Chapter 4. China

After a brief overview of the agro-climatic and agronomic conditions in China over the reporting period (section 4.1), Chapter 4 presents an updated estimate of major cereals and soybean production at provincial and national levels as well as summer crops production and total annual outputs (4.2) and describes the situation by region, focusing on the seven most productive agro-ecological regions of China: Northeast China, Inner Mongolia, Huanghuaihai, Loess region, Lower Yangtze, Southwest China, and Southern China (4.3). Section 4.4 describes trade prospects of major cereals and soybean. Additional information on the agro-climatic indicators for agriculturally important Chinese provinces is listed in table A.11 in Annex A.

4.1 Overview

From the perspectives of agroclimatic indicators, the overall conditions were generally normal in China from July to October 2022. The only exception was that the drought and heat affected Lower Yangtze River basin. Temperature and radiation were above average by 0.8°C and 9%, respectively, while rainfall was 27% below average. As a result, the potential biomass was 7% smaller than the 15YA. The maximum Vegetation Condition Index (VCIx) was quite high at 0.92. The national Cropping Intensity (CI) was 5% above the 5YA, but was close to that of 2021. Moreover, the mean of CALF for the whole country was at an average level compared to the 5YA. The national mean value of Crop Production Index (CPI) is 1.16, indicating a good crop production status.

Over the entire growing period, all of the main agricultural regions of China except Northeast China (+21%) recorded below-average rainfall, with the largest negative departure occurring in Lower Yangtze region (-47%). According to the spatial distribution of rainfall profiles, blue marked regions (62.6% of the cultivated regions) had slightly above average rainfall during the whole monitoring period, while other cultivated regions had below-average rainfall almost during the whole monitoring period. It is worth noting that 7.7% of the cultivated regions (marked in light green) experienced positive rainfall departure larger than 150 mm/dekad, mainly located in Guangdong and some parts of Hunan, Guangxi, and Fujian.

Six of the main agricultural regions in China recorded above-average temperatures ranging from +0.3℃ (Inner Mongolia) to +1.2℃ (Lower Yangtze region), while only Northeast China recorded below-average temperatures with negative departures of -0.3°C. The map of the spatial distribution of temperature profiles indicates that temperatures fluctuated during the monitoring period as follows: 30.3% of the cultivated regions experienced relatively smoother temperature variation, while other regions had some fluctuations in temperature during certain periods. 34.4% of the cultivated regions suffered from positive temperature departure larger than +3.0℃ in early and middle August, mainly located in northern parts of Lower Yangtze region, Southwest China and some parts of Loess region and Huanghuaihai region. The rest 35.3% of the cultivated regions mainly had below-average temperature during the whole monitoring period, mainly distributed in Northeast China, Inner Mongolia and some parts in Huanghuaihai region.

As for RADPAR, all of the main agricultural regions in China received average or above-average radiation as compared to the 15YA. With respect to BIOMSS, only Northeast China had positive departures of 9% as a result of abundant rainfall, while all the others had negative BIOMSS departure with a range from -20% (Lower Yangtze region) to -4% (Loess region and Huanghuaihai). As can be seen in the spatial distribution of potential biomass departure from the 15YA, most parts of China had negative departures, but there were areas with positive departures, mainly concentrated in some parts in Shandong, Liaoning and Jilin, as confirmed by the statistics at AEZ level.

The VCIx values were all greater than or equal to 0.89 in all of the main producing regions of China, with values between 0.89 (Lower Yangtze region) and 0.96 (Northeast China). Nationally, CALF was average in all AEZs of China as compared to the 5YA. Among them, Inner Mongolia recorded slightly below-average CALF (-1%) while all the remaining regions showed an average CALF. When it comes to the cropping intensity (CI), values of 200% are mainly concentrated in the North China Plain with the wheat-maize rotation system while values of 300% are sparsely distributed in Southwestern and Southern China. The largest CI departure occurred in Southwest China (+18%), and CI in Lower Yangtze River, Southwest, Huanghuaihai, and the Loess region presented above 5YA CI but was in general close to that of 2021.VHIn maps show that agricultural drought mainly occurred in Southwest China and Lower Yangtze region, especially in the provinces of Jiangxi, Anhui, Jiangsu, Chongqing, Sichuan, Hubei, and Hunan. The combination of high temperatures and drought caused unfavorable conditions for rice production in these provinces. Regarding CPI values for AEZs, Northeast China had the biggest CPI value at 1.19 under agreeable agroclimatic conditions.

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

Region	Agroclimatic indicators				Agronomic indicators		
	Departure from 15YA (2007-2021)				Departure from 5YA (2017-2021)		Current period
	RAIN (%)	TEMP (°C)	RADPAR (%)	BIOMSS (%)	CALF (%)	Cropping intensity (%)	Maximum VCI
Huanghuaihai	-14	0.8	3	-4	0	8	0.92
Inner Mongolia	-8	0.3	4	-5	-1	1	0.93
Loess region	-10	1	3	-4	0	4	0.93
Lower Yangtze	-47	1.2	13	-20	0	12	0.89
Northeast China	21	-0.3	0	9	0	0	0.96
Southern China	-23	0.7	12	-8	0	11	0.92
Southwest China	-28	1.1	12	-8	0	18	0.93

Figure 4.1 China crop calendar

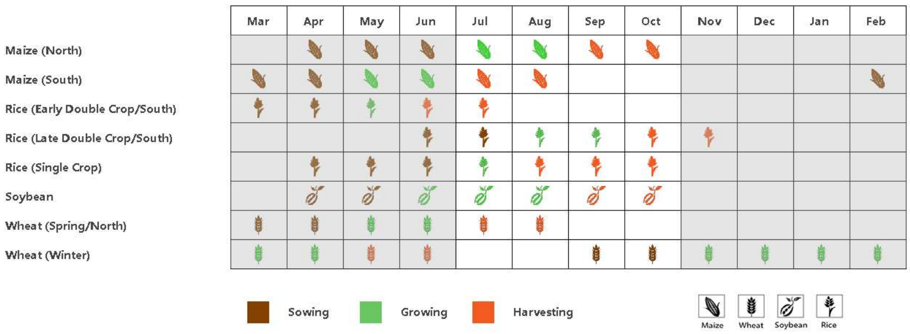
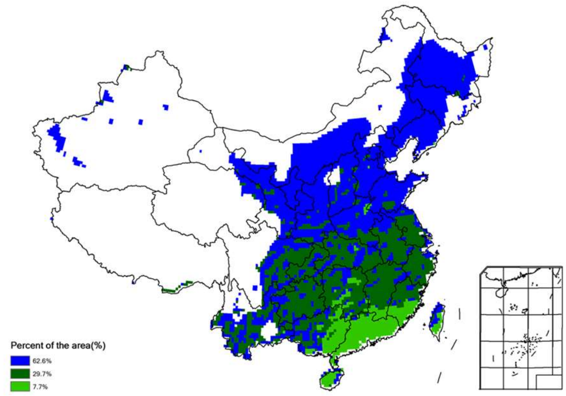


Figure 4.2 China spatial distribution of rainfall profiles, July to Oct 2022



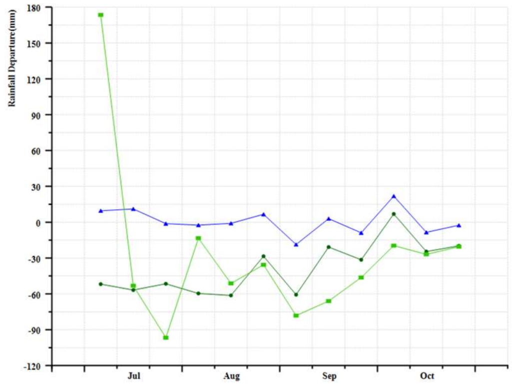


Figure 4.3 China spatial distribution of temperature profiles, July to Oct 2022

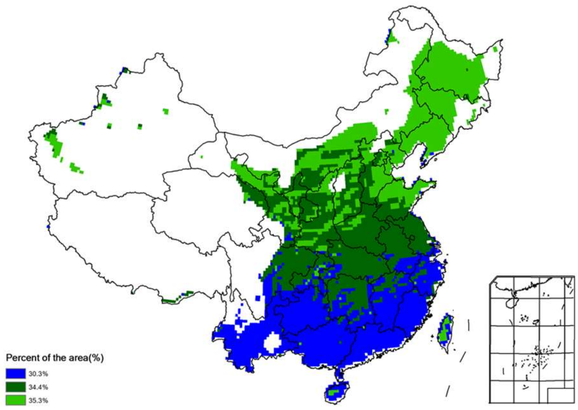
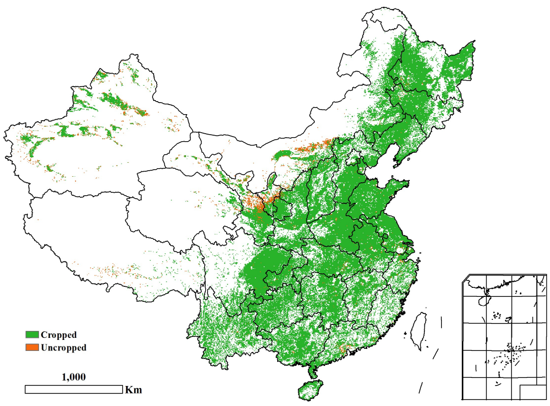


Figure 4.4 China cropped and uncropped arable land, by pixel, July to Oct 2022

Figure 4.5 China maximum Vegetation Condition Index (VCIx), by pixel, July to Oct 2022



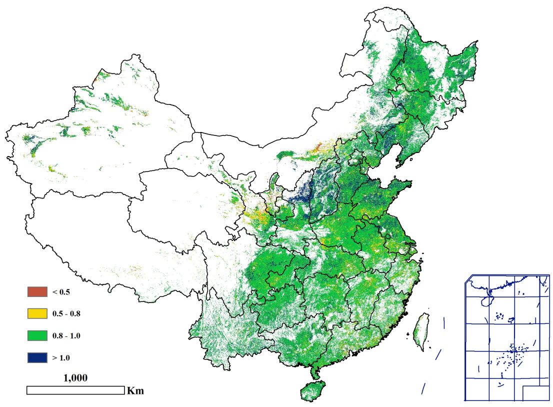
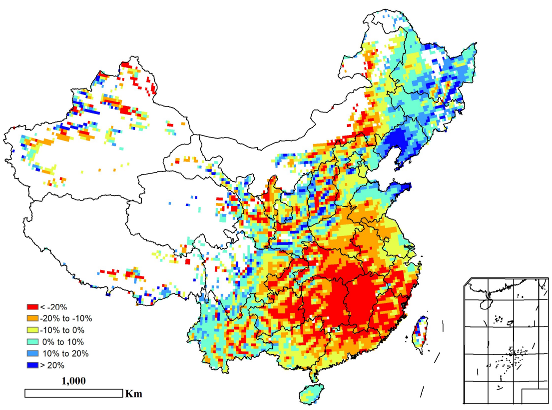


Figure 4.6 China biomass departure map from 15YA, by pixel, July to Oct 2022

Figure 4.7 China minimum Vegetation Health Index (VHIn), by pixel, July to Oct 2022



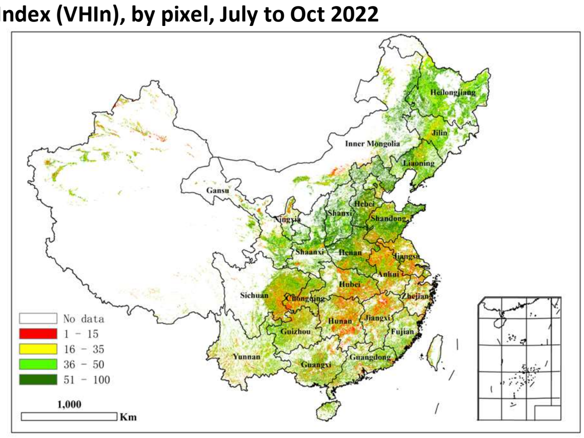
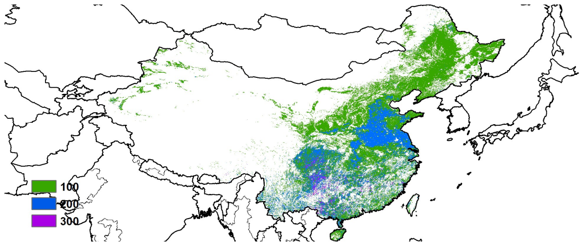


Figure 4.8 China Cropping Intensity (CI), by pixel, 2022



4.2 China's crops production

The agro-climatic conditions during 2022 summer crops growth process, the national agricultural meteorological conditions are generally close to the average conditions, but regional differences, showing a pattern of persistent high temperatures in the south and more rain in the north. since July, the Yangtze River basin has seen persistent high temperatures and less rain, high temperature and dry weather has continued until the first and middle of August, the adverse impact on the growth of crops in this region, resulting in Sichuan, Chongqing, Jiangxi, Hunan and other places. The growth was significantly lower than the average level in the past five years. Northeast China, most of Shandong, Shaanxi and Shanxi had normal temperatures and high precipitation, with generally better-than-average crop growth. The negative impact of local flooding was generally limited, with the disaster-forming effects mainly distributed in parts of southern Gansu.

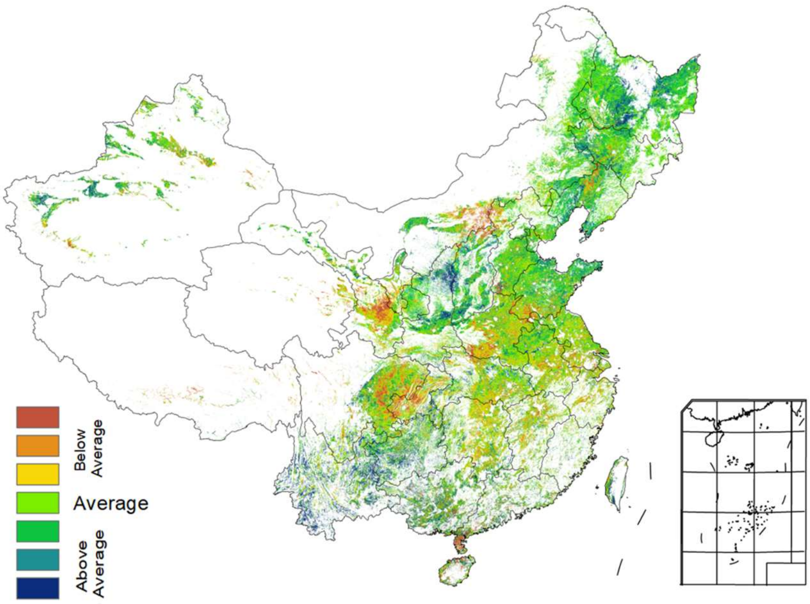


Figure 4.9 Crop growth during the peak growth period of summer crop crops in China in mid-August 2022 (compared with the average of recent 5 years)

China's total crop production in 2022 is 646.74 million tons, a decrease of 5.48 million tons or 0.8% year-on-year. Among them, the total production of staple crops (wheat and rice) is 329.53 million tons, a slight decrease of 1.76 million tons, or 0.5%; As a result of crop type shifting policy, the total production of summer crops (including maize, semi-late rice, late rice, spring wheat, soybeans, legumes and tuber crops) is 476.96 million tons, a decrease of 4.75 million tons, or 1.0%, compared with 2021; the total production of winter crops (winter wheat, rapeseed, and other minor crops) is 142.23 million tons, down 0.98 million tons, or 0.7%. The main reason for the reduction in winter crops production is the year-on-year decline of

1.9% in planted area; total production of early rice was 27.55 million tons, an increase of 0.25 million tons, or 0.9%. As far as the provinces are concerned, most of the provinces in the Yangtze River Basin saw a year-on-year decrease in summer crop production. Among them, Jiangxi (-4.7%), Sichuan (-4.5%), Chongqing (-4.1%), Hubei (-2.3%) and Hunan (-2.2%) had slightly larger reductions in their summer crops. Anhui, Jiangsu and Zhejiang summer crop production also fell slightly. Heilongjiang and Inner Mongolia due to the shrinkage of maize planted area, summer crop production decreased by 5.2% and 2.5% respectively. Summer crop yields increased in Xinjiang (+5.7%), Shanxi (+1.8%), Fujian (+1.8%) and Jilin (+1.7%) due to generally better agro-meteorological conditions than last year. As the summer crops production occupy the majority of annual crops production, the intre-annual variations of annual crops production in the above provinces is in general close to that of summer crops production.

Table 4.2 Summer crop and annual crop production and variation in China in 2022

	Summer crop		Total annual production	
	Production (1000 tonnes)	Variation (%)	Production (1000 tonnes)	Variation (%)
Anhui	20169	-1.4	35888	-2
Chongqing	7862	-4.1	7862	-4.1
Fujian	5190	1.8	6072	1.8
Gansu	6842	-1.3	10405	-0.4
Guangdong	7837	-1.8	11991	-1.7
Guangxi	9391	-0.4	14129	0
Guizhou	12672	-0.9	12672	-0.9
Hebei	21253	0.4	33761	-0.5
Heilongjiang	76543	-5.2	76543	-5.2
Henan	24378	-0.8	57031	-1.3
Hubei	18600	-2.3	25652	-1.9
Hunan	18913	-2.2	27872	-0.6
Inner Mongolia	33402	-2.5	33402	-2.5
Jiangsu	20337	-0.5	34324	-0.2
Jiangxi	9959	-4.7	15822	-2.8
Jilin	40792	1.7	40792	1.7
Liaoning	21323	0.7	21323	0.7
Ningxia	2796	1.3	2796	1.3
Shaanxi	7623	-0.6	11689	-1
Shandong	20511	0.8	47663	0.1
Shanxi	9345	1.8	11684	2.3
Sichuan	26468	-4.5	32424	-3.3
Xinjiang	9988	5.7	15106	4
Yunnan	15343	0.5	15343	0.5
Zhejiang	6292	-1.1	6879	-0.9
subtotal	453829	-1.5	609125	-1.3
China	476959	-1	646736	-0.8

Maize: China's total maize production in 2022 was 227.19 million tons, down 6.65 million tons or 2.8% year-on-year, with the main reason for the decrease being a 3.2% year-on-year reduction in maize planted area. Although some of the main production areas suffered from extreme heat and drought and local flooding disasters and other unfavorable factors, but China's northeast and the Huanghuaihai regions and other areas of the main maize production areas are growing well, yield increased year-on-year. The national average maize yield is expected to be 5,560 kg/ha, a slight increase of 0.4%.

In northeastern China, rainfall was significantly higher than normal, resulting in localized flooding in northwestern Heilongjiang, central Jilin and north-central Liaoning, but sufficient precipitation contributed to generally better crop growth than in 2021. Maize yields increased in Jilin (+1.2%), Liaoning (+1.5%) and Heilongjiang (+2.9%). As China's largest maize-producing regions, northeastern Inner

Mongolia and Heilongjiang saw the most significant shrinkage in maize acreage. This led to a 4.9% and 12.7% year-on-year decline in maize production in two provinces and regions, respectively. Persistent high temperature weather in the Yangtze River basin since July led to severe drought in Chongqing and Sichuan provinces and cities, resulting in maize yield decreases of 6.4% and 9.4%, respectively. Jiangsu maize planted area decreased year-on-year, resulting in a 2.5% reduction in maize production. Maize production increased in Shandong (+0.8%), Shanxi (+1.8%), Yunnan (+3.2%) and Xinjiang (+7.0%), thanks to generally favorable agro-meteorological conditions during the reproductive period.

Soybean: The year 2022 was the largest year for soybean planted in China in 10 years, reaching 9.851 million ha, an increase of 2.043 million ha or 26.2% from the previous year. The national average yield was 1,846 kg/ha, an increase of 0.5% year-over-year. China's soybean production reached 18.19 million tons, an increase of 3.84 million tons or 26.8% year-over-year, the largest increase in 10 years.

The soybean planted area in Heilongjiang Province reached 4.962 million ha, an increase of 1.384 million ha or 38.7% from 3.578 million ha in 2021. Soybean planted area in Inner Mongolia reached 1.486 million ha, an increase of 0.438 million ha, or 41.8%. compared with 1.048 million ha in 2021. The significant expansion of planted area contributed to the increase in soybean production in the two provinces and regions, by 1.98 million tons and 0.5 million tons, an increase of 41.3% and 41.0%, respectively. In addition, soybean production in provinces such as Henan, Hebei, Jiangsu, Shandong and Shanxi also increased to varying degrees. The direct reason for the significant increase in soybean planted area is the increase in soybean planted subsidies. The multi-pronged measures of soybean producer subsidies, arable land rotation subsidies and soybean planted seed subsidies have bridged the income gap between planted soybeans and maize, and all relevant subsidies are directly issued to the actual planted farmers, which has mobilized farmers to plant soybeans.

Table 4.3 production and amplitude of maize, rice, wheat and soybean in China in 2022

	Maize		Rice		Wheat		Soybean	
	Production (1000 tonnes)	Variation (%)	Production (1000 tonnes)	Variation (%)	Production (1000 tonnes)	Variation (%)	Production (1000 tonnes)	Variation (%)
Anhui	3589	1	16087	-2.1	14181	-2	1071	-0.2
Chongqing	1984	-6.4	4624	-3.1				
Fujian			2251	1.8				
Gansu	5497	-1.2			2610	5.2		
Guangdong			10318	-1.6				
Guangxi			9956	0.1				
Guizhou	5147	-0.7	5480	-1.1				
Hebei	19297	0.4			12199	-2	201	2.4
Heilongjiang	43870	-12.7	22774	2			6768	41.3
Henan	15246	-0.7	3701	-2	32508	-1.6	834	3.3
Hubei			14905	-2.3	4470	-0.1		
Hunan			25043	-0.4				
Inner Mongolia	23433	-4.9			1975	0.2	1707	41
Jiangsu	2137	-2.5	16148	-0.6	13574	-0.6	825	7.5
Jiangxi			14602	-2.7				
Jilin	32066	2.1	5889	1.6			720	-12.1
Liaoning	16449	0.6	4645	1.2			431	-1.4
Ningxia	1689	-0.3	481	7.2				
Shaanxi	3807	-0.1	978	-3.3	4003	-1.3		
Shandong	19363	0.8			26909	-0.4	720	0.7
Shanxi	9347	1.8			2264	4.4	166	4.5
Sichuan	6535	-9.4	14855	-2.2	1972	2.7		
Xinjiang	7432	7			5017	1.1		
Yunnan	6629	3.2	5740	-2.6				
Zhejiang			6217	-0.9				

	Maize		Rice		Wheat		Soybean	
	Production (1000 tonnes)	Variation (%)	Production (1000 tonnes)	Variation (%)	Production (1000 tonnes)	Variation (%)	Production (1000 tonnes)	Variation (%)
subtotal	223518	-3	184695	-0.9	121682	-0.8	13443	22.5
China	227191	-2.8	195335	-0.6	134198	-0.5	18185	26.8

Rice: The total national rice production was 195.33 million tons, a decrease of 1.09 million tons or 0.6% year-on-year. Among them, the production of early rice was 27.55 million tons, an increase of 0.25 million tons or 0.9% year-on-year. The production of semi-late rice/single rice was 133.75 million tons, a decrease of 0.39 million tons, or 0.3%. Late rice production was 34.03 million tons, down 0.95 million tons, or 2.7%. Since the sowing of semi-late rice/single rice, generally favorable agrometeorological conditions in the northern single rice producing areas, with single rice production in Liaoning, Jilin and Heilongjiang increasing by 1.2%, 1.6% and 2.0% year-on-year. Persistent extreme heat in the main rice producing areas of the Yangtze River Basin started since the maturity stages of semi-late rice. The impacts of heat and drought on semi-late rice was limited. Hunan (-0.6%), Jiangxi (-1.2%), Anhui (-2.1%), Hubei (-2.1%), Sichuan (-2.2%) and Chongqing (-3.1%) saw slight year-over-year declines in production. The persistent extreme heat and dry weather covered almost the entire fertility period of late rice in the Yangtze River Basin, which was unfavorable to late rice production, resulting in a 2.7% year-on-year decrease in national late rice production. Although persistent hot and dry weather resulted in severe meteorological drought, but the agricultural drought was less severe thanks to the well-developed agricultural infrastructures which compensated for the meteorological drought. Even though, late rice production in Jiangxi (-6.3%), Zhejiang (-4.1%), Hunan (-4.0%), Hubei (-2.9%) and Anhui (-2.0%) all still declined year-over-year. Guangdong and Guangxi late rice production also declined to varying degrees year-on-year. Only Fujian late rice production increased year-on-year by 1.8%.

Table 4.4 Early, semi-late and late rice production and variation (%) by province in China, 2022

	Early rice		Semi-late rice/single rice		Late rice	
	Production (1000 tonnes)	Variation (%)	Production (1000 tonnes)	Variation (%)	Production (1000 tonnes)	Variation (%)
Anhui	1058	-2.2	13467	-2.1	1562	-2
Chongqing			4624	-3.1		
Fujian	881	1.8			1370	1.8
Guangdong	4154	-1.3			6165	-1.8
Guangxi	4738	0.7			5219	-0.4
Guizhou			5480	-1.1		
Heilongjiang			22774	2		
Henan			3701	-2		
Hubei	866	-3.7	10875	-2.1	3164	-2.9
Hunan	8959	3.1	8387	-0.6	7697	-4
Jiangsu			16148	-0.6		
Jiangxi	5863	0.5	2954	-1.2	5785	-6.3
Jilin			5889	1.6		
Liaoning			4645	1.2		
Ningxia			481	7.2		
Shaanxi			978	-3.3		
Sichuan			14855	-2.2		
Yunnan			5740	-2.6		
Zhejiang	587	1.6	4795	-0.6	835	-4.1
subtotal	27106	0.9	125793	-0.7	31797	-3
China	27551	0.9	133749	-0.3	34035	-2.7

4.3 Regional analysis

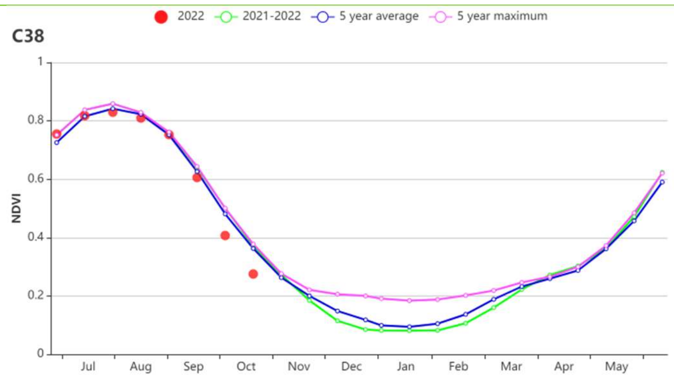
Figures 4.10 through 4.16 present crop condition information for each of China's seven agricultural regions. The provided information is as follows: (a) Phenology of major crops; (b) Crop condition development graph based on NDVI, comparing the current season up to October 2022 to the previous season,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

Northeast region

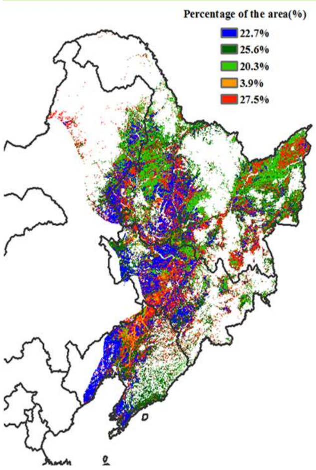
The current monitoring period (July to October) covered the peak of the summer crops in July until the harvest in September and October in northeast China. The crops, including maize, rice and soybeans, reached maturity stage in August to September in Heilongjiang, Jilin and Liaoning provinces, and the harvest was mostly completed by the end of October. Overall, crop growth in northeast China was normal from July to mid-September, but was slightly lower than average after mid-September. Precipitation in northeast China was 21% higher than the average level, the average temperature was 0.3°C lower. Temperatures were close to average during the current monitoring period except in late August and early October. During the monitoring period, the potential biomass in northeast China was 9% above the fifteen-year average. The eastern parts of northeast China were significantly above average, and this could be attributed to the abundant rainfall and moderate temperatures. While biomass estimates for western parts of northeast China were slightly less than average due to excessive precipitation.

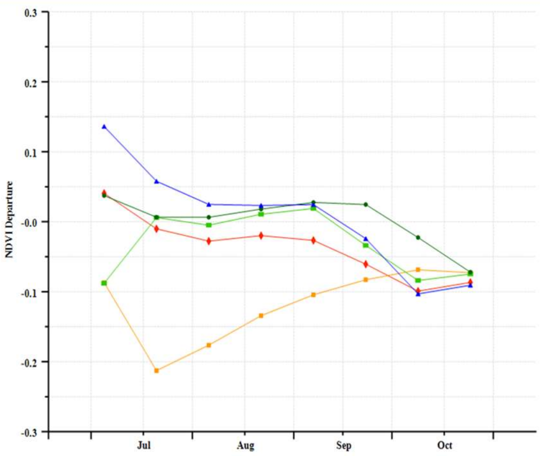
The crop conditions during the monitoring period were in general close to average but spatial variations existed. As shown by NDVI clusters and profiles, 3.9% of cropland over western Liaoning province and Jilin province were observed with negative NDVI departures, indicating that crops in this area were in relatively poor conditions. The spatial distribution map of the VCI shows that the crops in the whole northeast region were in good conditions, with VCIx values higher than 0.8 in almost all areas, except for small parts in the western part in Jilin and Liaoning province. In general, crops in northeast China grow well in 2022, with good prospects for crop yield.

Figure 4.10 Crop condition China Northeast region, July-October 2022

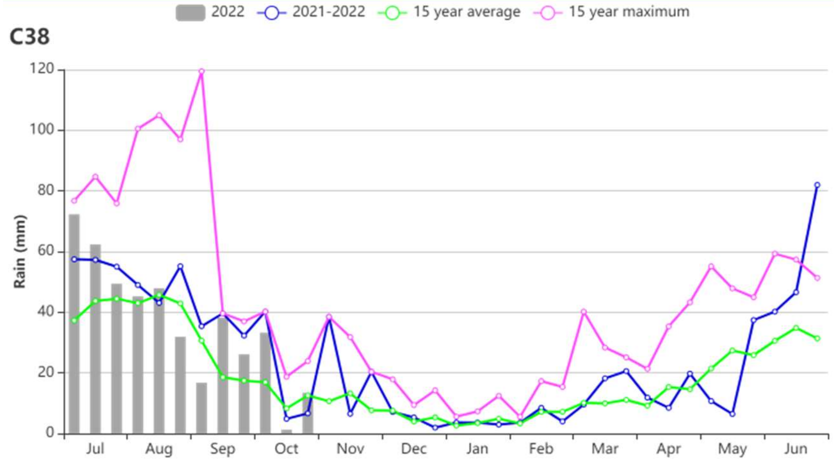


(a) Crop condition development graph based on NDVI

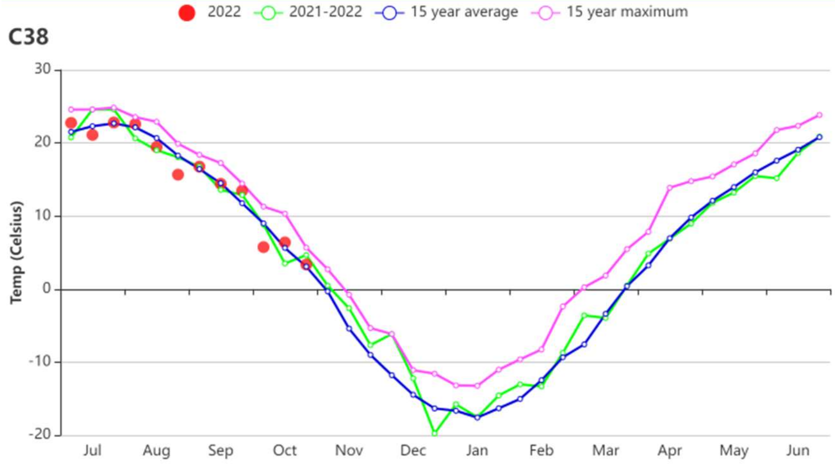




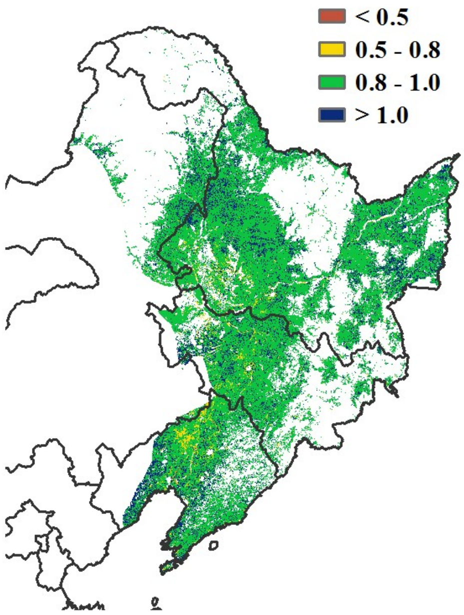
(b) Spatial NDVI patterns compared to 5YA (c) NDVI profiles



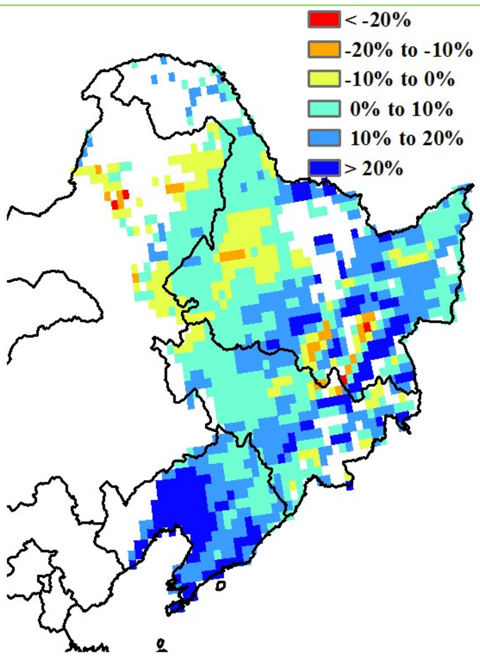
(d) Time series rainfall profile



(e) Time series temperature profile



(f) Maximum VCI



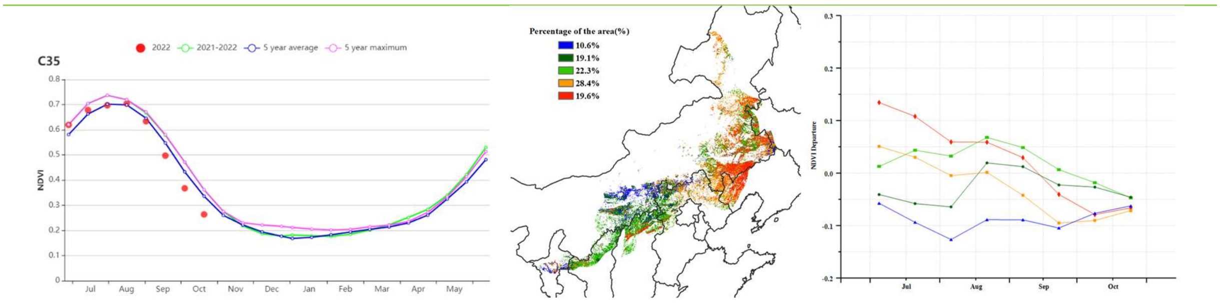
(g) Biomass departure

Inner Mongolia

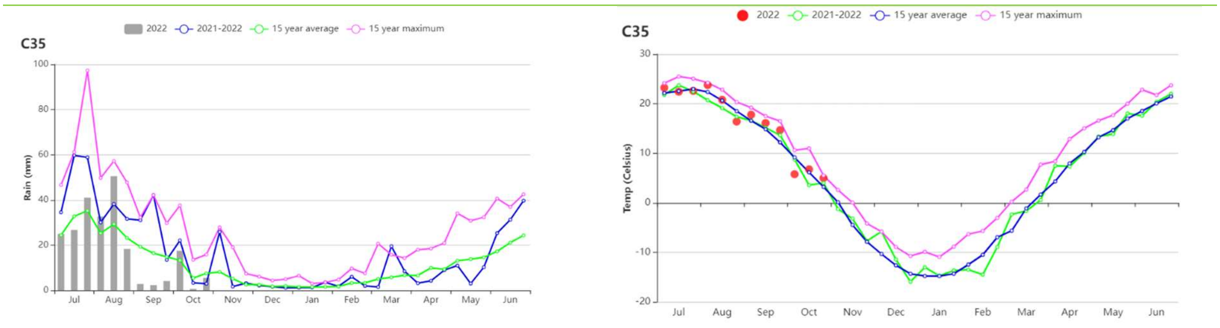
During this monitoring period, maize and soybean are the main summer crops grown in Inner Mongolia.

CropWatch Agroclimatic Indicators (CWAIs) show that rainfall was slightly below average (-8%). TEMP and RADPAR were both above average (+0.3°C and +4%, respectively). Insufficient rainfall resulted in a lower-than-average potential BIOMSS estimate (-5%). The NDVI development graph indicates slightly above-average crop conditions during July and August, but conditions then dropped to below the 5YA in September and October. The spatial NDVI patterns show that 29.7% of the crops were below the 5YA, mainly distributed in northern Shanxi and central Inner Mongolia. The rest of the cropped areas showed a continuous deterioration from above average to below average over time, but in general with above average crop condition during peak growing season. The fraction of cropped arable land (CALF) reached 95% and VCIx was above average (0.93). On the whole, Inner Mongolia is expected to have close to average crop production.

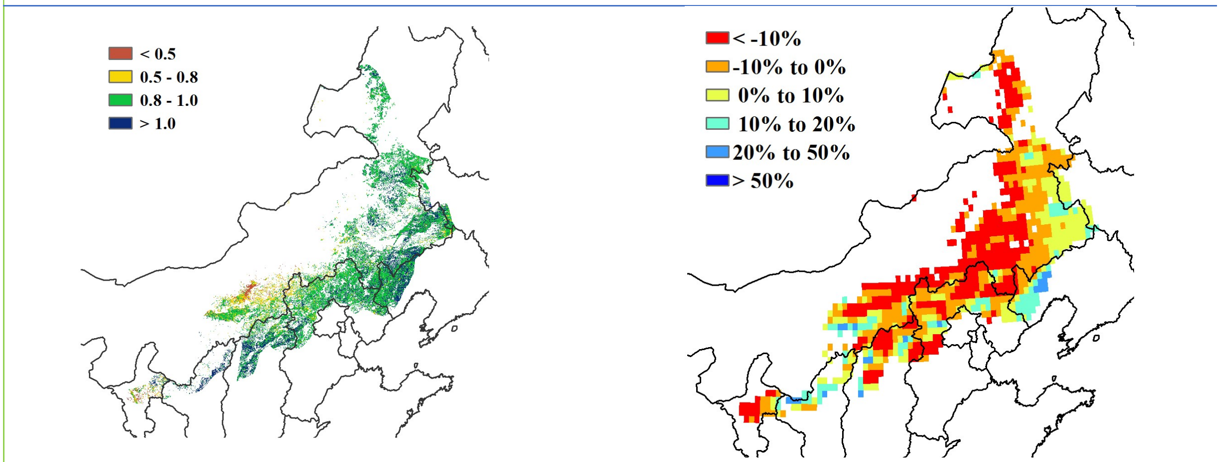
Figure 4.11 Crop condition Inner Mongolia, July - October 2022



(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

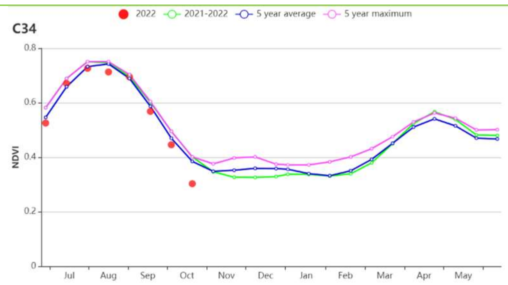
Huanghuaihai

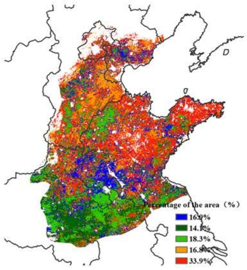
This report covers the main growing period for maize, which reached maturity in late September or early October. The winter wheat sowing started in early October. As presented by the agro-climate indicators, the temperature (+0.8°C) and radiation (+3%) in this area were above the 15YA, but precipitation was below (-14%), which resulted in below-average biomass production potential (BIOMSS -4%). Significantly above-average BIOMSS was located in northern Shandong, southeastern Beijing, and Qinhuangdao.

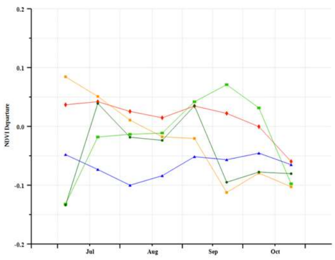
According to the NDVI development graph, crop conditions were favorable before August due to sufficient rainfall, while a lack of rainfall since August led to a slight deterioration in crop conditions. Significant above average rainfall was observed in early October which improved the soil moisture, benefiting for winter crops emergence and early development. As the NDVI departure clustering map shows, 33.9% of cropland was always slightly above average before mid-October, widely located in Shandong, central Hebei, and northeastern Henan. 16.8% of the cropped area in central Hebei and southwestern Shandong (blue colors in the NDVI departure clustering map) experienced poor crop conditions during the whole monitoring period.

The CALF is similar to the 5YA, and the maximum VCI value was 0.92. The Crop Production Index (CPI) is 1.18. Overall, crop conditions were average during the period.

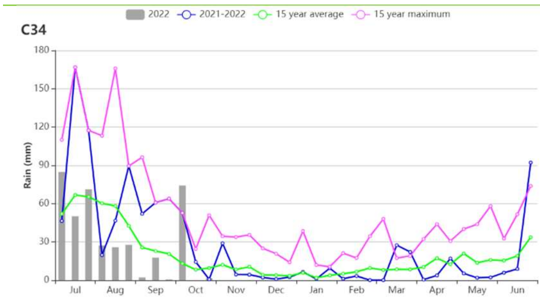
Figure 4.12 Crop condition China Huanghuaihai, July - October 2022



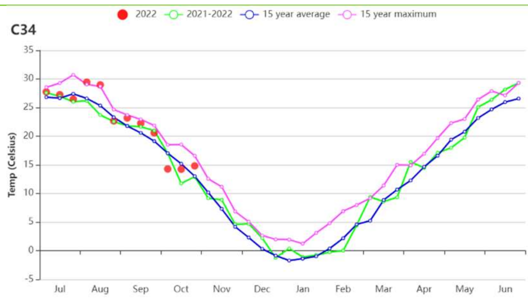




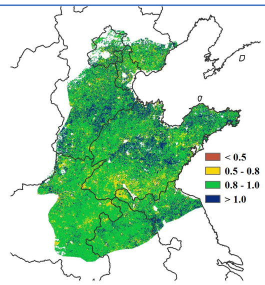
(a) Crop condition development graph based on NDVI (b) Spatial NDVI patterns compared to 5YA (c) NDVI profiles



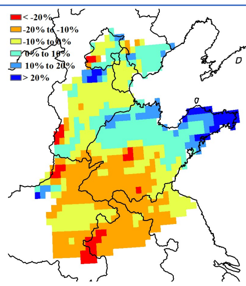
(d)Time series rainfall profile



(e)Time series temperature profile



(f) Maximum VCI



(g) Biomass departure

Loess region

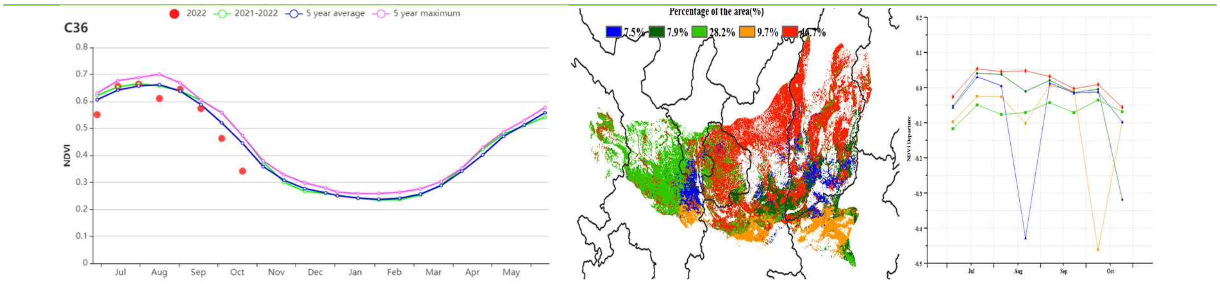
During the reporting period, maize was harvested in late September and early October, and then the sowing of winter wheat was completed.

The CropWatch Agro-climatic Indicators (CWAIs) of the Loess Region show that the rainfall was below average (-10%), temperature was 1℃ higher, and radiation was above average by 3%. The combined effect resulted in potential biomass that was 4% below the average compared to the 15YA.

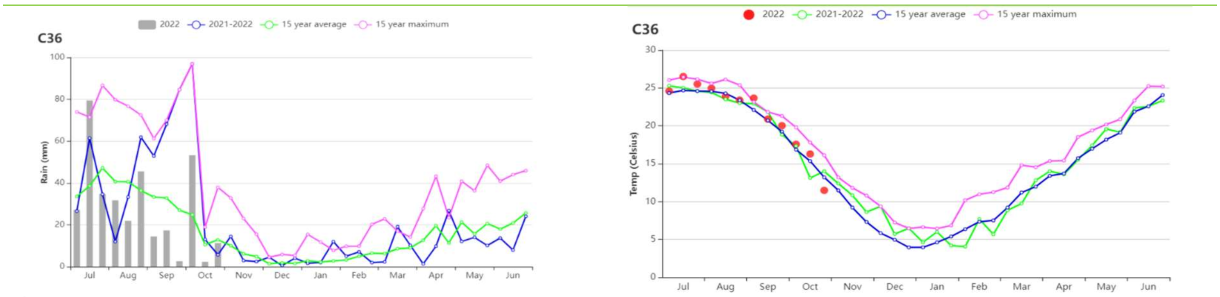
According to the regional NDVI development graph, the crop conditions in the Loess region hovered around the 5YA during the monitoring period except for late August and late September. The NDVI departure cluster profiles indicate that about 37.9% of the crop conditions were below the average throughout the entire monitoring period, mainly in the western and southern Loess Region. Crop conditions in other areas were close to average during the monitoring period. It is noteworthy that crop condition was in general above average during peak growing season. VCIx for the region was 0.93, indicating favorable crop condition during the monitoring period. The fraction of cropped arable land (CALF) in the whole region is as high as 97%, which is comparable to the average.

All in all, the crop conditions in the Loess region were at the average.

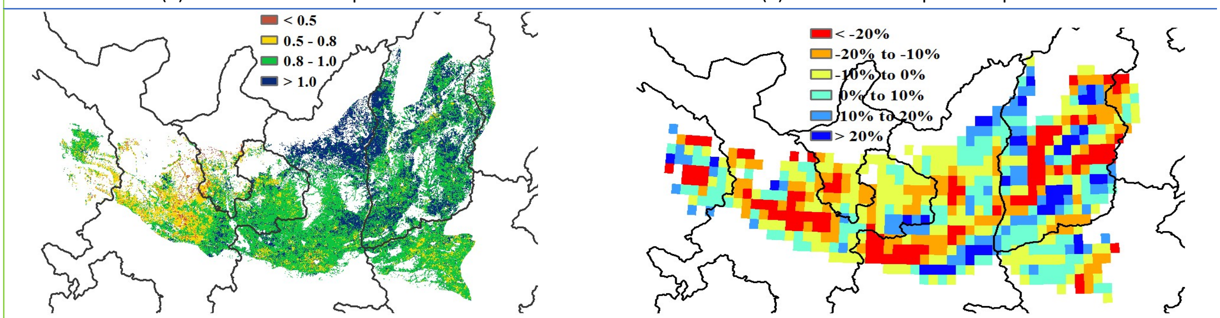
Figure 4.13 Crop condition China Loess region, July - October 2022



(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

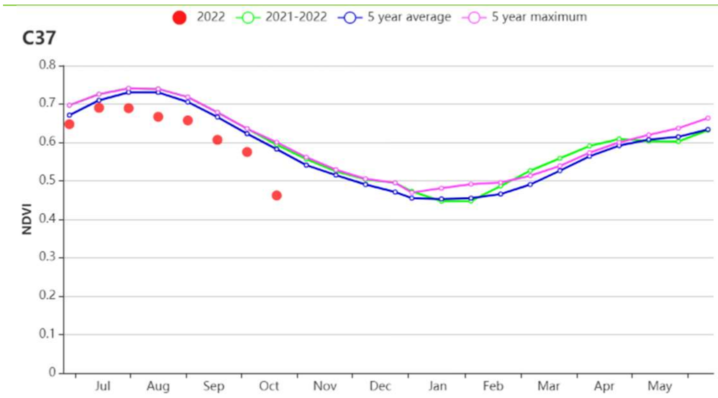
By October, the autumn grain crops such as late rice and maize had been harvested in the Lower Yangtze region.

According to the CropWatch agro-climatic indicators, the accumulated precipitation from July to October was 47% below the average. Temperature and photosynthetically active radiation were 1.2℃ and 13% higher than the 15-year averages, respectively. The rainfall profiles indicate that the decadal precipitation was below average throughout the entire monitoring period. The high temperatures and drought conditions caused a negative departure of the biomass production potential by 20%.

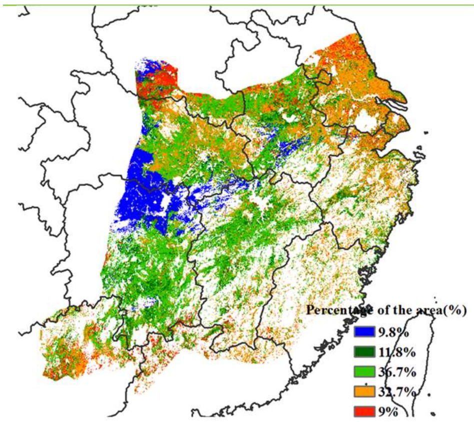
As shown in the NDVI development graph, crop conditions were below the 5-year average throughout this period. Only 32.7% of the region, mainly distributed in Jiangsu and northern Zhejiang, had a slightly lower crop growth than the average, and the potential biomass departure map shows a similar spatial pattern in this part with values between -10% and +10%. Crop growth in the other region was significantly lower than the average of the previous years. The potential biomass departure in most area was 20% below average (red area), the meteorological drought in Hunan, Hubei, Jiangxi was the most serious. However, benefited from good irrigation conditions, the average VCIx of this region was 0.89, and most of the area had VCIx values ranging from 0.8 to 1, indicating that the crop growth is generally normal during the peak growth period, but high temperature and drought during the grain filling period had a certain impact on the yield of late rice.

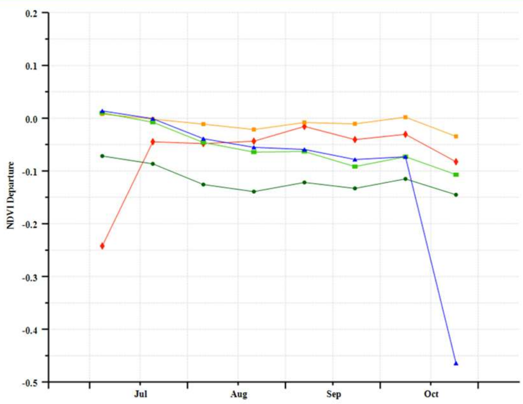
In general, affected by the continuous high temperature and drought during the monitoring period, the crop conditions in the Lower Yangtze region were below average.

Figure 4.14 Crop condition China Lower Yangtze region, July - October 2022

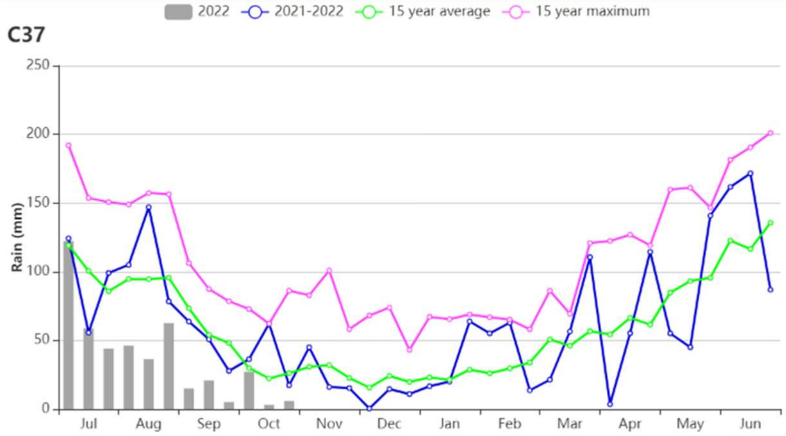


(a) Crop condition development graph based on NDVI

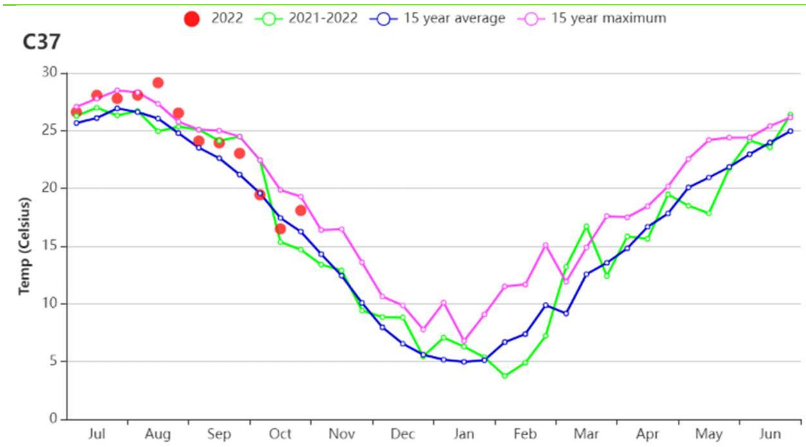




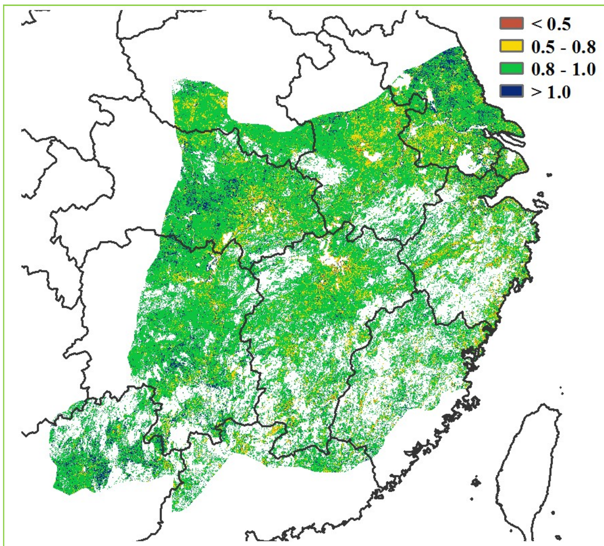
(b) Spatial NDVI patterns compared to 5YA (c) NDVI profiles



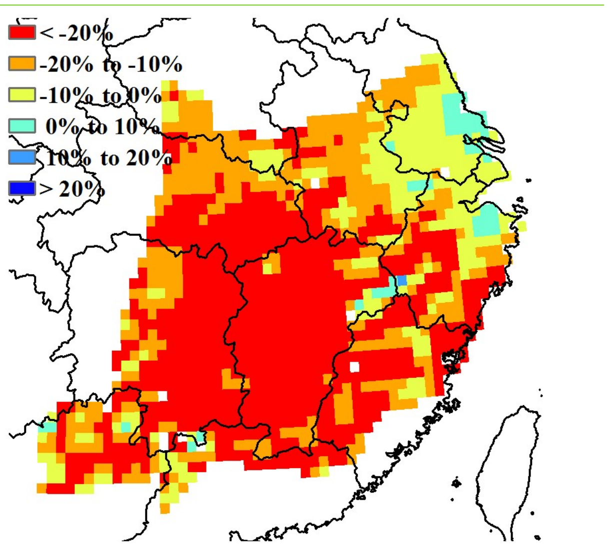
(d)Time series rainfall profile



(e)Time series temperature profile



(f) Maximum VCI



(g) Biomass departure

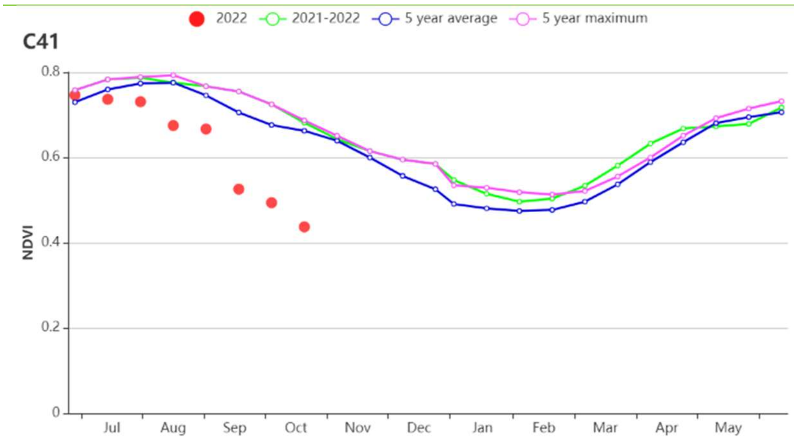
Southwest

This reporting period covers the growth and maturity stages of summer crops, including late rice, semi-late rice, and maize. Their harvest was followed by the sowing of winter wheat in some fields. Overall, crop conditions were below the 5-year average because of drought.

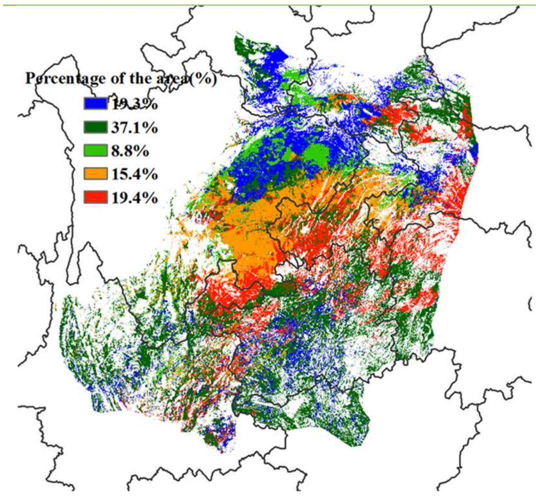
During this reporting period, the region experienced severe heat and drought events. Agroclimatic indicators showed that RAIN in the region was only 635 mm, 28% lower than the 15-year average, while TEMP was 19.8℃, 1.1℃ higher than the 15-year average, and similarly, RADPAR was substantially higher (+12%). High temperature and less rainfall resulted in severe meteorological drought, and the potential biomass was 8% lower than the average. The VCIx of the region was still as high as 0.93, and most areas had high VCIx values. Comparing the VCIx map and the BIOMSS map, the agricultural drought in areas where severe meteorological drought occurred was relatively mild, indicating that irrigation measures in the region played an important role, Which mitigate the drought effects.

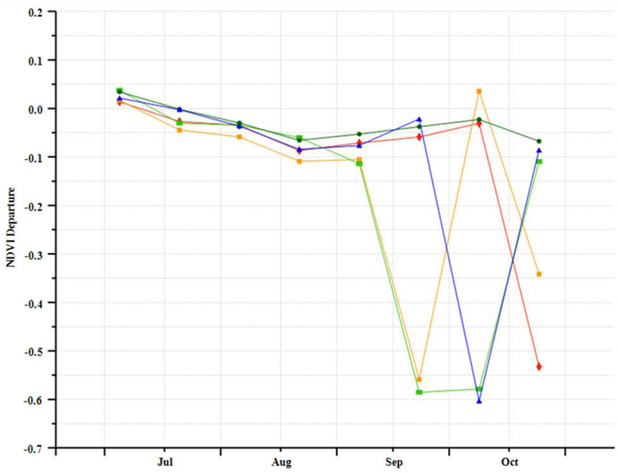
According to the NDVI distance level clustering map, crop conditions in the region were below average, while high precipitation in late August and mid-September contributed to a recovery of crop conditions in the southern part of the main production area in September, but it was still slightly below average. Despite the raging hot and dry weather, the arable land utilization in the region remained good. CALF was 100% and CI was 144%, almost unchanged from last year.

Figure 4.15 Crop condition China Southwest region, July - October 2022

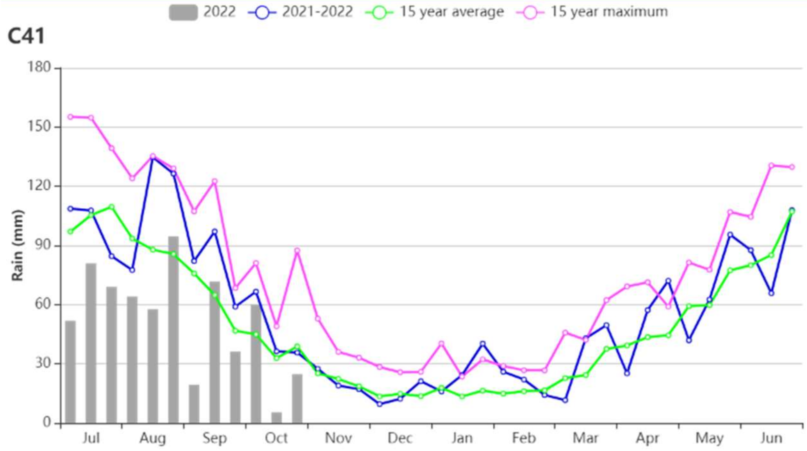


(a) Crop condition development graph based on NDVI

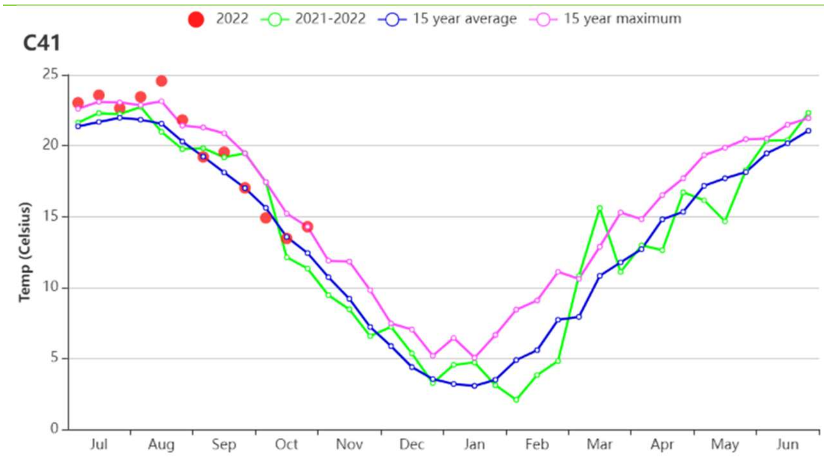




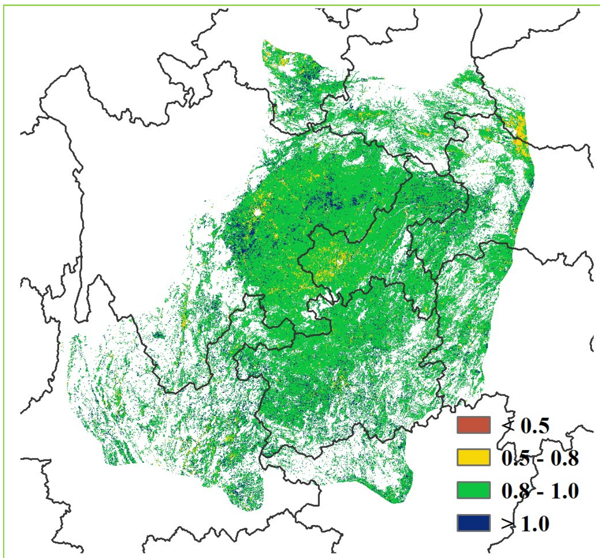
(b) Spatial NDVI patterns compared to 5YA (c) NDVI profiles



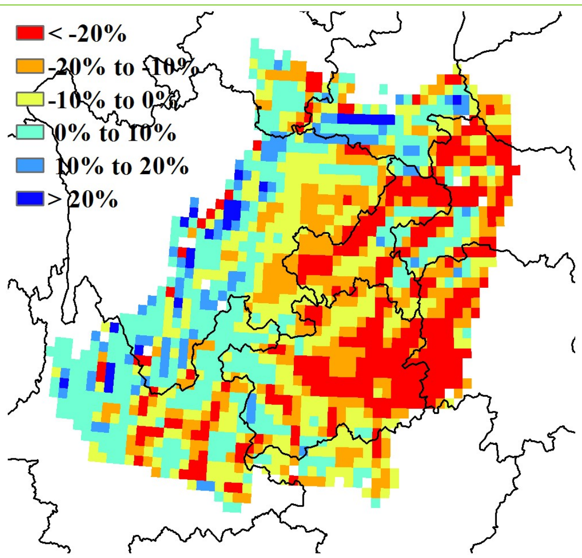
(d)Time series rainfall profile



(e)Time series temperature profile



(f) Maximum VCI



(g) Biomass departure

Southern China

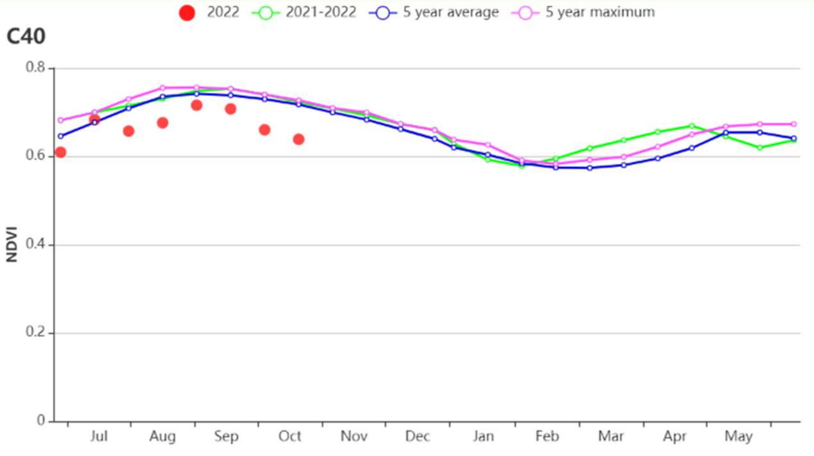
By October, late rice had been maturing and harvested progressively in Southern China. The average VCIx of the Southern China region during the monitoring period was 0.92. According to the regional NDVI profile, crop conditions were slightly below the 5-year average.

During the reporting period, precipitation in Southern China decreased obviously. According to the CropWatch agro-climatic indicators, the accumulated precipitation was 938 mm, 23% lower than average, while temperature and radiation were above average (TEMP +0.7ºC, RADPAR +12%), which resulted in below-average biomass production potential (BIOMSS -8%).

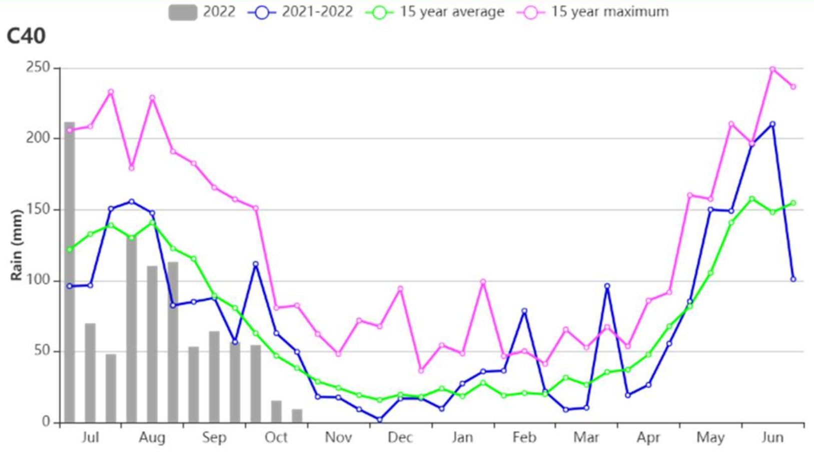
As shown by NDVI clusters and profiles, crop conditions in Yunnan was above average before August, and then fell back to the average due to the lack of precipitation. While, crop conditions in Guangdong, guangxi was below average and reverted to the average at the end of the reporting period. The potential biomass departure map showed a similar spatial pattern. BIOMSS in Yunnan was above average, while BIOMSS in Eastern Guangxi, Guangdong and Fujian was at or slightly below average and varied between -10% and 10%.

Affected by the lack of rainfall, crop conditions in Southern China was slightly below average. The precipitation exceeded 900mm, and the influence of precipitation decrease was unlikely to affect crop conditions in Southern China.

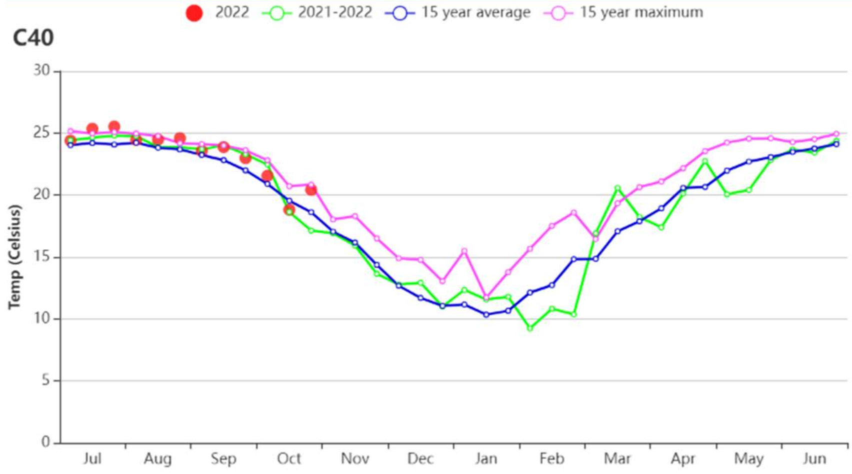
Figure 4.16 Crop condition Southern China, July - October 2022



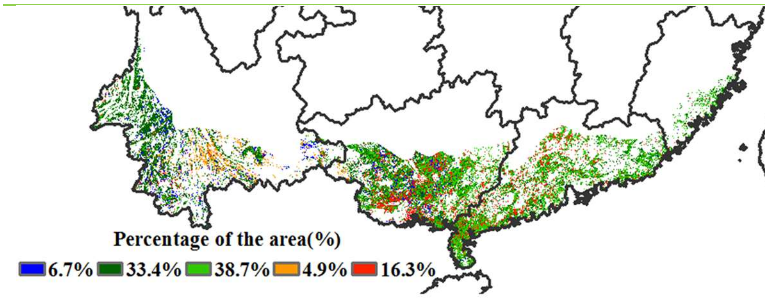
(a) Crop condition development graph based on NDVI

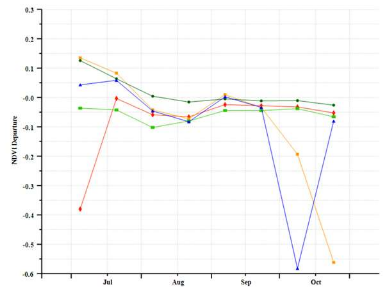


(b) Time series rainfall profile

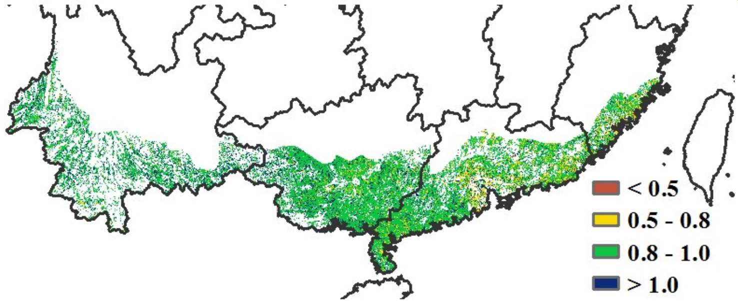


(c)Time series temperature profile

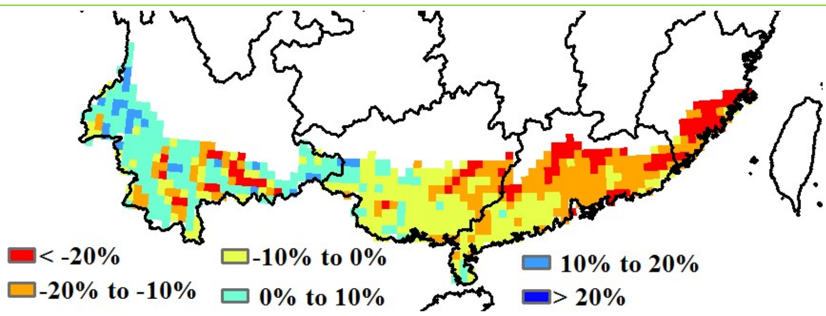




(d) Spatial NDVI patterns compared to 5YA (e) NDVI profiles



(f) Maximum VCI



(g) Biomass departure

4.4 Major crops trade prospects

International trade prospects for major cereals and oil crop in China

Maize

In the first three quarters, China imported 18.463 million tonnes of maize, a decrease of 25.9% over the previous year. The main import countries were the United States and Ukraine, accounting for 71.8% and 26.6% of the total import, respectively, and the import volume was US $6.253 billion. The export of maize was 900 tonnes, a decrease of 79.9% over the previous year. The export volume was US $1.316 million, mainly to Angola and Tajikistan.

Rice

In the first three quarters, China imported 5.048 million tonnes of rice, an increase of 40.7% over the previous year. The main import source countries were India, Pakistan, Vietnam, Myanmar and Thailand, accounting for 40.6%, 22.1%, 11.7%, 11.0% and 9.6% of the total import, respectively. The import volume was US $2.105 billion. The export of rice was 1.626 million tonnes, a decrease of 12.1% over the previous year, mainly exported to Egypt, Turkiye, Papua New Guinea, South Korea and Sierra Leone, accounting for 24.8%, 10.9%, 8.4%, 8.2% and 7.3% of the total export, respectively, with an export volume of US $748 million.

Wheat

In the first three quarters, China imported 6.622 million tonnes of wheat, a decrease of 12.8% over the previous year. The main import source countries were Australia, France and Canada, accounting for 68.8%, 22.0% and 8.9% of the total import, respectively. The import volume was US $2.472 billion. The wheat export was 107,500 tonnes, an increase of 94.1% over the previous year, and the export volume was US $51.343 million.

Soybean

In the first three quarters, China imported 69.047 million tonnes of soybeans, a decrease of 6.7% over the previous year. The main sources of imports were Brazil and the United States, accounting for 67.3% and 28.0% of the total import, respectively. The import volume was US $46.502 billion. Soybean exports were 78,600 tonnes, an increase of 57.3% over the previous year, mainly exported to South Korea, Japan and North Korea, accounting for 56.8%, 18.7% and 6.4% of the total export, respectively. The export volume was US $94.639 million.

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 increase slightly in 2022. The details are as follows:

In 2022, China's maize import will decrease significantly in 2022, by 21.2% year on year, and exports by 70.5%. Affected by extreme high temperature and drought, both the EU and the United States will reduce their production. The global maize production will decrease by 3%. The overall maize price is on the rise, especially in the early stage of the crisis in Ukraine. From the domestic perspective, the demand for deep processing of maize has declined, and imports from Ukraine have decreased due to the impact of geopolitical risks. It is expected that China's maize import will decline significantly in 2022.

In 2022, China's rice import will increase by 52.4% and export will decrease by 11.2%. Due to the impact of drought and waterlogging in major producing countries, the global rice production is expected to decrease, but the decrease is not significant. Driven by the price difference of rice at home and abroad, and the strong demand for broken rice for feeding and processing, China's rice import has kept growing, but India's rice export restrictions may lead to a slowdown in imports in the fourth quarter.

In 2022, China's wheat import will decrease by 22.5% and its export will increase by 70.4% in 2022. Since this year, wheat in major producing countries has grown well, and global wheat supply and demand has continued to ease. However, due to the crisis in Ukraine and other factors, wheat prices fluctuate greatly and remain at a high level. It is expected that wheat import will decrease significantly in 2022.

In 2022, China's soybean import will decrease by 6.6% and its export will increase by 20.1% in 2022. Affected by the drought and flood weather at the beginning of the year, the main soybean producing countries in South America have slightly reduced their output, but by a small margin. The global soybean supply prospects are optimistic and remains in tight balance. Due to the comprehensive impact of such factors as the international soybean price hitting a new high, the domestic soybean oil production increase, the decline of feed demand, and the low crushing profit, it is expected that the soybean import will decrease significantly throughout the year.

Figure 4.17 Rate of change of imports and exports for rice, wheat, maize, and soybean in China in 2022 (%)