Issued: 20 June 2022
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European Commission

JRC MARS Bulletin

Crop monitoring in Europe

June 2022

Yield outlook slightly reduced

Continued drier-than-usual conditions throughout Europe

The yield outlook for EU winter crops was slightly reduced for the third consecutive month. At EU level, the yield forecasts for soft wheat, durum wheat and winter barley are now just below the 5-year average. The forecasts for rapeseed, maize and sunflowers were also reduced but remain at, or just above, the 5-year average. Forecasts for sugar beet, potatoes, and soybeans (still mostly based on historical trends), as well as spring barley, remain essentially unchanged.

The main reason for the reduced yield outlook is the continued drier-than-usual conditions in large parts of Europe, with the strongest impacts in regions where these are combined with hot temperatures. In the Baltic Sea region, crops were negatively affected by persistently colder-than-usual weather.

The strongest downward revision (by almost 5% at EU level) was for durum wheat in southern Europe. Soft wheat was revised downward in 13 of the 25 EU wheat producing countries; most importantly in Hungary, Romania, Poland, and France.

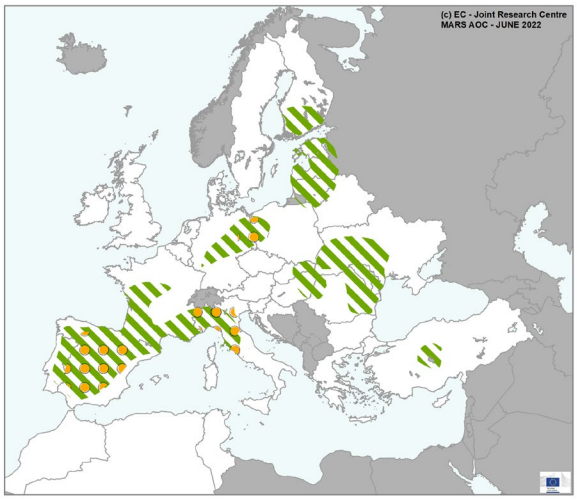
This issue of the Bulletin features a special section on rice in Europe. Rice sowing was accomplished without major constraints, but on an area about 7% smaller than last year, mainly due to water availability concerns.

Contents:

1. Agrometeorological overview
2. Remote sensing – observed canopy conditions
3. Pastures in Europe – regional monitoring
4. Rice analysis
5. Country analysis
6. Crop yield forecast
7. Atlas

Covers the period from 1 May until 14 June

AREAS OF CONCERN - SUMMER/WINTER CROPS



Crop	Yield t/ha				
	Avg 5yrs	May Bulletin	MARS 2022 forecasts	%22/5yrs	% Diff May
Total cereals	5.49	5.58	**5.50**	+ 0.1	– 1.4
Total wheat	5.62	5.69	**5.56**	– 1.0	– 2.3
Soft wheat	5.84	5.89	**5.76**	– 1.3	– 2.2
Durum wheat	3.52	3.61	**3.44**	– 2.3	– 4.7
Total barley	4.85	4.89	**4.88**	+ 0.7	– 0.2
Spring barley	4.13	4.18	**4.19**	+ 1.4	+ 0.2
Winter barley	5.75	5.78	**5.73**	– 0.4	– 0.9
Grain maize	7.86	7.92	**7.87**	+ 0.0	– 0.6
Rye	3.90	4.10	**4.00**	+ 2.6	– 2.4
Triticale	4.19	4.29	**4.27**	+ 1.9	– 0.5
Rape and turnip rape	3.07	3.17	**3.12**	+ 1.4	– 1.6
Potato	34.0	35.9	**35.7**	+ 5.2	– 0.3
Sugar beet	74.1	78.0	**78.1**	+ 5.4	+ 0.2
Sunflower	2.34	2.39	**2.37**	+ 1.5	– 0.8
Soybean	2.89	2.99	**2.99**	+ 3.4	+ 0.0
Rice	6.77	—	**6.84**	+ 1.0	—

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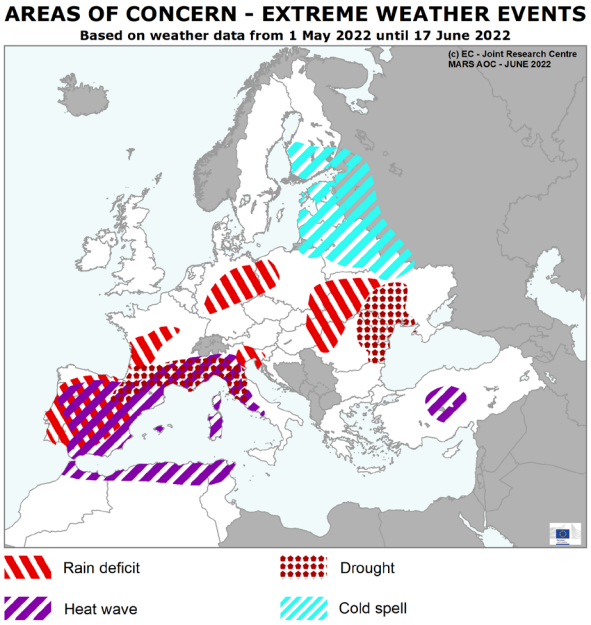
Joint Research Centre

1. Agrometeorological overview

1.1. Areas of concern



The map above only reflects the most distinct weather events (in terms of duration and/or severity) that occurred after the reporting period of the May Bulletin (20 May).

The weather observed during the current review period shows large regions under dry spell, notably in southern and south-western regions, where hot temperatures intensify the impacts of drought.

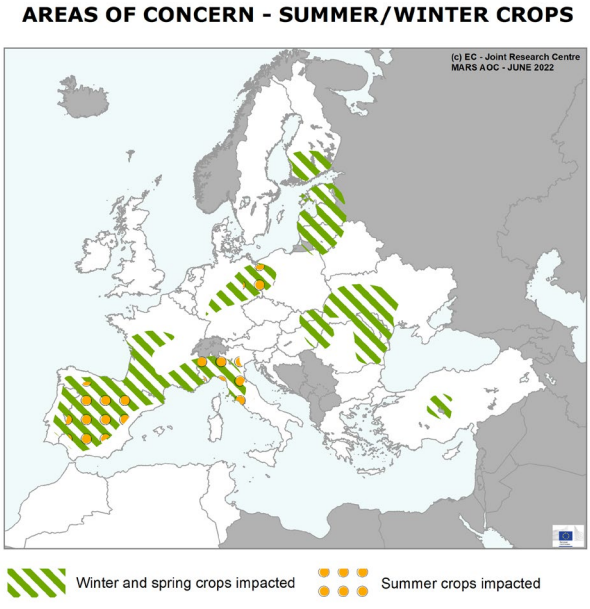
Drought conditions and hot temperatures have been recorded in central and north-western Italy, in southern France and, with less intensity, in western and central France. While in Italy, winter crops and summer crops (particularly maize and sunflowers) have been negatively impacted by the exceptionally hot and dry conditions in the above-mentioned regions, in France only winter crops have been impacted, so far. In Spain, rain deficit and very hot temperatures have negatively affected rain fed winter and summer crops.

A distinct rain deficit is observed in central and eastern Germany, and in western Poland. In eastern Germany and western Poland, the lack of precipitation is negatively affecting the yield formation in winter crops, and, to a lesser extent, the growth of summer crops.

In the Baltic countries, persistently below-average-temperatures caused delays in development and below-average biomass accumulation.

In eastern regions of Slovakia and Hungary and in their neighbouring regions of Romania and Ukraine, the absence of significant precipitation has reduced the yield potential of winter and spring crops. More severe impacts to winter and spring crops are observed in south-western Ukraine and eastern Romania where the persistent lack of precipitation has turned into drought.

In Turkey, the hot temperatures of early June accelerated crop development and reduced the time for biomass accumulation of winter crops, which are now in flowering stage in suboptimal condition.



1.2. Meteorological review (1 May –14 June 2022)

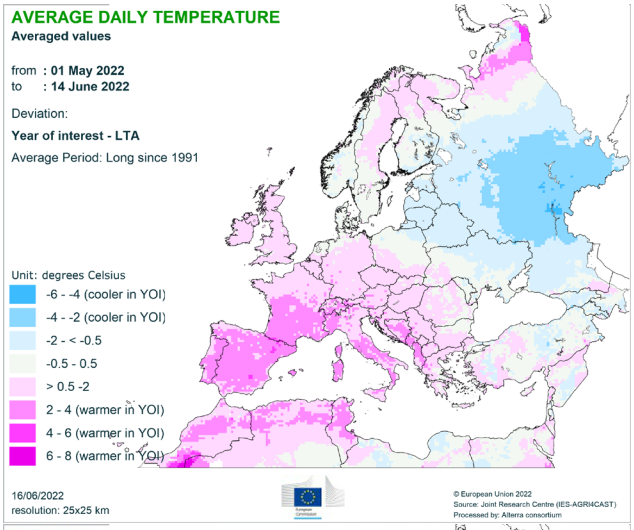
The weather observed during the period of review shows a continued transition to warmer- and drier-than-usual conditions in southern Europe.

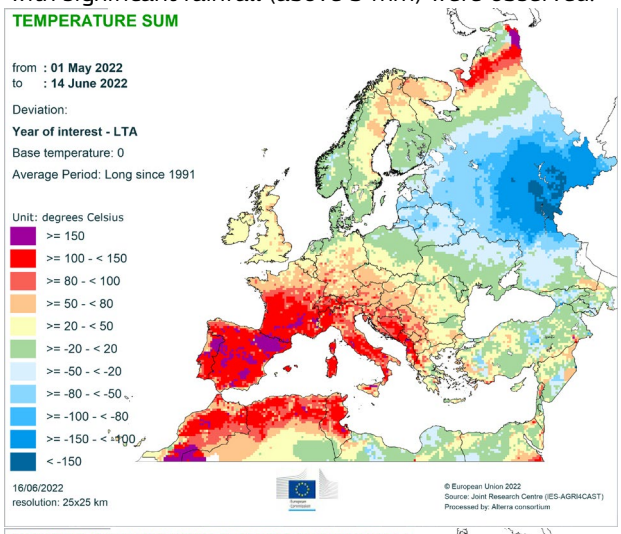
Warmer-than-usual conditions, with daily mean temperatures exceeding +2 °C with respect to the 1991–2021 long-term average (LTA), were observed in the Iberian Peninsula, much of France, the islands of Corsica and Sardinia, in the Alps region, central and southern Italy, the western Balkans, and the northernmost part of European Russia. Daily mean temperatures reached up to 4 °C above the LTA in these regions, with more distinct positive temperature anomalies (up to 6 °C above the LTA) locally in Spain and the northernmost part of European Russia. This is reflected in temperature sums (Tbase = 0 °C) exceeding +100 °Cd relative to the LTA in these regions, and exceeding +150 °C in parts of Spain, Portugal, southern France, and northernmost European Russia.

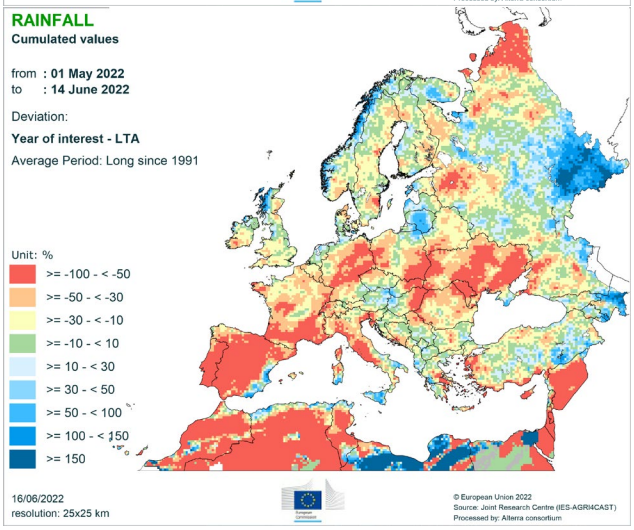
Colder-than-usual conditions, with temperature anomalies between -2 °C and -4 °C (locally down to -6 °C) compared with the LTA were observed in central European Russia. The temperature sums in this region were less than -80 °C relative to the LTA.

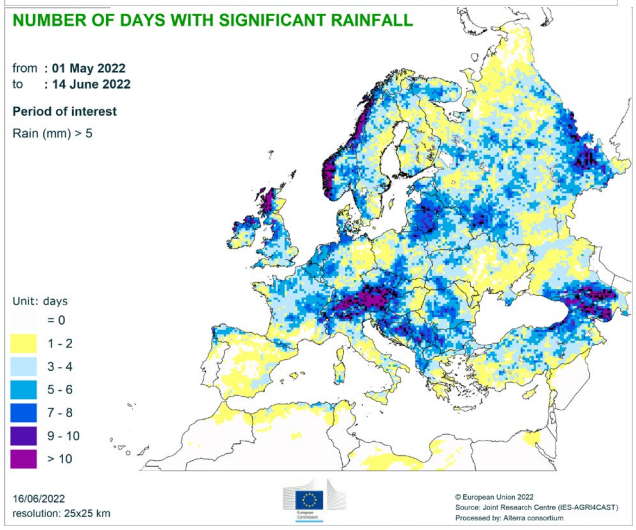
Drier-than-usual conditions, with precipitation anomalies of -50% or more with respect to the LTA, were observed in most of the Iberian Peninsula, southern France, the Mediterranean coast of Italy and inland into central Italy, Slovenia, in southern Germany across a belt widening to the east and extending into western Poland, in eastern Poland, Slovakia, and Hungary, and in most of Ukraine, as well as western, northernmost, and southern European Russia, and in areas along the Mediterranean coast of Turkey and Greece. In most of these regions, only 1 or 2 days with significant rainfall were observed.

Wetter-than-usual conditions (+50% or more with respect to the LTA) were observed locally along the Mediterranean coast in Spain, locally in the Alps region, as well as in Lithuania and the Baltic coast, along the western coast of Scandinavia, in northernmost United Kingdom, much of eastern European Russia, the Caucasus region and in parts of Turkey. In these regions, more than 9 days with significant rainfall (above 5 mm) were observed.









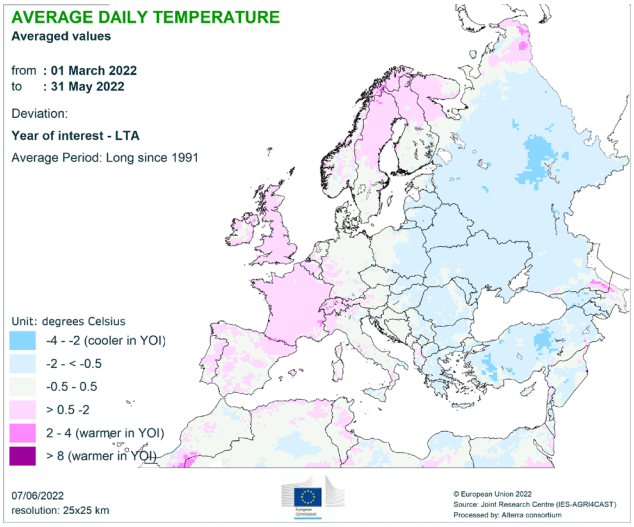
1.3. Spring review (March, April, May)

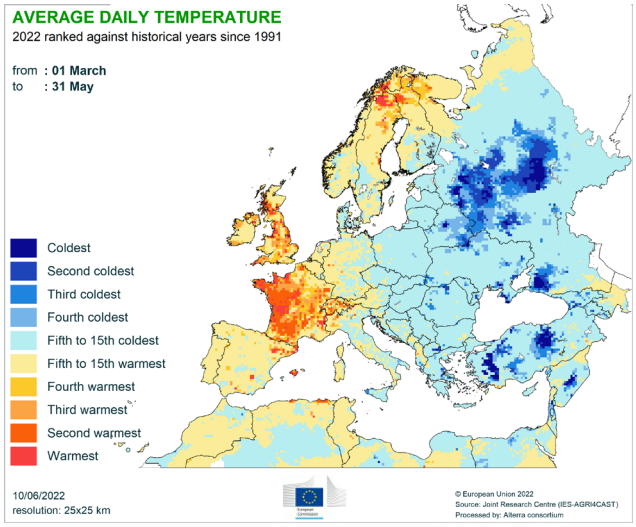
Warmer-than-usual conditions with respect to the 1991-2021 long-term average (LTA) were observed in France, the United Kingdom, in large parts of Ireland, Belgium, the Alps region, and the north-central Scandinavian Peninsula, as well as in parts of Spain, Portugal and western Germany. Average daily temperatures were up to 2 °C above the LTA in these regions. More distinct positive temperature anomalies (up to 4 °C above the LTA) were observed locally in the Alps and Caucasus regions, and the northernmost parts of Scandinavia and European Russia. Average daily temperatures were among the three warmest on record since 1991 in most of France and in parts of the United Kingdom and northern Scandinavia. The **number of hot days** (with daily maximum temperature above 30 °C) exceeded the LTA by more than 5 days in most of Spain and Portugal, parts of southern France, parts of Italy, as well as in the south-west Balkan region and western Turkey.

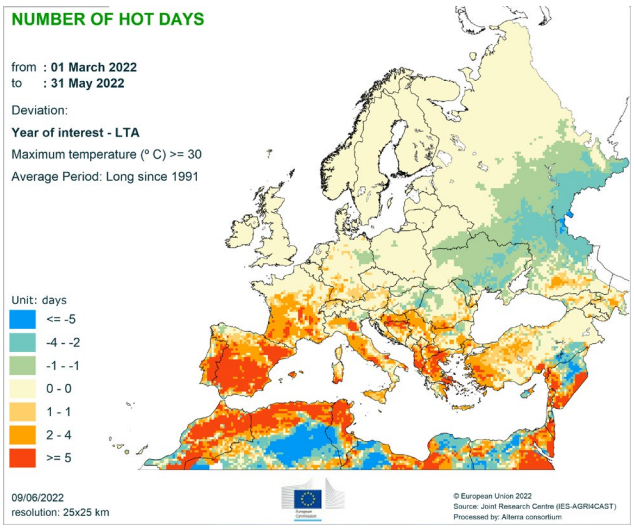
Colder-than-usual conditions, with temperature anomalies between -2 °C and -0.5 °C below the LTA, were observed across the Balkans, the Eastern European Plain, and in most of European Russia, the Caucasus region and Turkey. More distinct negative temperature anomalies (down to -4 °C below the LTA) were observed in parts of central European Russia and central and western Turkey. Average daily temperatures were among the coldest five on record since 1991 in central European Russia, parts of Belarus and Turkey. The **number of cold days** (with daily minimum temperature below 0 °C) exceeded the LTA by more than 10 days in parts of Germany, eastward across the European Plain, including Baltic Scandinavia, along the Danube, in some parts of Italy and the Balkan countries, as well as in western Turkey and locally in the Caucasus and Crimea. These anomalies were mainly associated with a cold spell evolving over Europe in March to early-April, while in late April and during May the number of cold days was close to the LTA across most of Europe.

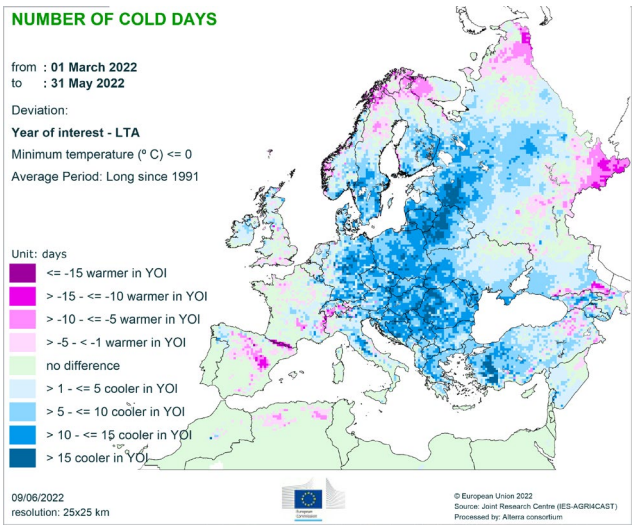
Drier-than-usual conditions were observed in most parts of Europe. Precipitation anomalies of -50% or more negative (with respect to the LTA) were observed in Belgium, parts of France, north-eastern Portugal, parts of Italy, north-eastern Germany, north-western Poland, south-western Ukraine, along the Black Sea coast in Romania, parts of Bulgaria, Greece and eastern Turkey, as well as westernmost and northernmost parts of European Russia, southern Norway, and more locally in Sweden.

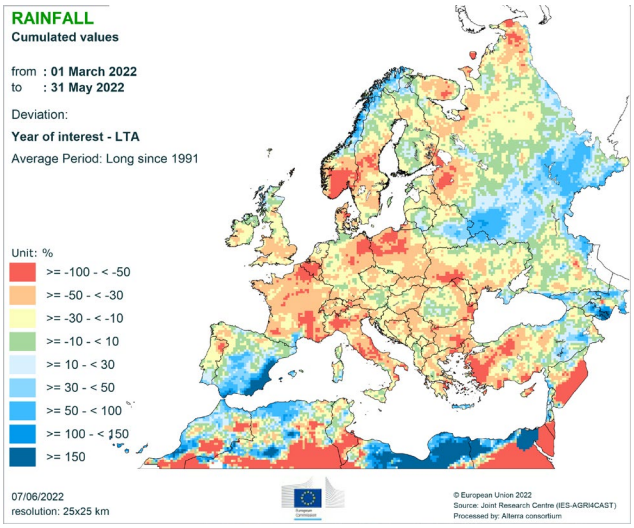
Wetter-than-usual conditions (50% or more rainfall with respect to the LTA) were observed in central and southern Spain, parts of Belarus, northernmost Ukraine, central European Russia, and parts of the Caucasus region and eastern Turkey, as well as along the Norwegian Sea coast. More distinct positive anomaly is observed locally along the Mediterranean coast in Spain where rainfall exceeded the LTA by more than 150%.

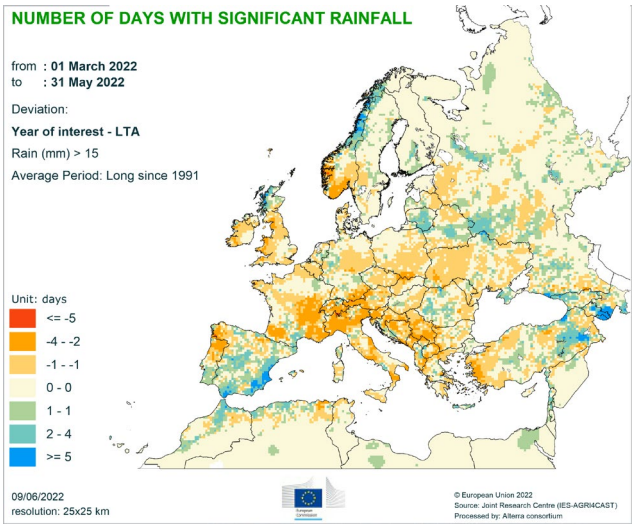





NUMBER OF HOT DAYS
from : 01 March 2022
to : 31 May 2022
Deviation:
Year of interest - LTA
Maximum temperature (° C) >= 30
Average Period: Long since 1991
Unit: days
<= -5
-4 - -2
-1 - -1
0 - 0
1 - 1
2 - 4
>= 5
09/06/2022
resolution: 25x25 km
© European Union 2022
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium


NUMBER OF COLD DAYS
from : 01 March 2022
to : 31 May 2022
Deviation:
Year of interest - LTA
Minimum temperature (° C) <= 0
Average Period: Long since 1991
Unit: days
<= -15 warmer in YOI
> -15 - <= -10 warmer in YOI
> -10 - <= -5 warmer in YOI
> -5 - < -1 warmer in YOI
no difference
> 1 - <= 5 cooler in YOI
> 5 - <= 10 cooler in YOI
> 10 - <= 15 cooler in YOI
> 15 cooler in YOI
09/06/2022
resolution: 25x25 km
© European Union 2022
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium


RAINFALL
Cumulated values
from : 01 March 2022
to : 31 May 2022
Deviation:
Year of interest - LTA
Average Period: Long since 1991
Unit: %
>= -100 - < -50
>= -50 - < -30
>= -30 - < -10
>= -10 - < 10
>= 10 - < 30
>= 30 - < 50
>= 50 - < 100
>= 100 - < 150
>= 150
07/06/2022
resolution: 25x25 km
© European Union 2022
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium


NUMBER OF DAYS WITH SIGNIFICANT RAINFALL
from : 01 March 2022
to : 31 May 2022
Deviation:
Year of interest - LTA
Rain (mm) > 15
Average Period: Long since 1991
Unit: days
<= -5
-4 - -2
-1 - -1
0 - 0
1 - 1
2 - 4
>= 5
09/06/2022
resolution: 25x25 km
© European Union 2022
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium

1.4. Weather forecast (16 - 23 June)

Weather conditions will be mainly determined by the progression of an Atlantic low-pressure system forming a slow-moving ridge in the European jet stream that is transitioning through the Iberian Peninsula and pushing warm air into western Europe.

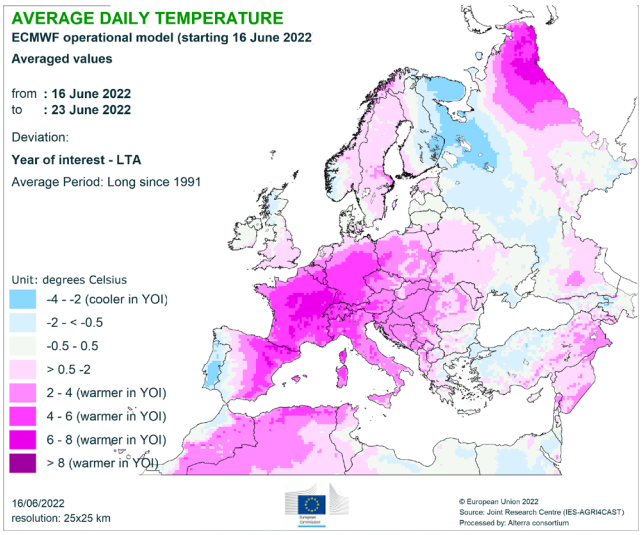
Warmer-than-usual conditions, with average daily temperatures between 4 ^{0}C and 8 ^{0}C above the LTA, are forecast in eastern Spain, most of France, southern Germany, the Alps region, north-western Italy, as well as in northern European Russia. Six and more days with maximum temperatures exceeding 30 ^{0}C are forecast in eastern Spain, southern France, most of Italy, as well as in the Caspian Depression of European Russia. Up to 4 days with daily maximum temperatures above 30 ^{0}C, are expected in the rest of continental Europe south of 55^{0}N latitude. A drop in average daily temperatures is expected in the latter half of the forecast period (after 19 June) with up to 3 days with temperatures exceeding 30 ^{0}C only in parts of Italy, the western Balkans, and western and southern Turkey.

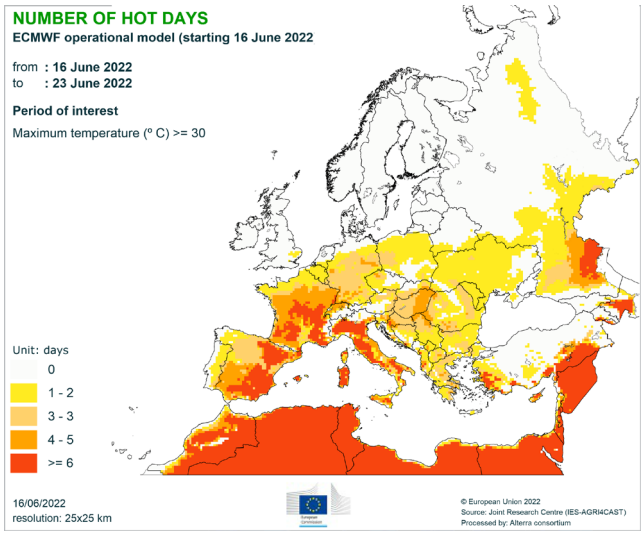
Colder-than-usual conditions, with temperatures between 2 and 4 ^{0}C below the LTA, are forecast for southern Portugal and north-western European Russia.

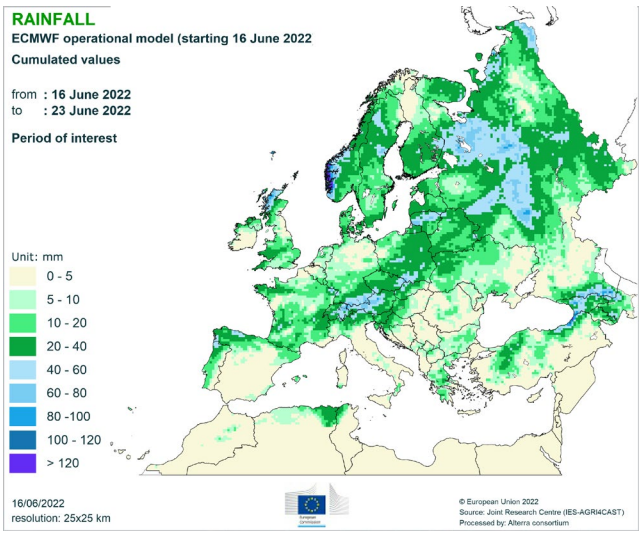
Dry conditions with less than 5 mm of accumulated precipitation are forecast in most of the Iberian Peninsula, southern Ireland, northern Germany, as well as most of Italy, eastern Hungary, Bosnia & Herzegovina, Serbia, Albania, Romania, eastern Ukraine and southern European Russia.

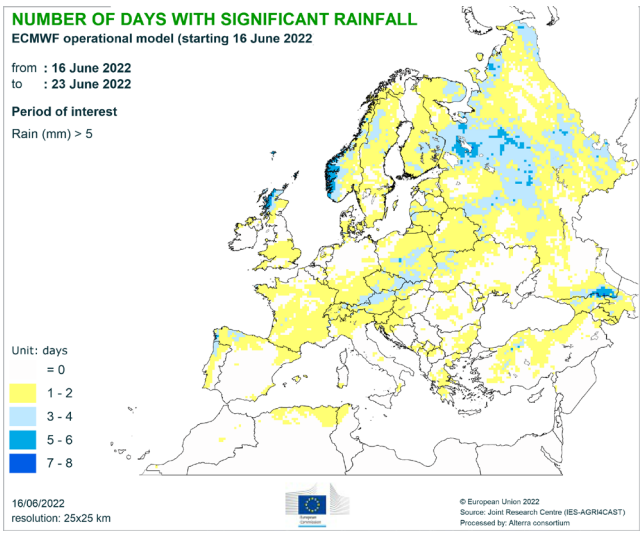
Wet conditions with accumulated precipitation between **40 and 100 mm** (locally exceeding 100 mm) are forecast in the northernmost parts of the British Isles, western Norway, central European Russia, parts of Lithuania, the Alps region, and the Caucasus Mountains. These regions are predicted to receive significant rainfall (above 5 mm) for between 3 and 6 days.

According to the **long-range weather forecast** for July, August and September, **warmer-than-usual conditions** are very likely to persist in the Iberian Peninsula, Italy, Romania and the Balkan region during July and August, and in the Iberian Peninsula and parts of Italy also in September. This is likely to be accompanied by **drier-than-usual conditions**, potentially exacerbating the negative climatic water balance.



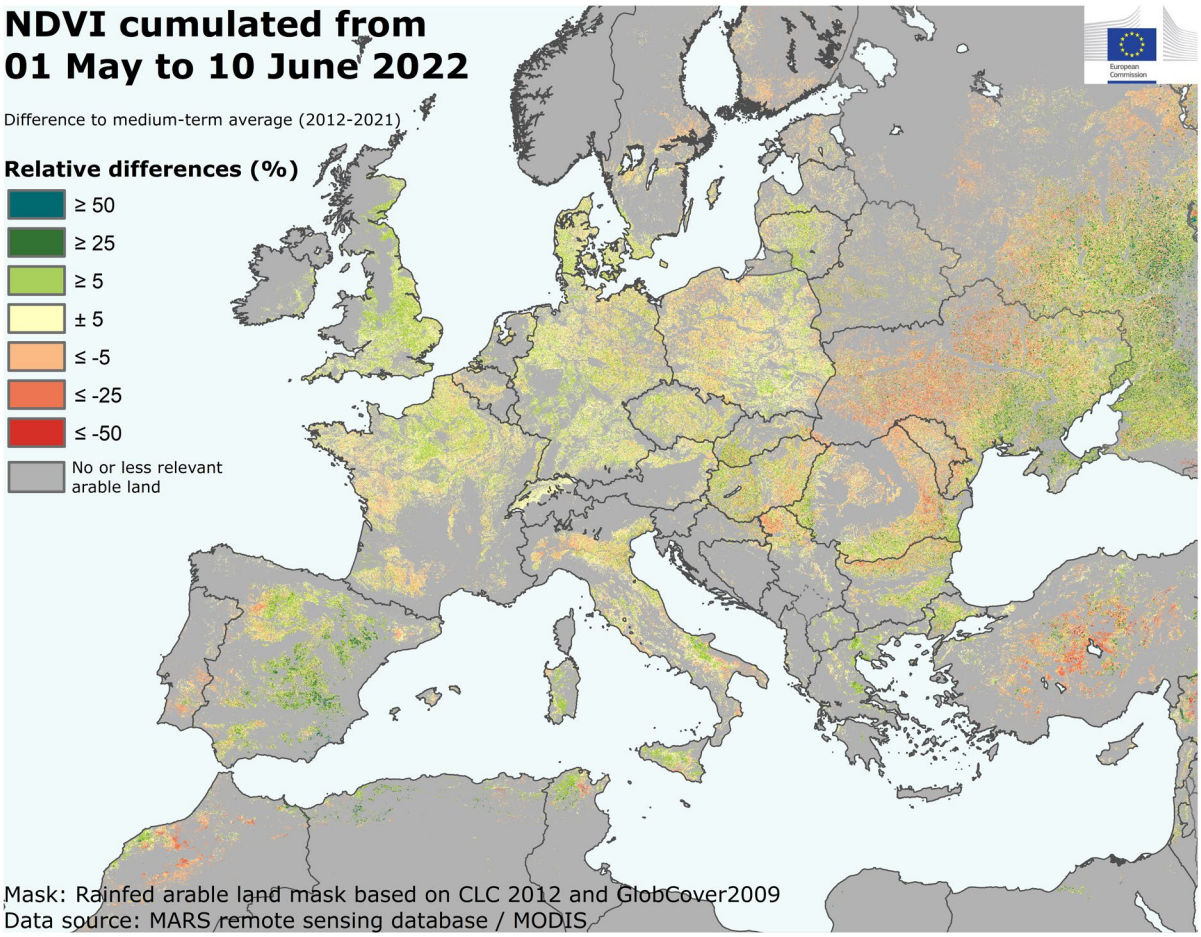



RAINFALL
ECMWF operational model (starting 16 June 2022
Cumulated values
from : 16 June 2022
to : 23 June 2022
Period of interest
Unit: mm
0 - 5
5 - 10
10 - 20
20 - 40
40 - 60
60 - 80
80 -100
100 - 120
> 120
16/06/2022
resolution: 25x25 km
© European Union 2022
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium


NUMBER OF DAYS WITH SIGNIFICANT RAINFALL
ECMWF operational model (starting 16 June 2022
from : 16 June 2022
to : 23 June 2022
Period of interest
Rain (mm) > 5
Unit: days
= 0
1 - 2
3 - 4
5 - 6
7 - 8
16/06/2022
resolution: 25x25 km
© European Union 2022
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium

2. Remote sensing – observed canopy conditions

Delayed growth prevails in central and eastern Europe

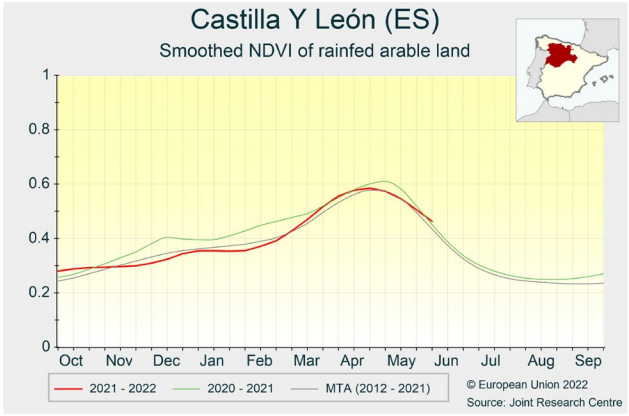


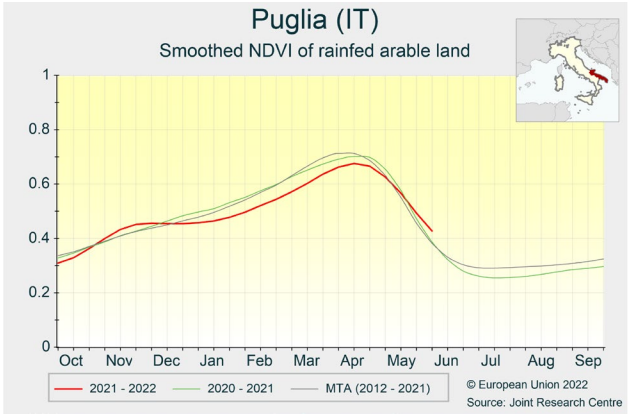
The map displays the difference between the Normalised Difference Vegetation Index (NDVI) cumulated from 1 May to 10 June 2022 and the medium-term average (2012-2021) for the same period. Positive anomalies (in green) reflect above-average canopy density or early crop development, while negative anomalies (in red) reflect below-average biomass accumulation or late crop development.

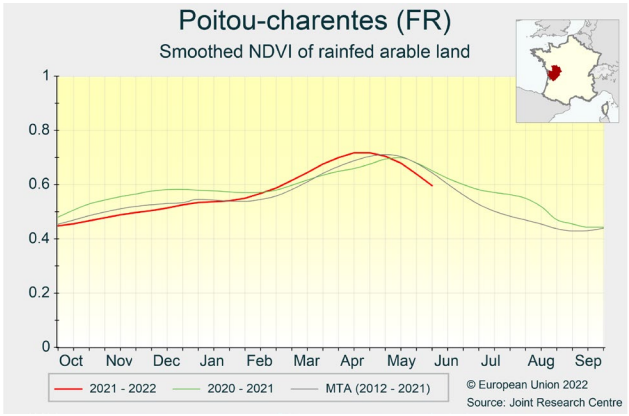
The map above displays predominately winter crop conditions, as biomass accumulation for summer crops has just started and is contributing little to NDVI values. Negative anomalies prevail in **Turkey** and the **Baltic countries**, reflecting late crop development due to cold temperatures in May; while the cold and dry spring affected crops in **western Ukraine** and **eastern Romania**. Warmer temperatures and adequate precipitation in late May and June favoured fair biomass accumulation in central and northern Europe.

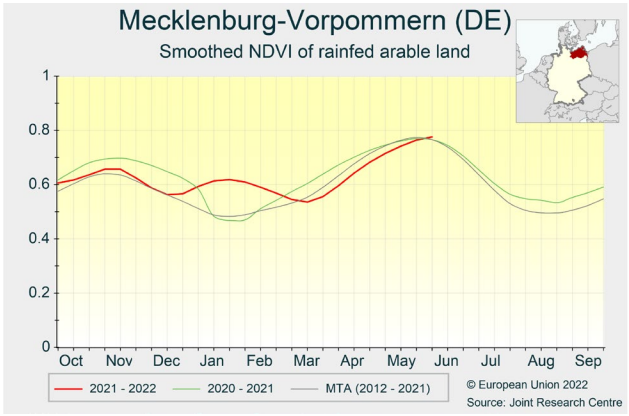
In **Spain**, after favourable rainfall in April, crop biomass accumulation is in line with the average. However, warmer-than-usual temperatures and lack of precipitation are likely to accelerate senescence (e.g. *Castilla Y León*). In **southern Italy**, the winter cereals campaign was characterised by cold weather and is concluding poorly under dry and hot conditions (e.g. *Puglia*). In northern regions, despite some rainfall registered in the first dekad of May, precipitation deficit is affecting crop development. In **France**, warmer- and drier-than-usual conditions were registered in May all over the country. In western and southern regions, temperature anomalies were more persistent and maximum values exceeded 30 °C, leading to early ripening (e.g. *Poitou-charentes*). In eastern and northern regions, average to positive biomass accumulation still prevails (greenish colours in the map), but more rainfall is needed to further sustain crops during grain filling. In **northern Germany**, after a warm and dry

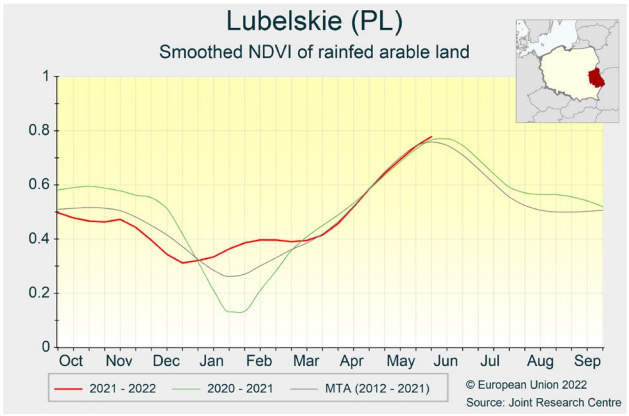
beginning of May, seasonal temperatures and distributed precipitations marked the end of the month. The NDVI profile shows winter crops approaching a late flowering with average biomass accumulated (e.g. *Mecklenburg-Vorpommern*). Similarly, **Poland** is characterised by average crop biomass accumulation, with some concerns related to crop water stress in regions that experienced severe rain deficit in the first half of May (e.g. *Lubelskie*). In the **Baltic countries**, temperatures were below the LTA for the whole of May, resulting in a slowing down of crop development. In **Austria**, **Czechia**, **Slovakia** and **southern Germany**, the temperature increase in May was beneficial for boosting crop development, and seasonal precipitation observed during the whole spring provided adequate water supply to sustain positive biomass accumulation (e.g. *Niederösterreich*). In **Hungary**, warmer temperatures and abundant rainfall since the end of May contributed to a fair progress for crops. In **Romania** and **Bulgaria**, below average temperatures until the first dekad of May delayed crop development. Nonetheless, the NDVI profile indicates cumulative biomass above the average, due to beneficial rainfall in the second half of May and beginning of June (e.g. *Yuzhen Tsentralen*). In **Ukraine**, the map shows two distinct anomalies: positive anomalies (green colours) in eastern regions reflect above-average biomass accumulation, as crops benefited from temperature increases and adequate precipitation in the second half of May; whereas negative anomalies (red colours) in western regions are consequence of delayed growth, but some rainfall that arrived in late May brought relief to crops after a persistent rain deficit. In **European Russia**, below-average temperatures in May led to a slowdown in vegetative development of crops. Temperatures have started to increase in June, and cumulative biomass has maintained well above the average (e.g. *Rostovskaya Oblast*). Positive anomalies (green colour in the map) still prevail in the **United Kingdom**, where warm temperatures and seasonal precipitation uniformly distributed in May favoured above-average crop biomass accumulation. In **Turkey**, after hot and dry weather in April, temperatures sharply decreased in May, causing further delay to crop development.

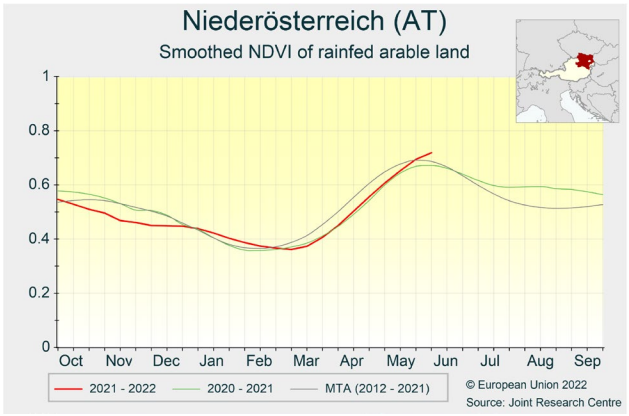


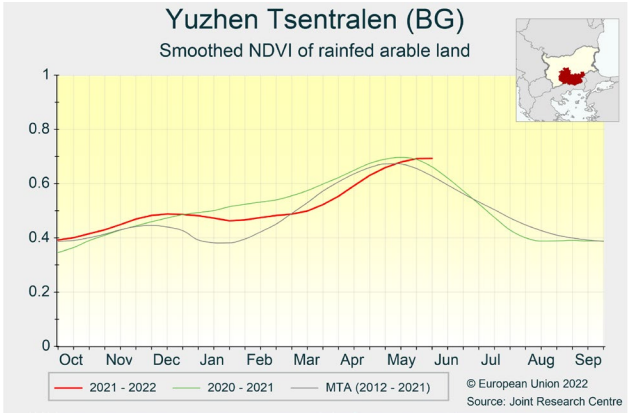


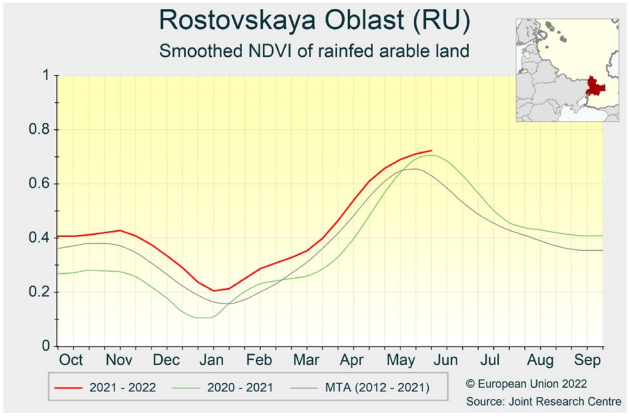





Lubelskie (PL)
Smoothed NDVI of rainfed arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2021 - 2022
2020 - 2021
MTA (2012 - 2021)
© European Union 2022
Source: Joint Research Centre


Niederösterreich (AT)
Smoothed NDVI of rainfed arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2021 - 2022
2020 - 2021
MTA (2012 - 2021)
© European Union 2022
Source: Joint Research Centre

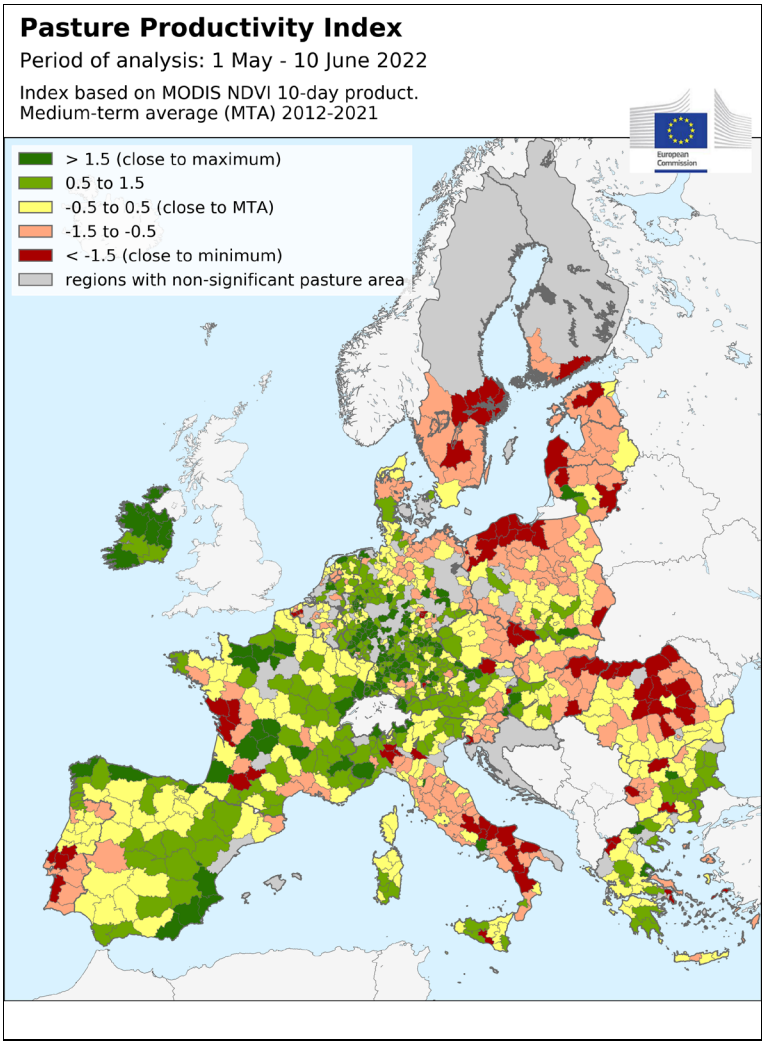

Yuzhen Tsentralen (BG)
Smoothed NDVI of rainfed arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2021 - 2022
2020 - 2021
MTA (2012 - 2021)
© European Union 2022
Source: Joint Research Centre


Rostovskaya Oblast (RU)
Smoothed NDVI of rainfed arable land
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2021 - 2022
2020 - 2021
MTA (2012 - 2021)
© European Union 2022
Source: Joint Research Centre

3. Pastures in Europe – regional monitoring

Eastern regions under stress

Considering the period of review, the distinction observed in the May Bulletin, between western regions with a predominance of positive PPIs [1], suggesting favourable conditions, and eastern regions (including Italy), with a predominance of negative PPIs, is continued. However, compared with the previous reporting period, the current situation is more mixed, reflecting some improvement in central and south-eastern regions, and worsening in some western regions, as well as in the Baltic Sea region.



For the period of review, the PPI is mostly positive in the following regions: **Austria**, **Czechia**, **Slovakia**, **Bulgaria**, north-western and southern **Germany**, the northern half of **France**, **Hungary**, **Slovenia**, **Benelux**, **Denmark** and **Sweden**.

In southern and western **France**, hot and dry conditions negatively affected pasture productivity. In northern and central **Italy,** irrigated grassland and fodder areas are benefiting from the high temperatures but there are strong concerns related to water availability during the coming months. Non-irrigated pastures are not faring well. Pastures in southern **Italy**, **Spain, Portugal** and **Greece** also experienced dry and hot conditions during the review period, with negative effects on biomass accumulation; as is usually the case around this time of year.

[1] PPI, the relative index of pasture productivity, is an indicator of biomass formation, based on the integration of the NDVI remote sensing product of pasture areas (at NUTS3 level) over a period of interest. The index shows the relative position of the current season within the historical series from 2012 to 2021, also referred to as the Mid-Term Average (MTA).

On the other hand, in **Finland** and the **Baltic countries**, persistently below-average temperatures limited the development of pastures to levels below the MTA.

In **Poland**, the first two dekads of May were very dry, but frequent rain events (albeit at low intensity) improved soil moisture conditions at the end of May. In June, warmer temperatures and some rain favoured pasture development, except in western areas (e.g. *Lubuskie*), which experienced a prolonged rain deficit. The first (delayed) cut of pastures indicates lower–than-usual biomass due to the preceding dry and colder-than-usual conditions. Recent rains are expected to improve biomass accumulation for the following cuts.

North-western regions in **Germany** received adequate rainfall, in contrast to prevailing dry conditions in the east. In southern **Germany**, pastures have caught up on previously delayed development.

In the **Benelux** countries, rainfall since 20 May has brought relief to pastures. In most regions, the rains arrived just in time to prevent substantial negative impacts from the preceding dry conditions. However, soil water levels remain low in most parts of Belgium and Luxembourg.

In **Austria, Czechia** and **Slovakia,** generally favourable thermal and soil moisture conditions enhanced biomass accumulation.

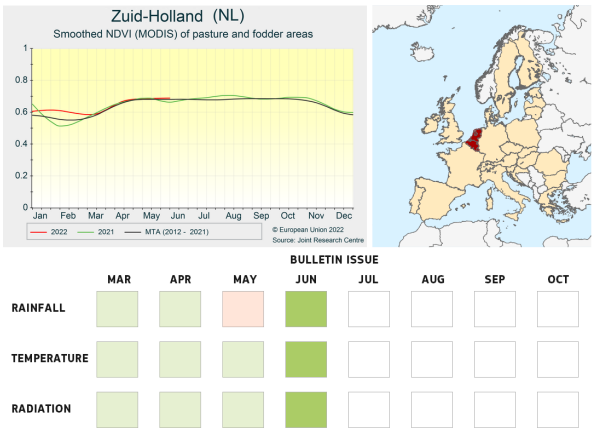
In **Slovenia and Croatia**, contrasting rainfall conditions between western (below average) and eastern Slovenia (in line with average) resulted in geographically distinct pasture performance.

In north and north-eastern regions of **Romania**, the growth of pastures was negatively affected due to the continuation of the dry conditions reported in May.

In **Bulgaria**, relatively cold weather in May, followed by warm weather and abundant rainfall in the first dekad of June favoured biomass accumulation.

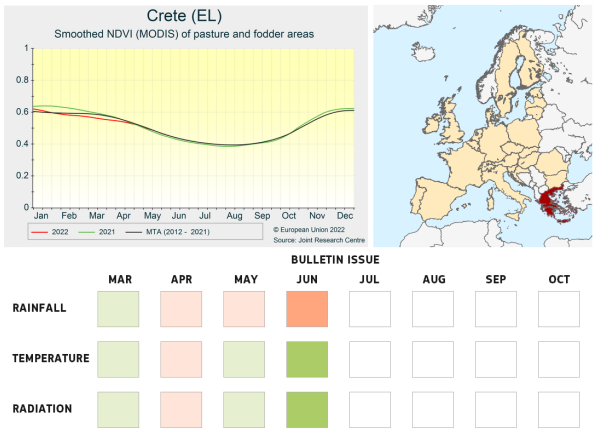
Benelux

Reference period: 01 May to 10 Jun 2022



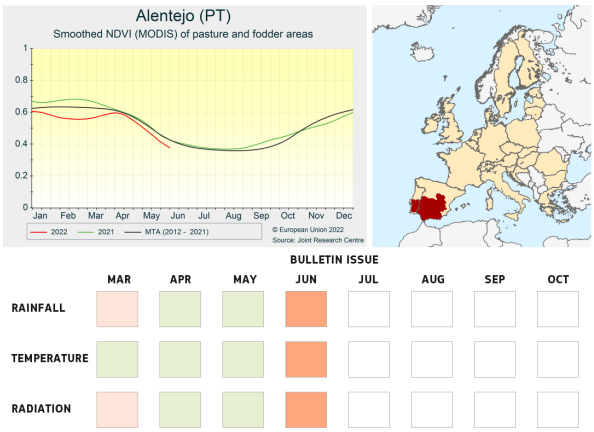
Greece

Reference period: 01 May to 10 Jun 2022



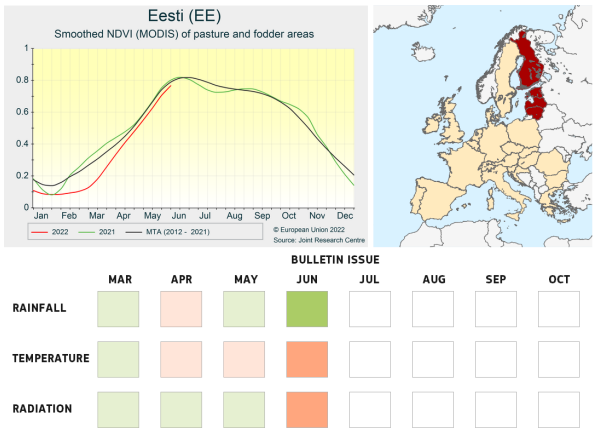
Spain and Portugal - South

Reference period: 01 May to 10 Jun 2022



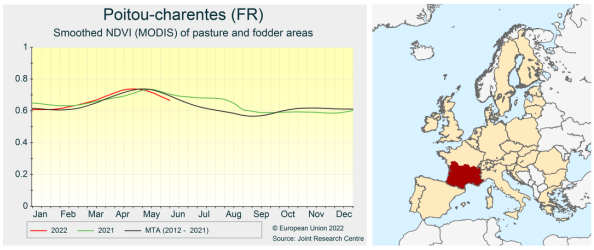
Finland and Baltic countries

Reference period: 01 May to 10 Jun 2022



France - South

Reference period: 01 May to 10 Jun 2022

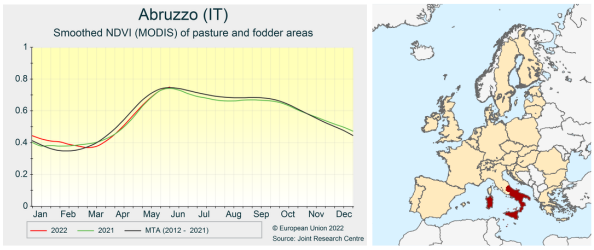


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL								
TEMPERATURE								
RADIATION								

Italy - South and islands

Reference period: 01 May to 10 Jun 2022

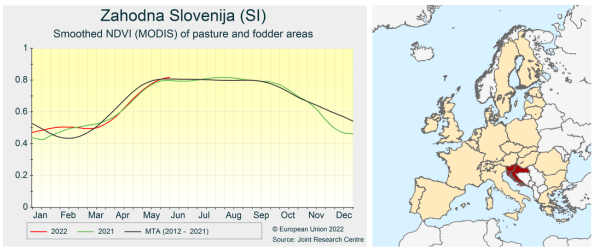


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL								
TEMPERATURE								
RADIATION								

Slovenia and Croatia

Reference period: 01 May to 10 Jun 2022

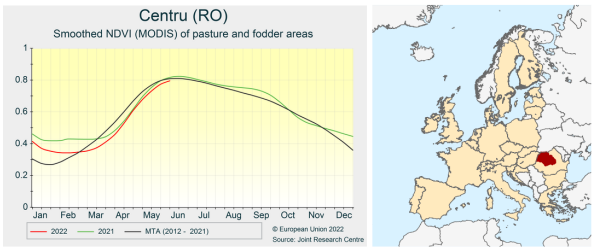


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL								
TEMPERATURE								
RADIATION								

Romania - Central

Reference period: 01 May to 10 Jun 2022



BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL								
TEMPERATURE								
RADIATION								

4. Rice in Europe

Hot and dry conditions in the western and central rice districts

The rice campaign in Europe experienced a long-lasting rainfall deficit in the growing regions of Italy, Spain, Portugal and France and above-average temperatures in Italy and in the Iberian Peninsula. Rice sowing was generally accomplished within the usual window and without any serious constraint, but it was slightly delayed in northern Italy and Greece. Rice cultivations in Bulgaria and Hungary recovered after a start to the rice campaign with unusually low temperatures. Our forecast for rice in Europe is 6.80 t/ha, 1.1% above the 5-year average, following the long-term trend for most producing countries at this time of season.

During the review period (1 April–14 June), rainfall cumulates in northern **Italy** were approximately half the long-term average, while daily temperatures remained above average in April and were exceptionally high in May (temperature sums among the highest on our records since 1979). The persistence of hot and dry conditions influenced the sowing intentions of rice producers in Italy, where the planted area is estimated (Enterisi) to be nearly 10,000 ha less than the previous season (-4.5% compared to 2021). Rice cultivations at the early vegetative development are delayed by nearly 10 days compared to the average season, but the delay is still fully reversible. The current yield forecast is based on the long-term trend analysis and is set above the last 5-year average.

In **Spain**, rainfall mainly took place in April, while since May the rice-growing regions have essentially stayed dry. Precipitation cumulates were below the LTA in *Extremadura* and *Cataluña* (35% and 40% below the LTA, respectively), but were well above average due to the more intense rain in April in *Valencia*. Daily temperatures were overall above average, with maximum temperatures unusually high (well above 32 °C) during the 17–21 May and 6–13 June periods. Rice crop in Spain is on average at the early vegetative stages, and growing conditions are in line with the average season in the whole country with the only exception of *Andalucía*, where high temperatures in May and June and irrigation constraints led to below-average biomass accumulation. Our forecast is following the last 5-year trend.

Rice sowing in **Greece** occurred on time and under favourable meteorological conditions. However, in the *Thessaloniki* plain, daily temperatures in May were below average, delaying crop growth by 10-15 days compared to an average season. Rice in Greece is on average at the second-leaf phenological stage. Our forecast for rice is close to the last 5-year average.

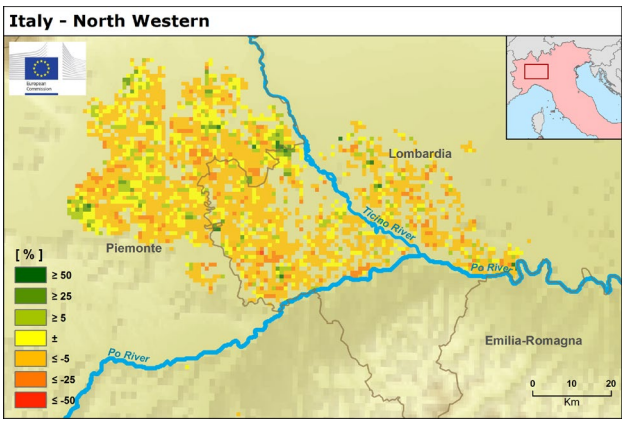
Sowing conditions for rice in **Portugal** were overall favourable in April, while they have worsened since crop emergence in May. In particular, heatwaves occurred in mid-May and mid-June, the latter with maximum daily temperatures reaching > 36 °C. Moreover, a long-lasting dry period (nearly 50 days) has been taking place since 20 April. Our yield forecast is below the last 5-year average.

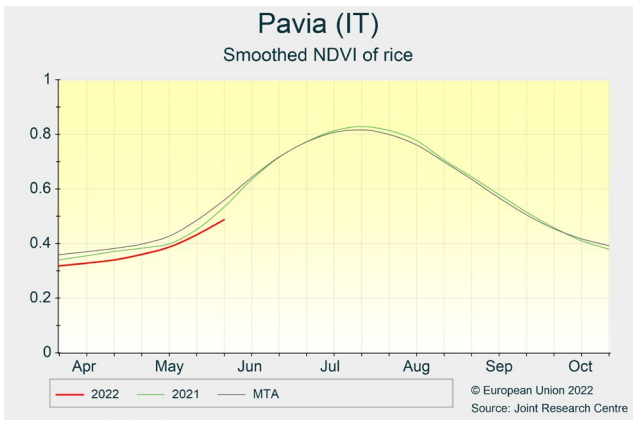
In **France** (i.e. *Bouche du Rhone*), average daily temperatures remained 1-2 °C above the LTA in most of April and May, but have increased to 3-4 °C above the LTA since beginning of June. Rainfall has been scarce, with totals of 38 mm compared to a LTA value of 108 mm. Our yield forecast is slightly above the trend, when also taking irrigation into consideration; most of the yield variability will depend on temperatures and water availability during the coming months.

A cold spell of three days took place in **Bulgaria** (i.e. *Plovdiv* and *Stara Zagora*) around 25 April, directly after rice sowings. Average daily temperatures were around 5 °C and minimum temperatures close to 0 °C. These events delayed crop germination, but in May the crops recovered fast, up to average biomass levels thanks to beneficial, warm temperatures. Our forecast is following the last 5-year trend.

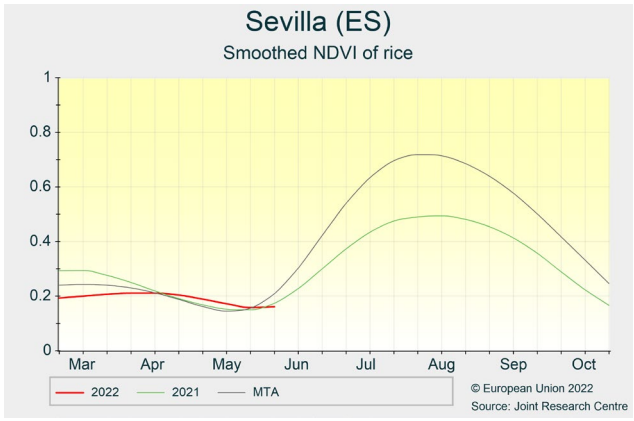
The main rice-growing regions in **Romania** have experienced colder-than-usual weather since the beginning of April. Rainfall was moderately below the LTA, with fairly distributed precipitation throughout the review period in *Braila*, *Ialomita* and *Calarasi*. Our current yield outlook for rice is in line with the historical trend.

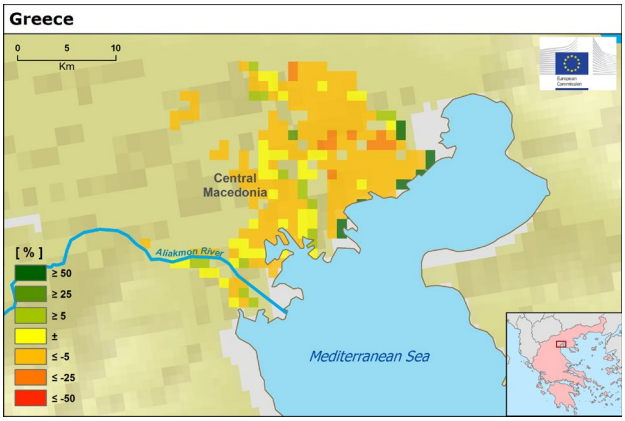
The rice-sowing campaign in **Hungary** was timely, but emergence and early development were delayed (early April) due to the subsequent below-average temperatures, with minimum daily temperatures even below 0 °C. Nevertheless, a recovery in crop development has been observed since the end of April. The yield forecast is based on the historical trend.

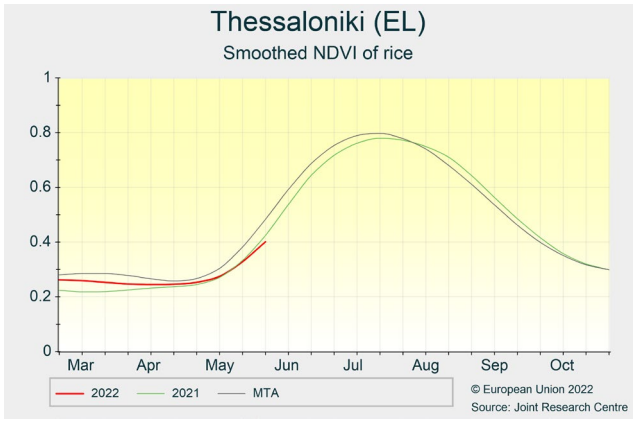

Italy - North Western
Lombardia
Piemonte
Emilia-Romagna
Ticino River
Po River
Po River
[%]
≥ 50
≥ 25
≥ 5
±
≤ -5
≤ -25
≤ -50
0 10 20
Km

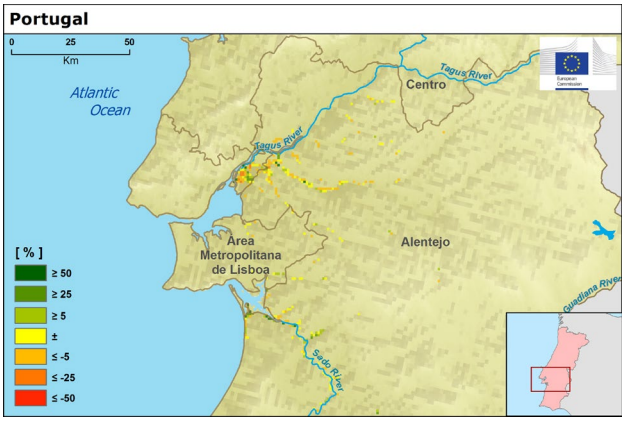

Pavia (IT)
Smoothed NDVI of rice
1
0.8
0.6
0.4
0.2
0
Apr May Jun Jul Aug Sep Oct
2022 2021 MTA
© European Union 2022
Source: Joint Research Centre

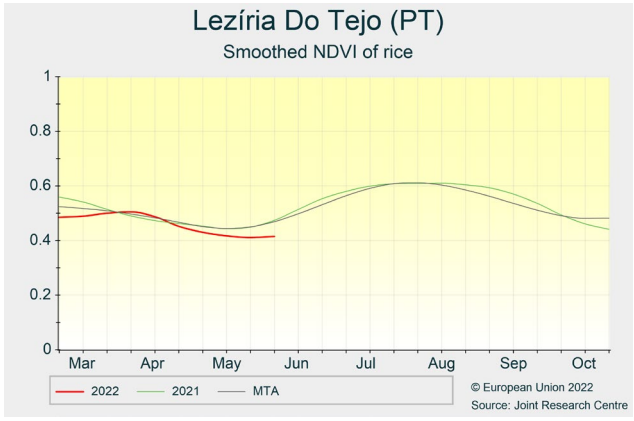

Spain
Castilla Y León
Comunidad De Madrid
Aragón
Extremadura
Castilla-La Mancha
Comunidad Valenciana
Mediterranean Sea
Guadiana River
Jucar River
Guadalquivir River
Segura River
Andalucía
Murcia
[%]
≥ 50
≥ 25
≥ 5
±
≤ -5
≤ -25
≤ -50
0 50 100
Km

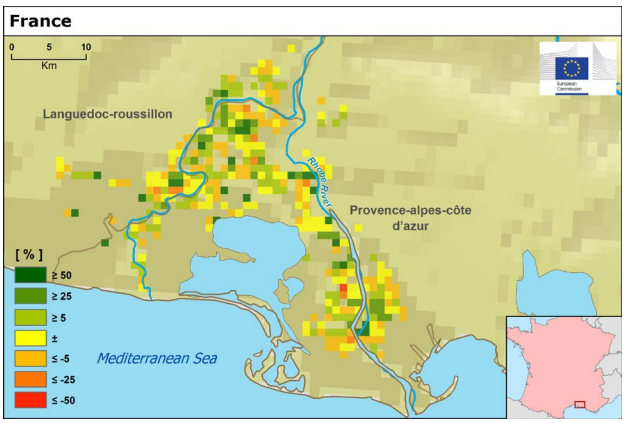

Sevilla (ES)
Smoothed NDVI of rice
1
0.8
0.6
0.4
0.2
0
Mar Apr May Jun Jul Aug Sep Oct
2022 2021 MTA
© European Union 2022
Source: Joint Research Centre

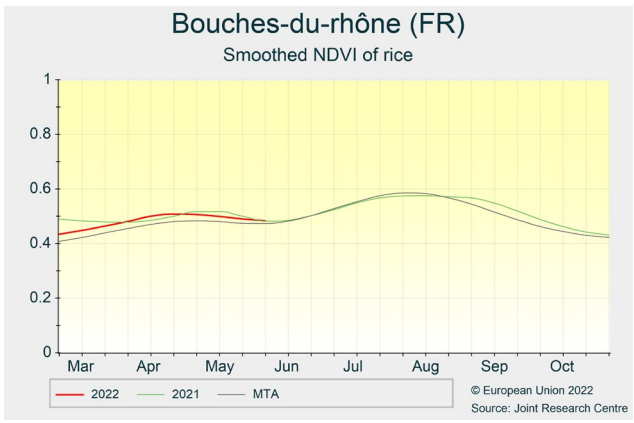

Greece
0 5 10
Km
Central Macedonia
Aliakmon River
Mediterranean Sea
[%]
≥ 50
≥ 25
≥ 5
±
≤ -5
≤ -25
≤ -50

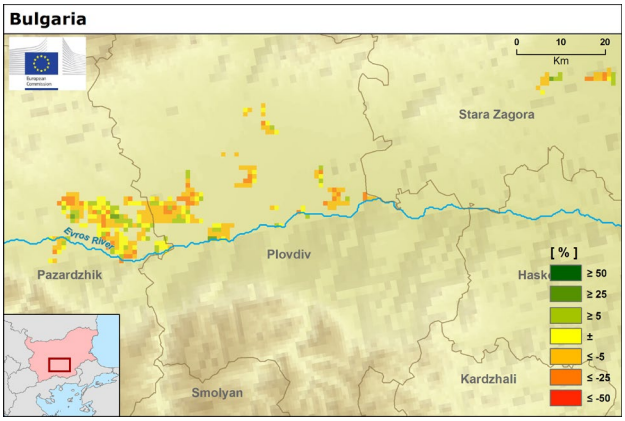

Thessaloniki (EL)
Smoothed NDVI of rice
1
0.8
0.6
0.4
0.2
0
Mar Apr May Jun Jul Aug Sep Oct
2022 2021 MTA
© European Union 2022
Source: Joint Research Centre

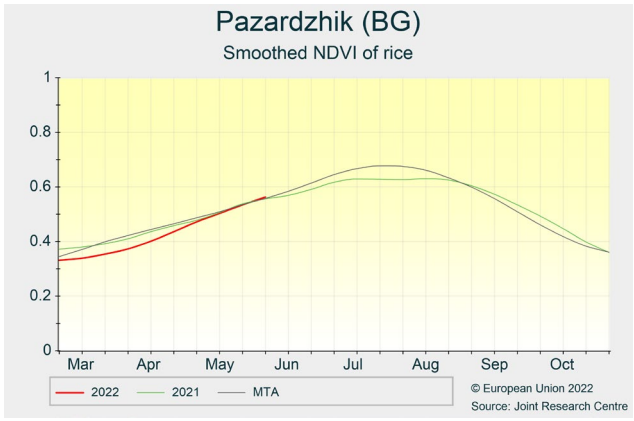

Portugal
0 25 50
Km
Atlantic Ocean
Centro
Tagus River
Tagus River
Area Metropolitana de Lisboa
Alentejo
Guadiana River
Sado River
[%]
≥ 50
≥ 25
≥ 5
±
≤ -5
≤ -25
≤ -50

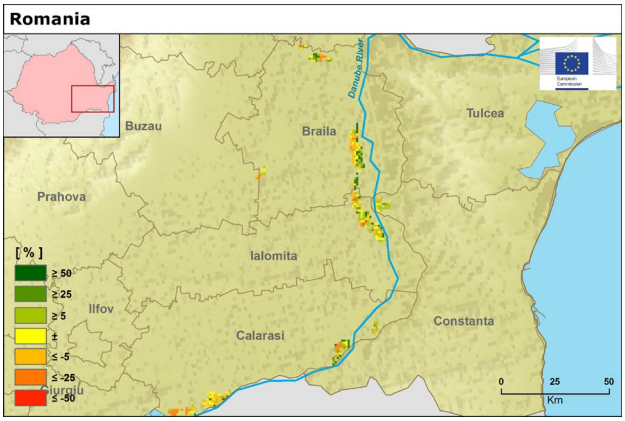

Lezíria Do Tejo (PT)
Smoothed NDVI of rice
1
0.8
0.6
0.4
0.2
0
Mar Apr May Jun Jul Aug Sep Oct
2022 2021 MTA
© European Union 2022
Source: Joint Research Centre

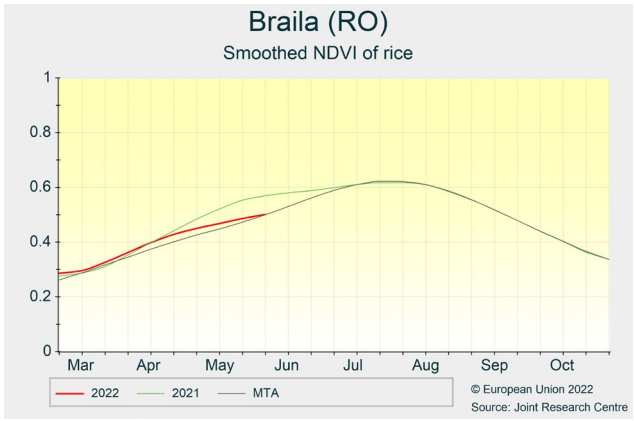


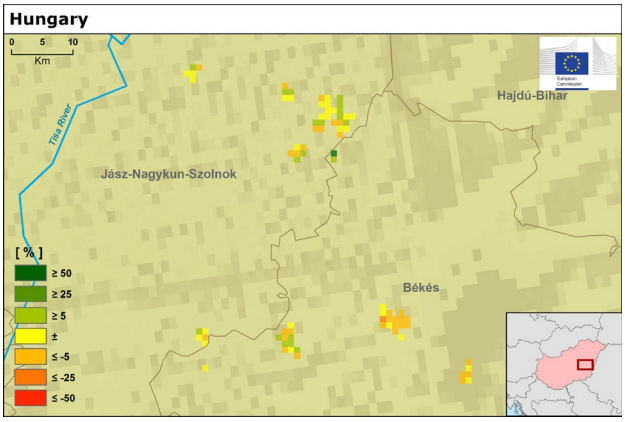


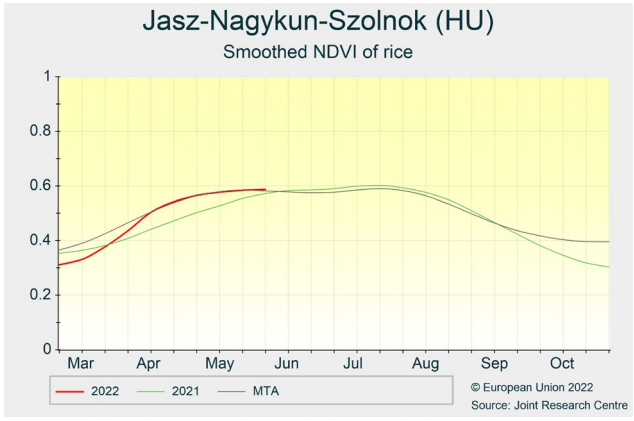












The maps display the difference between the Normalised Difference Vegetation Index (NDVI) cumulated from 1 April to 10 June 2022 and the medium-term average (2012-2021) for the same period. Mask: Rice areas based on CLC 2018. Data source: JRC MARS remote sensing database / MODIS.

5. Country analysis

5.1. European Union

France

Winter crops negatively affected by adverse weather conditions

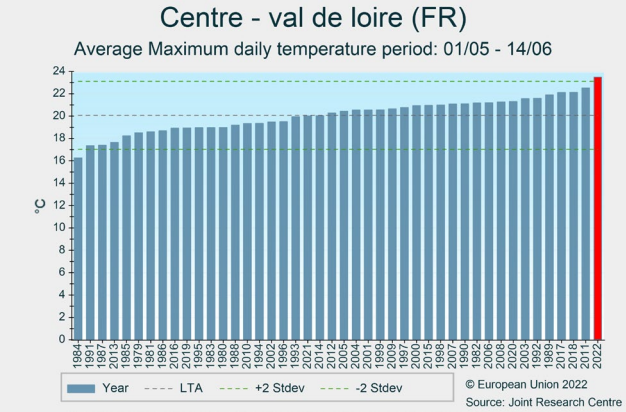
Drought conditions in the south and west of the country during May reduced the yield outlook of winter cereals.

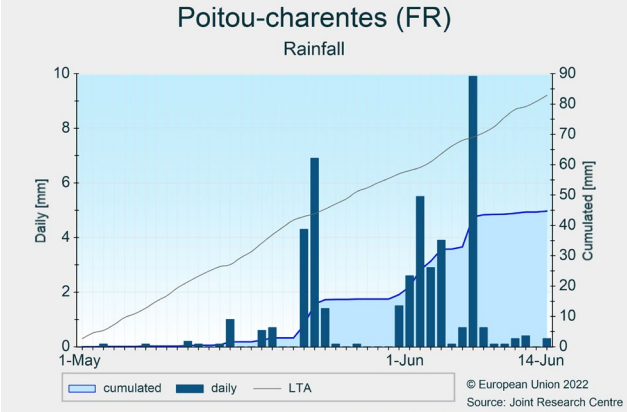
France experienced exceptionally warm and dry conditions in May. On average, during the review period, maximum temperatures at country level were the highest in our records. In the south-west, 7 to 16 days with maximum temperatures above 30 °C were observed. While April was dry already, in May too rainfall was well below the LTA in the entire country. With totals of 25 mm or less it particularly affected all southern and western regions. Rain eventually arrived in June; between 20 and 80 mm were measured across the country except in the south-east.

The winter cereal development accelerated in May due to the warm temperatures, and the heading stage is now finished across the country. High temperatures combined with the significant water deficit were strongly unfavourable and primarily affected the southern and western regions where the crops were most advanced. Precipitation in early June arrived too late to preserve the yield potential in these regions. The degradation is also highlighted in the Céré'Obs reports[2], with a sharp drop in the share of winter wheat fields under good and excellent conditions (-23% from 5 May to 9 June). The currently forecast high temperatures from 13 to 19 June will also penalise the grain filling.

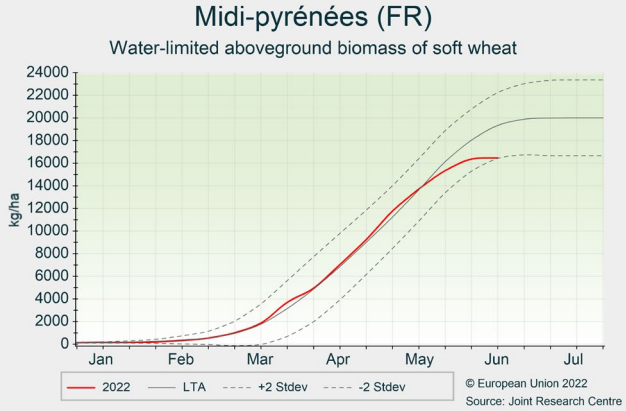
The yield outlook for winter crops is overall negative, with a contrast between north of Paris where around average yields are expected, and the southern and western regions where damage has already reduced the yield potential. Therefore, we reduced the winter cereals forecast, and, to a lesser extent, the rapeseed forecast.

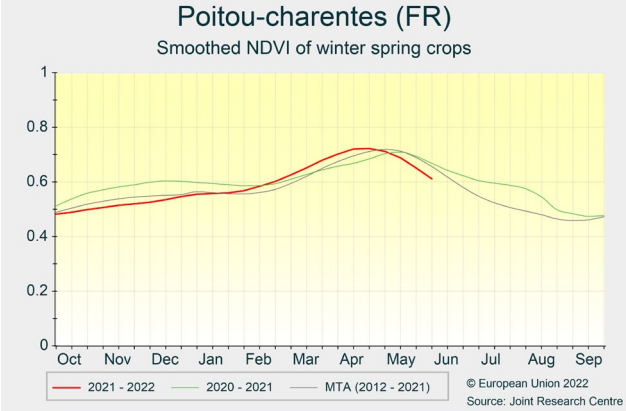
The early development stages of summer crops were also affected by the drought conditions in May. In the north, the limited rainfall of mid-May and the heavy rains of early June, combined with warm temperatures, were favourable, while in the south, the lack of water and the potential restrictions of irrigation for the coming months may reduce the yield potential. Nonetheless, we maintain the yield outlook of summer crops at the trend level.





[2] https://cereobs.franceagrimer.fr/cereobs-sp/#/home


Midi-pyrénées (FR)
Water-limited aboveground biomass of soft wheat
kg/ha
24000
22000
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
2022
LTA
+2 Stdev
-2 Stdev
© European Union 2022
Source: Joint Research Centre


Poitou-charentes (FR)
Smoothed NDVI of winter spring crops
1
0.8
0.6
0.4
0.2
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2021 - 2022
2020 - 2021
MTA (2012 - 2021)
© European Union 2022
Source: Joint Research Centre

Germany

Continued dry conditions in the east

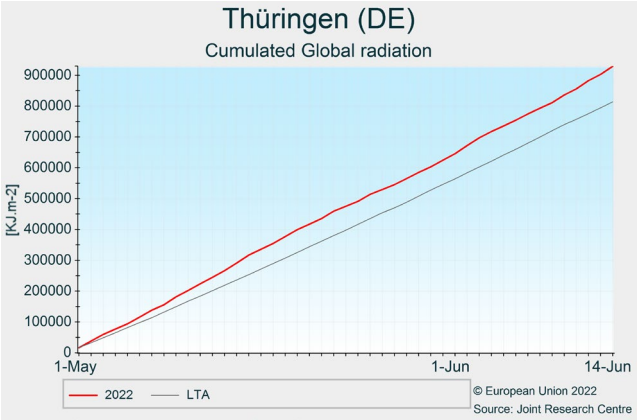
Heterogonous yields are expected due to contrasting growing conditions. Eastern Germany remains too dry and crops are negatively impacted, whereas in the remaining part of the country beneficial showers alleviated the rain deficit and maintained the yield potential.

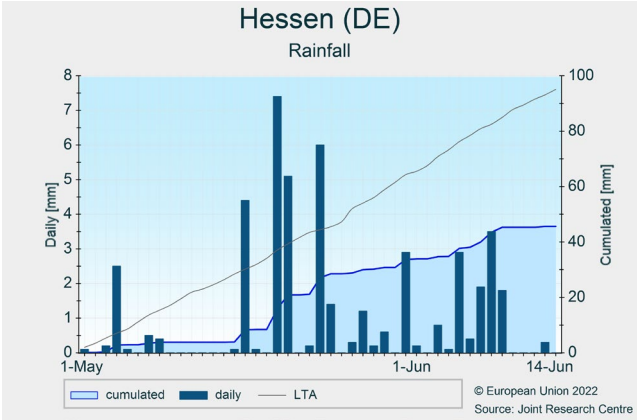
A continued rain deficit characterises the period under review for large parts of Germany. While it is most severe in eastern and central Germany (Niedersachsen, Nordrhein-Westfalen, Hessen, Rheinland-Pfalz), precipitation has been sufficient with >80 mm in the north-west coastline and southern Bavaria and Baden-Wuerttemberg (also in the form of hail and thunderstorms). However, central and western Germany experienced beneficial, albeit scattered, showers during May sustaining flowering and grain filling of winter cereals and the vegetative growth of spring cereals at average to good levels. This was supported by good radiation levels. In eastern Germany, days with beneficial rainfall were practically absent and the crop yield potential is now negatively impacted.

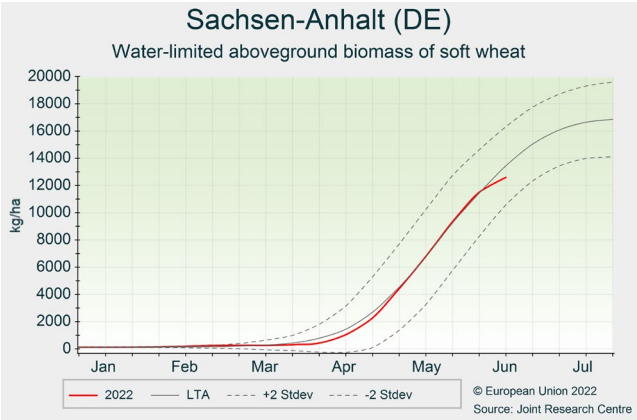
Rather mild temperatures and the almost complete absence of hot days prevented plants from thermal stress during the flowering and grain-filling stages. Temperature accumulation values are moderately above the LTA with a gradient from south (warmer) to north (colder).

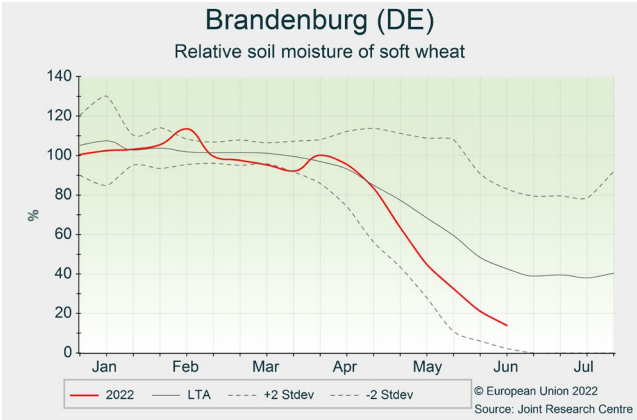
Winter cereal development is slightly advanced and forecasts are above the 5-year average and a touch above last year. Compared to our previous bulletin, most forecasts are somewhat reduced to take into account the continued negative growing conditions in East Germany and the dry zones that have emerged in eastern Niedersachsen, western Nordrhein-Westfalen and Hessen.

Winter barley was slightly revised upwards, since the flowering period was sustained by good weather conditions with respect to temperature and radiation levels. Summer crops are mostly following the trend.









Poland

Late May rains improved crop conditions regionally

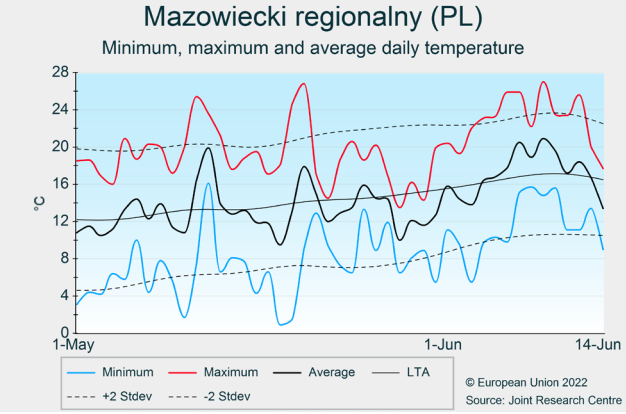
Beneficial showers in the third dekad of May alleviated dry conditions that had been developing over the first two dekads of the month due to a substantial rain deficit. Soil moisture conditions improved at the onset of winter cereal flowering and grain filling, but some areas remained dry. Agrometeorological conditions have improved since the end of May enhancing the development of spring and summer crops.

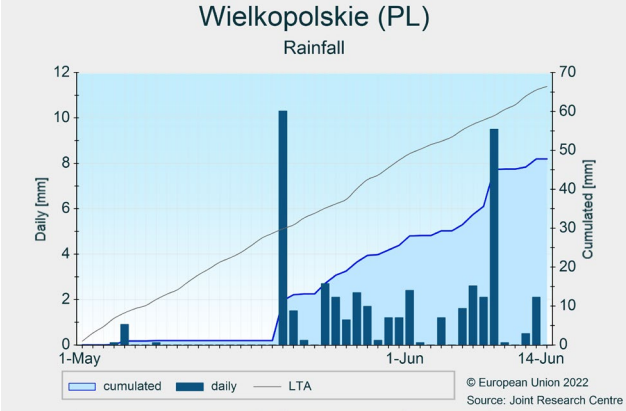
The first and second dekads of May were characterised by a substantial rainfall deficit and a deteriorating soil moisture deficit (mostly pronounced in central and north-west regions). Low intensity but frequent rain showers during the third dekad of May alleviated dry topsoil conditions (except for south-east regions). The first dekad of June was associated with above-average rainfall totals in the central north-south belt, and below-average precipitation in the west and south-east regions. In May temperatures were slightly below average in the north-east and above-average in the south-west, while the beginning of June was slightly warmer than usual.

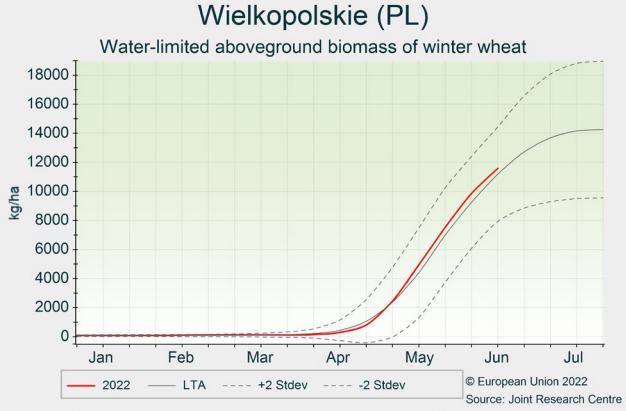
Agrometeorological conditions have improved considerably since the end of May sustaining the vegetative growth of spring cereals and grain filling of winter cereals. Nevertheless, earlier dry conditions could negatively affect yield potentials of spring cereals in the tillering stage, as well as winter cereals in the flowering and early grain filling stages, especially on lighter soils in dry regions. So far, mild temperatures have prevented plants from thermal stress during the flowering and grain filling stages.

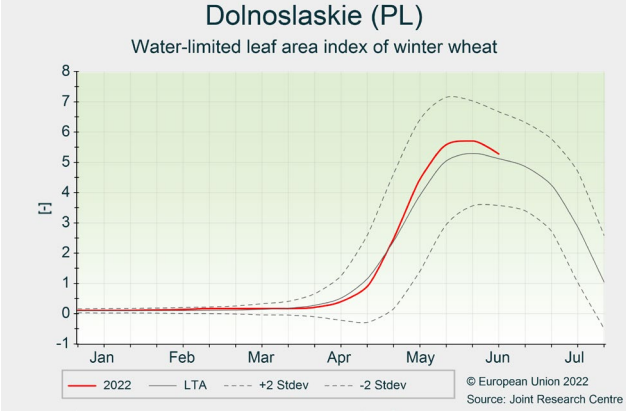
After the dry and cold start of the season, summer crops have been profiting from improved thermal and soil moisture conditions and have been recuperating their vegetative growth. Our crop model indicators show that the development and biomass accumulation of summer crops are currently close to seasonal average values. Nevertheless, some concerns have been raised due to pest pressure, especially for sugar beet.

Our yield expectations for winter and spring crops have been slightly reduced due to regionally dry conditions during the first two dekads of May. For summer crops we base our expectations on trends. As substantial water deficits are present after a dry spring, more rainfall during the coming weeks is essential for adequate crop development and maintaining this outlook.









Romania

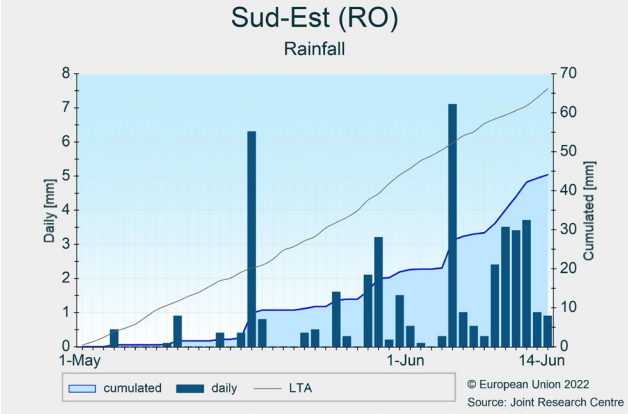
Winter crop yield outlook further reduced

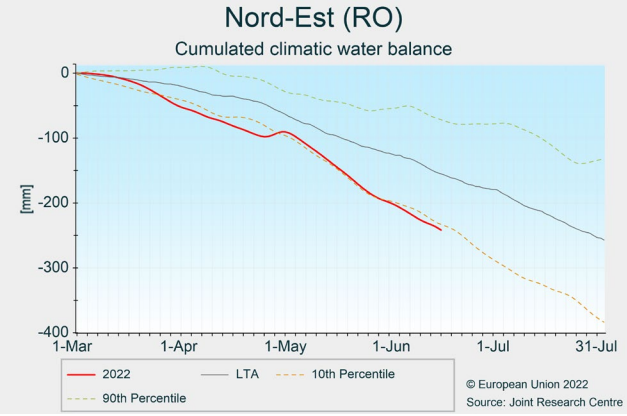
The persistent rain deficit in several winter crop growing regions combined with a temperature accumulation surplus during the period under review further deteriorated winter crop conditions. Rainfall is urgently needed to sustain the yield potential of summer crops.

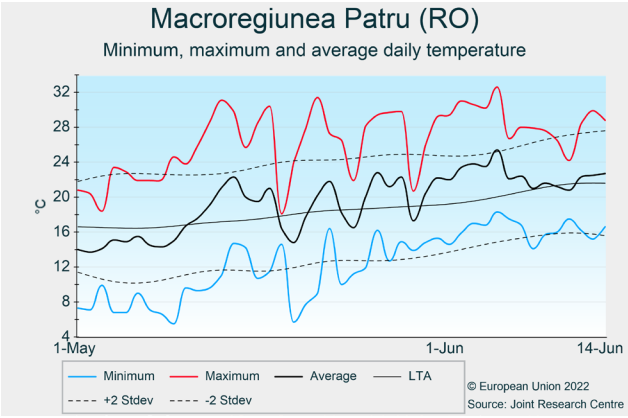
Agrometeorological conditions did not improve in Romania. Below-average rainfall prevailed during the period under review. Precipitation was mostly up to 50% below the LTA, except for the eastern part of the country, where rainfall has been scarce.

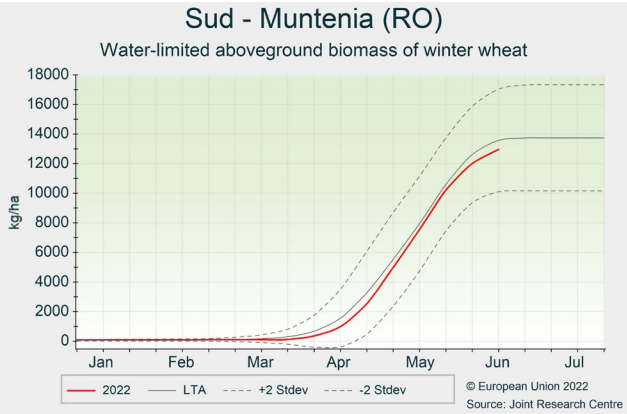
Colder-than-usual conditions prevailed in first dekad of May. Since then, temperatures increased have stayed up to 2 °C above average. A more distinct positive thermal anomaly has been registered in the south-western part of the country since early June.

These conditions have led to poor soil moisture conditions in several parts of Romania during the critical phase of flowering and early grain filling stages. Our crop model currently shows a suboptimal development of winter crops and the currently forecast warmer-than-usual temperatures could negatively affect yield potential. Consequently, the winter crops yield outlook was revised downwards and is now below the 5-year average. Rainfall remains urgently needed to sustain the yield potential of summer crops.









Spain and Portugal

Dry and hot weather; crops under stress

Crop conditions are challenging, most of the Iberian Peninsula has been dry and hot. Rainfall is among the lowest on our records, while temperatures are among the highest. We kept the winter crop yield outlook below the 5-year average and revised it downward for summer crops.

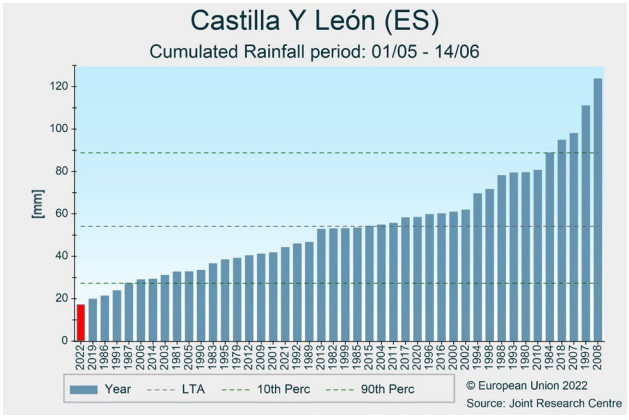
The conditions of the review period did not bring any relief, but rather confirmed the negative impacts of spring weather on yields in Spain as already accounted for in the May analysis. The review period has been one of the driest on our records with less than 15 mm of rainfall for most of the peninsula (except northern Spain). Temperatures were almost constantly above average, with daily maxima reaching above 35 °C in mid-May and above 40 °C in early June in the north-eastern as well as central-southern regions of Spain. It was one of the warmest periods of late spring and early June; only 2015 was warmer in the southern regions.

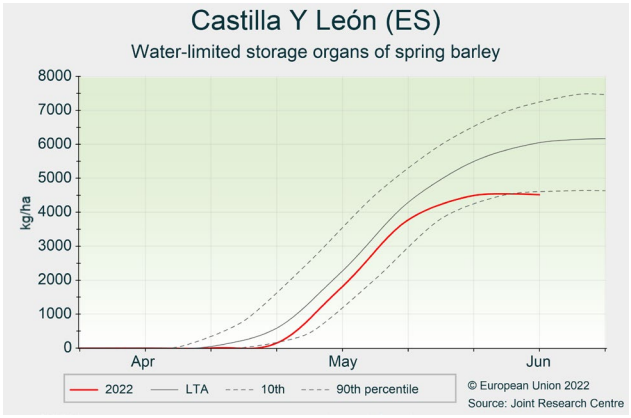
The total water volume stored in Spanish reservoirs is well below 50%, and irrigation water supply has started to be restricted. In *Murcia*, the capacity is still at last month's level (~40%), while storage reduced to 35% in *Andalucia*, to 42% in *Castilla la Mancha*, and to 37% in *Extremadura* (www.embalses.net). In Portugal, water levels in most reservoirs are still above 50% of capacity except for western *Alentejo* (sir.dgadr.gov.pt/reservas).

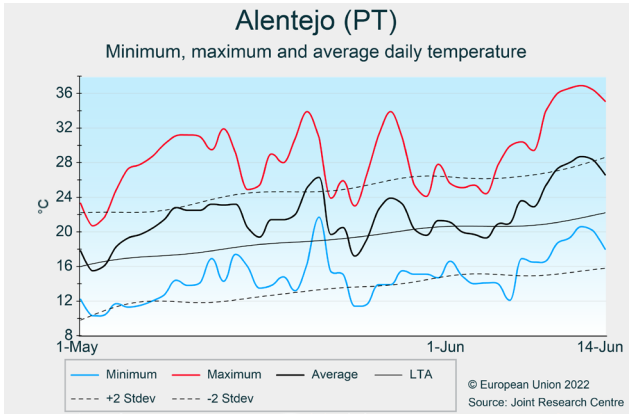
The very dry and hot weather early in the season, raising concern also in the national press, accelerated the phenological cycle of winter crops such as soft wheat that matured early with reduced time for grain filling. Also spring barley completed its grain filling faster, now reaching maturity, thus impacting the yield outlook.

Grain maize is 10 to 15 days advanced in crop development in the whole peninsula, being now in full stem elongation. Irrigated summer crops like grain maize will do well in the northern parts, but limitations in water supply could impact the extent and performance of summer crops in southern Spain and Portugal. In fact, reports of heat and the lack of water affecting non-irrigated sunflower and rapeseed in Spain suggest negative impacts on growth and development.

Our current yield forecasts are below the 5-year average for winter crops and spring barley, and have been revised down to below the 5-year average for summer crops.







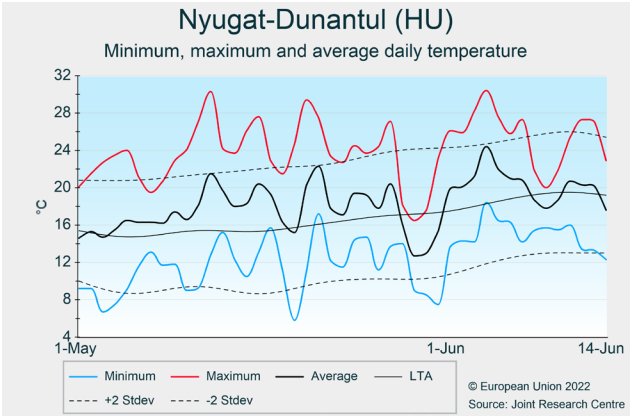
Hungary

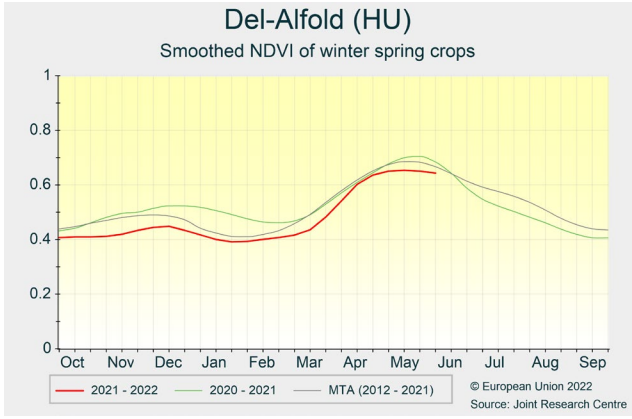
Dry conditions in the east have impacted the winter cereal yield outlook

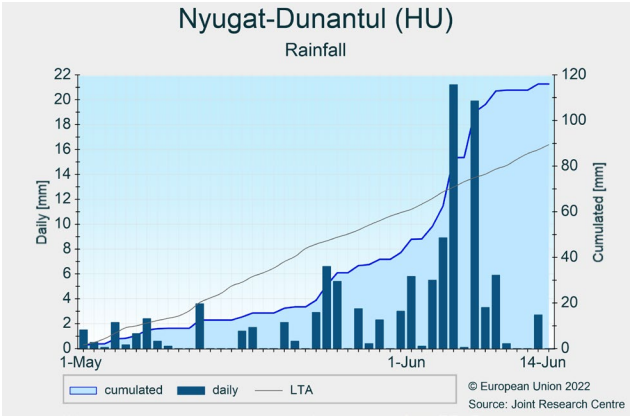
The dry conditions since May in eastern Hungary have affected crop growth, while crops are in good condition in the west.

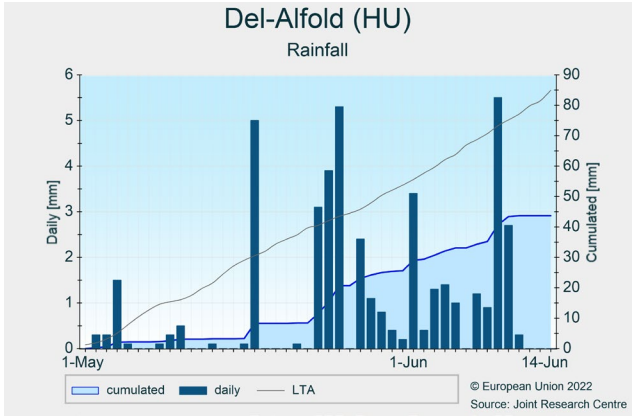
Warmer than usual conditions have prevailed since the beginning of May in the country with average temperatures 1 to 2 °C above the LTA. Precipitation in May was scarce and poorly distributed, with a deficit between 50% and 70% compared to the LTA (except in *Nyugat-Dunántúl*). In the first half of June, precipitation totals of 55-75 mm were significant in the western parts of the country, while the 20-30 mm recorded in eastern Hungary remained well below the LTA.

Winter cereals are currently at the grain development stage, with a slight delay compared to average conditions due to the dry start to the year. Precipitation in early May was essential to preserve the yield outlook in the west, where the remote sensing analysis depicts positive anomalies. In the east, the soil moisture deficit generated water stress that most likely reduced the yield potential. Altogether, we reduced the yield forecast for winter cereals. The rapeseed yield forecast is less impacted by the adverse weather, because rapeseed is less cropped in the east of the country. Summer crops in early development benefitted from the above-average temperatures for accelerated crop growth. However, they were also affected by the dry conditions in the east. Nonetheless, the yield outlook for summer crops is maintained at the trend level.









Italy

June heat stress worsens conditions of cereals

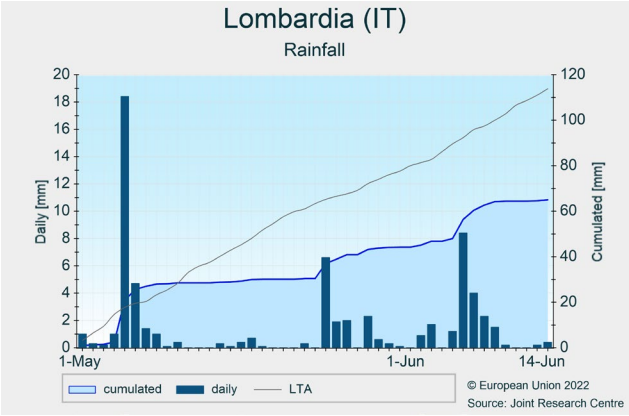
Yield forecasts for cereals have been revised downward due to hot temperatures. The durum wheat forecast is below the 5-year average while the soft wheat forecast is well below last year's value. Summer crop forecasts were decreased due to shortage of water for irrigation.

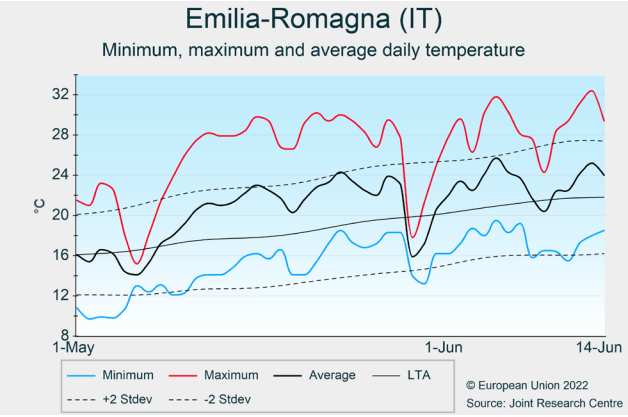
Since our May assessment, crop conditions have worsened. The relief brought by rains in May was short lived and followed by unusual hot temperatures that shortened the grain filling of winter crops. This also increased the water demand of summer crops which remain partially unsatisfied due to low soil moisture levels and limited water availability for irrigation. No significant rainfall is expected in the coming days. Furthermore, irrigation water availability will also depend on a wider water allocation strategy.

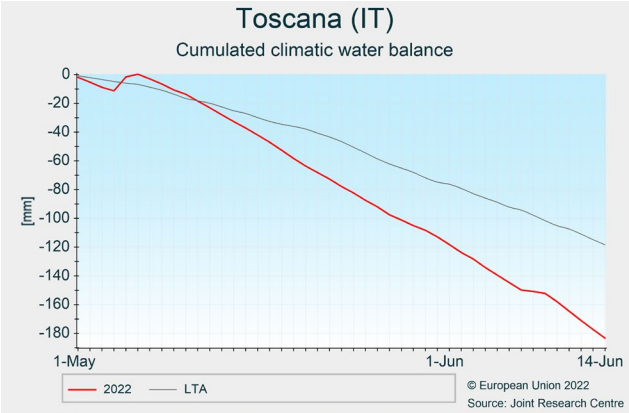
In northern Italy, the precipitation deficit continues (50% below LTA since the first of May) but at the same time mature winter crops were damaged by rain storms in June. Between 15 and 22 May the average temperature moved from 4 °C to 6 °C above LTA while maximum temperatures remained around 30 °C. Consequently, crop development accelerated and winter crop storage organs were negatively affected by shortened grain filling and reduced grain numbers. Summer crops profited from the very warm conditions and accelerated biomass accumulation. Nonetheless, the increased crop water demand (maize notably) was unsatisfied due to low soil moisture, the scarce precipitation and lack of water for irrigation. This last element is indeed the most critical one as many of the channels for irrigation are empty or mostly empty. The maize canopy is still in good shape but the risk of insufficient irrigation remains high.

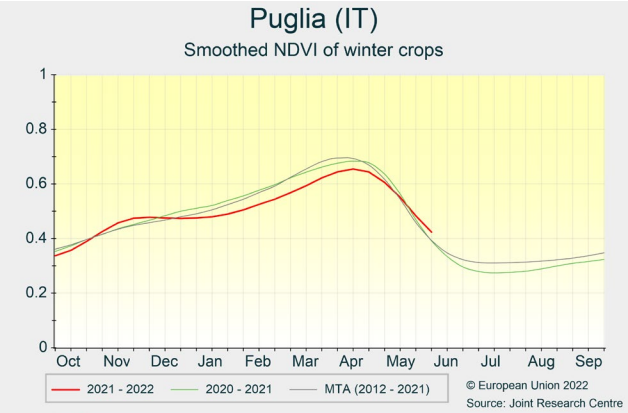
In central Italy, drought conditions are still present, most notably in Toscana and Lazio. In those regions, late May was very dry and at the beginning of June two heat waves occurred with maximum temperatures well above 30 °C. Winter crops and sunflowers were negatively impacted.

In southern Italy the winter crop season finished and harvesting activities started in late May (Sicily) or around 10 June (Puglia). The whole season was difficult, sowings were late due to excessively wet conditions, and canopy growth was suboptimal due to dry weather, while grain filling was shortened by a heat wave at the beginning of June. Cereal forecasts are in line with or slightly below the 5-year average.









Czechia, Austria and Slovakia

Favourable conditions for crops

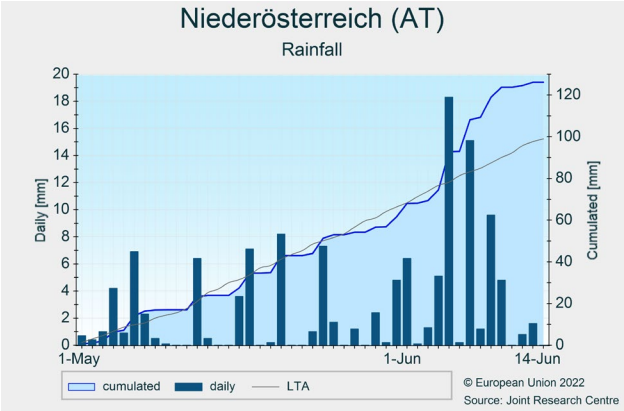
Slightly warmer than usual temperatures, accompanied by adequate rainfall, were favourable for flowering and grain filling of winter crops and vegetative development of summer crops. Yield expectations are positive.

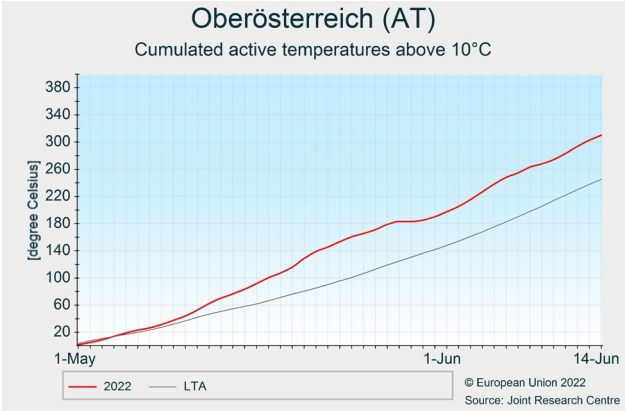
The period of analysis was characterised by predominantly above-average temperatures, with positive temperature anomalies ranging from 0.8 °C in Slovakia to 1.6 °C in Austria. The number of warm days during the period with temperature maxima above 25 °C was higher than average, but peak temperatures rarely exceeded 28 °C, resulting in active temperatures (above 10 °C) cumulated over the period of analysis significantly above the LTA.

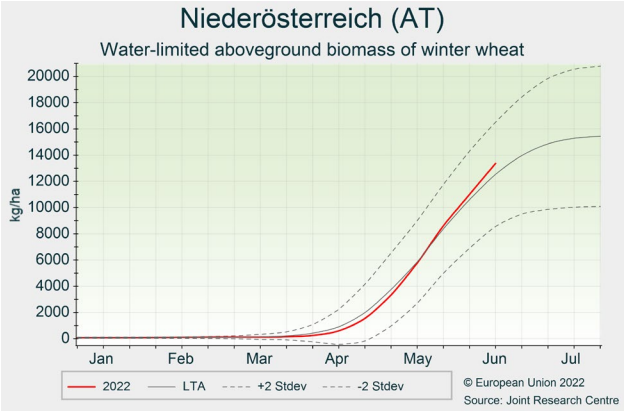
Precipitation totals for the period of review remained below average in most of Czechia, except in the south-east where rainfall was around average. In the main producing regions of Austria and western Slovakia, precipitation totals were slightly above the average, mainly due to abundant rainfall during the first dekad of June. Despite some regional rainfall deficits topsoil moisture conditions were generally adequate to sustain fair crop growth and development. Cumulative global radiation was slightly above the average.

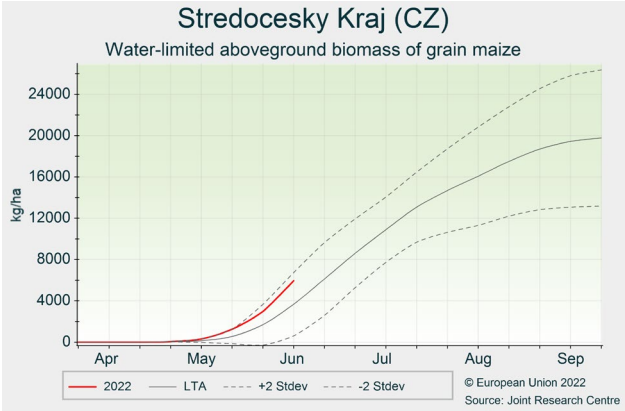
Winter and spring crops are generally in good condition. Adequate soil moisture and the absence of thermal stress were favourable for flowering and grain filling of winter cereals. Our model results show that the development of winter wheat is on a normal trajectory, and biomass and storage organ accumulation ranges around or above seasonal values. Warmer temperatures in May and early June were also beneficial for boosting the development and vegetative growth of summer crops. Our model simulates grain maize being advanced in development with biomass accumulation significantly above seasonal values.

Due to generally favourable conditions we maintain our positive yield outlook for winter and summer crops.









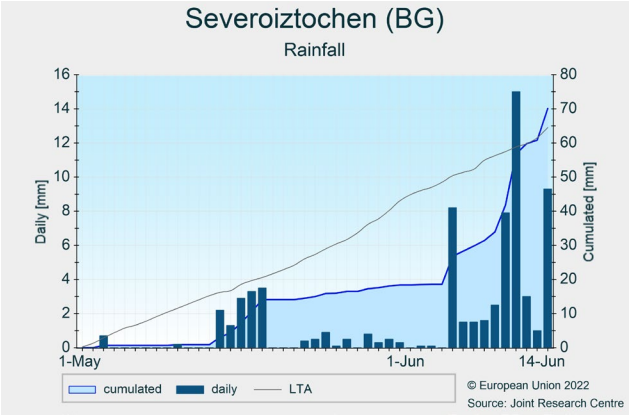
Bulgaria

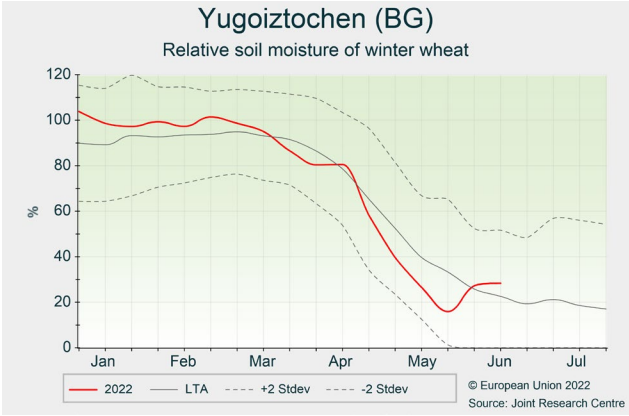
Favourable precipitation sustains above-average yield expectations

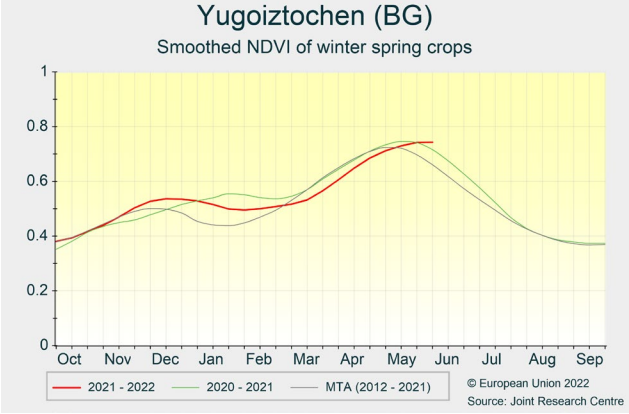
Abundant rainfall in June replenished soil moisture content contributing to favourable crop development. The winter cereal yield outlook has been maintained above the 5-year-average. Summer crop forecasts have been slightly revised upwards.

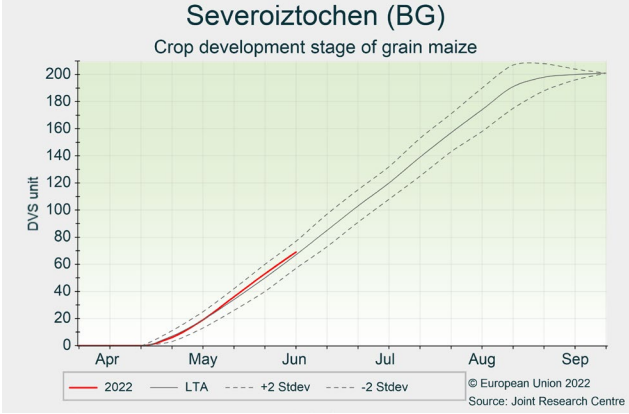
In the first dekad of May, Bulgaria experienced colder than average temperatures with average daily values up to 4 °C below the LTA. Temperatures increased afterwards and seasonal values were registered for the remaining period of analysis. Overall, May was characterised by a persistent rain deficit (rainfall cumulates 50% below the LTA). Some rainfall was recorded in the second half of the month, but mostly locally. The lack of precipitation observed in May was finally interrupted by intense rainfall in the first half June, which brought cumulative precipitation back to seasonal levels and restored soil water content.

Colder-than-usual weather at the beginning of May further slowed down winter crop development with about 20 days delay with regard to the average. This delay, however, aligned significant precipitation with the grain filling phase and helped to recover crop biomass accumulation, especially in southern and eastern regions. Although below last year's values, a good outlook is foreseen for winter cereals, and our yield forecasts are above the 5-year-average. Temperature increase, intense rainfall in June, and subsequent improvement of soil moisture conditions were particularly beneficial for summer crop growth. Summer crop forecasts have been revised slightly above historical trends.









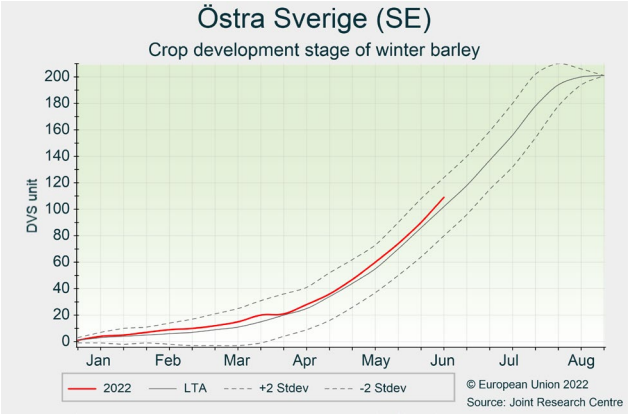
Denmark and Sweden

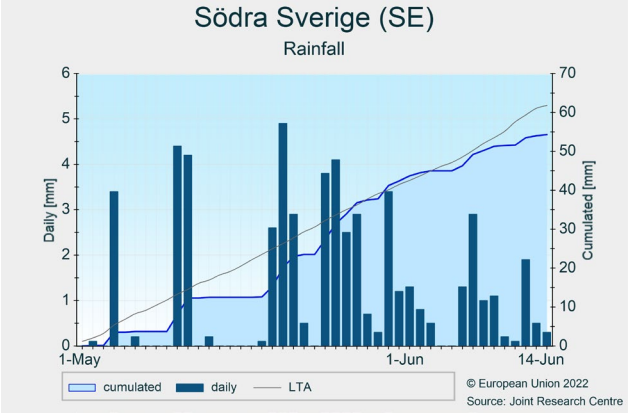
Positive yield outlook despite earlier dry conditions

Seasonal rainfall values returned after a long period with below-average rainfall. Temperatures and radiation remain close to the average, resulting in good conditions for crop development. Yield forecasts are maintained close to the historical trend.

While limited rainfall was observed since mid-April, cumulative rainfall from mid-May onward has been close to the LTA. Beneficial distribution of rainfall since early May across most of Denmark and Sweden resulted in limited exposure to water stress. Overall, temperatures and radiation were in line with the average notwithstanding a few days with lower than normal temperatures in late May as reported in Denmark. Satellite NDVI data were close to average for both countries. According to our models, winter barley entered its grain filling stage in both countries, whereas spring barley is about to reach flowering.

The general outlook for crop production is positive. Reported dry conditions from mid-April to mid-May did not negatively affect crop growth and recent rainfall mitigated the risk of water stress. The yield forecasts remain close to the historical trend and above the 5-year average for both winter and summer crops.





Estonia, Latvia, Lithuania, Finland

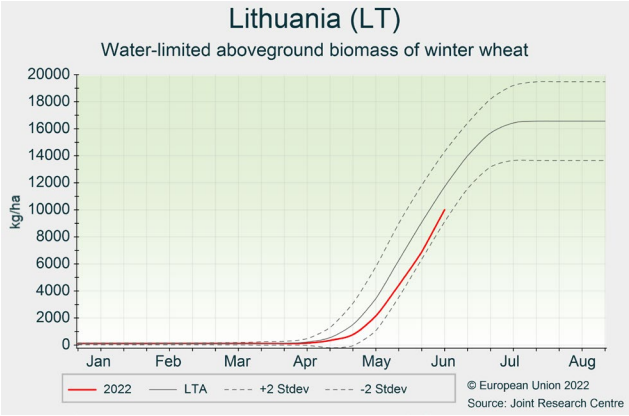
An average yield outlook

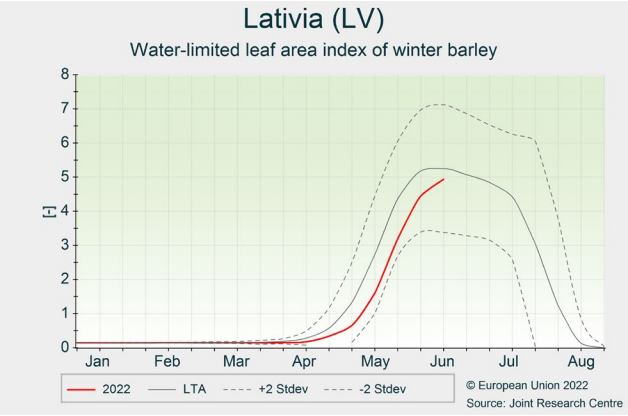
After the mainly cold and dry weather of May, temperatures and soil moisture improved in June, but crops remain delayed and wet conditions increased the spread of pest and diseases. Yield forecasts remain close to the 5-year average but are revised downwards for winter wheat and barley in Baltic countries.

Temperatures were below average in May, with a few night frosts occurring at the beginning of the period, without major consequences. In June, temperatures remained mainly above average levels. After the drier than usual conditions in May, rainfall increased at the end of the month resulting in above-average cumulated values. Cumulative radiation was below average in Lithuania and Latvia but close to the average in Estonia and Finland.

Crop model indicators show delayed crop development in all Baltic countries for all crops and particularly for winter cereals where the model also indicates below-average biomass accumulation. The mild temperatures at the end of the period and in the coming weeks should help to recover crop growth. Spring cereals are in vegetative growth stages and winter cereals are at flag leaf stage. Winter rapeseed is at the flowering stage and modelled LAI and biomass reached normal values for this time of the year. Rainfall in May largely compensated for the low soil moisture levels of the previous period, but wet conditions combined with higher temperatures increased the spread of pests and diseases. Rain hampered the progress of plant protection application in the fields. High precipitation in Finland ensured the emergence of the recently sown crops but slightly delayed the end of the sowing campaign that is mostly completed.

Yield forecasts mostly remain close to the 5-year average but were revised downwards for winter cereals in the Baltic countries to take account of the below-average biomass accumulation and the spread of pests and diseases.





Greece and Cyprus

Good yield prospects for soft wheat and barley

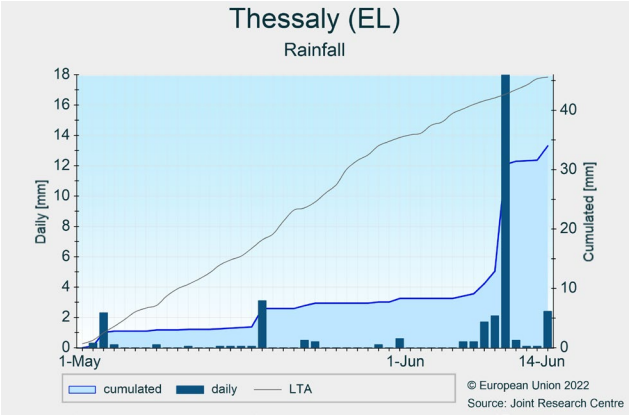
The harvest of winter crops started in June with good yield expectations for barley and soft wheat. Heavy rains and hail around harvest brought some concern for durum wheat and for triticale, although forecasts remain above the 5-year average. At the same time, summer crops maintain a good yield prospect.

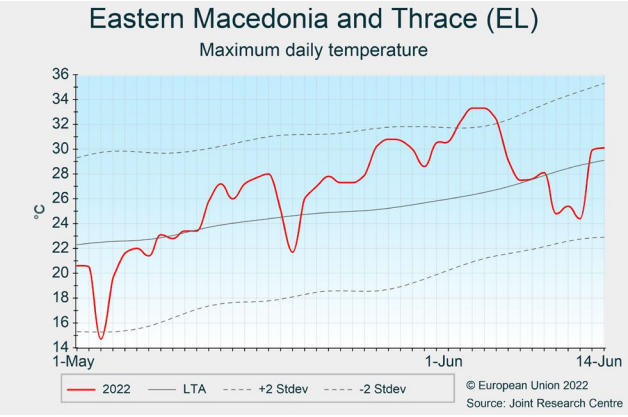
In the first half of June the barley harvest ended with good yield prospects in *Thessaly*, which produces a third of Greek barley. While in the northern major barley producing areas, mostly *Central Macedonia*, the barley harvest is ongoing with good yield expectations too.

Both soft wheat and durum wheat had good yield prospects in Greece this year. Soft wheat harvest ended around the first ten days of June in the most important producing areas, *Central Macedonia, West Macedonia, East Macedonia and Thrace*. However, heavy rains and hail around 10 June hampered the harvest operations of durum wheat and might have ruined some fields not yet harvested, especially in the region of *Thessaly*. In the *Macedonian regions*, the durum wheat harvest is planned for the second half of June. Among the winter crops, triticale seems the one that suffered the most from the overall colder than usual weather conditions as highlighted in the April issue of our Bulletin.

At the same time, summer crops maintain a good yield prospect thanks to May rains and mild temperatures.

Our yield forecasts for soft wheat, barley and summer crops are moderately revised upward. Although our forecast for triticale is moderately revised downward it remains above the 5-year average. The May durum wheat forecast is maintained.





Ireland

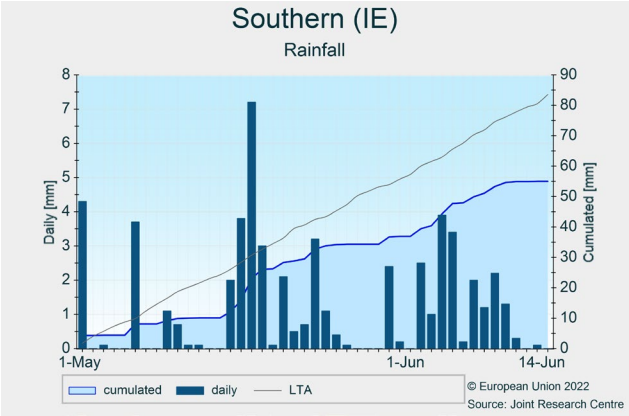
Favourable yield outlook

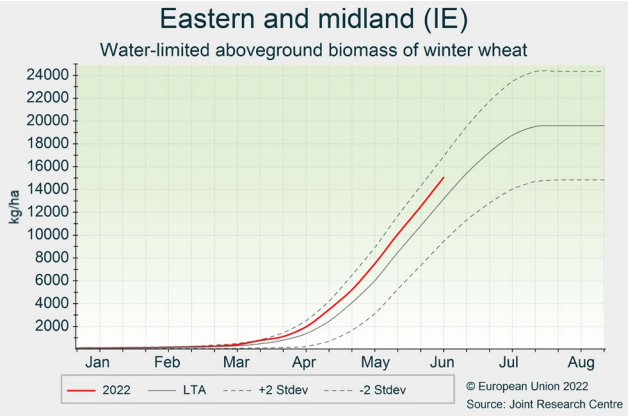
Mild temperatures sustained good growth and rainfall partly restored soil moisture levels, thus reducing concern for cereals, while reaching critical developmental stages. The favourable yield outlook is maintained for winter cereals and spring barley.

The review period was characterised by above-average temperatures, with the exception of a few days at the end of May, when temperatures decreased below the LTA. Precipitation was unevenly distributed across the country, and remained relatively scarce in the south and, to a lesser extent, in the east. In the rest of the country, rainfall reached close to average values. Radiation was slightly below average.

Spring barley is approaching the heading stage. The majority of winter cereals are now at flowering, with winter barley starting the grain filling phase. Model indicators show advanced development and above-average biomass accumulation for winter and spring cereals, and below average soil water contents in the southern and eastern areas. The rainfall in May was particularly beneficial for spring barley, and all crops are in good condition. Given the persistent soil moisture deficit in the south, regular rainfall in the coming weeks will be required to sustain the high yield potential.

The yield forecasts remain close to those of the May Bulletin and above the 5-year average.





Belgium, Luxembourg and the Netherlands

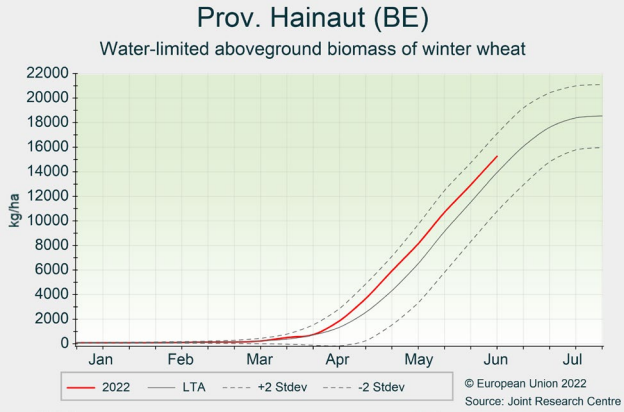
Slightly improved yield outlook; more rainfall needed in the south

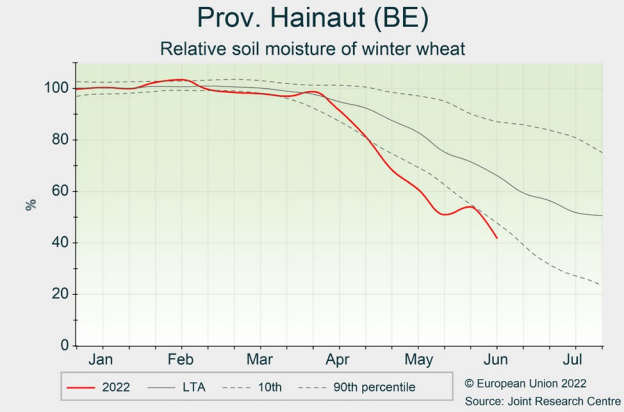
Rainfall in the second half of May and the first week of June brought relief to crops. In most regions, particularly in the south-west, the rains arrived just in time to prevent substantial negative impacts. Yield forecasts for winter crops were revised slightly upward. However, soil water levels remain low in Belgium, Luxembourg, and southern parts of the Netherlands.

Temperatures in the first two dekads of May were warmer than usual, with the warmest days between 15 and 19 May, when maximum temperatures remained above 25 °C in most regions. This was followed by an abrupt drop in temperatures, which continued fluctuating around the LTA during the remainder of the review period.

Rainfall presented a gradient from about 30% above the LTA in northern parts of the Netherlands, to 30% below the LTA in Luxembourg and southern and western parts of Belgium. Rainfall was concentrated in the period between 20 May and 8 June. Sunshine levels were above the LTA.

Overall, temperatures and radiation surplus were favourable for crops. In most areas, leaf area development and biomass accumulation have been above average. The rainfall in the second half of May arrived just in time to prevent substantial negative impacts, particularly in the south-west. More abundant rainfall in the first week of June helped to partly restore soil water reserves. Crop development is slightly advanced. However, soil water levels remain well below average in Belgium, Luxembourg, and southern parts of the Netherlands. Depending on the severity and duration of the hot and dry conditions forecast for some days following the review period, this could become a hazard for rain fed cereal crops and potatoes. Our yield forecasts for winter crops and spring barley were revised slightly upward. The forecasts for summer crops are still based on historical trends.





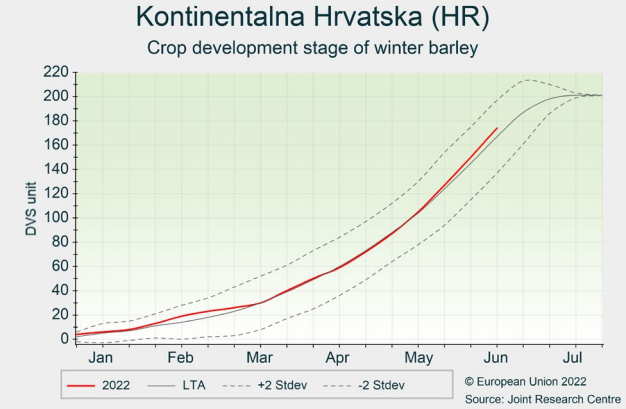
Slovenia and Croatia

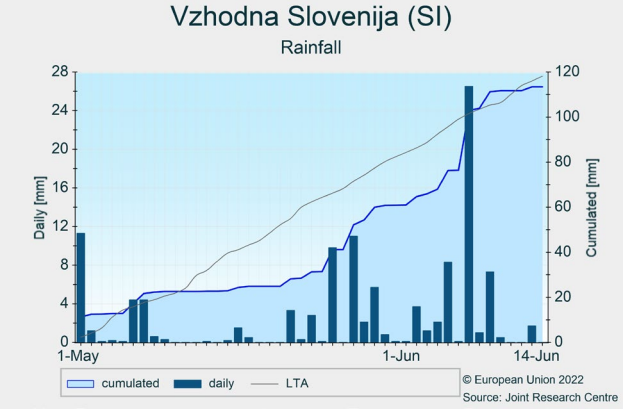
Recent rainfall alleviated dry conditions

Dry conditions were observed in both countries in May, partly compensated for by well-distributed rainfall in early June. However, the combination of reduced soil moisture and higher than usual temperatures in May occurred during the sensitive flowering phase of winter cereals. Accordingly, the forecast was slightly degraded, albeit remaining above the 5-year average.

The analysis period was warmer than usual, notwithstanding below-average temperatures at the end of May. Precipitation was scarce in the first two dekads of May, but rain set in at the end of May and continued in June, bringing overall precipitation sums close to average, alleviating the soil moisture deficit for the period of interest. Cumulated rainfall was close to the LTA for continental Croatia and eastern Slovenia, while the western parts of both countries remained below the expected levels of cumulated rainfall. A hailstorm was reported on 25 May affecting northern Croatia and eastern Slovenia, although the extent of damage is difficult to evaluate. Global radiation and satellite NDVI data were close to the LTA. According to our models, both winter and spring cereals reached the grain filling stage in good condition.

Although the general yield outlook remains positive, the dry conditions during the flowering stage in May might have limited the formation of grains. The forecast has been slightly degraded, but is still above the 5-year average.





5.2. United Kingdom

Improved soil water conditions maintain yield potential

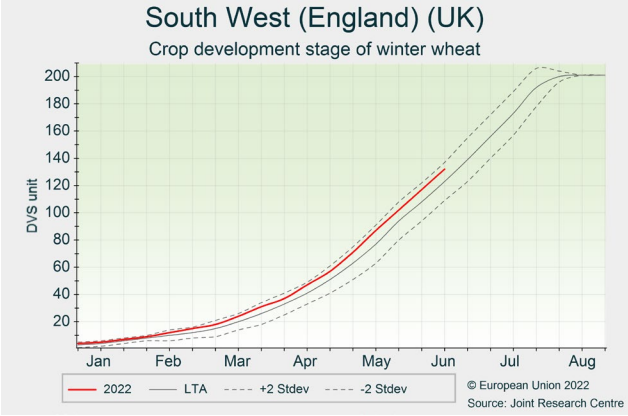
Rainfall arrived just on time to improve crop conditions before these were irreversibly impacted, and mild temperatures sustained adequate growth. Our yield forecasts for spring and winter cereals are maintained above the 5-year average.

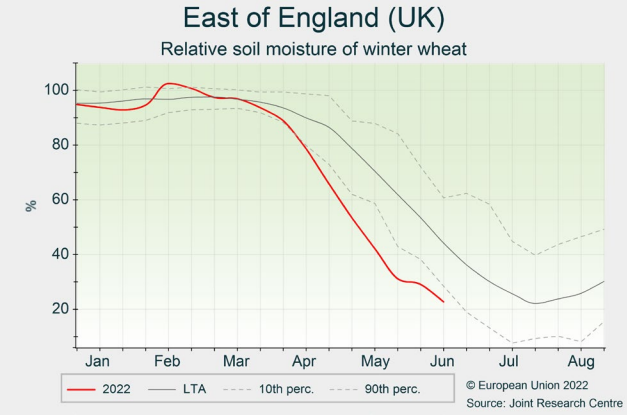
Temperatures were predominantly above the LTA, with the exception of a few cold days between the end of May and the beginning of June. Cumulative rainfall reached average values during the review period, except in *Wales, South West England* and *Scotland*, where it remained slightly below the LTA. Cumulative radiation was close to the LTA in most regions.

In southern regions, the rainfall episodes in May and early June were particularly welcomed to partly restore soil moisture, which was critically low at the beginning of the review period, thus removing immediate concerns about water stress during the flowering stage of winter cereals and during the vegetative phase of spring cereals.

Model-based indicators show above-average development and biomass accumulation for winter and spring crops. Yield forecasts are maintained above the 5-year average.

However, soil water contents in the south are still very low, and more rainfall is needed in the coming weeks to sustain the favourable yield outlook.





5.3. Black Sea Area

Ukraine

Mediocre yield outlook for winter crops

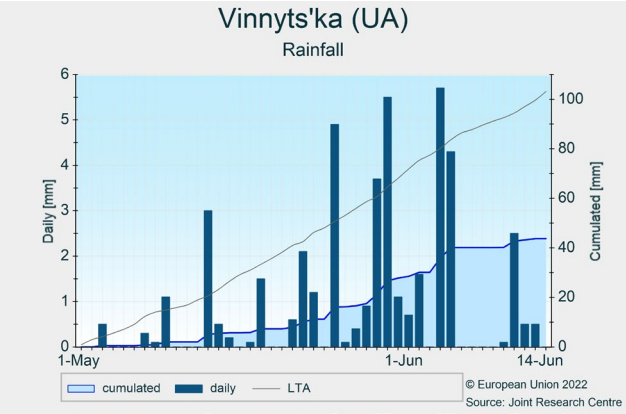
The June edition of the JRC MARS Bulletin in the Global outlook series on Ukraine[3] provided a regional analysis and showed poor yield outlook for winter crops, especially in the central and western part of the country, due to adverse weather conditions. Fair yields are still expected in the eastern oblasts.

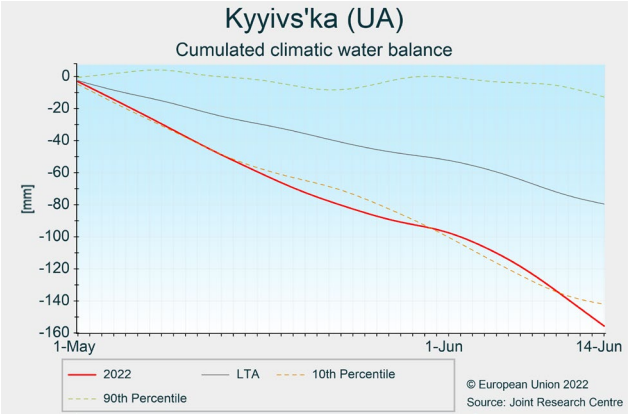
Drier than usual conditions prevailed during the period under review. Persistent rainfall deficit continued in the south-western oblasts, where precipitation was locally up to 80% below the LTA. Since early June, rainfall has also been scare in the central and south-eastern oblasts. This led to poor soil moisture conditions in a large part of the country.

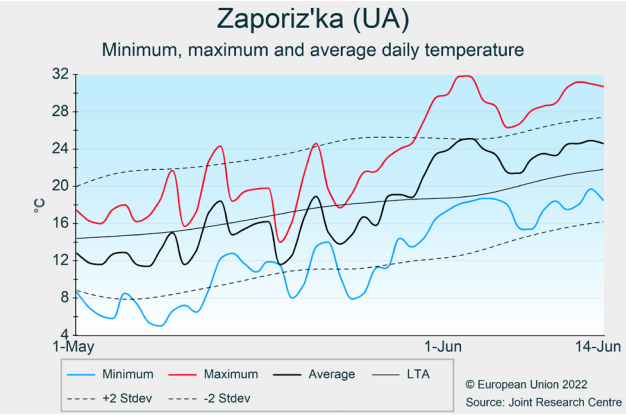
Temperatures stayed 0 °C to 2 °C below the LTA in May. Only the south-western oblasts experienced slightly above-average temperature. This resulted in a delayed crop development. Since early June, a positive thermal anomaly of up to 4 °C ,with daily maximum temperatures exceeding 30 °C for several days, prevailed in the eastern half of Ukraine, possibly with negative effects on grain filling.

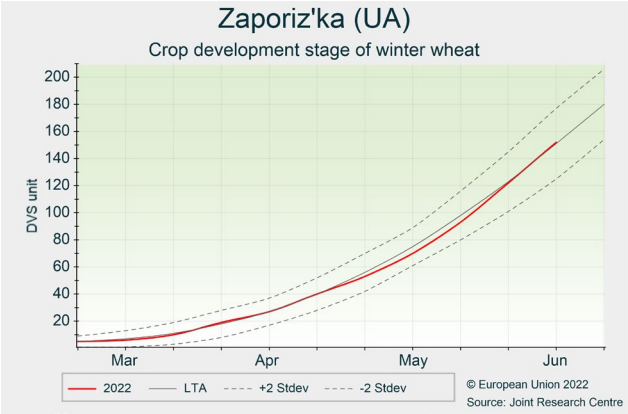
Due to the adverse weather conditions experienced since the start of the current season, our yield forecast for winter crops is below the historical trend and well below last year's record level. The yield outlook could be further reduced in case of hot and/or dry conditions in the coming weeks.

According to the Ukrainian Ministry of Agriculture[4], the sowing campaign of spring and summer crops is finished. Summer crops profited from the increased temperatures in the first half of June to recover from the delayed development in May. Their yield outlook is currently forecast at the trend level. However, rainfall is urgently needed to sustain their yield potential.









[3] https://publications.jrc.ec.europa.eu/repository/handle/JRC127973
[4] https://minagro.gov.ua/news/v-ukrayini-zasiali-1911-tis-ga-yaroyi-pshenici

Turkey

Yields drop after hot temperatures and storms

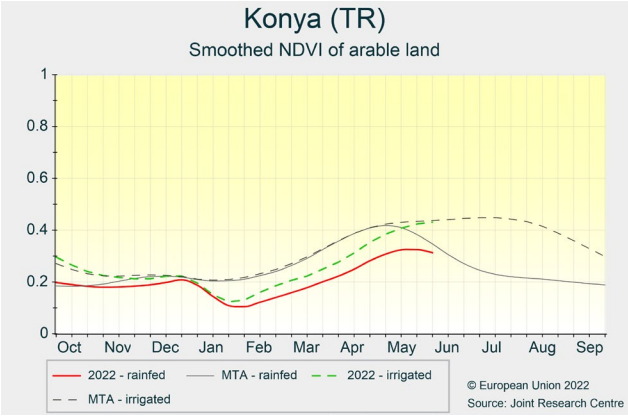
The delayed winter crop season faced sudden adverse conditions that changed yield expectations: in June hot temperatures shortened biomass accumulation while storms damaged the canopy. Yield forecasts for winter cereals are revised downward and are now in line with the 5-year average.

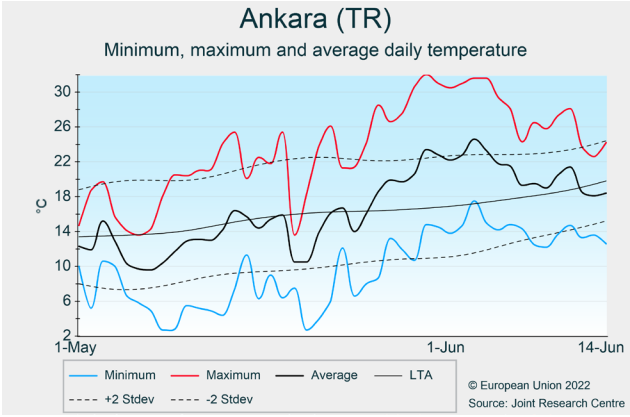
In Anatolian regions, the winter crop season was delayed at the beginning of May although canopy conditions were good. Colder than usual temperatures (-2 °C to -4 °C below the LTA) up to 10 May slowed down the already low biomass accumulation. Since then temperatures have slowly increased. A heat wave moved temperatures well above the average and above 30 °C for 2 to 5 days in *Konya*, *Ankara*, *Bursa*, *Kirikkale* and *Kayseri*. As a consequence, the phenological development of winter crops accelerated, reducing the time available for vegetative development. Winter crops thus started flowering in June with suboptimal biomass accumulation. June brought several storms, flash floods and hail events that have locally compromised crop canopies. Irrigation seems to have mitigated the effect of hot temperatures and irrigated cereals perform much better than those that are rain fed (e.g. Konya NDVI graphs). If hot temperatures continue over the next week, shortening of grain filling is likely to occur and cereal yields could decrease further.

In south-eastern regions the main winter crop season has concluded with moderate yield expectations. The lower than usual temperatures in the first 20 days of May allowed for a longer than usual grain filling period favouring yield formation and compensating for the suboptimal biomass accumulation and canopy development. The heat wave that started on 27 May (with T max > 35 °C) came too late to have a significant influence on final yields.

The maize season is proceeding regularly in the main producing regions of *Adana* and *Hatay*. Water is sufficient to fully irrigate crops, even in the central region of Konya where most sugar beet and soybean is cultivated.

Although winter cereal yields are revised downward they remain around the 5-year average.





5.4. European Russia and Belarus

European Russia

Early heatwave could compromise fair yield potential in the south

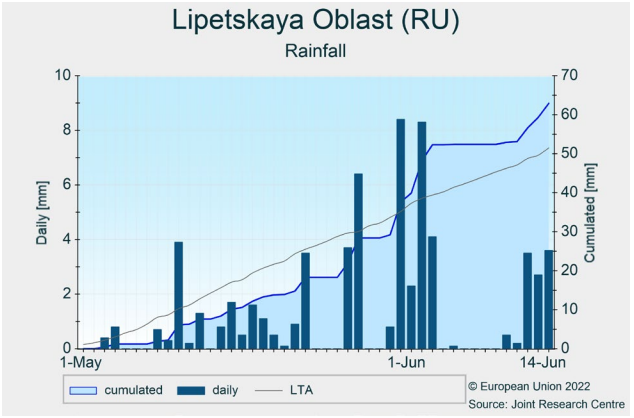
Favourable conditions have prevailed since the start of the season in European Russia. Winter crops are currently in good condition and above-average yields are expected. However, the drier than usual conditions combined with significantly warmer than usual temperatures in the southern oblasts could negatively affect the yields.

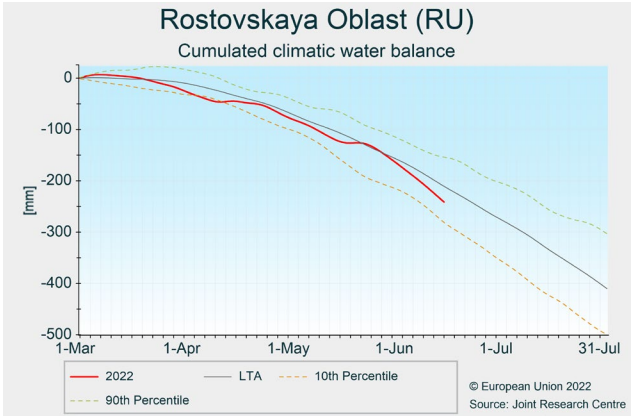
Most of European Russia experienced near-seasonal rainfall during the period under review, with the exception of the Volga okrug, where abundant and frequent rainfall was recorded, and the western half of the Southern okrug (particularly in the oblasts of Rostov and Krasnodar), where rainfall was below the LTA.

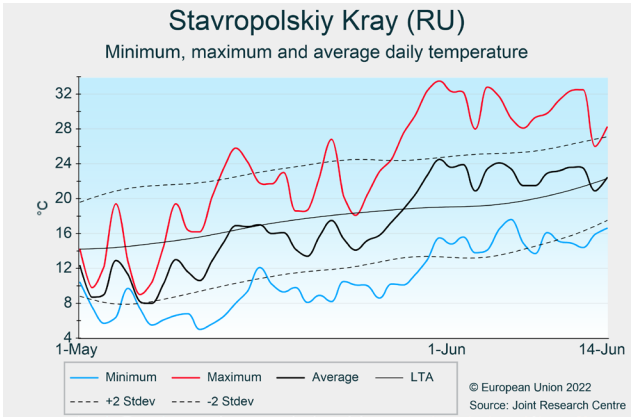
May temperatures were on average 2 to 4 °C below the LTA in most regions; the southern half of the Volga okrug experienced up to 6 °C below-average temperatures. These conditions allowed the winter cereal crops to pass the stem elongation and the flowering stages without any thermal stress. Remote sensing images indicate above-average biomass accumulation overall and sustaining the expected above-average yields this season.

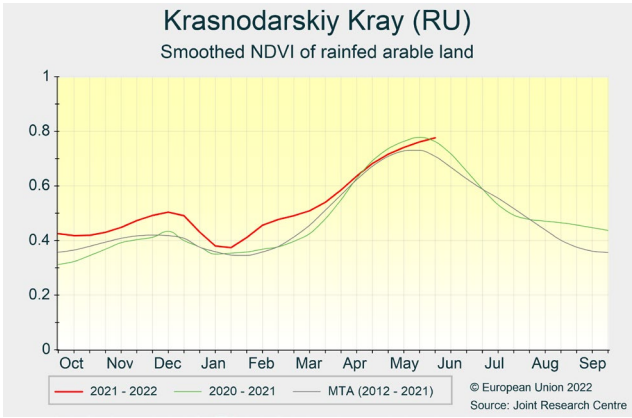
Temperatures increased steeply towards the end of May, resulting in a heatwave in early June, with daily maximum temperatures, frequently exceeding 30 °C in the Southern okrug and in the North Caucasian okrug. According to the current weather forecast, warmer than usual conditions are expected to continue, which might negatively affect the grain filling of winter cereals.

A more detailed analysis will be provided in the upcoming June edition of the Bulletin in the Global outlook series on Russia[5].









[5] https://publications.jrc.ec.europa.eu/repository/handle/JRC127975 (to become active on 27 June 2022)

Belarus

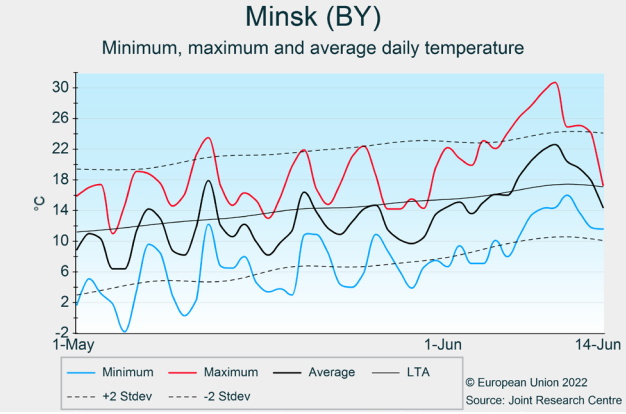
Good conditions for crops

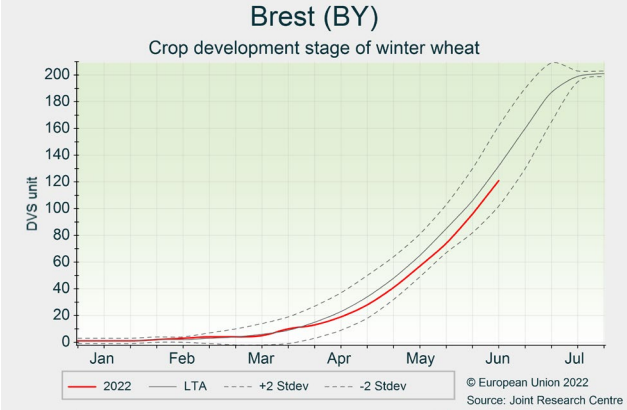
A colder than usual May resulted in some delay in crop development, but warmer weather during the first dekad of June favoured crop development and growth. Soil moisture levels were generally adequate, and a positive yield outlook is maintained.

During the first two dekads of May, precipitation totals were significantly below average resulting in topsoil moisture deficits, especially in the *Vitebsk* region. Abundant rain during the third dekad of the month alleviated dry conditions. In the first half of June, precipitation totals were variable across the country (from above-average values in the west to below-average in south-east), but soil moisture levels remained generally adequate. May was colder than usual (with negative daily temperature anomalies exceeding -2 °C), while the first dekad of June was characterised by above-average temperatures. Cumulative global radiation was around average.

Crops are generally in good condition although delayed in development after a cold spring. Winter wheat is undergoing flowering in generally favourable agro-meteorological conditions. Our model simulations indicate that winter wheat development and biomass accumulation have been accelerating thanks to the favourable June conditions and are now around or approaching average seasonal values.

The early development of maize was delayed due to the colder than usual spring, but plants are recuperating with vegetative growth. We maintain our positive yield outlook for both winter and summer crops.





5.5. Maghreb

Morocco, Algeria and Tunisia

Negative outlook for Morocco and Algeria, positive expectations for Tunisia

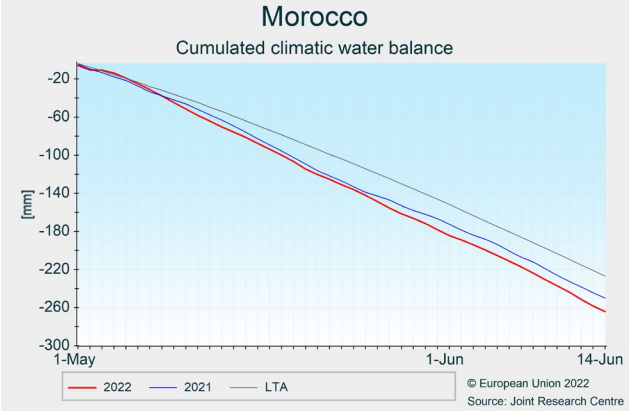
A high rate of crop failure due to drought is confirmed in Morocco. Winter crops in central and eastern Algeria presented a sharp recovery after beneficial rainfall, whereas the areas to the west remained hampered by this season's drought. Crop recovery was also observed in central-western regions of Tunisia.

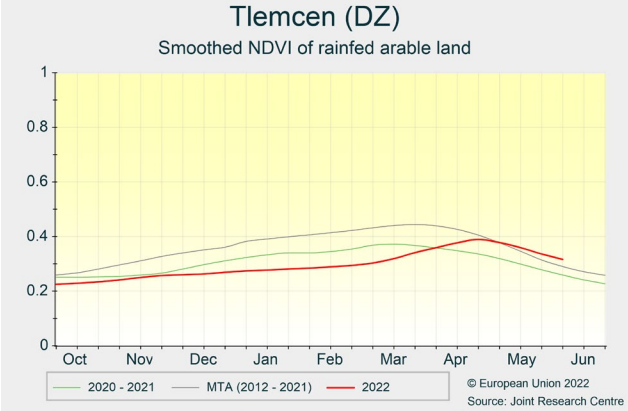
Dry and hot conditions prevailed in **Morocco**, in line with the meteorological conditions observed since the beginning of the season. Average daily temperatures were +2 °C to +4 °C above the LTA, while accumulated rainfall was 20 mm below the LTA. The interpretation of remote sensing data suggests that winter crops completed the phenological cycle around the end of May. Harvest operations have already started. Well below-average biomass accumulation levels are observed across the country. Our yield forecasts range from -54% (soft wheat) to -61% (barley) compared with the 5-year average.

In **Algeria**, cereals are in advanced maturity stages, and the harvesting campaign is about to begin. At country level, our yield expectations for winter cereals remain below the 5-year average but have improved after a period with above-average rainfall from the beginning of March until mid-May, which allowed partial recovery of winter crops in central and eastern regions. Our forecast for soft wheat and barley is slightly worse than for durum wheat because of the higher share of soft wheat and barley in the western regions of the country.

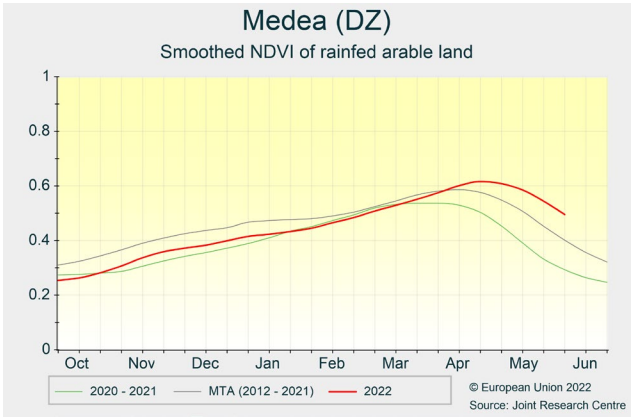
In **Tunisia**, overall positive conditions were observed for durum and soft wheat. Harvesting is about to begin. No biotic or abiotic stress occurred during grain filling. In central-western regions (e.g. *Kasserine*, *Kairouan* and *Kef* - important barley producers) crops recovered after the intense rain event of mid-March. Our yield forecasts are above the 5-year average and above last year's level.

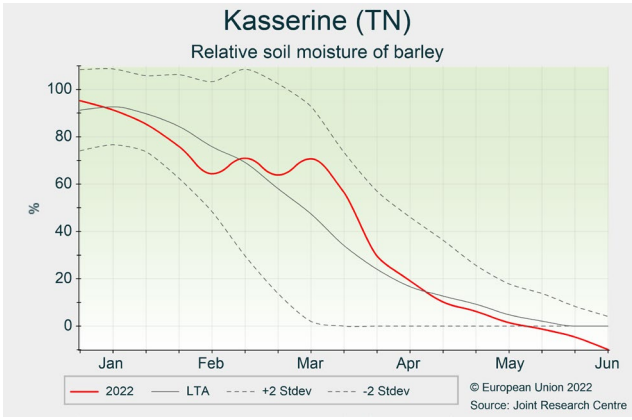
For more information, readers are referred to the June issue of the JRC MARS Bulletin on Morocco, Algeria, Tunisia, Libya and Egypt, in the Global outlook series[6].





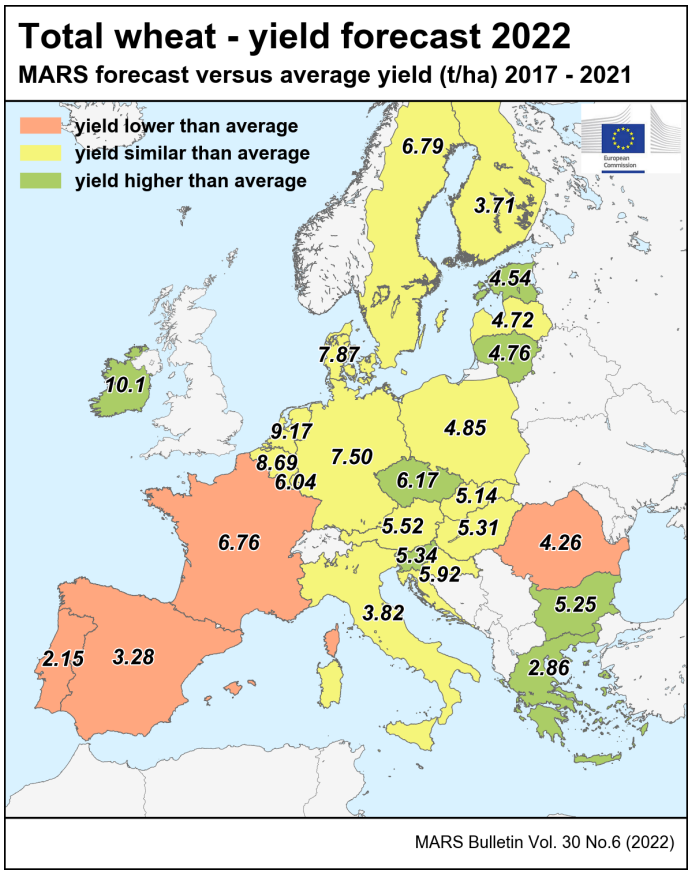
[6] https://publications.jrc.ec.europa.eu/repository/handle/JRC127970


Medea (DZ)
Smoothed NDVI of rainfed arable land
1
0.8
0.6
0.4
0.2
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
2020 - 2021
MTA (2012 - 2021)
2022
© European Union 2022
Source: Joint Research Centre

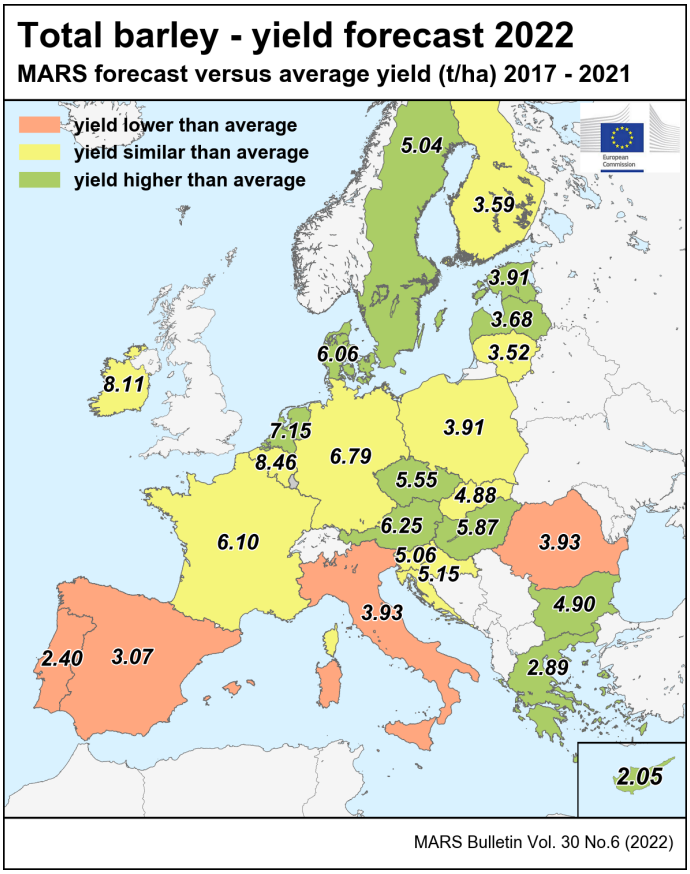

Kasserine (TN)
Relative soil moisture of barley
%
100
80
60
40
20
0
Jan
Feb
Mar
Apr
May
Jun
2022
LTA
+2 Stdev
-2 Stdev
© European Union 2022
Source: Joint Research Centre

6. Crop yield forecast

Country	Total wheat (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
EU	5.62	5.82	**5.56**	– 1.0	– 4.5
AT	5.34	5.50	**5.52**	+ 3.5	+ 0.4
BE	8.63	7.88	**8.69**	+ 0.7	+ 10
BG	5.03	5.91	**5.25**	+ 4.5	– 11
CY	—	—	**—**	—	—
CZ	5.84	6.32	**6.17**	+ 5.5	– 2.5
DE	7.36	7.30	**7.50**	+ 1.8	+ 2.7
DK	7.77	7.62	**7.87**	+ 1.3	+ 3.2
EE	4.27	4.09	**4.54**	+ 6.3	+ 11
EL	2.73	2.73	**2.86**	+ 4.8	+ 4.9
ES	3.45	3.93	**3.28**	– 4.8	– 17
FI	3.62	3.19	**3.71**	+ 2.5	+ 16
FR	7.17	7.08	**6.76**	– 5.7	– 4.5
HR	5.84	6.63	**5.92**	+ 1.4	– 11
HU	5.44	5.97	**5.31**	– 2.4	– 11
IE	9.65	10.6	**10.1**	+ 4.6	– 4.3
IT	3.90	4.12	**3.82**	– 2.1	– 7.5
LT	4.55	4.50	**4.76**	+ 4.6	+ 5.8
LU	5.89	5.96	**6.04**	+ 2.6	+ 1.3
LV	4.60	4.48	**4.72**	+ 2.5	+ 5.2
MT	—	—	**—**	—	—
NL	8.86	8.20	**9.17**	+ 3.5	+ 12
PL	4.74	5.07	**4.85**	+ 2.3	– 4.4
PT	2.48	2.65	**2.15**	– 13	– 19
RO	4.52	5.30	**4.26**	– 5.7	– 20
SE	6.53	6.31	**6.79**	+ 4.0	+ 7.6
SI	5.09	5.77	**5.34**	+ 4.9	– 7.3
SK	5.08	5.63	**5.14**	+ 1.1	– 8.7



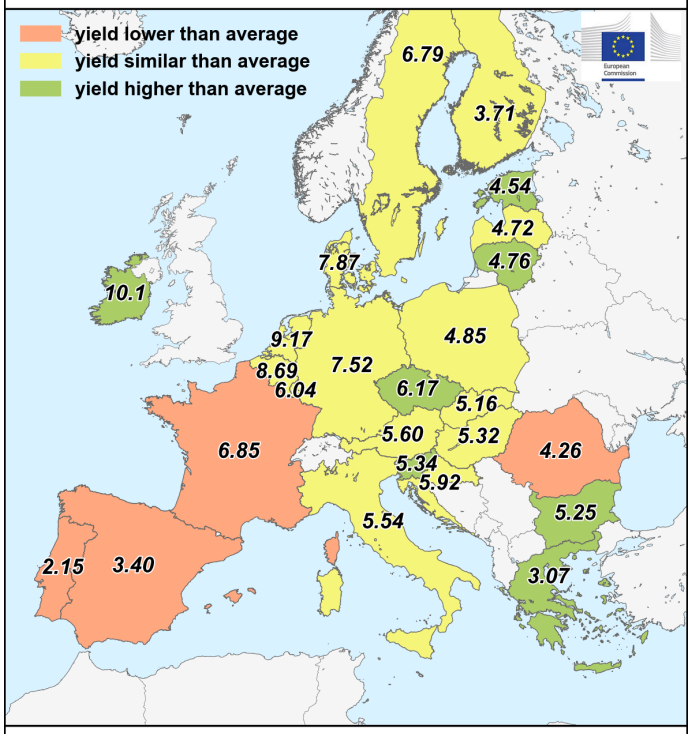
Country	Total barley (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
EU	4.85	5.09	**4.88**	+ 0.7	– 4.1
AT	5.81	5.97	**6.25**	+ 7.5	+ 4.7
BE	8.19	7.97	**8.46**	+ 3.4	+ 6.2
BG	4.70	5.45	**4.90**	+ 4.1	– 10
CY	1.79	1.83	**2.05**	+ 15	+ 12
CZ	5.28	5.35	**5.55**	+ 5.2	+ 3.7
DE	6.53	6.76	**6.79**	+ 3.9	+ 0.3
DK	5.68	5.65	**6.06**	+ 6.6	+ 7.3
EE	3.66	3.26	**3.91**	+ 7.0	+ 20
EL	2.67	2.47	**2.89**	+ 8.3	+ 17
ES	3.22	3.55	**3.07**	– 4.6	– 14
FI	3.55	2.66	**3.59**	+ 1.2	+ 35
FR	6.32	6.65	**6.10**	– 3.5	– 8.3
HR	5.01	5.49	**5.15**	+ 2.7	– 6.2
HU	5.54	6.39	**5.87**	+ 6.0	– 8.1
IE	7.89	8.45	**8.11**	+ 2.8	– 4.1
IT	4.09	4.21	**3.93**	– 4.1	– 6.7
LT	3.45	3.46	**3.52**	+ 2.0	+ 1.7
LU	—	—	**—**	—	—
LV	3.17	2.89	**3.68**	+ 16	+ 27
MT	—	—	**—**	—	—
NL	6.82	6.71	**7.15**	+ 4.9	+ 6.6
PL	3.77	4.18	**3.91**	+ 3.6	– 6.6
PT	2.96	3.35	**2.40**	– 19	– 28
RO	4.14	5.26	**3.93**	– 5.0	– 25
SE	4.49	3.92	**5.04**	+ 12	+ 28
SI	4.97	5.45	**5.06**	+ 1.9	– 7.1
SK	4.70	5.07	**4.88**	+ 3.8	– 3.8



Country	Soft wheat (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
EU	5.84	6.05	**5.76**	– 1.3	– 4.7
AT	5.40	5.57	**5.60**	+ 3.7	+ 0.6
BE	8.63	7.88	**8.69**	+ 0.7	+ 10
BG	5.03	5.91	**5.25**	+ 4.5	– 11
CY	—	—	—	—	—
CZ	5.84	6.32	**6.17**	+ 5.5	– 2.5
DE	7.39	7.32	**7.52**	+ 1.8	+ 2.7
DK	7.77	7.62	**7.87**	+ 1.3	+ 3.2
EE	4.27	4.09	**4.54**	+ 6.3	+ 11
EL	2.90	3.02	**3.07**	+ 5.7	+ 1.3
ES	3.56	4.17	**3.40**	– 4.7	– 19
FI	3.62	3.19	**3.71**	+ 2.5	+ 16
FR	7.27	7.17	**6.85**	– 5.8	– 4.5
HR	5.84	6.63	**5.92**	+ 1.4	– 11
HU	5.47	5.99	**5.32**	– 2.7	– 11
IE	9.65	10.6	**10.1**	+ 4.6	– 4.3
IT	5.46	6.13	**5.54**	+ 1.4	– 9.6
LT	4.55	4.50	**4.76**	+ 4.6	+ 5.8
LU	5.89	5.96	**6.04**	+ 2.6	+ 1.3
LV	4.60	4.48	**4.72**	+ 2.5	+ 5.2
MT	—	—	—	—	—
NL	8.86	8.20	**9.17**	+ 3.5	+ 12
PL	4.74	5.07	**4.85**	+ 2.3	– 4.4
PT	2.48	2.65	**2.15**	– 13	– 19
RO	4.52	5.30	**4.26**	– 5.7	– 20
SE	6.53	6.31	**6.79**	+ 4.0	+ 7.6
SI	5.09	5.77	**5.34**	+ 4.9	– 7.3
SK	5.11	5.59	**5.16**	+ 1.0	– 7.7

Soft wheat - yield forecast 2022

MARS forecast versus average yield (t/ha) 2017 - 2021



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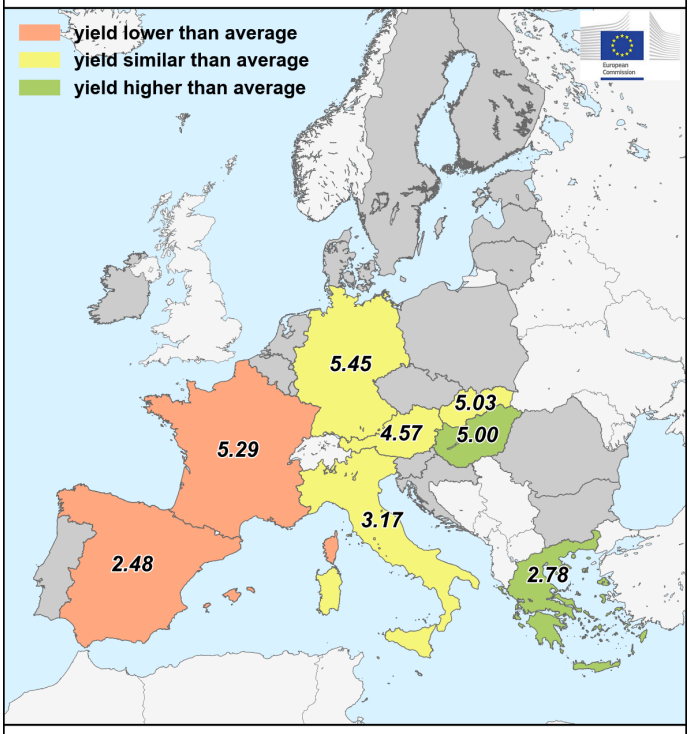
Country	Durum wheat (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
EU	3.52	3.55	**3.44**	– 2.3	– 3.1
AT	4.42	4.51	**4.57**	+ 3.5	+ 1.4
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	—	—	—	—	—
DE	5.24	5.52	**5.45**	+ 4.0	– 1.2
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	2.67	2.60	**2.78**	+ 4.2	+ 6.6
ES	2.85	2.49	**2.48**	– 13	– 0.7
FI	—	—	—	—	—
FR	5.54	5.51	**5.29**	– 4.4	– 4.0
HR	—	—	—	—	—
HU	4.74	5.42	**5.00**	+ 5.6	– 7.8
IE	—	—	—	—	—
IT	3.25	3.31	**3.17**	– 2.4	– 4.1
LT	—	—	—	—	—
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	—	—	—	—	—
PT	—	—	—	—	—
RO	—	—	—	—	—
SE	—	—	—	—	—
SI	—	—	—	—	—
SK	4.91	5.91	**5.03**	+ 2.4	– 15

Durum wheat - yield forecast 2022

MARS forecast versus average yield (t/ha) 2017 - 2021



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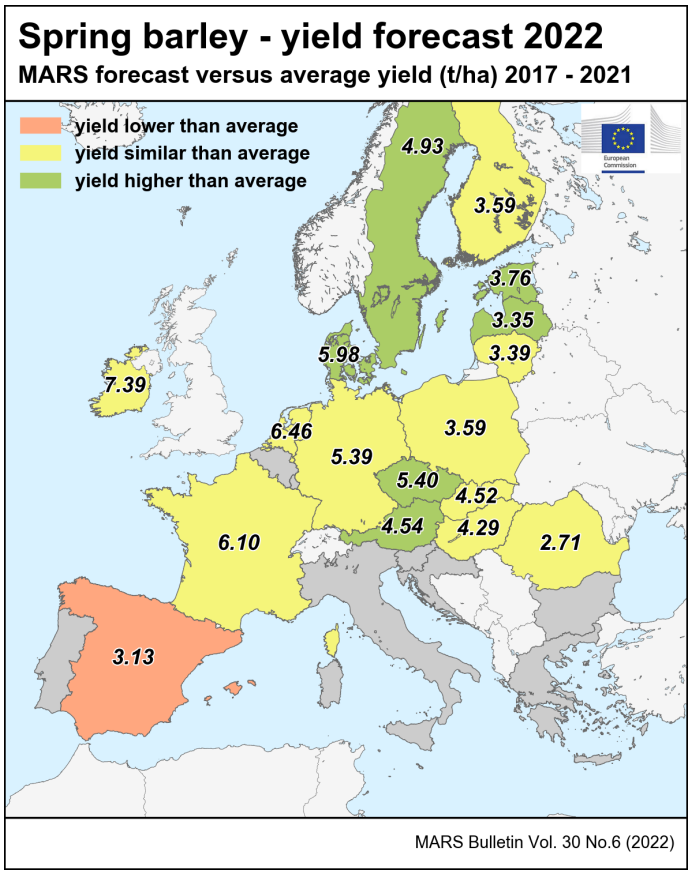
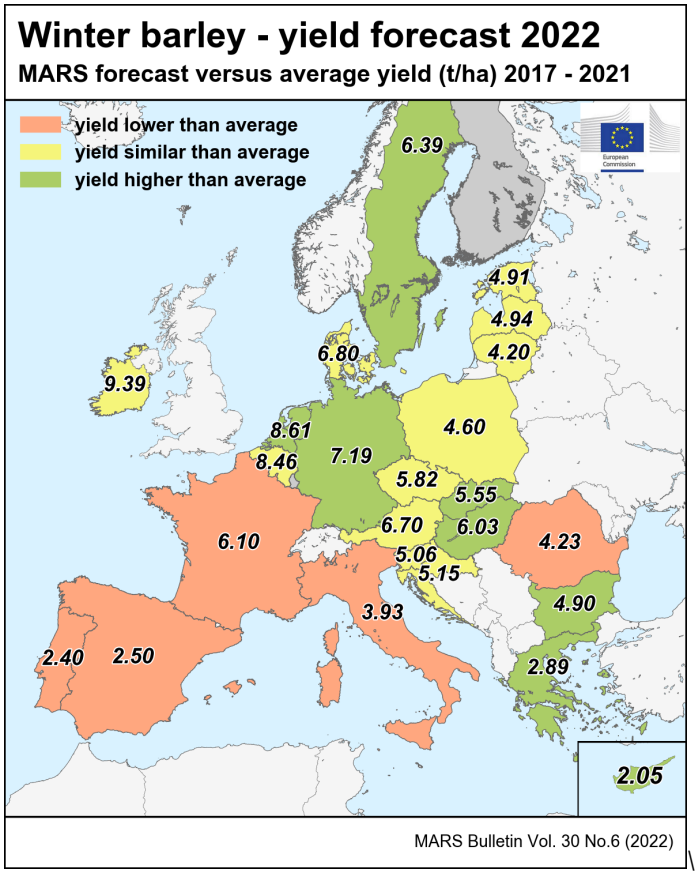
Country	Spring barley (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
EU	4.13	4.21	**4.19**	+ 1.4	– 0.6
AT	4.12	4.36	**4.54**	+ 10	+ 4.0
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	5.04	5.09	**5.40**	+ 7.2	+ 6.1
DE	5.20	5.09	**5.39**	+ 3.7	+ 5.9
DK	5.53	5.51	**5.98**	+ 8.0	+ 8.5
EE	3.46	2.79	**3.76**	+ 8.5	+ 35
EL	—	—	—	—	—
ES	3.29	3.61	**3.13**	– 4.7	– 13
FI	3.55	2.66	**3.59**	+ 1.2	+ 35
FR	5.96	6.03	**6.10**	+ 2.3	+ 1.1
HR	—	—	—	—	—
HU	4.16	4.72	**4.29**	+ 3.2	– 9.2
IE	7.25	7.89	**7.39**	+ 2.0	– 6.3
IT	—	—	—	—	—
LT	3.36	3.30	**3.39**	+ 0.7	+ 2.5
LU	—	—	—	—	—
LV	3.01	2.46	**3.35**	+ 11	+ 36
MT	—	—	—	—	—
NL	6.29	6.17	**6.46**	+ 2.6	+ 4.5
PL	3.47	3.78	**3.59**	+ 3.5	– 4.9
PT	—	—	—	—	—
RO	2.78	3.42	**2.71**	– 2.4	– 21
SE	4.39	3.77	**4.93**	+ 12	+ 31
SI	—	—	—	—	—
SK	4.40	4.72	**4.52**	+ 2.7	– 4.2



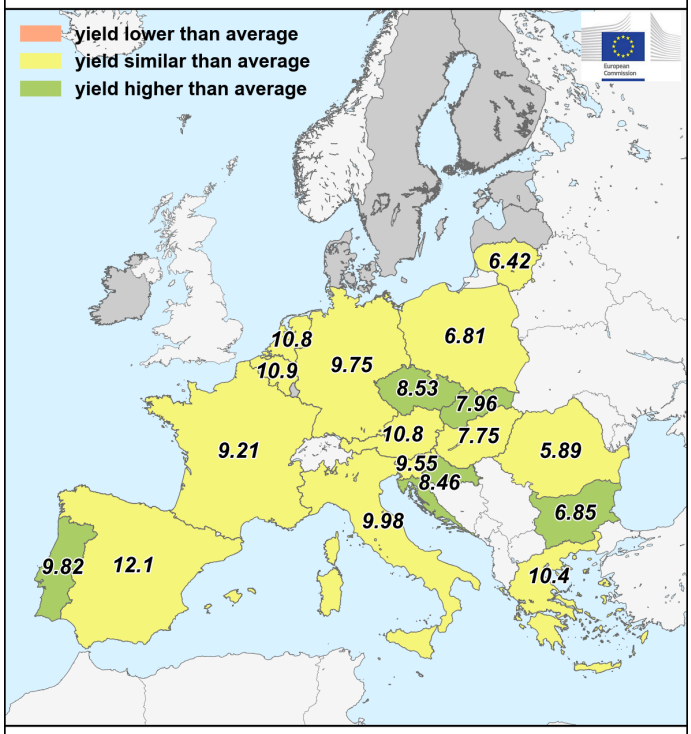
Country	Winter barley (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
EU	5.75	6.11	**5.73**	– 0.4	– 6.1
AT	6.52	6.53	**6.70**	+ 2.8	+ 2.6
BE	8.19	7.97	**8.46**	+ 3.4	+ 6.2
BG	4.70	5.45	**4.90**	+ 4.1	– 10
CY	1.79	1.83	**2.05**	+ 15	+ 12
CZ	5.76	5.87	**5.82**	+ 1.0	– 0.9
DE	6.91	7.16	**7.19**	+ 4.1	+ 0.4
DK	6.60	6.64	**6.80**	+ 3.1	+ 2.5
EE	5.02	5.11	**4.91**	– 2.1	– 3.8
EL	2.67	2.47	**2.89**	+ 8.3	+ 17
ES	2.69	2.98	**2.50**	– 7.2	– 16
FI	—	—	—	—	—
FR	6.49	6.93	**6.10**	– 6.0	– 12
HR	5.01	5.49	**5.15**	+ 2.7	– 6.2
HU	5.72	6.58	**6.03**	+ 5.5	– 8.3
IE	9.07	9.42	**9.39**	+ 3.5	– 0.4
IT	4.09	4.21	**3.93**	– 4.1	– 6.7
LT	4.15	4.17	**4.20**	+ 1.1	+ 0.7
LU	—	—	—	—	—
LV	4.86	4.95	**4.94**	+ 1.5	– 0.2
MT	—	—	—	—	—
NL	8.12	7.83	**8.61**	+ 6.0	+ 10
PL	4.58	4.77	**4.60**	+ 0.5	– 3.6
PT	2.96	3.35	**2.40**	– 19	– 28
RO	4.50	5.54	**4.23**	– 5.9	– 24
SE	5.94	5.58	**6.39**	+ 7.6	+ 15
SI	4.97	5.45	**5.06**	+ 1.9	– 7.1
SK	5.30	5.72	**5.55**	+ 4.8	– 2.9



Country	Grain maize (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
EU	7.86	7.92	**7.87**	+ 0.0	– 0.7
AT	10.6	11.2	**10.8**	+ 1.6	– 3.5
BE	10.6	11.9	**10.9**	+ 2.3	– 8.7
BG	6.40	5.89	**6.85**	+ 7.0	+ 16
CY	—	—	—	—	—
CZ	8.12	9.65	**8.53**	+ 5.0	– 12
DE	9.50	10.4	**9.75**	+ 2.6	– 5.9
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	10.2	9.91	**10.4**	+ 1.3	+ 4.5
ES	11.9	12.3	**12.1**	+ 1.3	– 1.9
FI	—	—	—	—	—
FR	9.11	10.1	**9.21**	+ 1.1	– 9.1
HR	8.12	7.77	**8.46**	+ 4.1	+ 8.8
HU	7.57	6.04	**7.75**	+ 2.4	+ 28
IE	—	—	—	—	—
IT	10.3	10.3	**9.98**	– 3.0	– 3.1
LT	6.59	5.86	**6.42**	– 2.7	+ 10
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	10.8	12.9	**10.8**	+ 0.1	– 17
PL	6.79	7.47	**6.81**	+ 0.3	– 8.9
PT	9.18	9.75	**9.82**	+ 6.9	+ 0.7
RO	5.99	5.90	**5.89**	– 1.6	– 0.2
SE	—	—	—	—	—
SI	9.22	9.39	**9.55**	+ 3.6	+ 1.7
SK	7.54	7.86	**7.96**	+ 5.5	+ 1.2

Grain maize - yield forecast 2022

MARS forecast versus average yield (t/ha) 2017 - 2021



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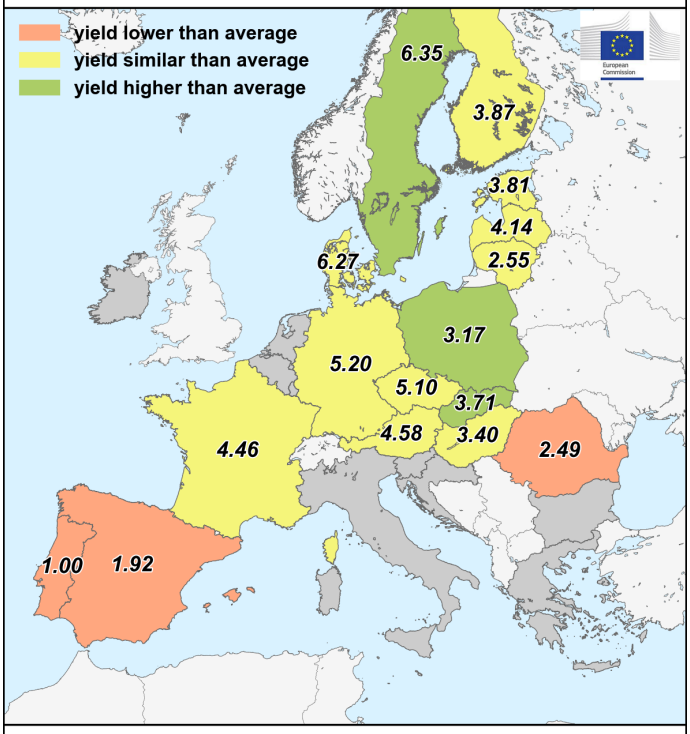
Country	Rye (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
EU	3.90	4.17	**4.00**	+ 2.6	– 4.3
AT	4.52	4.61	**4.58**	+ 1.5	– 0.6
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	5.07	5.03	**5.10**	+ 0.6	+ 1.3
DE	5.10	5.27	**5.20**	+ 2.0	– 1.2
DK	6.08	6.34	**6.27**	+ 3.0	– 1.2
EE	3.77	3.61	**3.81**	+ 1.2	+ 5.6
EL	—	—	—	—	—
ES	2.31	2.56	**1.92**	– 17	– 25
FI	3.93	3.67	**3.87**	– 1.6	+ 5.5
FR	4.51	4.56	**4.46**	– 1.0	– 2.1
HR	—	—	—	—	—
HU	3.31	3.18	**3.40**	+ 2.8	+ 6.8
IE	—	—	—	—	—
IT	—	—	—	—	—
LT	2.57	2.43	**2.55**	– 0.9	+ 4.8
LU	—	—	—	—	—
LV	4.13	3.84	**4.14**	+ 0.1	+ 7.6
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	2.99	3.31	**3.17**	+ 6.0	– 4.2
PT	1.07	1.14	**1.00**	– 7.0	– 13
RO	2.88	3.37	**2.49**	– 14	– 26
SE	6.06	5.66	**6.35**	+ 4.8	+ 12
SI	—	—	—	—	—
SK	3.50	3.55	**3.71**	+ 6.0	+ 4.7

Rye - yield forecast 2022

MARS forecast versus average yield (t/ha) 2017 - 2021



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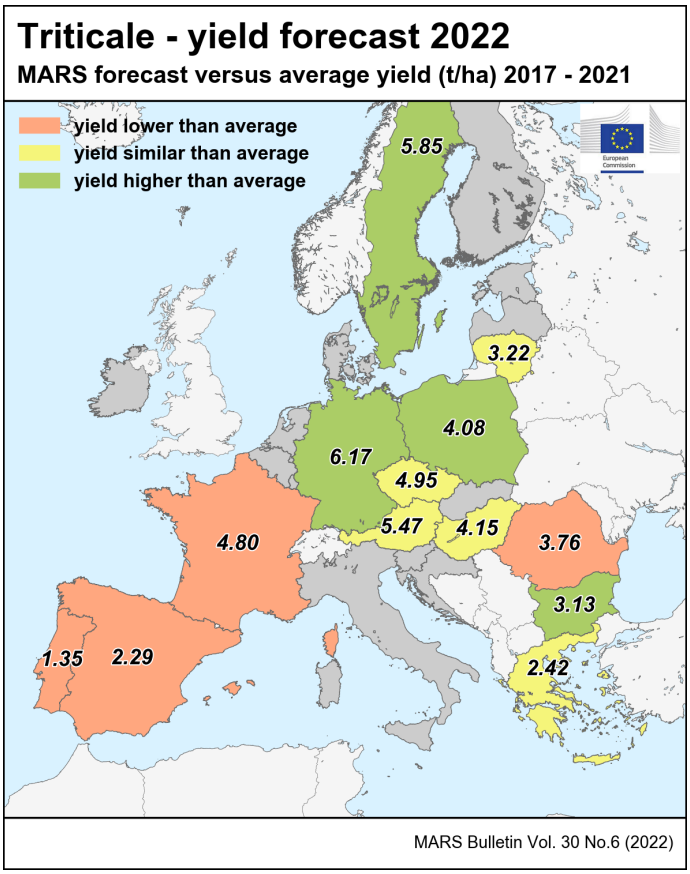
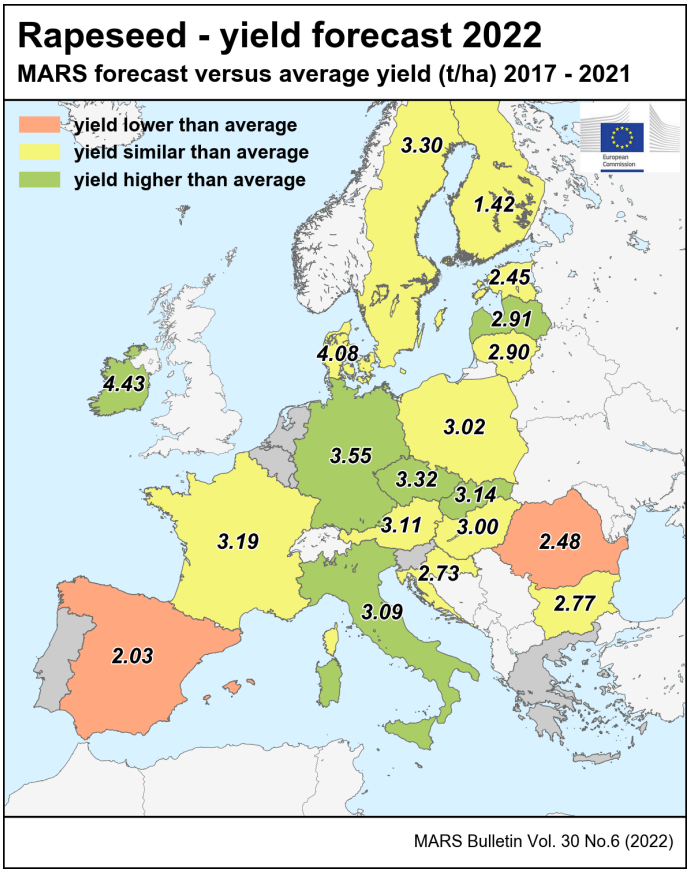
Country	Triticale (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
EU	4.19	4.41	**4.27**	+ 1.9	– 3.3
AT	5.36	5.29	**5.47**	+ 2.1	+ 3.5
BE	—	—	—	—	—
BG	3.00	3.28	**3.13**	+ 4.5	– 4.3
CY	—	—	—	—	—
CZ	4.84	4.73	**4.95**	+ 2.2	+ 4.4
DE	5.86	5.81	**6.17**	+ 5.3	+ 6.1
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	2.37	2.46	**2.42**	+ 2.4	– 1.4
ES	2.64	2.94	**2.29**	– 13	– 22
FI	—	—	—	—	—
FR	5.09	5.20	**4.80**	– 5.8	– 7.7
HR	—	—	—	—	—
HU	4.02	4.36	**4.15**	+ 3.1	– 4.9
IE	—	—	—	—	—
IT	—	—	—	—	—
LT	3.25	2.77	**3.22**	– 1.0	+ 16
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	3.87	4.25	**4.08**	+ 5.6	– 4.0
PT	1.60	1.54	**1.35**	– 16	– 12
RO	4.03	4.55	**3.76**	– 6.8	– 18
SE	5.57	5.14	**5.85**	+ 5.1	+ 14
SI	—	—	—	—	—
SK	—	—	—	—	—



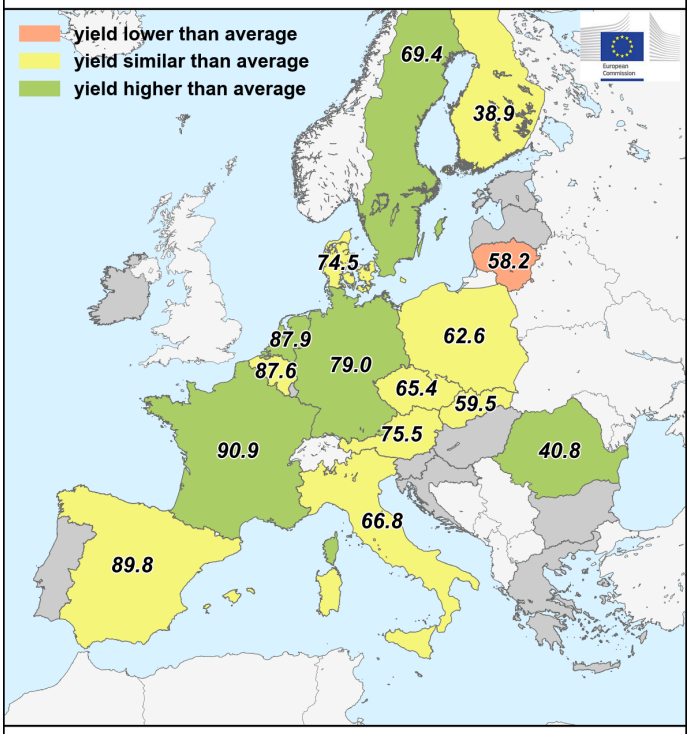
Country	Rape and turnip rape (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
EU	3.07	3.19	**3.12**	+ 1.4	– 2.4
AT	3.00	3.04	**3.11**	+ 3.6	+ 2.2
BE	—	—	—	—	—
BG	2.72	2.84	**2.77**	+ 1.7	– 2.8
CY	—	—	—	—	—
CZ	3.16	2.99	**3.32**	+ 5.2	+ 11
DE	3.33	3.50	**3.55**	+ 6.7	+ 1.4
DK	4.00	4.01	**4.08**	+ 2.1	+ 1.8
EE	2.41	2.74	**2.45**	+ 1.6	– 11
EL	—	—	—	—	—
ES	2.14	2.18	**2.03**	– 4.9	– 6.8
FI	1.39	1.20	**1.42**	+ 2.2	+ 18
FR	3.28	3.35	**3.19**	– 2.7	– 4.7
HR	2.76	2.42	**2.73**	– 0.9	+ 13
HU	2.96	2.81	**3.00**	+ 1.3	+ 6.6
IE	4.22	4.56	**4.43**	+ 5.0	– 3.0
IT	2.80	3.05	**3.09**	+ 10	+ 1.1
LT	2.89	2.91	**2.90**	+ 0.3	– 0.3
LU	—	—	—	—	—
LV	2.77	2.90	**2.91**	+ 5.3	+ 0.3
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	2.95	3.21	**3.02**	+ 2.3	– 6.0
PT	—	—	—	—	—
RO	2.61	3.09	**2.48**	– 4.9	– 20
SE	3.18	3.24	**3.30**	+ 3.8	+ 1.9
SI	—	—	—	—	—
SK	3.01	3.09	**3.14**	+ 4.3	+ 1.6



Country	Sugar beets (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
EU	74.1	N/A	**78.1**	+ 5.4	N/A
AT	73.6	79.7	**75.5**	+ 2.6	– 5.3
BE	86.7	82.5	**87.6**	+ 1.0	+ 6.2
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	63.0	67.7	**65.4**	+ 3.8	– 3.3
DE	75.1	81.8	**79.0**	+ 5.2	– 3.4
DK	73.3	77.5	**74.5**	+ 1.5	– 3.9
EE	—	—	—	—	—
EL	—	—	—	—	—
ES	87.5	87.5	**89.8**	+ 2.6	+ 2.6
FI	38.8	35.6	**38.9**	+ 0.2	+ 9.4
FR	82.3	85.7	**90.9**	+ 11	+ 6.2
HR	—	—	—	—	—
HU	—	—	—	—	—
IE	—	—	—	—	—
IT	67.6	N/A	**66.8**	– 1.2	N/A
LT	61.6	58.3	**58.2**	– 5.6	– 0.3
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	84.0	N/A	**87.9**	+ 4.7	N/A
PL	61.4	61.0	**62.6**	+ 2.0	+ 2.7
PT	—	—	—	—	—
RO	38.9	39.6	**40.8**	+ 5.0	+ 3.0
SE	66.2	71.9	**69.4**	+ 4.8	– 3.5
SI	—	—	—	—	—
SK	59.1	62.6	**59.5**	+ 0.8	– 4.9

Sugar beet - yield forecast 2022

MARS forecast versus average yield (t/ha) 2017 - 2021



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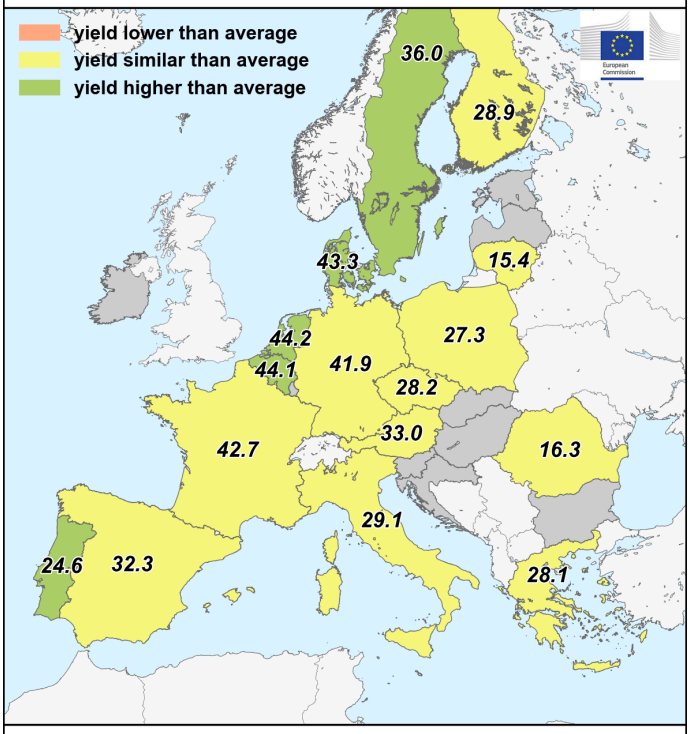
Country	Potato (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
EU	34.0	N/A	**35.7**	+ 5.2	N/A
AT	32.0	34.1	**33.0**	+ 3.1	– 3.4
BE	40.9	42.9	**44.1**	+ 7.8	+ 2.7
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	28.2	29.4	**28.2**	+ 0.3	– 4.1
DE	41.6	43.8	**41.9**	+ 0.8	– 4.4
DK	41.6	42.3	**43.3**	+ 4.2	+ 2.5
EE	—	—	—	—	—
EL	28.0	25.5	**28.1**	+ 0.6	+ 10
ES	31.8	32.5	**32.3**	+ 1.6	– 0.4
FI	28.7	27.5	**28.9**	+ 0.6	+ 5.1
FR	41.4	41.5	**42.7**	+ 3.3	+ 2.9
HR	—	—	—	—	—
HU	—	—	—	—	—
IE	—	—	—	—	—
IT	29.2	29.2	**29.1**	– 0.3	– 0.1
LT	15.0	13.1	**15.4**	+ 2.5	+ 18
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	41.8	N/A	**44.2**	+ 5.7	N/A
PL	27.4	30.0	**27.3**	– 0.2	– 9.0
PT	22.6	24.0	**24.6**	+ 9.0	+ 2.5
RO	16.5	16.5	**16.3**	– 1.2	– 1.0
SE	34.4	34.8	**36.0**	+ 4.5	+ 3.3
SI	—	—	—	—	—
SK	—	—	—	—	—

Potato - yield forecast 2022

MARS forecast versus average yield (t/ha) 2017 - 2021

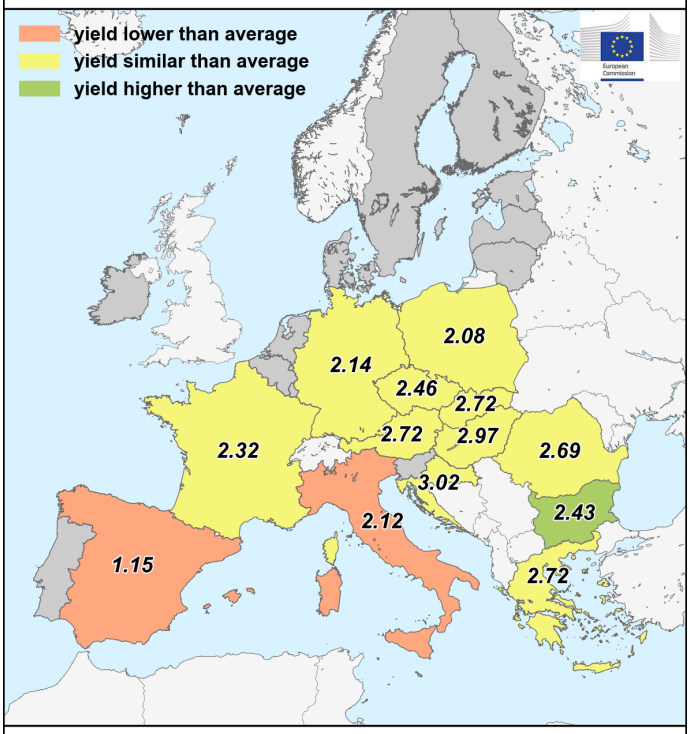


MARS Bulletin Vol. 30 No.6 (2022)

Country	Sunflower (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
EU	2.34	2.38	**2.37**	+ 1.5	– 0.4
AT	2.71	3.01	**2.72**	+ 0.3	– 9.8
BE	—	—	—	—	—
BG	2.31	2.38	**2.43**	+ 5.1	+ 2.1
CY	—	—	—	—	—
CZ	2.54	2.90	**2.46**	– 3.5	– 15
DE	2.20	2.60	**2.14**	– 3.0	– 18
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	2.65	2.53	**2.72**	+ 2.7	+ 7.6
ES	1.24	1.22	**1.15**	– 7.3	– 6.1
FI	—	—	—	—	—
FR	2.39	2.74	**2.32**	– 3.0	– 15
HR	3.05	3.04	**3.02**	– 0.8	– 0.7
HU	2.87	2.70	**2.97**	+ 3.4	+ 10
IE	—	—	—	—	—
IT	2.40	2.40	**2.12**	– 12	– 12
LT	—	—	—	—	—
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	2.13	2.38	**2.08**	– 2.6	– 13
PT	—	—	—	—	—
RO	2.60	2.54	**2.69**	+ 3.2	+ 5.9
SE	—	—	—	—	—
SI	—	—	—	—	—
SK	2.65	2.66	**2.72**	+ 2.7	+ 2.4

Sunflower - yield forecast 2022

MARS forecast versus average yield (t/ha) 2017 - 2021

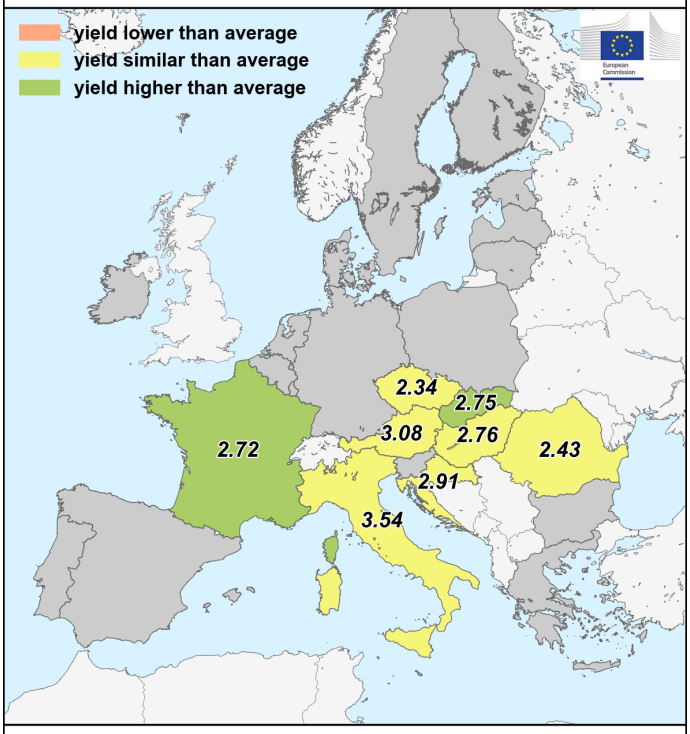


MARS Bulletin Vol. 30 No.6 (2022)

Country	Soybean (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
EU	2.89	2.83	**2.99**	+ 3.4	+ 5.7
AT	2.98	3.06	**3.08**	+ 3.5	+ 0.5
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	2.28	2.61	**2.34**	+ 2.9	– 10
DE	—	—	—	—	—
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	—	—	—	—	—
ES	—	—	—	—	—
FI	—	—	—	—	—
FR	2.61	2.85	**2.72**	+ 4.2	– 4.4
HR	2.88	2.63	**2.91**	+ 0.9	+ 11
HU	2.71	2.61	**2.76**	+ 1.9	+ 5.9
IE	—	—	—	—	—
IT	3.42	3.11	**3.54**	+ 3.5	+ 14
LT	—	—	—	—	—
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	—	—	—	—	—
PT	—	—	—	—	—
RO	2.42	2.49	**2.43**	+ 0.4	– 2.2
SE	—	—	—	—	—
SI	—	—	—	—	—
SK	2.44	2.52	**2.75**	+ 13	+ 9.1

Soybean - yield forecast 2022

MARS forecast versus average yield (t/ha) 2017 - 2021

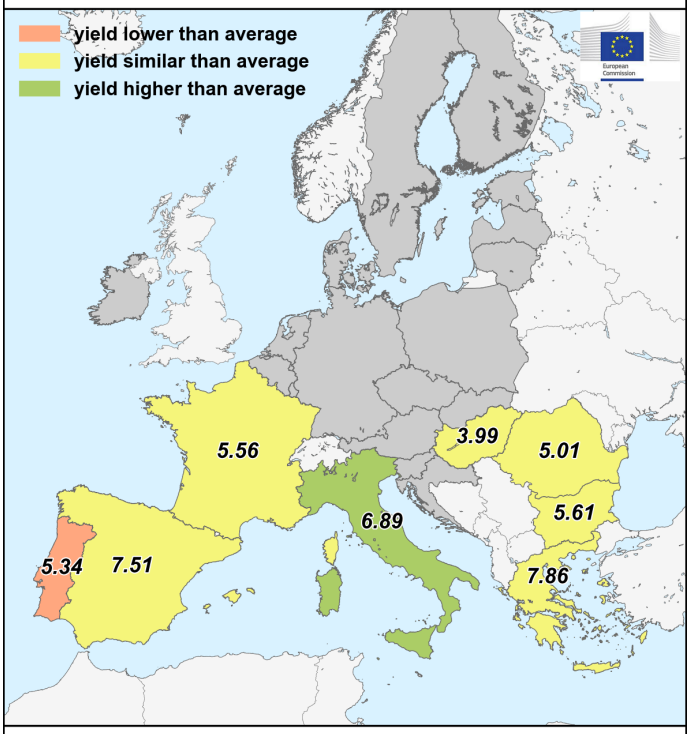


MARS Bulletin Vol. 30 No.6 (2022)

Country	Rice (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
EU	6.77	6.51	**6.84**	+ 1.0	+ 4.9
AT	—	—	—	—	—
BE	—	—	—	—	—
BG	5.60	4.90	**5.61**	+ 0.3	+ 15
CY	—	—	—	—	—
CZ	—	—	—	—	—
DE	—	—	—	—	—
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	7.89	6.80	**7.86**	– 0.3	+ 16
ES	7.56	7.36	**7.51**	– 0.7	+ 2.0
FI	—	—	—	—	—
FR	5.54	5.43	**5.56**	+ 0.3	+ 2.4
HR	—	—	—	—	—
HU	4.12	3.47	**3.99**	– 3.2	+ 15
IE	—	—	—	—	—
IT	6.62	6.45	**6.89**	+ 4.1	+ 6.8
LT	—	—	—	—	—
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	—	—	—	—	—
PT	5.69	5.97	**5.34**	– 6.1	– 11
RO	4.88	4.65	**5.01**	+ 2.6	+ 7.7
SE	—	—	—	—	—
SI	—	—	—	—	—
SK	—	—	—	—	—

Rice - yield forecast 2022

MARS forecast versus average yield (t/ha) 2017 - 2021



MARS Bulletin Vol. 30 No.6 (2022)

Country	Wheat (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
BY	3.45	3.54	**3.79**	+ 9.7	+ 7.0
DZ	1.59	1.45	**1.32**	– 17	– 8.6
MA	1.98	2.63	**0.87**	– 56	– 67
TN	1.85	1.95	**2.01**	+ 8.7	+ 3.0
TR	2.79	2.66	**2.75**	– 1.4	+ 3.4
UA	4.07	4.53	**4.11**	+ 0.9	– 9.3
UK	8.03	7.80	**8.18**	+ 1.8	+ 4.9

Country	Barley (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
BY	2.85	2.86	**3.29**	+ 16	+ 15
DZ	1.15	1.00	**0.91**	– 21	– 9.4
MA	1.30	1.87	**0.51**	– 61	– 73
TN	0.94	0.84	**0.97**	+ 3.1	+ 16
TR	2.53	1.87	**2.56**	+ 1.1	+ 37
UA	3.35	3.82	**3.34**	– 0.2	– 13
UK	6.15	6.09	**6.31**	+ 2.7	+ 3.7

Country	Grain maize (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
BY	5.58	5.31	**5.80**	+ 3.8	+ 9.1
DZ	—	—	—	—	—
MA	—	—	—	—	—
TN	—	—	—	—	—
TR	9.30	8.90	**9.36**	+ 0.6	+ 5.2
UA	6.76	7.68	**7.27**	+ 7.4	– 5.4
UK	—	—	—	—	—

Country	Soybean (t/ha)				
	Avg 5yrs	2021	MARS 2022 forecasts	%22/5yrs	%22/21
BY	—	—	—	—	—
DZ	—	—	—	—	—
MA	—	—	—	—	—
TN	—	—	—	—	—
TR	4.29	4.15	**4.60**	+ 7.2	+ 11
UA	2.29	2.64	**2.55**	+ 11	– 3.4
UK	—	—	—	—	—

NB: Yields are forecast for crops with more than 10 000 ha per country with sufficently long and coherent yield time series (for rice more than 1 000 ha per country).

Sources: 2017-2022 data come from DG Agriculture and Rural Development short-term-outlook data (dated May 2022, received on 01.06.2022), Eurostat Eurobase (last update: 01.06.2022) and EES (last update: 15.11.2017).

Non-EU 2017-2021 data come from USDA, Turkish Statistical Institute (TurkStat), Eurostat Eurobase (last update: 01.06.2022), Department for Environment, Food & Rural Affairs of UK (DEFRA), Ministry for Development of Economy, Trade and Agriculture of Ukraine, FAO and PSD-online.

2022 yields come from MARS Crop Yield Forecasting System (output up to 20.06.2022).

EU aggregate after 12.2020 is reported.

N/A = Data not available.

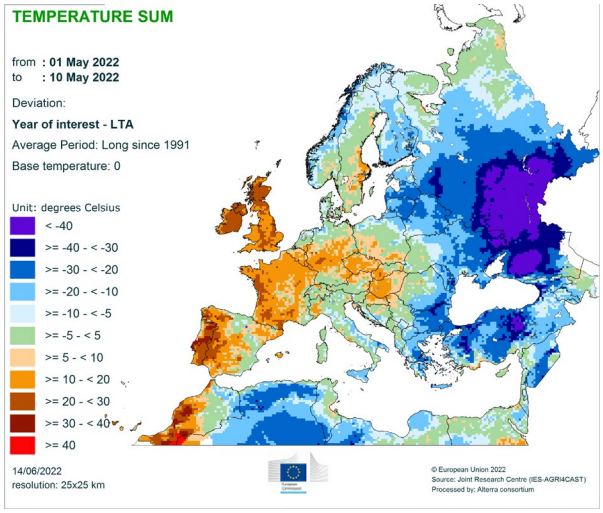
The column header '%22/5yrs' stands for the 2022 change with respect to the 5-year average(%). Similarly, '%22/21' stands for the 2022 change with respect to 2021(%).

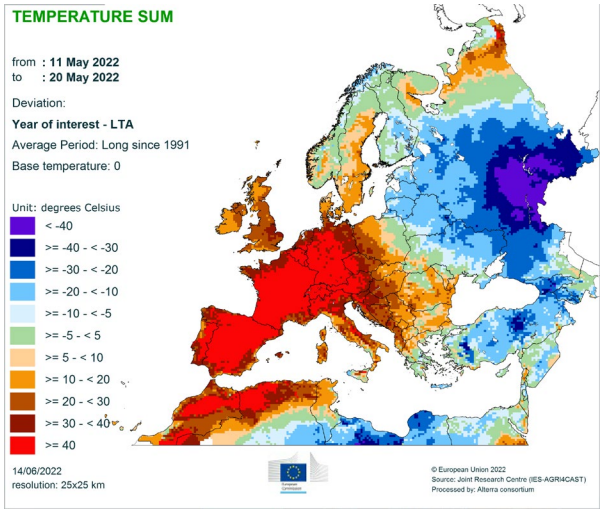
Cop name	Eurostat Crop name	Eurostat Crop Code	Official Eurostat Crop definition*
Total wheat	Wheat and spelt	C1100	Common wheat (*Triticum aestivum* L. emend. Fiori et Paol.), spelt (*Triticum spelta* L.), einkorn wheat (*Triticum monococcum* L.) and durum wheat (*Triticum durum* Desf.).
Total barley	Barley	C1300	Barley (*Hordeum vulgare* L.).
Soft wheat	Common wheat and spelt	C1110	Common wheat (*Triticum aestivum* L. emend. Fiori et Paol.), spelt (*Triticum spelta* L.) and einkorn wheat (*Triticum monococcum* L.).
Durum what	Durum wheat	C1120	*Triticum durum* Desf.
Spring barley	Spring barley	C1320	Barley (*Hordeum vulgare* L.) sown in the spring.
Winter barley	Winter barley	C1310	Barley (*Hordeum vulgare* L.) sown before or during winter.
Grain maize	Grain maize and corn-cob-mix	C1500	Maize (*Zea mays* L.) harvested for grain, as seed or as corn-cob-mix.
Green maize	Green maize	G3000	All forms of maize (*Zea mays* L.) grown mainly for silage (whole cob, parts of or whole plant) and not harvested for grain.
Rye	Rye and winter cereal mixtures (maslin)	C1200	Rye (*Secale cereale* L.) sown any time, mixtures of rye and other cereals and other cereal mixtures sown before or during the winter (maslin).
Triticale	Triticale	C1600	Triticale (x *Triticosecale* Wittmack).
Rape and turnip rape	Rape and turnip rape seeds	I1110	Rape (*Brassica napus* L.) and turnip rape (*Brassica rapa* L. var. oleifera (Lam.)) grown for the production of oil, harvested as dry grains.
Sugar beet	Sugar beet (excluding seed)	R2000	Sugar beet (*Beta vulgaris* L.) intended for the sugar industry, alcohol production or renewable energy production.
Potatoes	Potatoes (including seed potatoes)	R1000	Potatoes (*Solanum tuberosum* L.).
Sunflower	Sunflower seed	I1120	Sunflower (*Helianthus annuus* L.) harvested as dry grains.
Soybean	Soya	I1130	Soya (*Glycine max* L. Merril) harvested as dry grains.
Rice	Rice	C2000	Rice (*Oryza sativa*, L.).

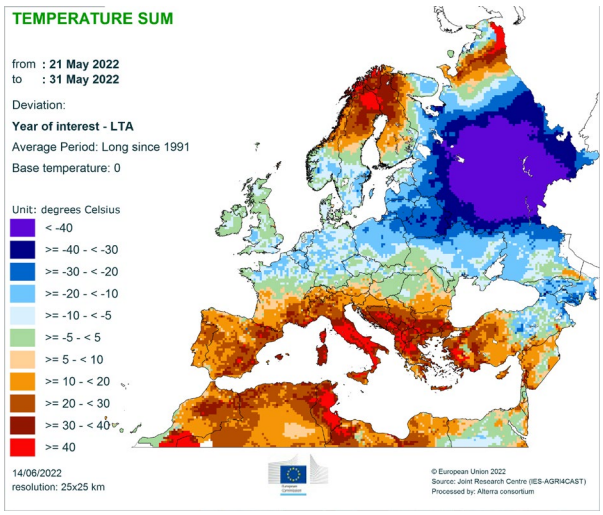
** Source:* Eurostat - Annual crop statistics (Handbook 2020 Edition)

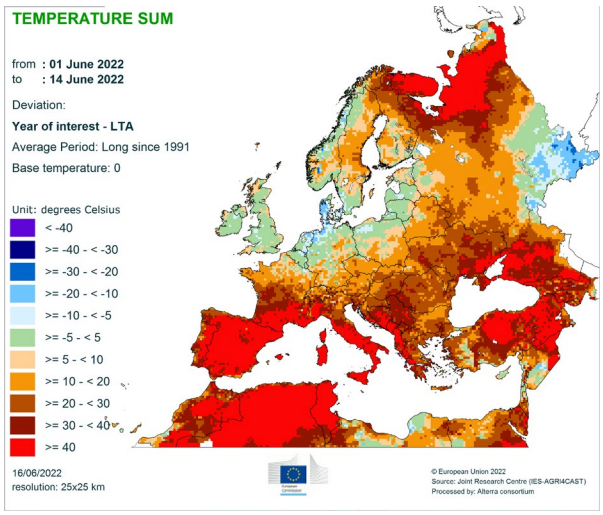
7. Atlas

Temperature regime

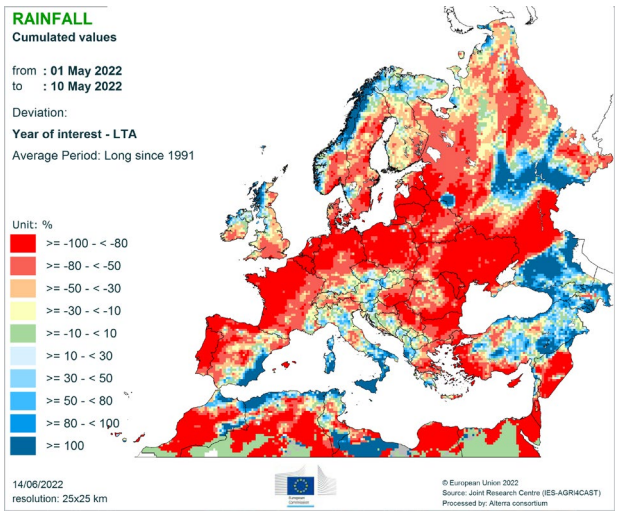


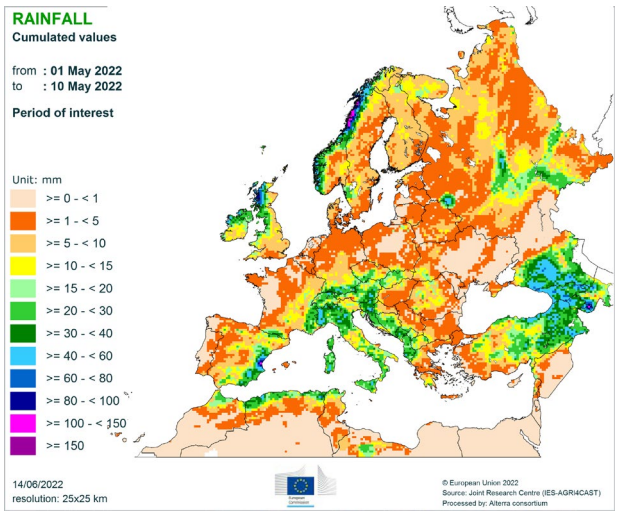


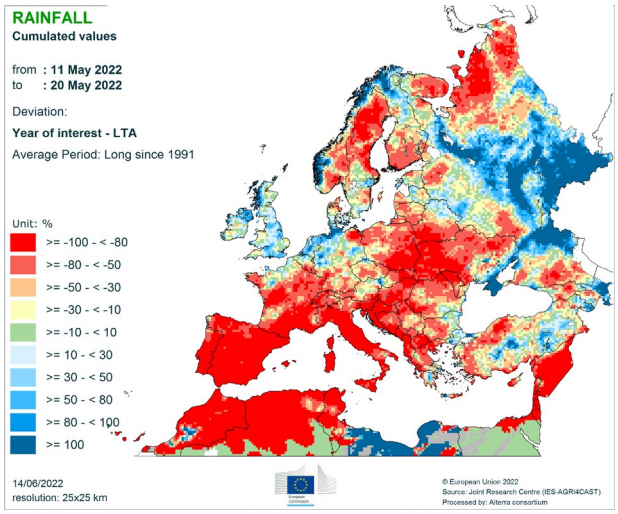


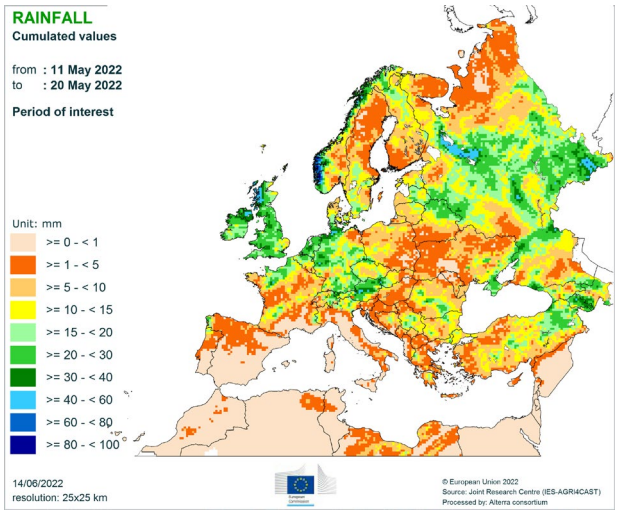


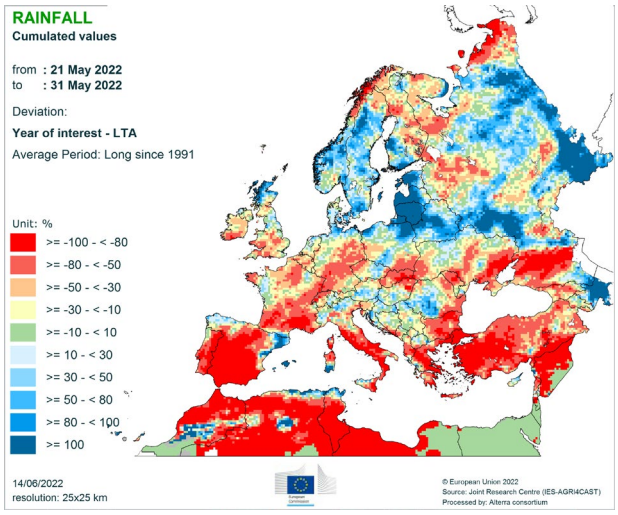
Precipitation

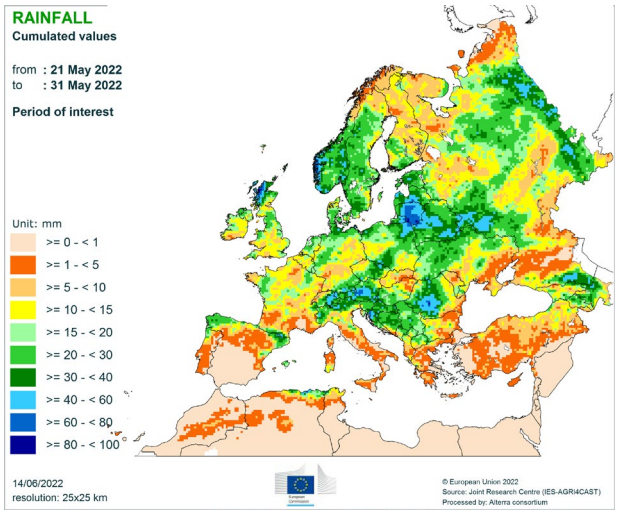


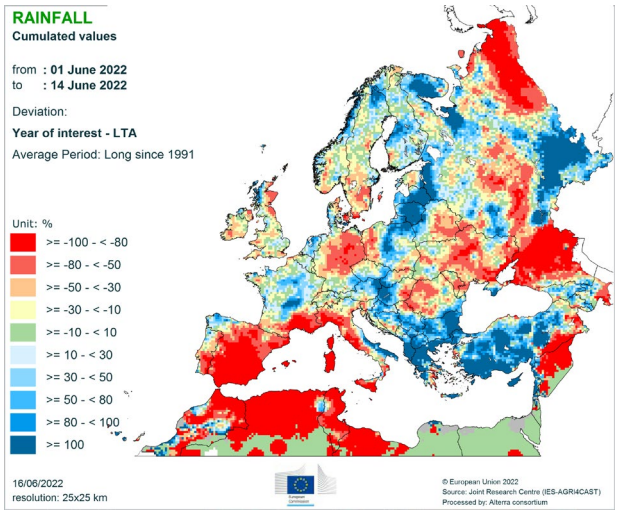


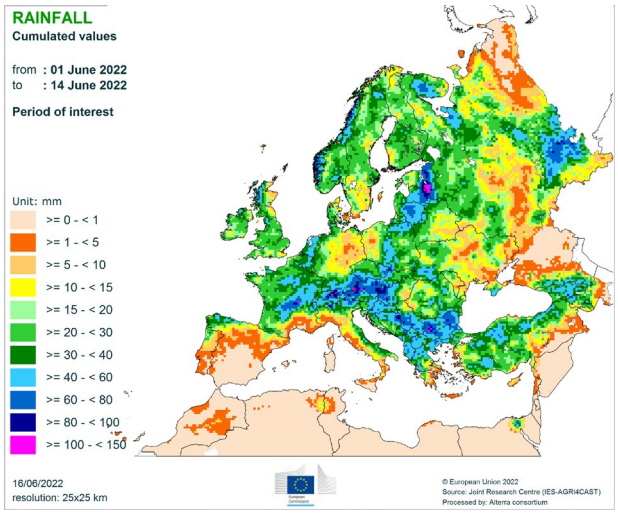




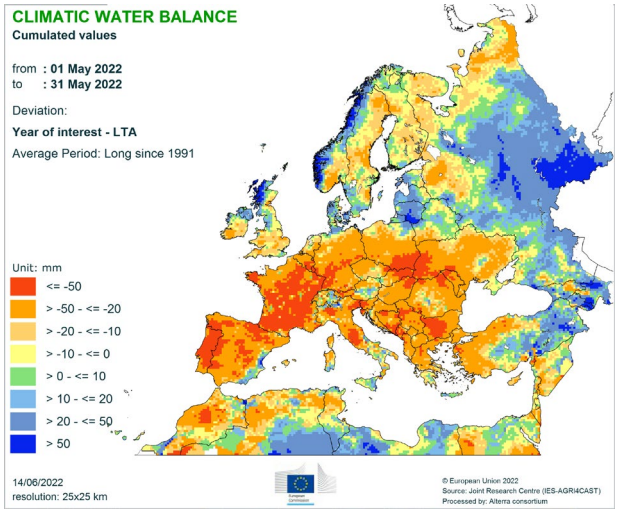


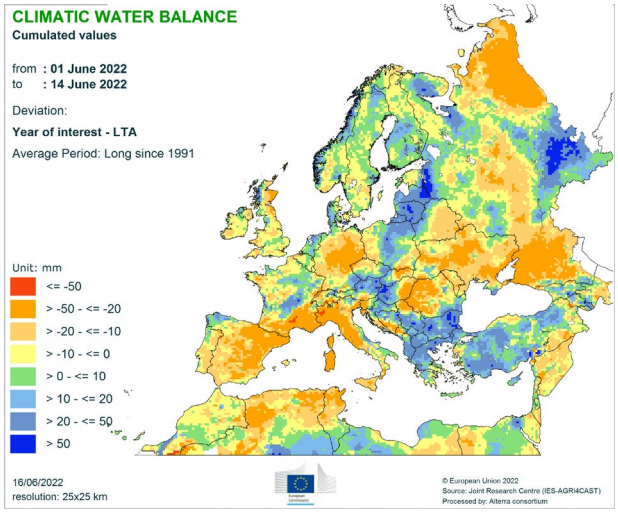




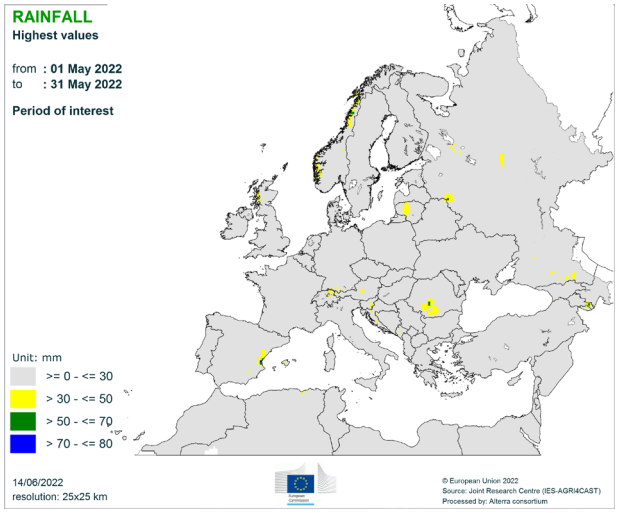


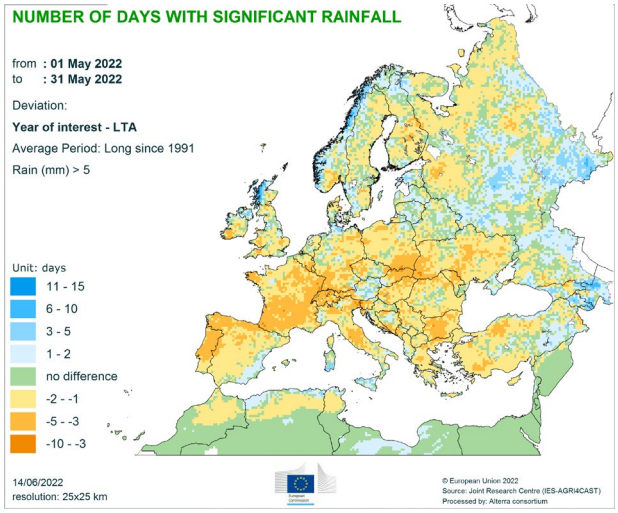
Climatic water balance

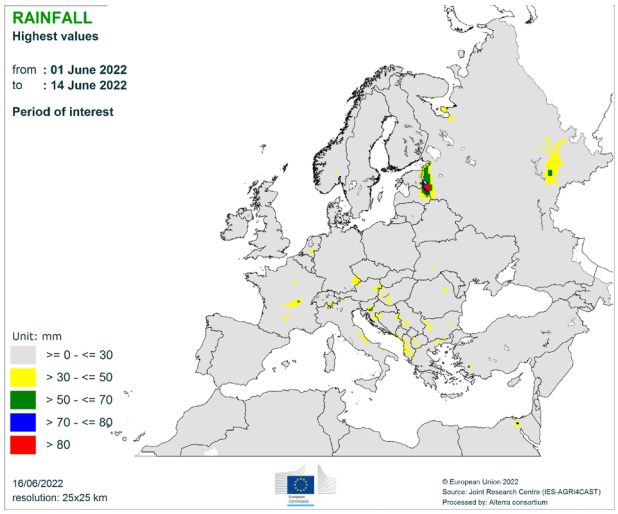


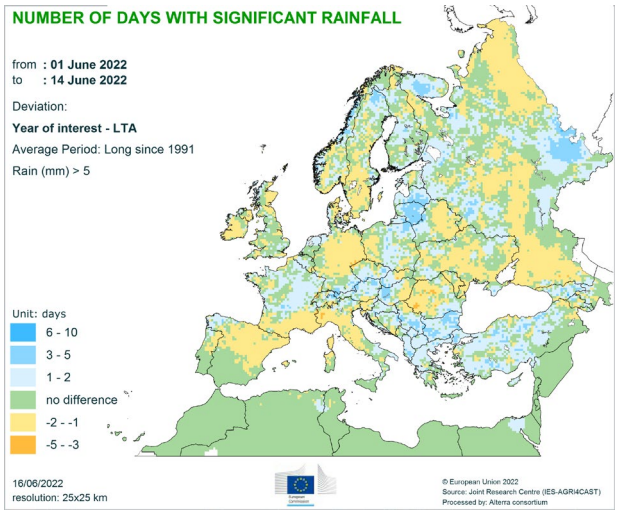


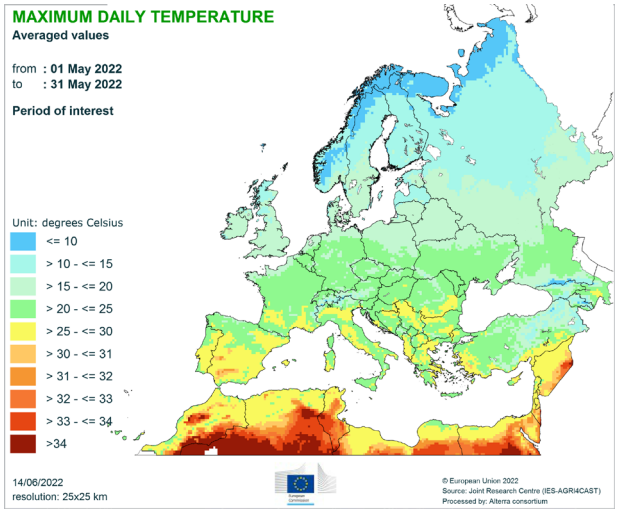
Weather events

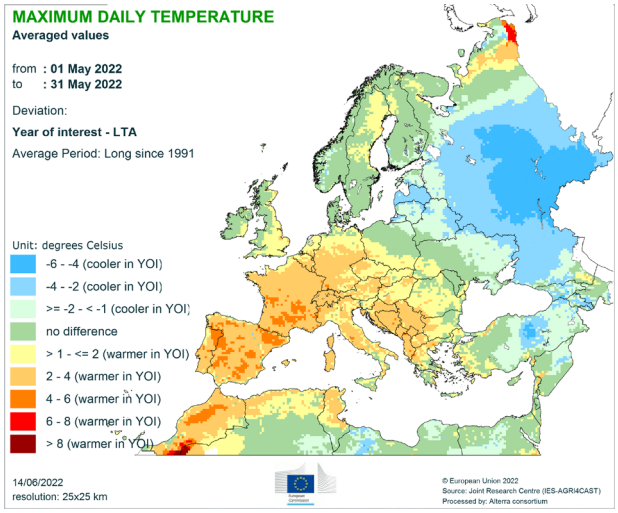


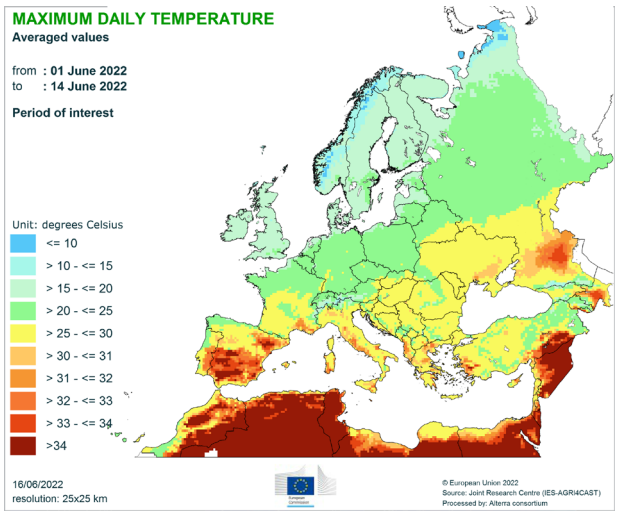


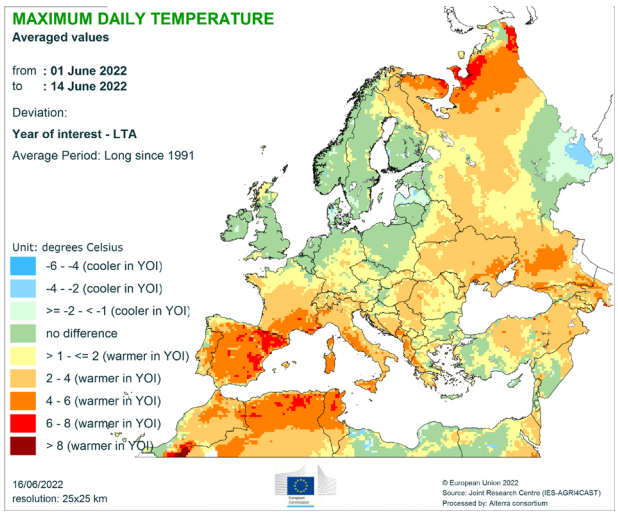

RAINFALL
Highest values
from : 01 June 2022
to : 14 June 2022
Period of interest
Unit: mm
>= 0 - <= 30
> 30 - <= 50
> 50 - <= 70
> 70 - <= 80
> 80
16/06/2022
resolution: 25x25 km
© European Union 2022
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium


NUMBER OF DAYS WITH SIGNIFICANT RAINFALL
from : 01 June 2022
to : 14 June 2022
Deviation:
Year of interest - LTA
Average Period: Long since 1991
Rain (mm) > 5
Unit: days
6 - 10
3 - 5
1 - 2
no difference
-2 - -1
-5 - -3
16/06/2022
resolution: 25x25 km
© European Union 2022
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium


MAXIMUM DAILY TEMPERATURE
Averaged values
from : 01 May 2022
to : 31 May 2022
Period of interest
Unit: degrees Celsius
<= 10
> 10 - <= 15
> 15 - <= 20
> 20 - <= 25
> 25 - <= 30
> 30 - <= 31
> 31 - <= 32
> 32 - <= 33
> 33 - <= 34
>34
14/06/2022
resolution: 25x25 km
© European Union 2022
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium


MAXIMUM DAILY TEMPERATURE
Averaged values
from : 01 May 2022
to : 31 May 2022
Deviation:
Year of interest - LTA
Average Period: Long since 1991
Unit: degrees Celsius
-6 - -4 (cooler in YOI)
-4 - -2 (cooler in YOI)
>= -2 - < -1 (cooler in YOI)
no difference
> 1 - <= 2 (warmer in YOI)
2 - 4 (warmer in YOI)
4 - 6 (warmer in YOI)
6 - 8 (warmer in YOI)
> 8 (warmer in YOI)
14/06/2022
resolution: 25x25 km
© European Union 2022
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium


MAXIMUM DAILY TEMPERATURE
Averaged values
from : 01 June 2022
to : 14 June 2022
Period of interest
Unit: degrees Celsius
<= 10
> 10 - <= 15
> 15 - <= 20
> 20 - <= 25
> 25 - <= 30
> 30 - <= 31
> 31 - <= 32
> 32 - <= 33
> 33 - <= 34
>34
16/06/2022
resolution: 25x25 km
© European Union 2022
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium


MAXIMUM DAILY TEMPERATURE
Averaged values
from : 01 June 2022
to : 14 June 2022
Deviation:
Year of interest - LTA
Average Period: Long since 1991
Unit: degrees Celsius
-6 - -4 (cooler in YOI)
-4 - -2 (cooler in YOI)
>= -2 - < -1 (cooler in YOI)
no difference
> 1 - <= 2 (warmer in YOI)
2 - 4 (warmer in YOI)
4 - 6 (warmer in YOI)
6 - 8 (warmer in YOI)
> 8 (warmer in YOI)
16/06/2022
resolution: 25x25 km
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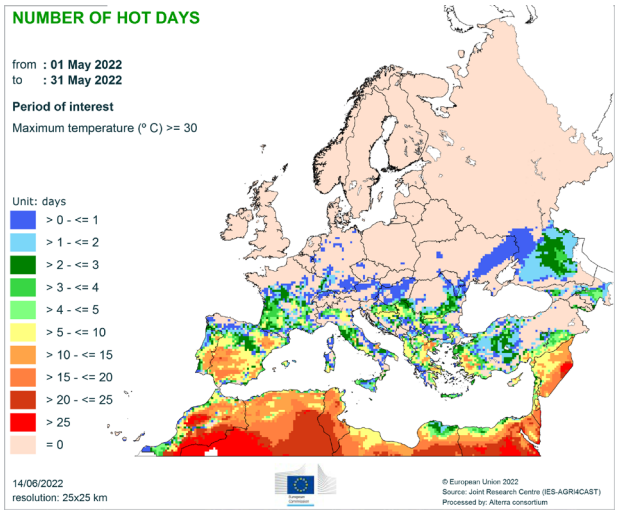
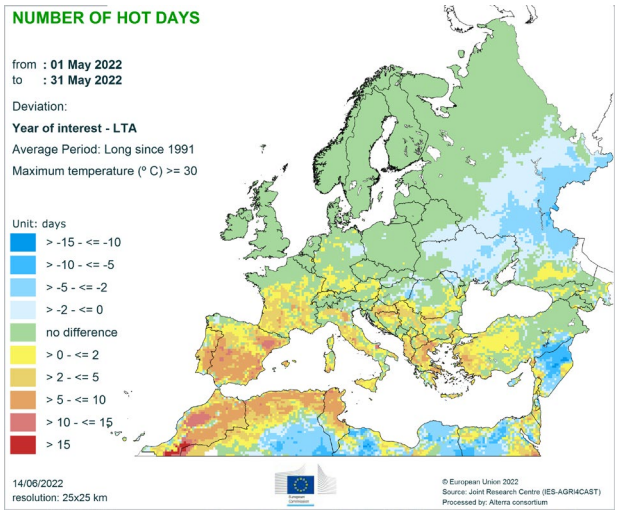
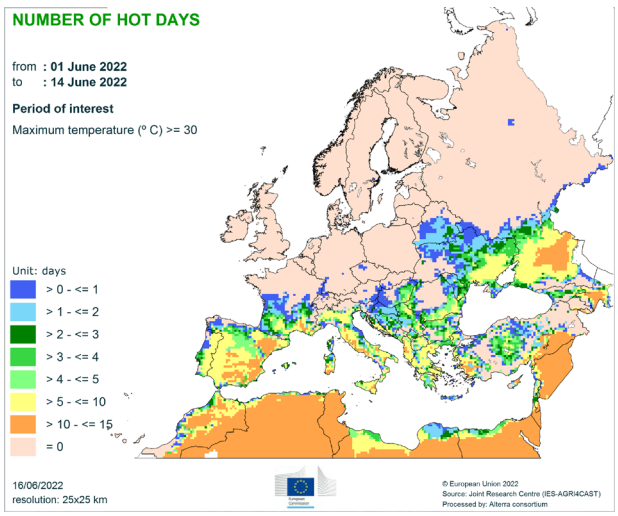
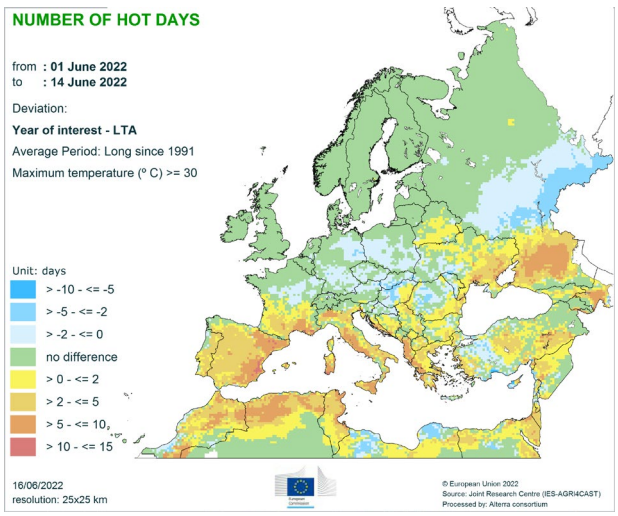
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium

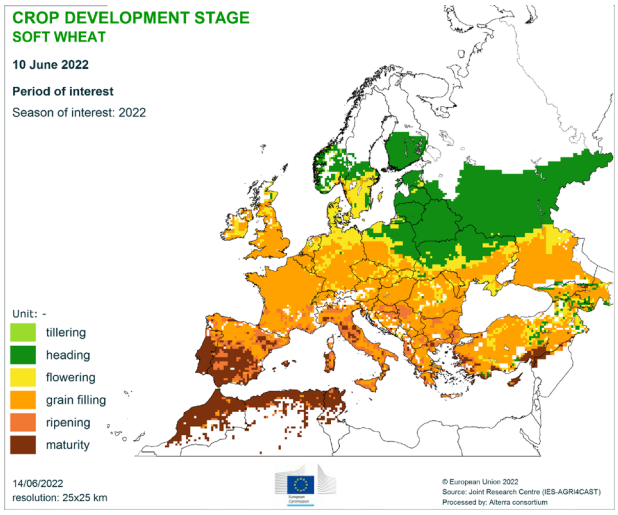


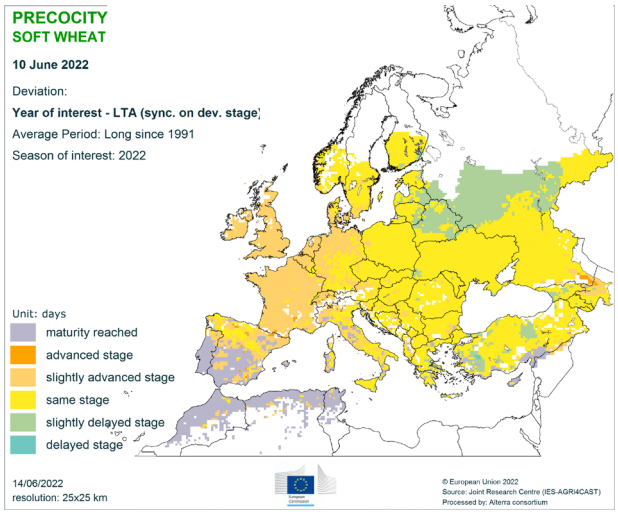


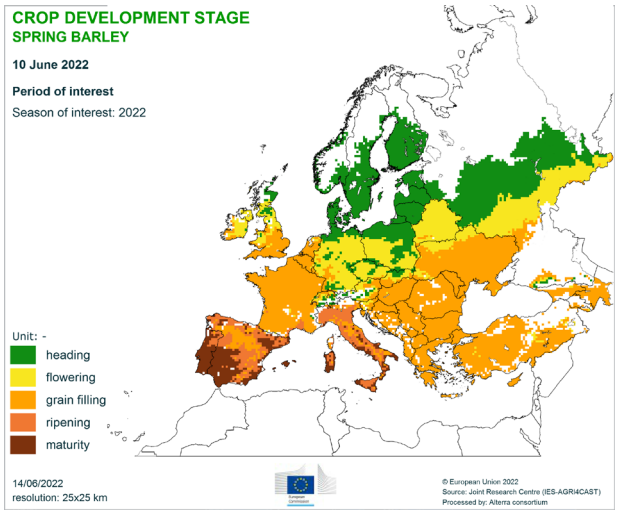


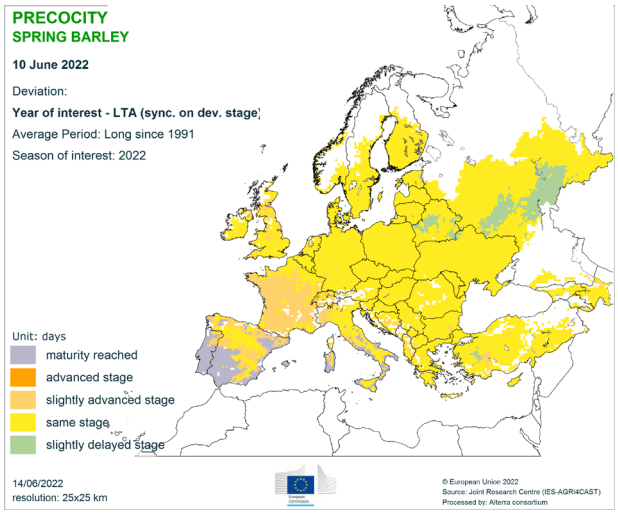


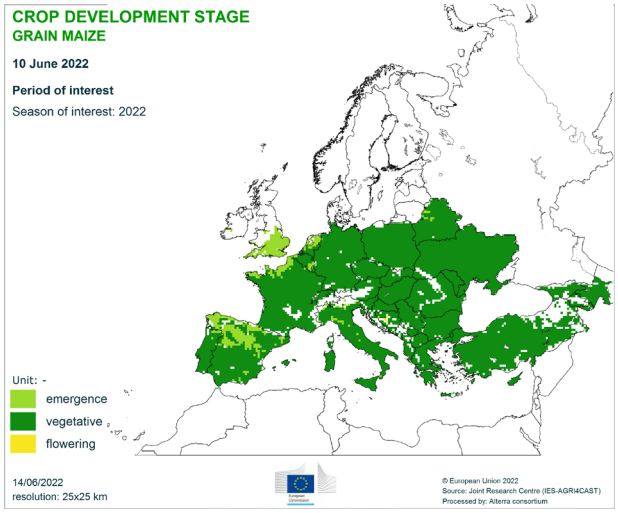
Crop development stages and precocity

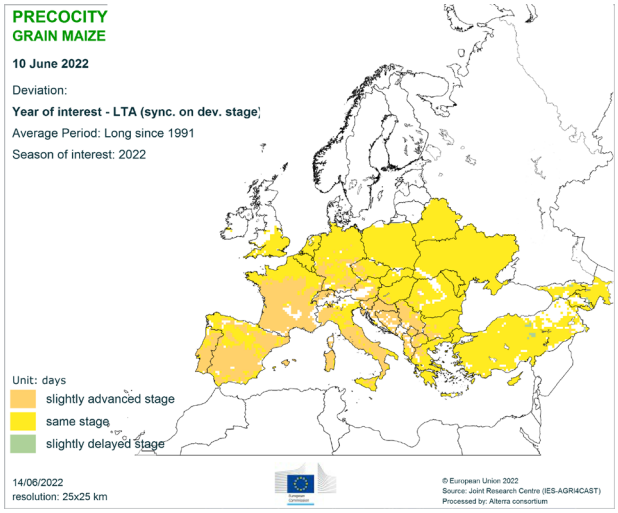





CROP DEVELOPMENT STAGE
SPRING BARLEY
10 June 2022
Period of interest
Season of interest: 2022
Unit: -
heading
flowering
grain filling
ripening
maturity
14/06/2022
resolution: 25x25 km
© European Union 2022
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium


PRECOCITY
SPRING BARLEY
10 June 2022
Deviation:
Year of interest - LTA (sync. on dev. stage)
Average Period: Long since 1991
Season of interest: 2022
Unit: days
maturity reached
advanced stage
slightly advanced stage
same stage
slightly delayed stage
14/06/2022
resolution: 25x25 km
© European Union 2022
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium


CROP DEVELOPMENT STAGE
GRAIN MAIZE
10 June 2022
Period of interest
Season of interest: 2022
Unit: -
emergence
vegetative
flowering
14/06/2022
resolution: 25x25 km
© European Union 2022
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium


PRECOCITY
GRAIN MAIZE
10 June 2022
Deviation:
Year of interest - LTA (sync. on dev. stage)
Average Period: Long since 1991
Season of interest: 2022
Unit: days
slightly advanced stage
same stage
slightly delayed stage
14/06/2022
resolution: 25x25 km
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Source: Joint Research Centre (IES-AGRI4CAST)
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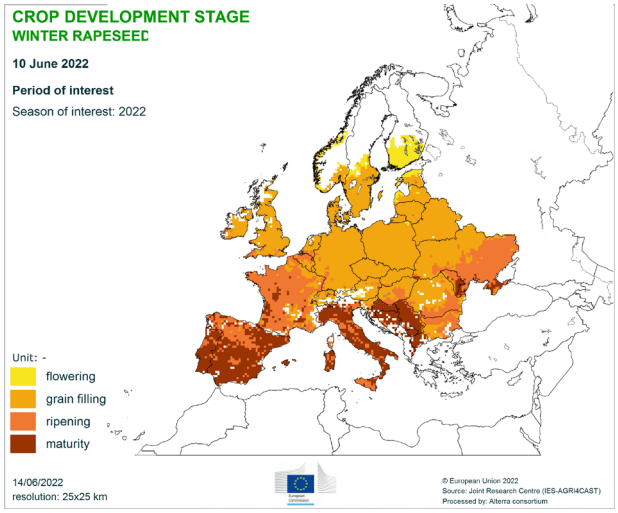
CROP DEVELOPMENT STAGE
WINTER RAPESEED
10 June 2022
Period of interest
Season of interest: 2022
Unit: -
flowering
grain filling
ripening
maturity
14/06/2022
resolution: 25x25 km
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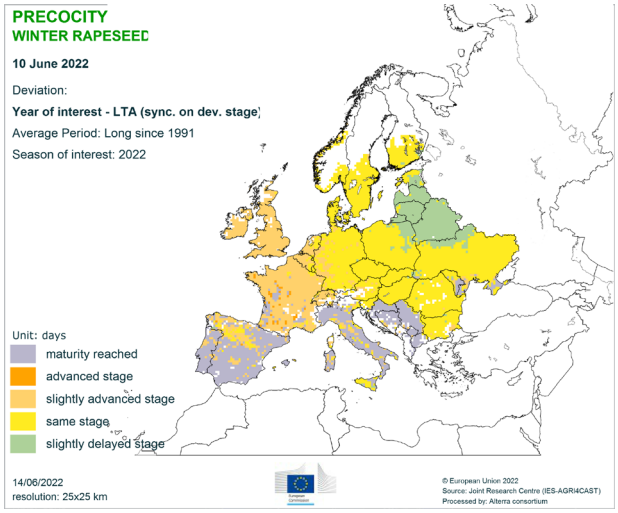
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium


PRECOCITY
WINTER RAPESEED
10 June 2022
Deviation:
Year of interest - LTA (sync. on dev. stage)
Average Period: Long since 1991
Season of interest: 2022
Unit: days
maturity reached
advanced stage
slightly advanced stage
same stage
slightly delayed stage
14/06/2022
resolution: 25x25 km
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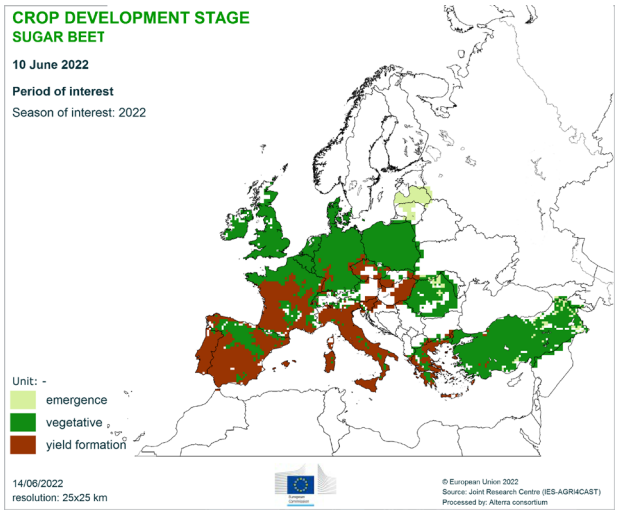
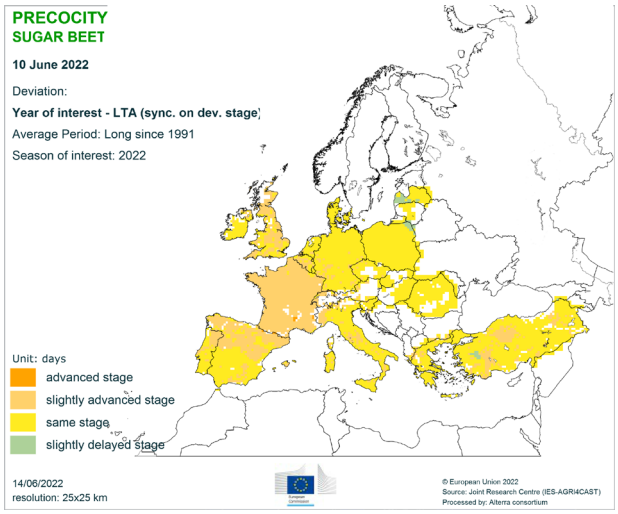
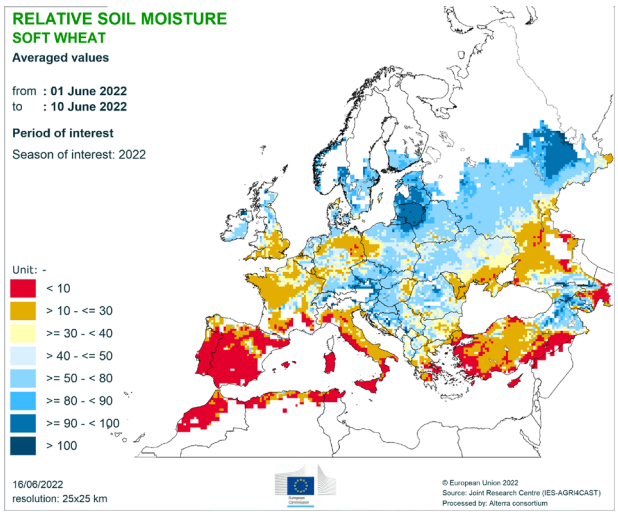
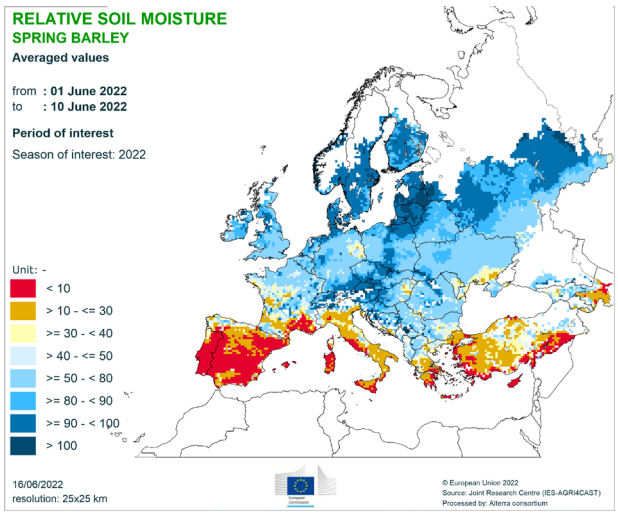
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium

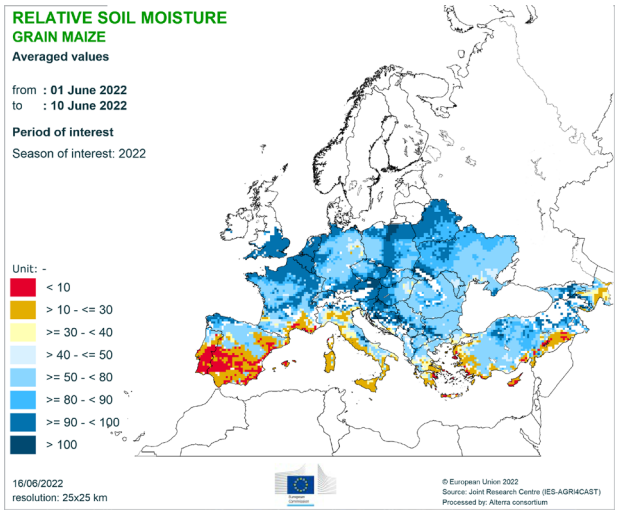


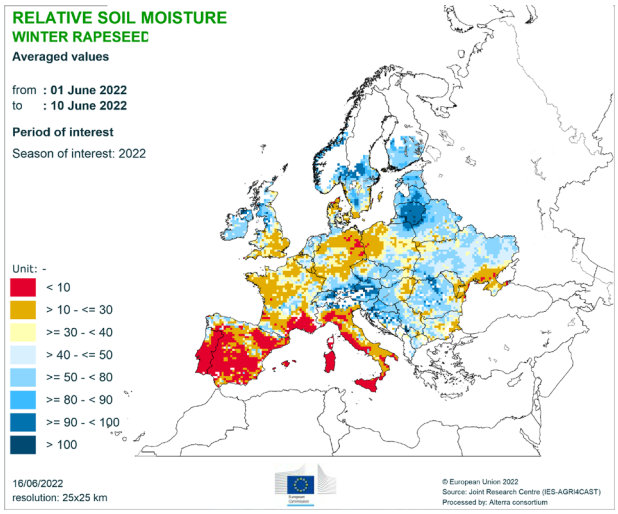


Relative soil moisture

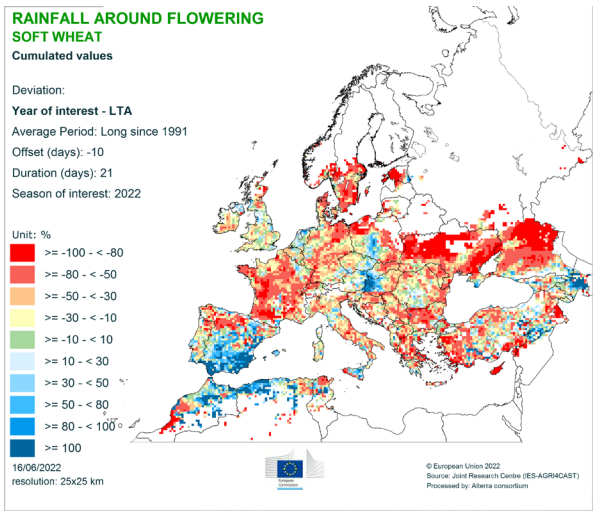


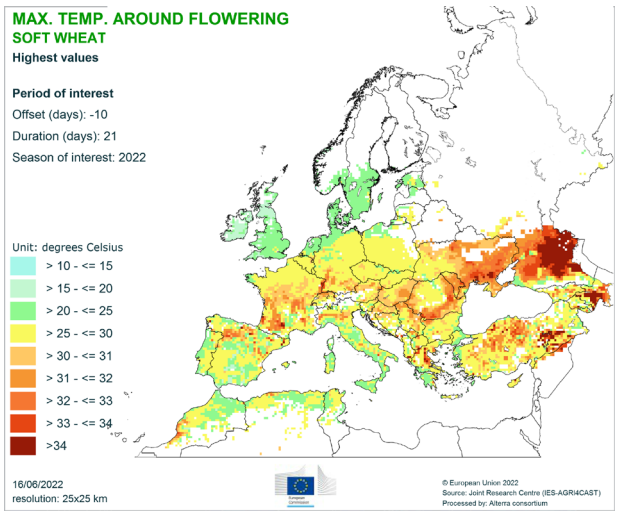


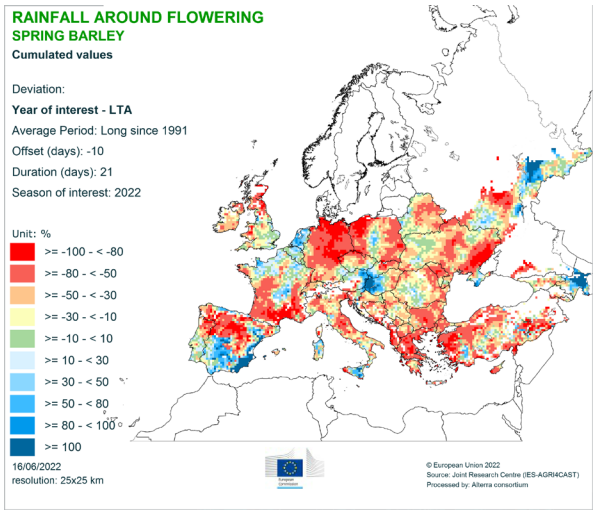


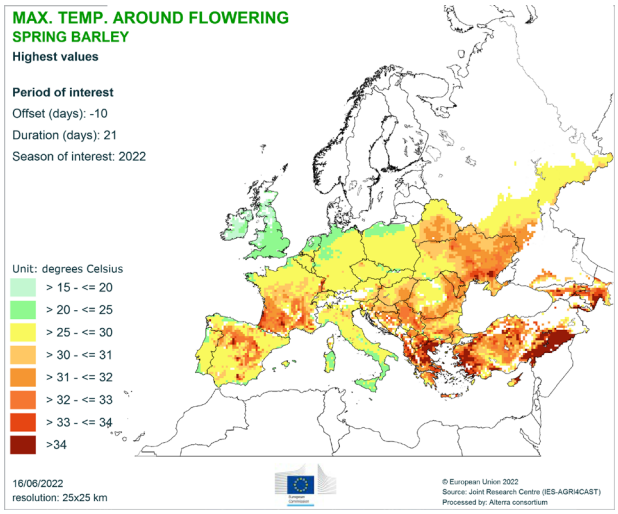


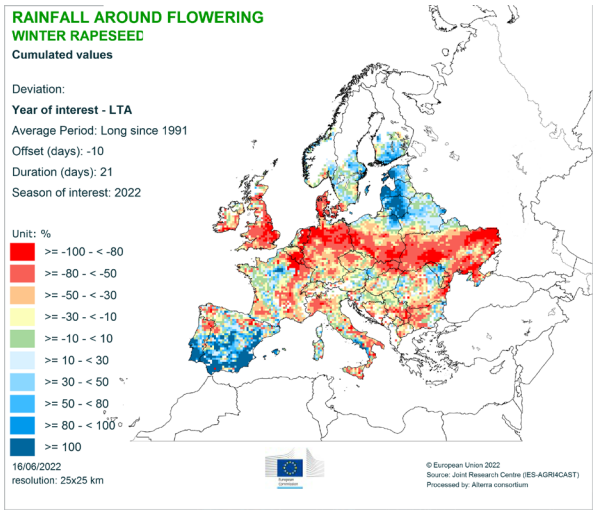
Precipitation and temperatures around flowering

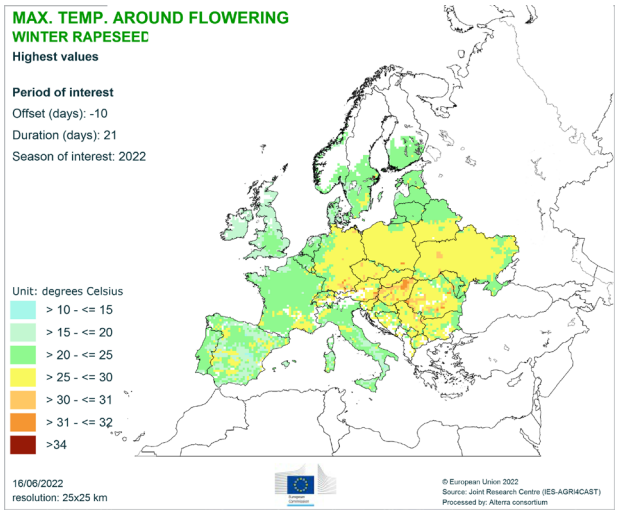












JRC MARS Bulletins 2022

Date	Publication	Reference
24 Jan	Agromet analysis	Vol. 30 No 1
21 Feb	Agromet analysis	Vol. 30 No 2
21 Mar	Agromet analysis, pasture analysis, yield forecast	Vol. 30 No 3
26 Apr	Agromet analysis, remote sensing, pasture analysis, sowing conditions, yield forecast	Vol. 30 No 4
23 May	Agromet analysis, remote sensing, pasture analysis, sowing update, yield forecast	Vol. 30 No 5
20 Jun	Agromet analysis, remote sensing, pasture analysis, rice analysis, yield forecast	Vol. 30 No 6
25 Jul	Agromet analysis, remote sensing, pasture analysis, harvesting conditions, yield forecast	Vol. 30 No 7
22 Aug	Agromet analysis, remote sensing, pasture update, harvesting update, yield forecast	Vol. 30 No 8
19 Sep	Agromet analysis, remote sensing, pasture analysis, rice analysis, harvesting update, yield forecast	Vol. 30 No 9
24 Oct	Agromet analysis, pasture update, sowing conditions, harvesting update, yield forecast	Vol. 30 No 10
21 Nov	Agromet analysis, sowing update, harvesting update	Vol. 30 No 11
19 Dec	Agromet analysis	Vol. 30 No 12

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Technical note
The long-term average (LTA) used within this Bulletin as a reference is calculated on the basis of weather data from 1991-2021.

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