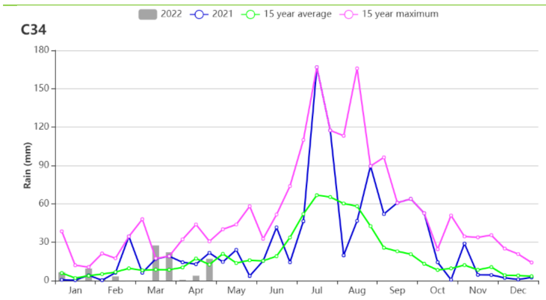
Based on the NDVI-based crop growth profile, the crops grew a bit more slowly in February and early March due to cooler than average temperatures, but reached the 5-year maximum level at the peak growing period by the end of April. As the NDVI clusters and profiles showed, only 12.2% of the cropland in Northeastern Anhui was higher than the 5YA before mid-March. Crops in the areas of Southern Hebei, Northeastern Shandong, Eastern Henan, and Northern Jiangsu (blue, red, and dark green colors in the NDVI departure clustering map) presented below-average conditions until mid-March, but recovered quickly thereafter. The map of maximum VCI presented a similar trend as the spatial NDVI pattern. Generally, the crop conditions in this important winter wheat production region are normal.

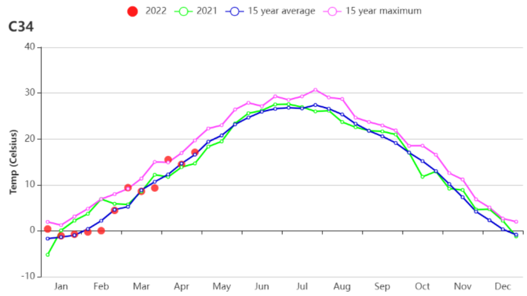
Figure 4.11 **Crop condition China Huanghuaihai, January - April 2022**



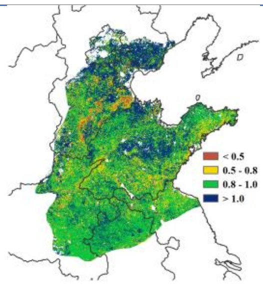


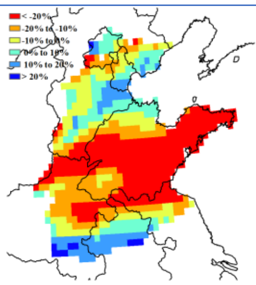
(a) Crop condition development graph based on NDVI (b) Spatial NDVI patterns compared to 5YA (c) NDVI profiles





(d)Time series rainfall profile (e)Time series temperature profile





(f) Maximum VCI (g) Biomass departure

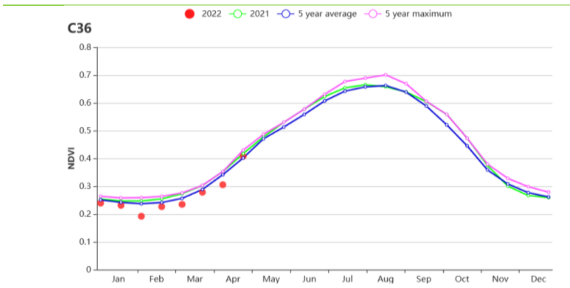
Loess region

During this reporting period, winter wheat, spring wheat and spring maize were the predominant crops grown in this region. Winter wheat sowing started from late September to mid-October and will be harvested in mid-June. Spring wheat and spring maize were sown from late March to April. During the monitoring period, the crop conditions in the Loess region were close to the 5YA.

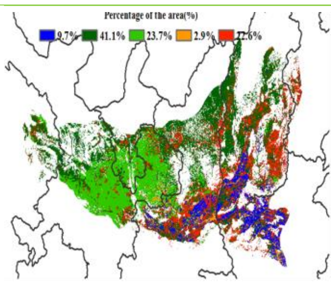
The CropWatch Agroclimatic Indicators (CWAIs) show that the precipitation was above average by 10%, the temperature increased by 0.5°C, and radiation was reduced by 4%. Due to the increase in precipitation and temperature, potential biomass increased by 3% compared to the 15YA. The precipitation exceeded the 15-year maximum in late January, mid-March and late April, but other time during the monitoring period also presented the periodic precipitation shortage. Temperatures were slightly above average in January, then dropped to below average in February, and fluctuated from March to April.

According to the regional NDVI development graph, the crop conditions were slightly below the 5YA until mid-April, but recovered to 5YA by late April and early May. NDVI clusters and profiles show that crop conditions in most regions were close to the average with minor negative departures. In western Henan, southern Gansu, Shaanxi and Shanxi (accounting for 12.6% of the total cropland area), the crop conditions were lower than the average level. The Maximum VCI map shows a low value of VCIx (0.85). CALF was at 37%, lower than the average level but higher than the same period last year. All in all, the agricultural conditions in the Loess region were close to the average.

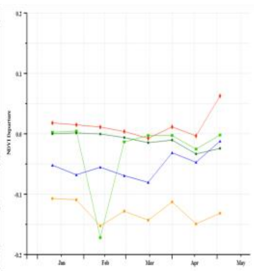
Figure 4.12 **Crop condition China Loess region, January - April 2022**



(a) Crop condition development graph based on NDVI

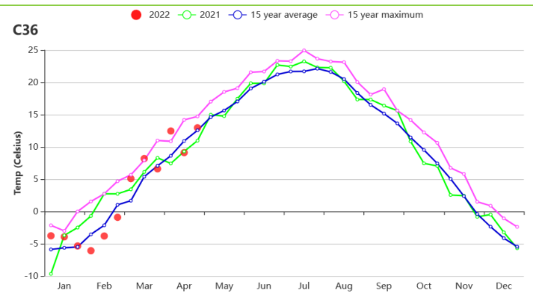


(b) Spatial NDVI patterns compared to 5YA

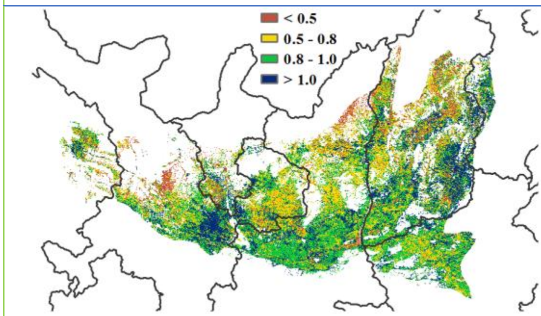


(c) NDVI profiles

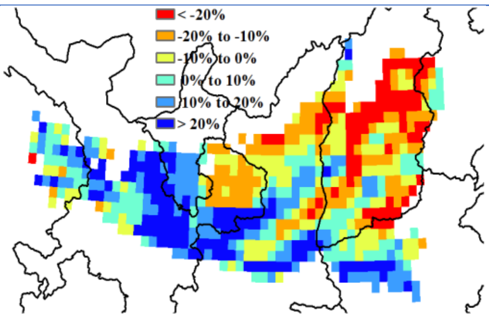
(d)Time series rainfall profile



(e)Time series temperature profile



(f) Maximum VCI



(g) Biomass departure

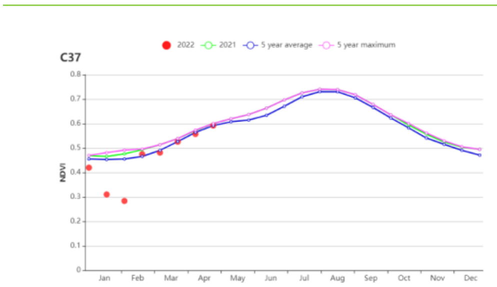
Lower Yangtze region

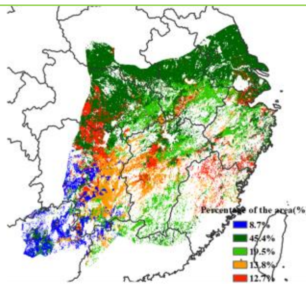
During this monitoring period, only winter crops like wheat and rapeseed were in the field, mostly in the north of the region, including parts in Hubei, Henan, Anhui and Jiangsu provinces. Limited winter crops were planted in Fujian, the southern Jiangxi and Hunan provinces.

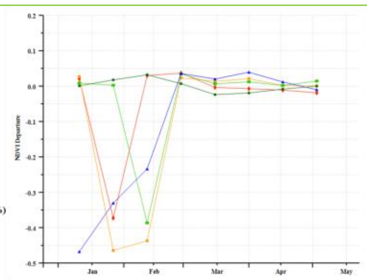
According to CropWatch agro-climatic indicators, the accumulated precipitation and temperature were 19% and 0.3℃ higher than the 15-year averages, respectively. The photosynthetically active radiation was slightly below average (RADPAR -2%) because of increased number of rainy days. The above-average precipitation resulted in an increase of biomass potential production by 6%, as compared to the 15YA. According to the NDVI-based crop development profiles, the crop growth was generally close to the average level during this period. The NDVI departure clustering analysis also reflected the overall normal crop growth conditions. 45.4% of the area, mostly distributed in the north of this region, including the central and southern Jiangsu, central Anhui, southern Henan and northern Hubei provinces, presented near-average crop conditions throughout this monitoring period. The crop condition in other parts had also been close to average since late February. The potential biomass departure map shows a similar pattern. The potential biomass levels in the northern part of the region were up to 20% higher than the average in previous years. The other parts generally had above-average potential biomass departures of up to 10%. The average VCIx of this region was 0.93, and most of the area had VCIx values ranging from 0.8 to 1. The proportion of NDVI anomaly categories showed most parts of the area had average or above-average crop conditions compared to previous years. The proportion of VHIm categories, as compared to the 5YA indicated that the crops in this area were minimally affected by drought.

Overall, the crop conditions in the Lower Yangtze region were normal..

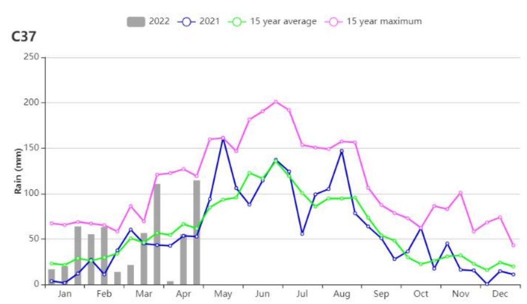
Figure 4.13 **Crop condition China Lower Yangtze region, January 2022 – April 2022**

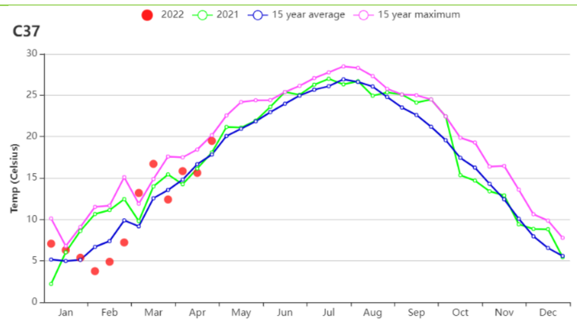




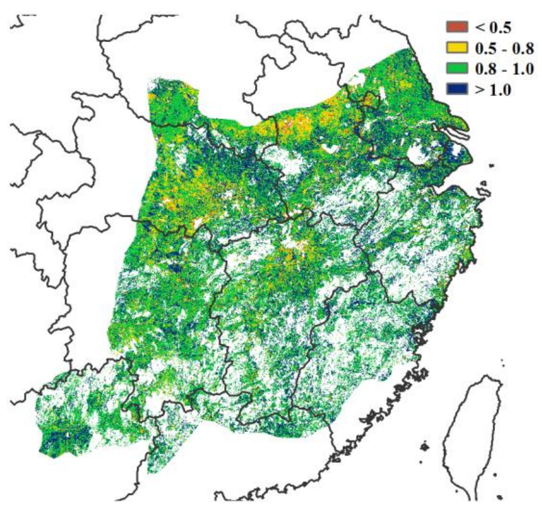


(a) Crop condition development graph based on NDVI (b) Spatial NDVI patterns compared to 5YA (c) NDVI profiles

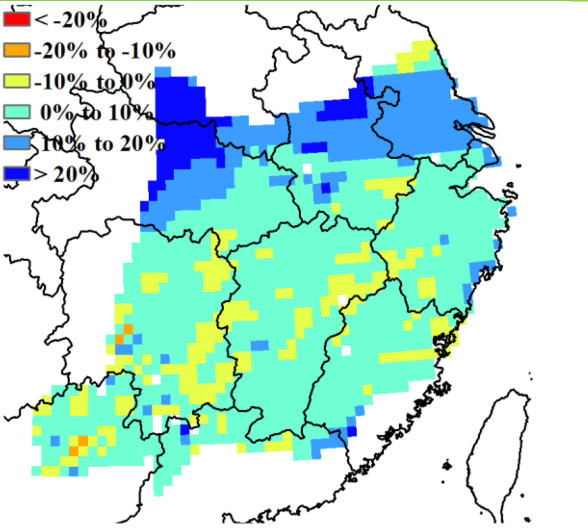




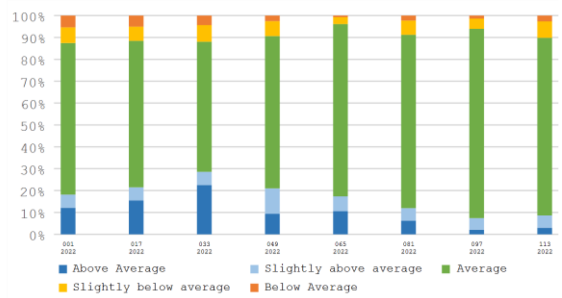
(d)Time series rainfall profile (e)Time series temperature profile



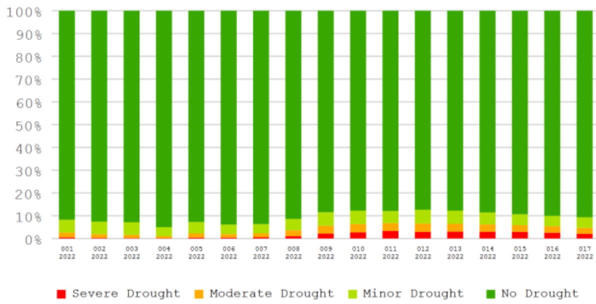
(f) Maximum VCI



(g) Biomass departure



(h) Proportion of NDVI anomaly categories compared with 5YA



(i) Proportion of VHIm categories compared with 5YA

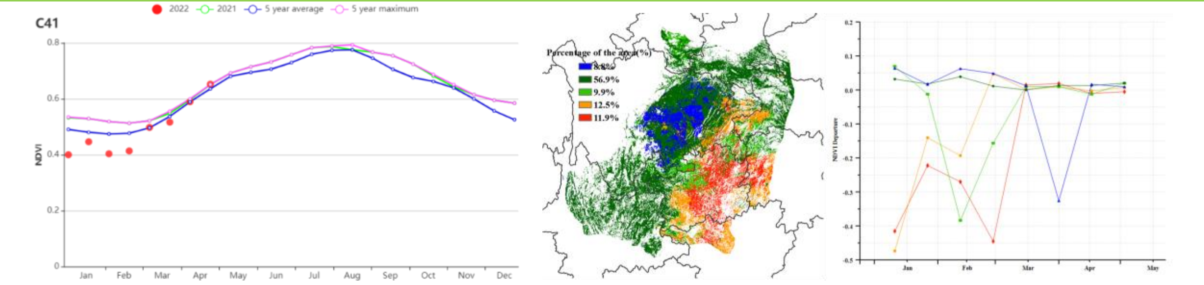
Southwest region

This report covers the overwintering periods upto to ripening stage of winter wheat in southwestern China. According to the regional NDVI profile, crop conditions were generally below the 5-year average before March and exceeded the average since April.

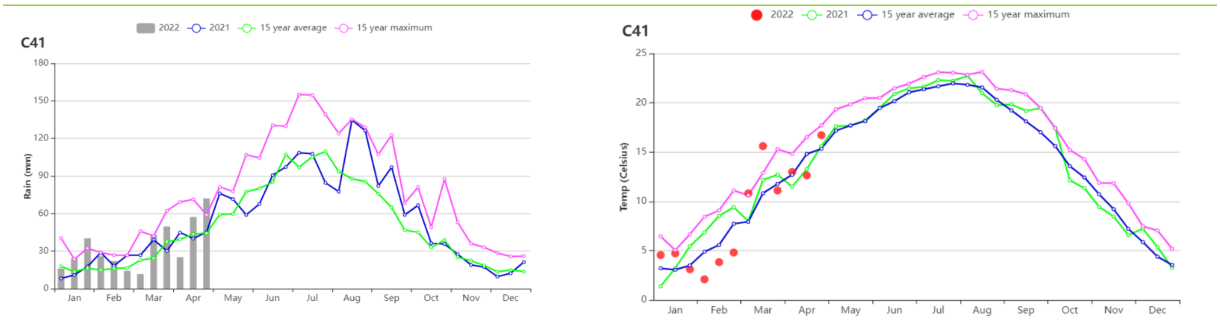
Rainfall was above the 15-year average (RAIN, +31%) but radiation was below average (RADPAR, -6%). Temperature was average (TEMP +0.1°C). The resulting BIOMSS was 12% above average mainly due to the above-average rainfall. The cropped arable land fraction remained at the same level as in the last five years.

According to the NDVI departure clustering map and the profiles, NDVI values were close to average in most areas after February. In Yunnan and Sichuan, the crop conditions were generally normal and above average during the monitoring period, mainly benefit from abundant precipitation (See Annex A.11), but crop growth was less favorable in Guizhou before March and below average in central-eastern Chongqing in February. The VCIx reached 0.99. All in all, crop conditions were generally average.

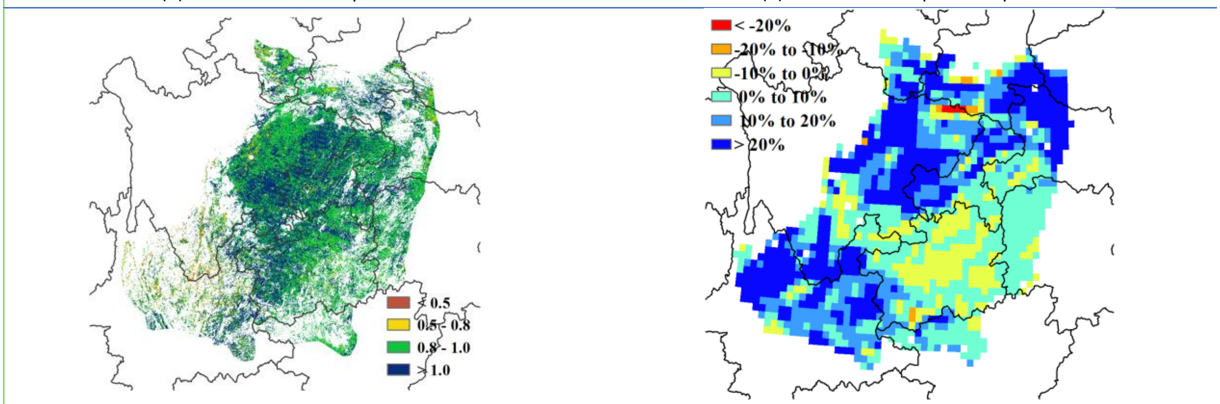
Figure 4.14 **Crop condition China Southwest region, January - April 2022**



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



(d)Time series rainfall profile (e)Time series temperature profile



(f) Maximum VCI (g) Biomass departure

Southern China

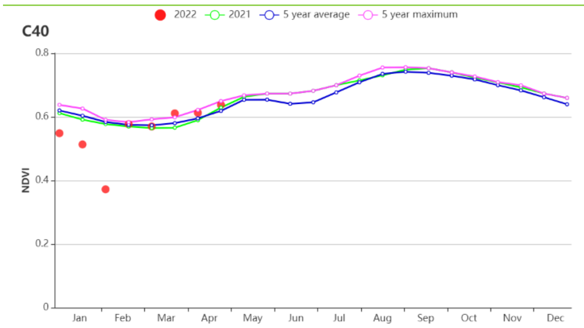
This reporting period covers the jointing, grain-filling up to maturity stages of winter wheat and seedling and transplanting of early rice in Southern China. According to the regional NDVI profile, crop conditions were in general slightly above average.

Rainfall (+13%) and radiation (+4%) were above the 15YA. Temperature was average. The BIOMSS was 7% above average mainly due to the above-average rainfall. The cropped arable land fraction remained at the same level as in the last five years.

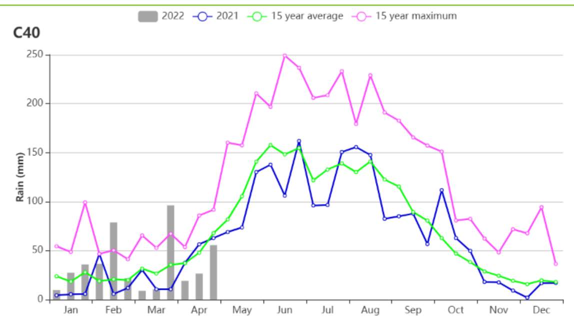
According to the NDVI departure clustering map and the profiles, values were close to average in most regions during this monitoring period in Southern China. In January and February, NDVI values in Guangxi and Guangdong were notably below average mainly due to excessive precipitation and lower temperature which slowed the growth of winter wheat and spring maize. The persistently above average rainfall from mid-January to mid-February has basically relieved the winter drought, prompting the crop conditions to above-average levels in the second half of the reporting period. In March, the temperature increased markedly, which was also good for the growth of rice seedlings. In April, weather conditions were favorable for the tillering of rice. The average VCIx of the Southern China region was 0.94, and most area had VCIx values ranging from 0.80 to 1.00. Low VCIx values were only scattered in Yunnan, Guangxi and Guangdong province which was consistent with the below-average BIOMSS map.

All in all, crop conditions were slightly above average.

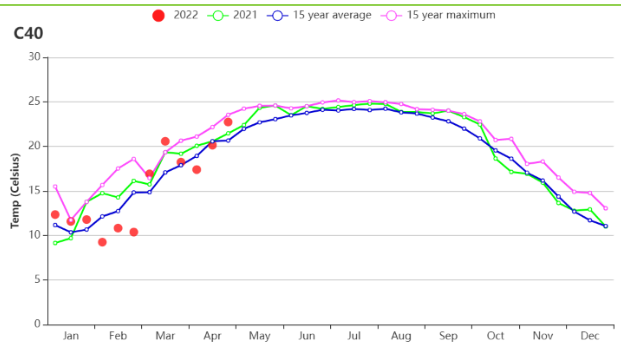
Figure 4.15 **Crop condition Southern China region, January - April 2022**



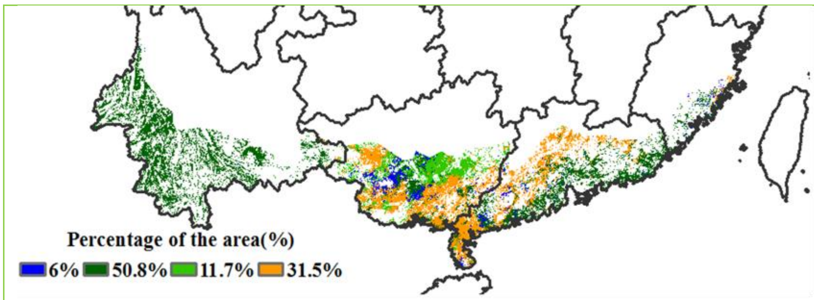
(a) Crop condition development graph based on NDVI



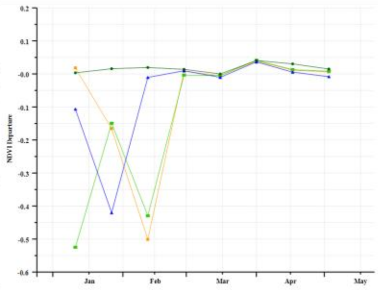
(b) Time series rainfall profile



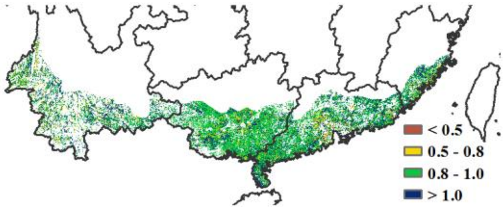
(c)Time series temperature profile



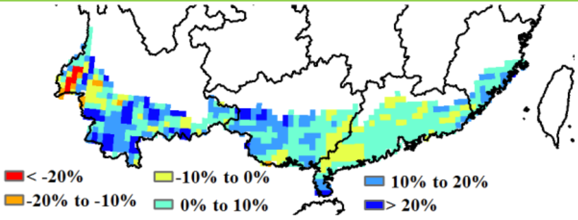
(d) Spatial NDVI patterns compared to 5YA



(e) NDVI profiles



(f) Maximum VCI



(g) Biomass departure

4.4 Major crops trade prospects

Trade prospects for major cereals and oil crop in China for 2022

Maize

In the first quarter, China imported 7.0983 million tonnes of maize, an increase of 5.5% over the same period of last year, with an import volume of US $2.289 billion. It was mainly imported from the Ukraine and United States, accounting for 56.4% and 41.7% of total imports, respectively. The export of maize was very limited, much less than 1000 tonnes.

Rice

In the first quarter, China imported 1.657 million tonnes of rice, an increase of 14.2% over the previous year, with an import volume of US $706 million. The main import sources were Pakistan, India, Thailand, Myanmar and Vietnam, accounting for 28.3%, 27.5%, 15.1%, 13.8% and 7.9% of the total imports, respectively. The export of rice was 428.8 thousand tonnes, a decrease of 34.7% over the same period last year, and the export volume was US $211 million. It is mainly exported to Egypt, Papua New Guinea, South Korea, Bulgaria and Côte d'Ivoire, accounting for 33.4%, 13.0%, 7.8%, 7.0% and 7.0% of the total exports, respectively.

Wheat

In the first quarter, China imported 3.051 million tonnes of wheat, an increase of 4.6% over the same period last year, with an import volume of US $1.123 billion. The main import sources were Australia, France and Canada, accounting for 52.5%, 37.5% and 9.8% of the total import, respectively. The export of wheat was 32.8 thousand tonnes, a decrease of 1.17 times over the same period last year, with an export volume was US $15.1323 million and the export price was US $462/ton. Wheat and mixed wheat was exported to Afghanistan.

Soybean

In the first quarter, China imported 20.295 million tonnes of soybeans, with a decrease of 4.1% over the same period last year, with an import volume was US $12.33 billion. The main import source countries were the United States and Brazil, accounting for 66.1% and 31.4% of the total import volume, respectively. The soybean export was 20.9 thousand tonnes, with an increase of 1.5% over the same period last year, and the export volume was US $27.1357 million. It was mainly exported to South Korea and Japan, accounting for 48.2% and 28.4% of the total export volume, respectively.

Trade prospects for major cereals and oil crop in China for 2022

On the basis of remote sensing-based production prediction in major agricultural producing countries in 2022 and the Major Agricultural Shocks and Policy Simulation Model, it is predicted that the import of major grain crops will decrease in 2022. The details are as follows:

In 2022, China's maize import decreased by 27.9%, and its export was basically the same as last year. The COVID-19 superimposed the impact of the dispute between Russia and Ukraine, the international maize price rose sharply, the advantage of maize import price weakened, the maize import fell from last year's high, and the export remained at a low level. It is estimated that China's maize imports will decrease in 2022.

In 2022, rice imports decreased by 5.4% and exports increased by 0.9%. Affected by the conflict between Russia and Ukraine and other factors, global grain prices have risen sharply, China's rice import demand has weakened, and the export is basically the same as last year. It is estimated that China's rice import will decrease in 2022.

In 2022, China's wheat import decreased by 31.7% and export decreased by 14.5%. Due to the conflict between Russia and Ukraine, the COVID-19 and other factors, the international wheat prices rose sharply, resulting in a sharp decline in wheat imports. Wheat exports remained at a low level. Wheat imports are expected to decrease significantly in 2022.

In 2022, China's soybean import decreased by 4.7%, and the export was basically the same as last year. Due to the vigorous implementation of the soybean and oil production capacity improvement project in China, the soybean sowing area, yield and self-sufficiency rate will rise steadily from 2022. China's soybean imports are expected to decrease in 2022.

Figure 4.16 Rate of change of imports and exports for rice, wheat, maize, and soybean in China in 2022 (%)