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European Commission

JRC MARS Bulletin

Crop monitoring in Europe

August 2023

Rain hampers harvesting in the north

Limited impacts of heatwaves on yield expectations at EU level

This month's review period was marked by frequent rains in large parts of north-western, northern central, and northern Europe, while heatwaves were a common feature in the south. At EU level, impacts of these events on yield expectations have been limited. Our yield forecast for sunflowers was revised upwards, mainly due to better-than-expected conditions in Spain and France, which offset the yield effect of worsened conditions in Bulgaria.

Abundant rain in frequent events, in many parts of north-western, northern central, and northern Europe, benefited summer crops, but caused delays to the harvesting of winter crops. Most seriously affected are north-western France, the Benelux countries, and large parts of Germany. Negative impacts are expected to mainly concern grain quality (see text box on page 3).

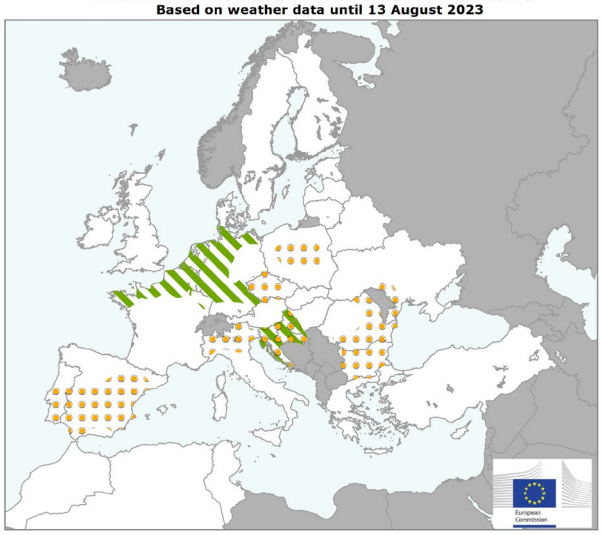
Heatwaves and drier-than-usual conditions particularly impacted summer crops in Bulgaria, southern and eastern Romania, Czechia and central Poland.

Torrential rains, and localised but numerous thunderstorms and hailstorms caused substantial damage to crops in northern Italy, Slovenia and Croatia. In Slovenia, torrential rains in the beginning of August caused floods and widespread damage to agricultural land.

Contents:

Covers the period from 1 July until 13 August

AREAS OF CONCERN - CROP IMPACTS
Based on weather data until 13 August 2023



Winter and spring crops impacted Summer crops impacted

Crop	Yield t/ha				
	Avg 5yrs	July Bulletin	MARS 2023 forecasts	%23/5yrs	% Diff July
Total cereals	5.44	5.46	**5.44**	+ 0	- 0
Total wheat	5.58	5.59	**5.58**	+ 0	- 0
Soft wheat	5.79	5.80	**5.78**	- 0	- 0
Durum wheat	3.50	3.39	**3.41**	- 3	+ 1
Total barley	4.89	4.74	**4.74**	- 3	+ 0
Spring barley	4.19	3.62	**3.60**	- 14	- 1
Winter barley	5.77	5.91	**5.92**	+ 3	+ 0
Grain maize	7.48	7.53	**7.45**	- 0	- 1
Rye	3.98	4.12	**4.12**	+ 4	+ 0
Triticale	4.22	4.29	**4.31**	+ 2	+ 0
Rape and turnip rape	3.10	3.20	**3.19**	+ 3	- 0
Potatoes	34.1	34.4	**34.4**	+ 1	+ 0
Sugar beet	72.0	73.3	**73.7**	+ 2	+ 0
Sunflower	2.21	2.12	**2.18**	- 2	+ 3
Soybeans	2.76	2.86	**2.82**	+ 2	- 1
Green maize	40.7	40.6	**40.3**	- 1	- 1

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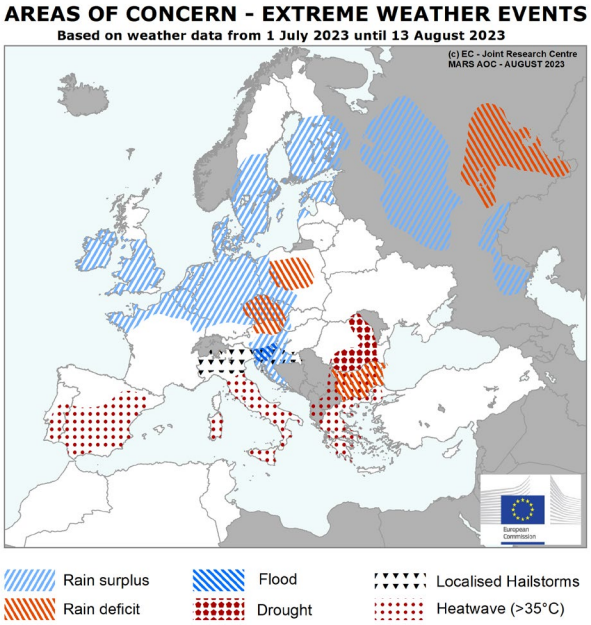
Joint Research Centre

1. Agrometeorological overview

1.1. Areas of concern



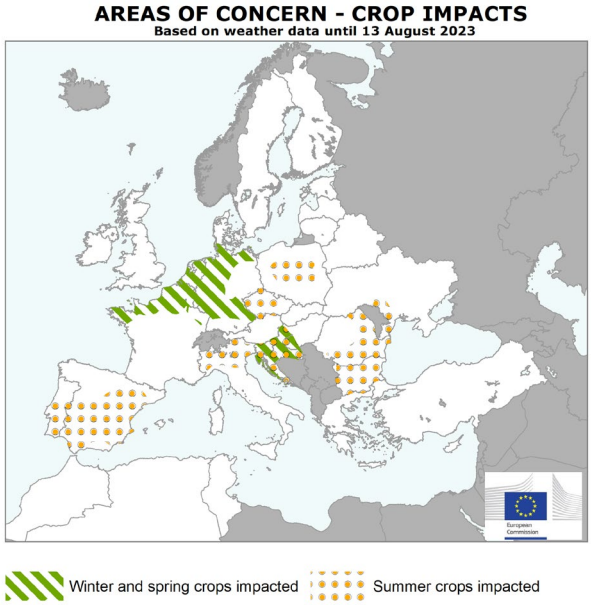
Many parts of southern Europe experienced heatwave episodes in July before slight cooling in August. In Italy, during a long-lasting **heatwave** from 5 to 25 July, daily temperatures were 4-6 °C above the LTA and maximum temperatures exceeded 40 °C in several places in the south. Temperature sums, cumulated for July, rank the 3rd highest of the past 30+ years. However, since our models represent low heat-stress sterility levels, the extreme heat conditions did not have relevant negative impacts on summer crops' growth. In Bulgaria and southern and north-eastern Romania, a long period of maximum daily temperatures exceeding 30 °C and a higher-than-usual number of hot days raise concern for summer crops. In Spain, the period of review ranks among the 5 hottest in our archive (since 1991) for all agricultural provinces. Andalucía ranks first in maximum temperatures; Castilla la Mancha 2nd after 2022. Nevertheless, this year's absence of very high temperature peaks, which did occur last year, means that maize fertility was not compromised.

In central Poland, Czechia, and parts of Austria, **rainfall deficit** during the first two dekads of July negatively impacted on summer crops, reducing the yield potential of grain maize. In the last dekad of July, abundant rain and milder temperatures led to more favourable conditions for summer crops. In Bulgaria, persistent and intensified dry conditions negatively affected the yield outlook for summer crops.

In southern and north-eastern Romania, rainfall deficit and persistent heat have developed into **drought** conditions with severe negative impacts for summer crops.

Many parts of north-western, northern central, and northern Europe, experienced a **rain surplus**, which was most pronounced in the last dekad of July and the first dekad of August. The abundant rain in frequent events during this period benefited summer crops – particularly in areas previously affected by rain deficit – but caused delays to the harvesting of winter crops with potential negative impacts on grain quality and yields. Most seriously affected are north-western France, the Benelux countries, and western and southern Germany. In these regions below-average to average rainfall in the first two dekads of July created favourable harvest conditions, but almost daily precipitation since then seriously hampered the harvesting of the remaining winter crops (particularly wheat and rapeseed), while creating optimal conditions for the incidence of fungal diseases. Impacts on crops are difficult to assess at this stage (see text box below). Our yield forecasts are based on the preliminary assumption of minor impacts on yields at national level.

In Ireland, Denmark, southern Sweden, Estonia, and Finland, abundant rainfall complicates harvest but no major damage to crops is expected yet. In western Russia frequent and abundant rains hampered the ongoing harvest of winter wheat in July.



Assessment of grain yield and quality losses due to extended rain at harvest

Once grain crops have reached physiological ripening, harvesting can normally start after several days, during which the grain moisture content decreases from about 35% to (ideally) below 15%, to make it suitable for storage and processing.

Under rainy conditions, the grains dry very slowly, or not at all, while harvesting operations are also physically hampered. Therefore, farmers prefer to wait until conditions improve. However, if wet conditions continue, grain quality decreases due to the initialisation of sprouting and the proliferation of fungi, making it unfit for milling and baking, with a price penalty for farmers. Meanwhile, the stands become more susceptible to lodging making them even more vulnerable, and more difficult to harvest. In extreme cases, the crop can only be used for fodder if sprouting is advanced, or even become unsuitable for this purpose, if contaminated with mycotoxins. To avoid this, farmers may decide to harvest anyway - despite the difficult conditions - and accept the extra costs of the slow and cumbersome harvesting and artificial drying, which is also time-sensitive (i.e. ideally within 48 hours of harvest).

Accurate quantification of the losses in yields and grain quality is feasible only when based on numerous observations at local level, and thus beyond the means and scope of the MARS Bulletin analysis. To include the effect of rain around harvest in the current assessment, we relied on information from specialist media and comparison with similar situations in the past. We conclude: (i) substantial impacts on grain quality, particularly of wheat, in the areas depicted on the crop impacts map of page 2, which will lead to a significant decrease of the amount of wheat of milling quality produced in these areas; and (2) limited impact on yields of winter crops and spring barley at regional and national level, however, with a substantial margin of uncertainty.

A distinct rain surplus was also experienced in southern Austria, Slovenia, Croatia, and western Hungary. Several days of torrential rains in the beginning of August caused **floods** and widespread damage to crops in Slovenia.

Localised severe thunderstorms and hailstorms in Croatia, Slovenia, and northern Italy occurred from 19 to 25 July with hail damage reports to crops in Trentino-Alto Adige (raising concern for fruit trees, particularly apples), in the northern part of Emilia-Romagna (concern for summer crops), and in Veneto, Friuli Venezia-Giulia, Lombardia, and Piemonte (summer crops). Subsequent downward revisions of forecasts for summer crop yields in the season are likely due to the negative impacts of hailstorms.

1.2. Meteorological review (1 July – 13 August 2023)

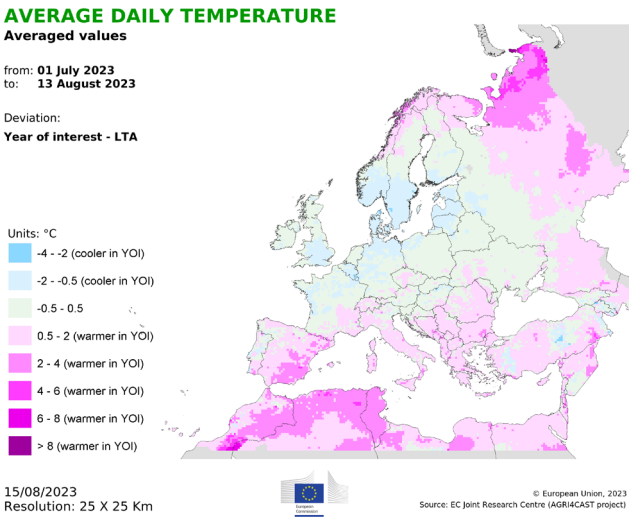
Warmer-than-usual conditions prevailed in Mediterranean Europe, with heavy rain and hailstorms in some areas; a low-pressure system kept northern Europe under wetter- and slightly colder-than-usual conditions.

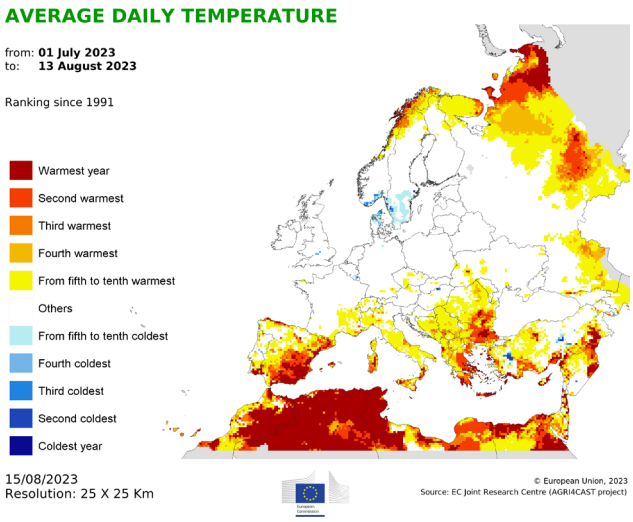
Slightly warmer-than-usual conditions, with daily mean temperatures between 0.5 °C and 2 °C above the 1991–2022 long-term average (LTA), were observed in most of Mediterranean Europe, the Balkan peninsula, Türkiye and European Russia. More distinct positive temperature anomalies (mainly 2 °C to 4 °C above the LTA) were observed in parts of Spain and of central and northern European Russia. This is reflected in average daily temperatures ranking among the three warmest in our records since 1991. In most of these regions, daily maximum temperatures exceeded 35 °C on the hottest days, and daily average temperatures exceeded 30 °C on 10 or more days. Heat was particularly intense in Greece, Spain and Italy around mid July, when temperatures exceeded 40 °C and locally in Spain and Italy even 45 °C.

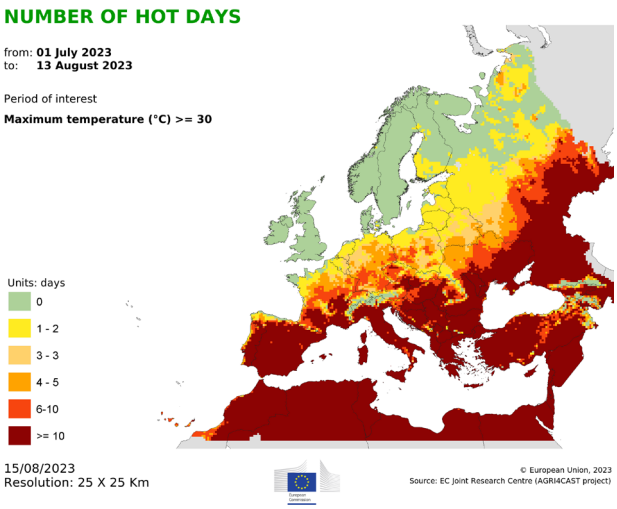
Slightly colder-than-usual conditions with temperature anomalies between 0.5 °C and 2 °C below the LTA were observed in large parts of north-western and northern Europe, and in parts of Türkiye. This is reflected in daily average temperatures ranking among the three coldest since 1991 in the Skagerrak strait region and parts of western and central Türkiye.

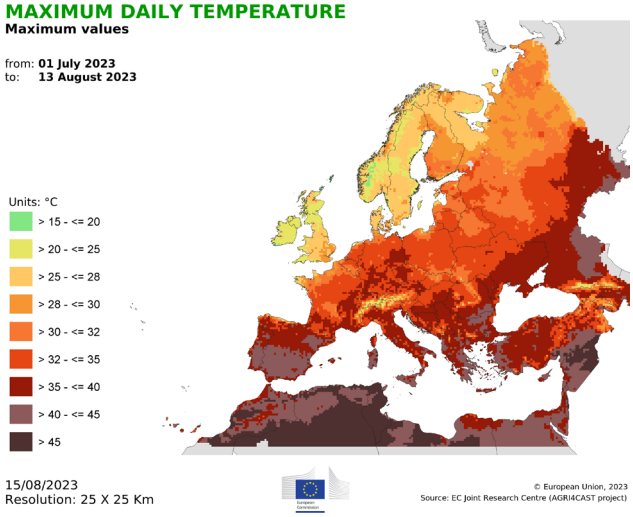
Dry conditions (with less than 30 mm rainfall) were observed in the Iberian Peninsula, southern France, most of Italy, Greece and Türkiye. In these regions, and in Bulgaria, cumulative rainfall passed the 5 mm threshold on no more than 3 days and was 50 % or more below the LTA.

Wet conditions with rainfall totals exceeding 90 mm were observed in most of Europe, except Mediterranean Europe, the southern Balkan peninsula (including Bulgaria, Greece and most of Türkiye) and European Russia. In these regions, cumulative rainfall passed the 5 mm threshold on 10 or more days and exceeded the LTA by 50 %, and in some areas (Slovenia, southern Sweden) by more than 150 %.







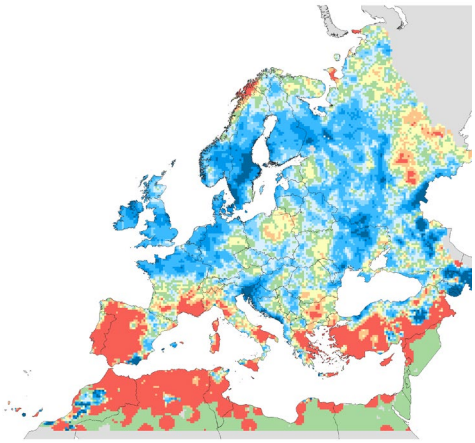


RAINFALL
Cumulative values

from: **01 July 2023**
to: **13 August 2023**

Deviation:
Year of interest - LTA

Units: %
- >= -100 - < -50
- >= -50 - < -30
- >= -30 - < -10
- >= -10 - < 10
- >= 10 - < 30
- >= 30 - < 50
- >= 50 - < 100
- >= 100 - < 150
- >= 150

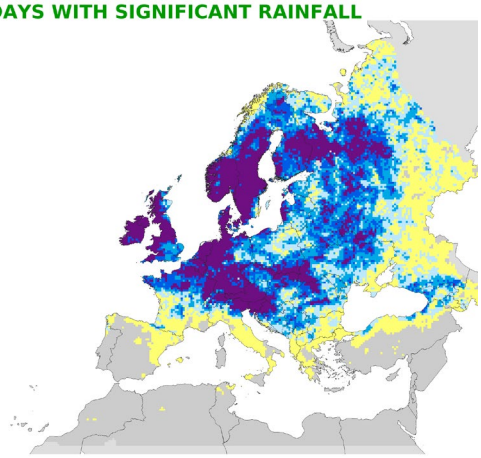


15/08/2023
Resolution: 25 X 25 Km

NUMBER OF DAYS WITH SIGNIFICANT RAINFALL

from: **01 July 2023**
to: **13 August 2023**
Rain (mm) > 5

Units: days
- = 0
- 1 - 3
- 4 - 5
- 6 - 7
- 7 - 9
- >= 10

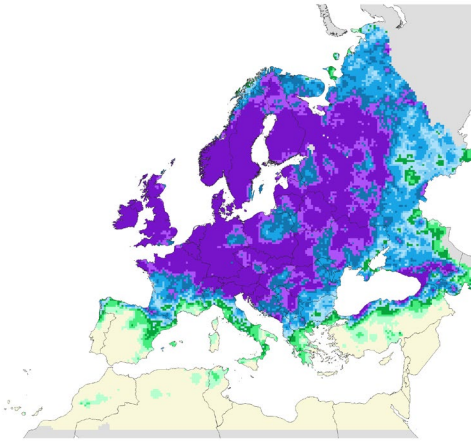


15/08/2023
Resolution: 25 X 25 Km

RAINFALL
Cumulative values

from: **01 July 2023**
to: **13 August 2023**

Units: mm
- 0 - 3
- 3 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 -70
- 70 - 90
- 90 - 110
- > 110

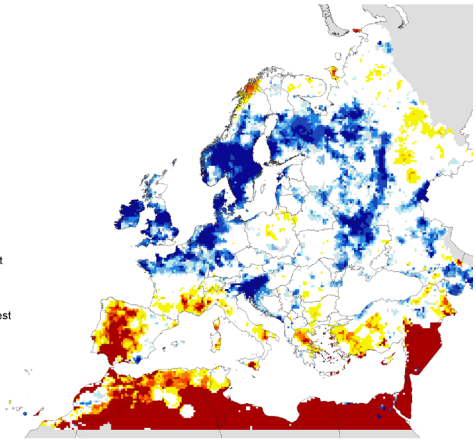


15/08/2023
Resolution: 25 X 25 Km

RAINFALL
Cumulative values

from: **01 July 2023**
to: **13 August 2023**

Ranking since 1991
- Driest year
- Second driest
- Third driest
- Fourth driest
- From fifth to tenth driest
- Others
- From fifth to tenth wettest
- Fourth wettest
- Third wettest
- Second wettest
- Wettest year



15/08/2023
Resolution: 25 X 25 Km

1.3. Weather forecast (17 - 26 August)

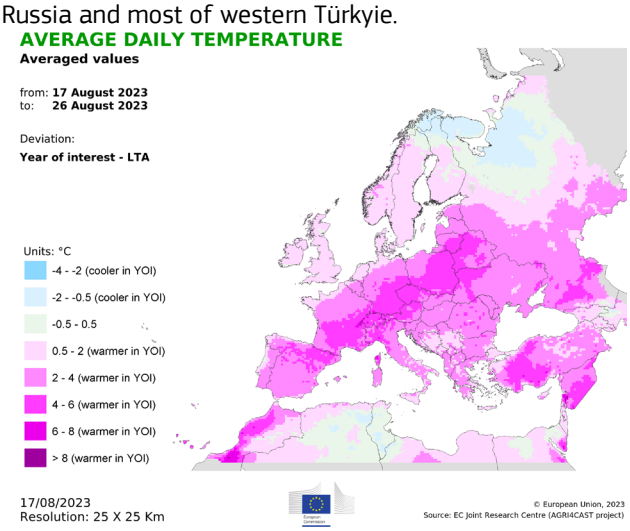
Frontal weather system continues to bring scattered showers across many parts of central and northern Europe, while air temperatures are forecast to start increasing again to above-average levels across the continent.

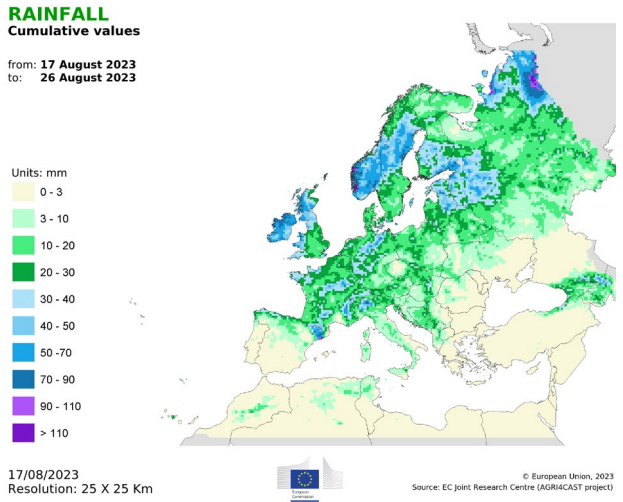
Colder-than-usual conditions, with daily average temperatures between -2°C and -0.5°C relative to the 1991-2022 long-term average (LTA) are forecast only in northern Scandinavia and northernmost European Russia. **Warmer-than-usual conditions**, with daily average temperatures exceeding the LTA by 0.5°C and 2°C, are forecast for Ireland and the United Kingdom, the Atlantic coast of France, Netherlands, northern Germany, Denmark, most of Scandinavia, parts of central and northern European Russia, parts of the western Balkan Peninsula, and along the Bosporus Strait in Türkyie. **Much warmer-than-usual conditions** (daily average temperatures exceeding the LTA by 2°C and more) are forecast elsewhere in Europe, with positive anomalies between 4°C and 6°C in a wide belt extending from northern Spain northeast to Lithuania, Belarus, and north-western Ukraine, as well as in parts of southern European Russia and most of western Türkyie.

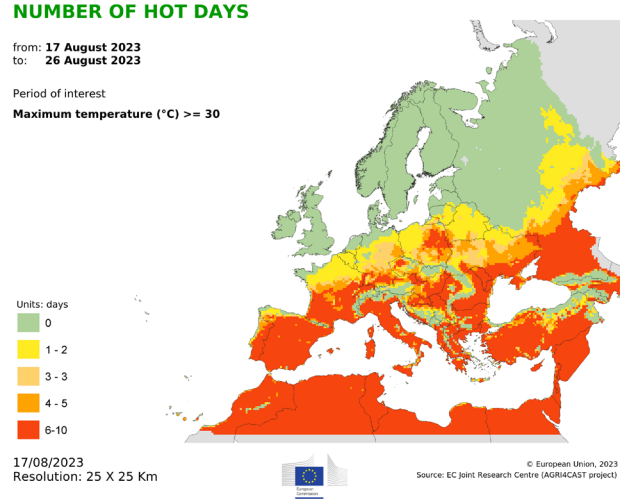
Dry conditions (total precipitation less than 3 mm) are forecast for most of the Iberian Peninsula, southern Italy, Greece, Bulgaria, and most of Romania, as well as in eastern Ukraine and southernmost European Russia.

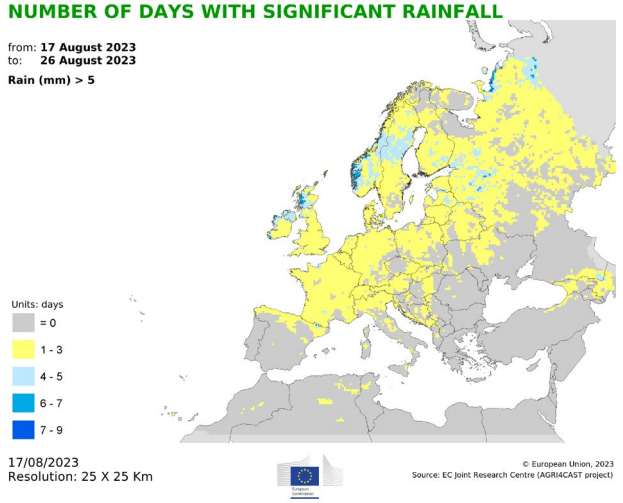
Wet conditions (total precipitation above 30 mm) are forecast elsewhere in Europe with regions in western and central Europe, Scandinavia, the Baltic Sea countries, and northernmost European Russia forecast to receive up to 90 mm rainfall. **Very wet conditions** (rainfall above 90 mm) are forecast locally in the latter region.

The long-range weather forecast points to highly likely warmer-than-usual conditions in parts of southern Europe exceeding the 24-year climatological median by up to 2°C in September, and in most of Europe by up to 1°C in October-November. In southern Europe in September and in most of Europe in October-November, this will be accompanied by moderately likely wet conditions (i.e. rainfall exceeding the 24-year climatological monthly median by up to 50 mm).



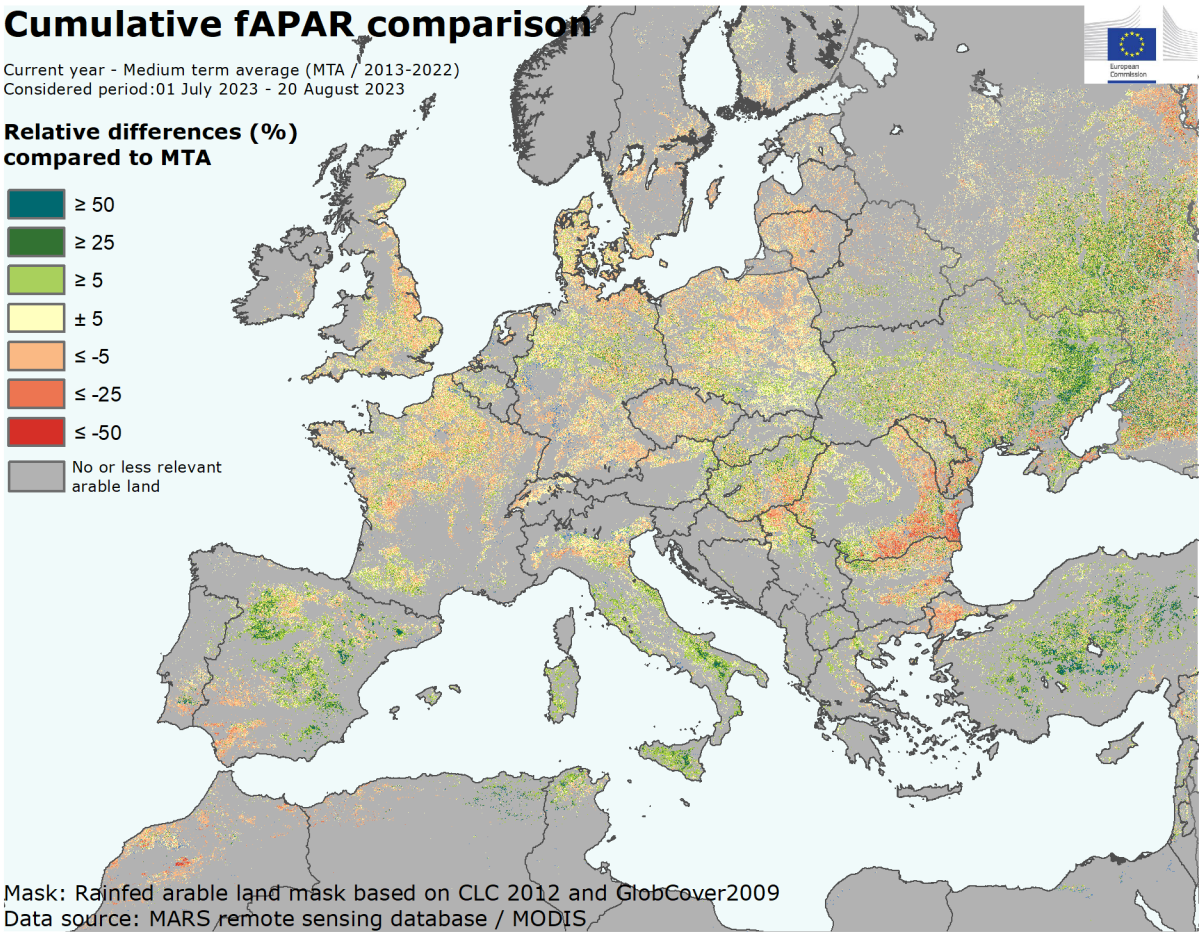






2. Remote sensing – observed canopy conditions

Beneficial rains improve summer crop conditions



The map displays the difference between the fraction of absorbed photosynthetically active radiation (fAPAR) accumulated from 1 July to 20 August 2023 and the medium-term average (2013–2022) for the same period. Positive anomalies (in green) reflect above-average canopy density, while negative anomalies (in red) reflect below-average biomass accumulation.

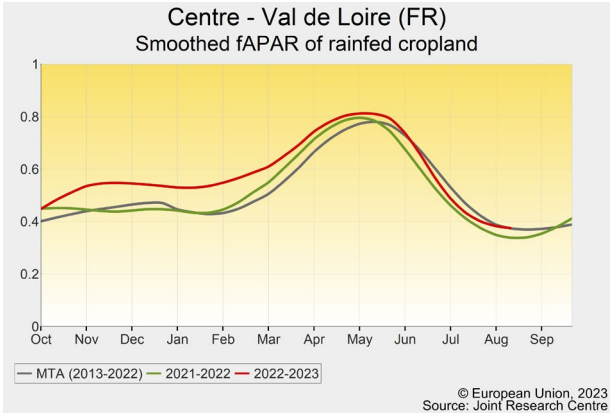
The map predominantly illustrates the state of summer crops across southern, central and eastern Europe, where winter crops have entered senescence or have already been harvested. Conversely, in northern Europe, winter and spring crops are prominent.

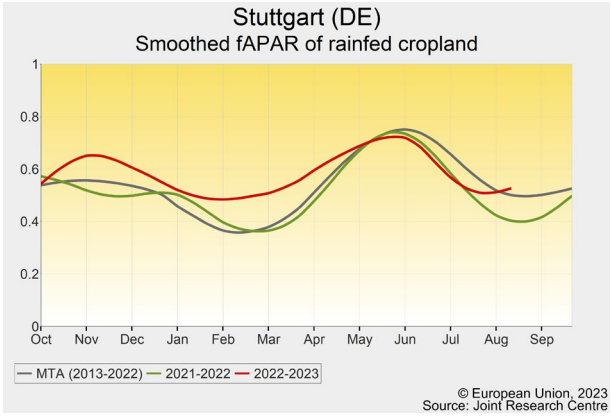
In regions spanning from northern **France** to central **Poland**, including southern **Germany** and **Czechia**, the map suggests average conditions. This reflects a combination of the below-average growing conditions until mid July, followed by a clear recovery of the summer crops since the end of July, due to abundant rainfall.

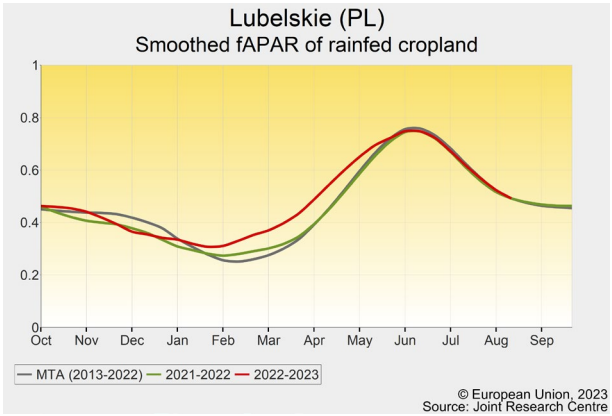
In south-west France, the map highlights good growing conditions. Across the **Benelux** countries, the north-western regions of **Germany**, **Denmark** and **Sweden**, copious and evenly spread rainfall has proven advantageous for the growth of summer crops, leading to slightly above-average biomass accumulation while delaying the ongoing harvest of winter crops.

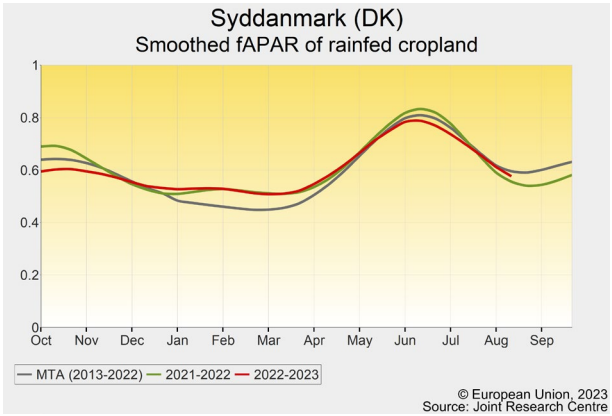
Continued favourable conditions persist in most parts of **Hungary**, while its eastern portion and western **Romania** are beginning to show the effects of a recent rainfall deficit. In northern **Italy**, the current growth conditions are approaching average thanks to favourable weather patterns in the previous month, although some regions have been negatively affected by hailstorms that occurred during the final 10 days of July. Southern **Italy** continues to experience highly positive growing conditions as a result of wet spring and summer seasons. In the Iberian Peninsula, there has been an improvement in the central regions of **Spain** (*Castilla-y-León* and *Castilla-La-Mancha*) due to persistent wet weather patterns since July, providing beneficial conditions for summer crops.

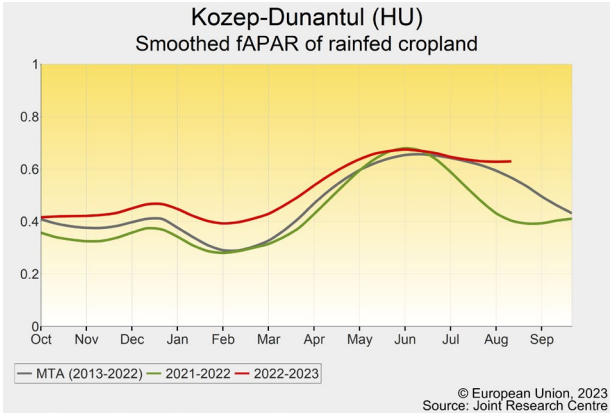
Regions located to the west of the Black Sea, including eastern **Romania** and **Bulgaria**, southern **Ukraine** (*Odes'ka*), and European **Türkiye**, are facing a rainfall deficit. This has led to a negative anomaly, indicating unfavourable conditions for summer crops, particularly grain maize. In the northern part of **Ukraine**, above-average accumulation of biomass is observed, attributed to substantial and consistent rainfall occurring since July. In the eastern part of **Türkiye**, despite a lack of rainfall, the overall vegetation status remains positive thanks to favourable weather conditions experienced in May and June.

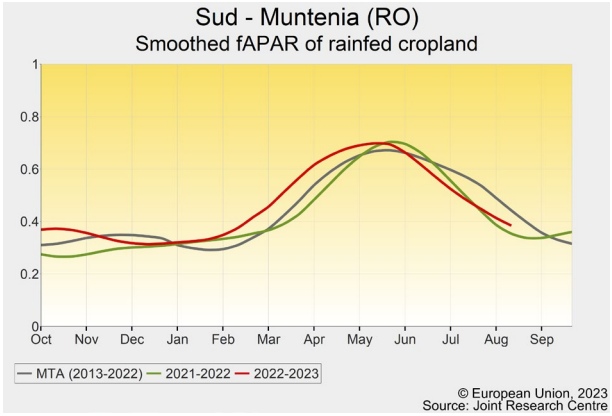


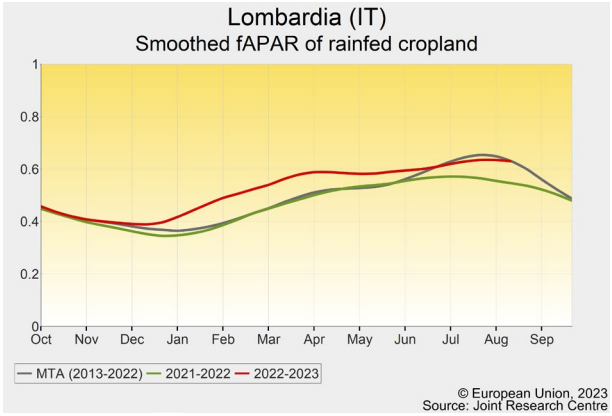


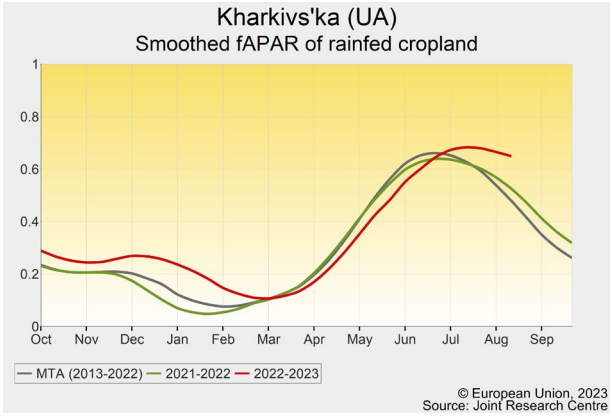









Lombardia (IT)
Smoothed fAPAR of rainfed cropland
1
0.8
0.6
0.4
0.2
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
MTA (2013-2022)
2021-2022
2022-2023
© European Union, 2023
Source: Joint Research Centre

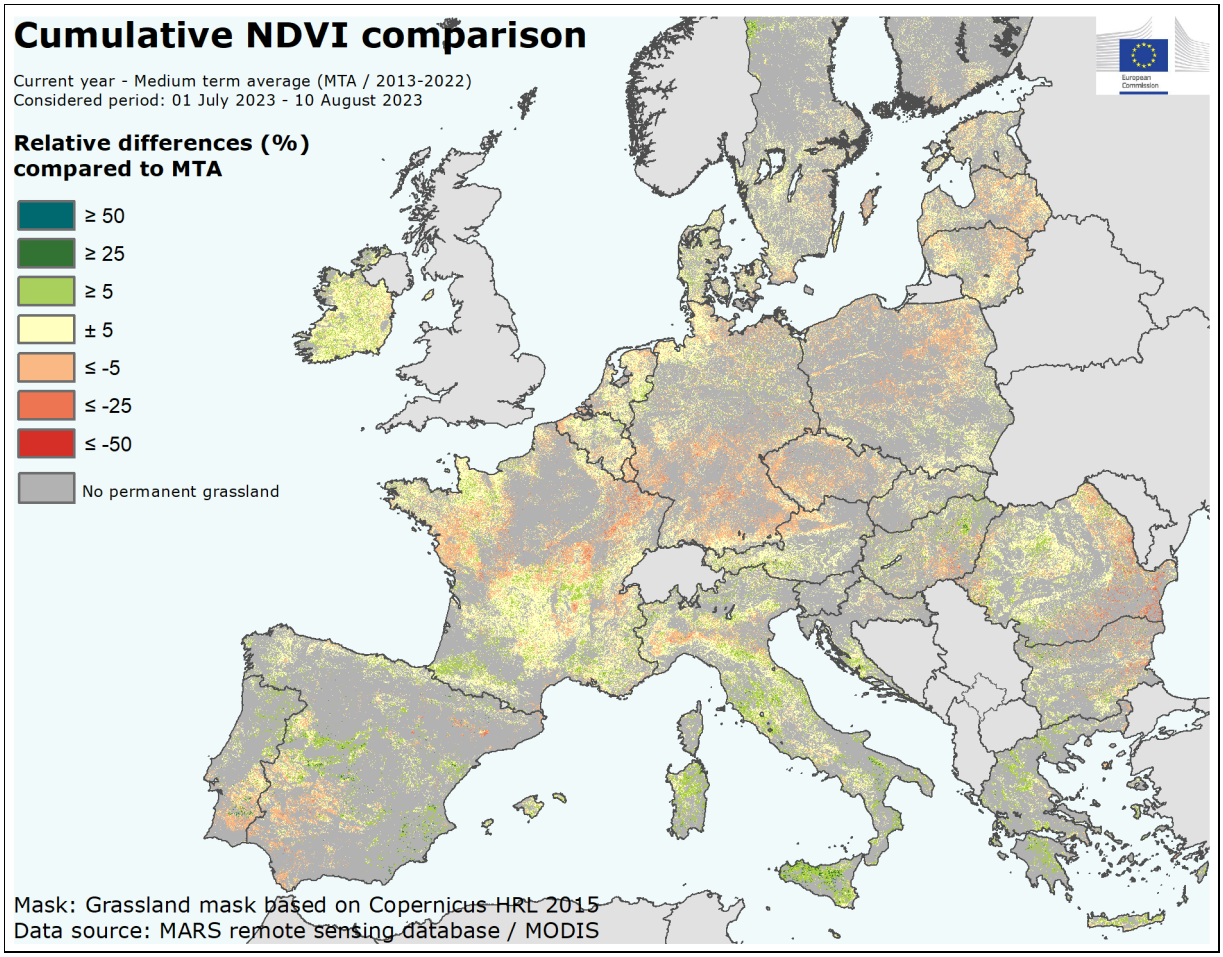

Kharkivs'ka (UA)
Smoothed fAPAR of rainfed cropland
1
0.8
0.6
0.4
0.2
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
MTA (2013-2022)
2021-2022
2022-2023
© European Union, 2023
Source: Joint Research Centre

3. Grassland and fodder monitoring

Frequent rainfall brings relief to the north

The return of rainfall, in well-above-average amounts, brought relief to grasslands in many northern and central European regions, but caused damage in eastern Alpine areas. Large parts of southern Europe were exposed to very dry and hot summer conditions, which particularly affected grasslands in the eastern parts of Bulgaria and in Romania.

The map below displays the differences between the normalised difference vegetation index (NDVI), cumulative from 1 July to 10 August 2023, and the medium-term average (MTA) (2013–2022) for the same period, in EU grassland areas. Positive anomalies (in green) reflect above-average surface greenness, associated with above-average grassland productivity, while negative anomalies (in red) reflect below-average surface greenness. In the region spanning from northern France to Poland, including southern Germany, Czechia and northern Austria, the negative anomalies should be interpreted with care, as cloud-free images have locally not been obtainable since mid July.



In **Ireland**, precipitation was twice the usual amount, while temperatures and radiation were comparable to the MTA, resulting in favourable conditions for grassland growth, which is slightly above last year and in line with the MTA. In **Finland**, **Sweden**, **Denmark** and the **Baltic Sea countries**, abundant and well-distributed rainfall, combined with average to slightly below-average temperatures, contributed to raising grassland productivity to near-normal levels, after the negative impact of the dry conditions in May, June and part of July. In northern **France**, grasslands are in fair condition thanks to frequent and well-above-average rainfall. In south-eastern France, prevailing dry conditions continued to hamper growth, as usual for the summer season. In the **Benelux** countries, frequent and abundant precipitation allowed pastures to recover from the stress caused by the

preceding hot and dry conditions. Soil moisture levels are now above average, thus providing a good reserve in case of drier-than-usual conditions in the coming weeks. Green maize is in fair condition but still reflects the delayed sowing and difficult conditions around emergence and early development. In northern **Germany**, growing conditions were very similar, with abundant rainfall that helped the NDVI recover and favoured biomass accumulation even though full recovery to the LTA has not been reached. In southern **Germany**, rainfall returned as well, but the growth conditions remain mainly below average. Reports suggest that some of the winter cereals not harvested before the prolonged rainfall period after 20 July may be converted to animal fodder. In **Poland**, **Czechia**, **Slovakia** and northern **Austria**, little rainfall was registered in July, followed by excessive rain in August. Nevertheless, the impact of the dry conditions is still visible in the vegetation signals.

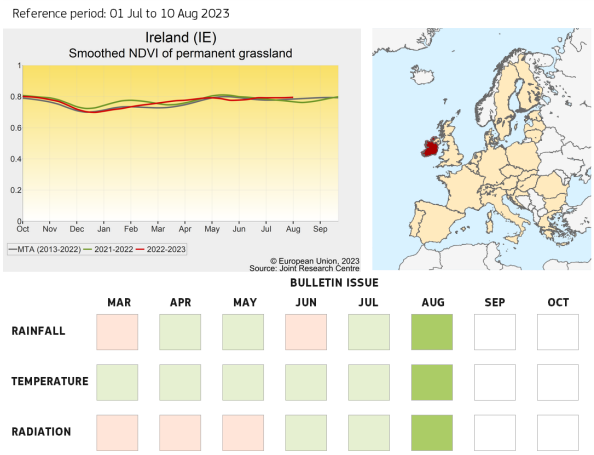
In **Slovenia** and southern **Austria**, frequent and extremely abundant rainfall events have been observed in grassland areas, causing serious floods and potentially high levels of damage. In **Croatia**, abundant rainfall events were recorded in grassland areas, with the coastal part showing a higher grassland productivity rate than eastern Croatia. In **Hungary**, grasslands also benefited from above-average precipitation. Biomass accumulation is near average in western and central Hungary, well above average in north-eastern areas, and below average in south-eastern parts of the country.

In central and southern **Romania**, precipitation was mostly above the LTA, with average biomass formation in grasslands. In eastern **Romania**, the dry conditions continued during the first half of the review period, accompanied by high temperatures leading to below-average biomass accumulation. In **Bulgaria**, grassland productivity is above average in the western regions, but below average in central and eastern regions, which experienced sparse rainfall and frequent hot days.

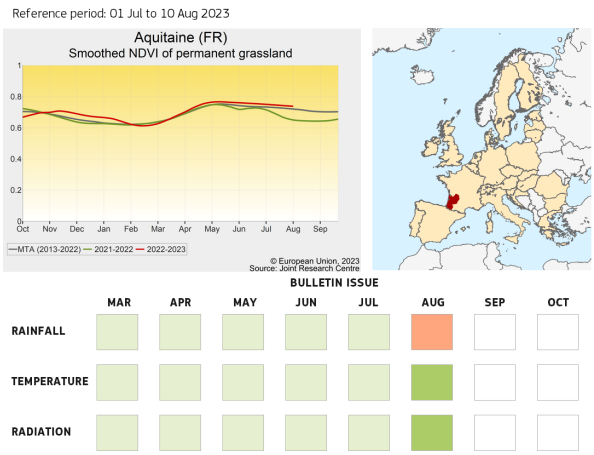
In **Italy**, despite exceptionally high temperatures in July, grassland biomass accumulation maintained the above-average trend that has featured since the beginning of this season.

In **Greece**, despite little or no rain in most parts of the country, grassland remains in average condition but is increasingly suffering and vulnerable to wildfires. In northern **Spain** and **Portugal**, grasslands are in relatively good condition for a summer period. The share of green maize in comparison with grain maize may be less than initially expected because of the relatively favourable conditions for grain maize. In southern parts of **Spain** and **Portugal**, the dry conditions observed during the review period are more pronounced than the normal summer conditions, with a large share of spring cereals harvested as fodder.

Ireland

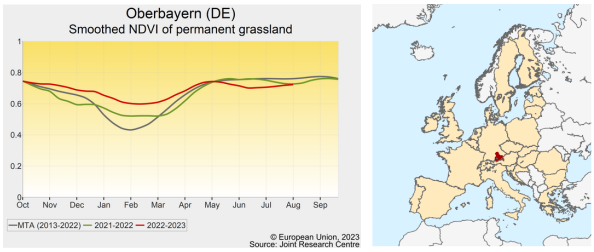


France



Germany - South

Reference period: 01 Jul to 10 Aug 2023

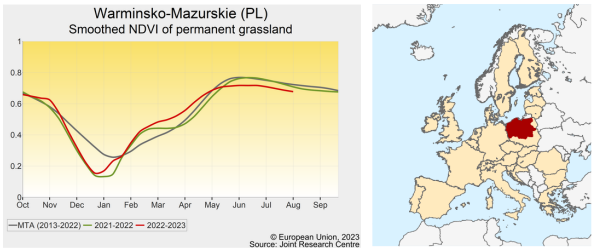


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL								
TEMPERATURE								
RADIATION								

Poland

Reference period: 01 Jul to 10 Aug 2023

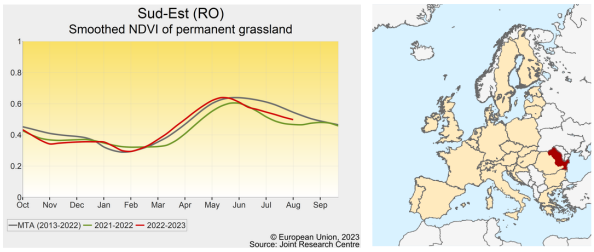


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL								
TEMPERATURE								
RADIATION								

Romania - East

Reference period: 01 Jul to 10 Aug 2023

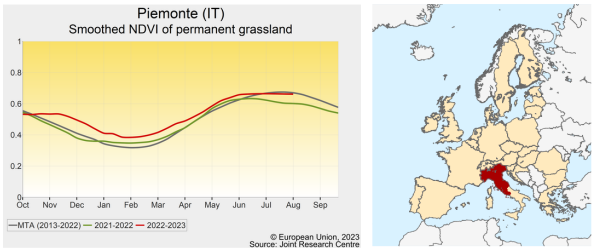


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL								
TEMPERATURE								
RADIATION								

Italy - North and central

Reference period: 01 Jul to 10 Aug 2023

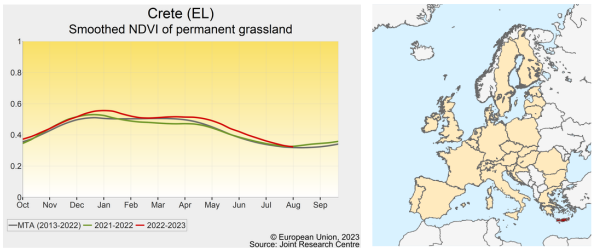


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL								
TEMPERATURE								
RADIATION								

Greece

Reference period: 01 Jul to 10 Aug 2023

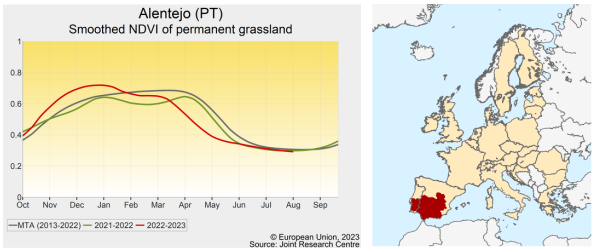


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL								
TEMPERATURE								
RADIATION								

Spain and Portugal - South

Reference period: 01 Jul to 10 Aug 2023



BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL								
TEMPERATURE								
RADIATION								

4. Country analysis

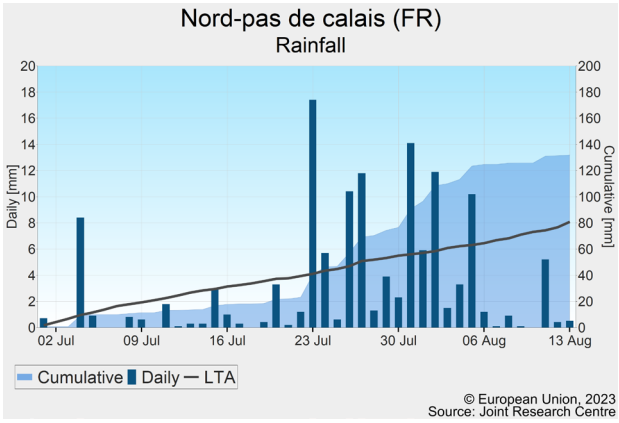
4.1. European Union

France

Wet conditions favourable for summer crops

Northern parts of the country experienced abundant precipitation, with over 10 days with > 5 mm of precipitation recorded in *Hauts-de-France* and *Grand-Est*. Temperatures across the country were slightly below average, with only 2 days with maximum temperatures above 30 °C, in early July. Global radiation followed the LTA. Grain maize either has reached or is about to reach the flowering stage.

The harvest of winter barley was completed in the second half of July, and field reports suggest an overall above-average yield level and good quality, except in southern regions, where persistent dry conditions in spring severely affected the outlook. Conversely, comments on harvested spring barley fields confirm disappointing yields (albeit above the 5-year average) as a result of unfavourable conditions during the early part of the growing season. The ongoing harvest of winter wheat is facing challenges due to the rainy conditions in north–western regions, notably in *Normandie*, *Bretagne*, and *Hauts-de-France*. While a significant loss of grain is not projected, grain quality is expected to be negatively affected. Our yield forecasts for winter crops and spring barley remain unchanged, while our projections for summer crops are revised upwards.

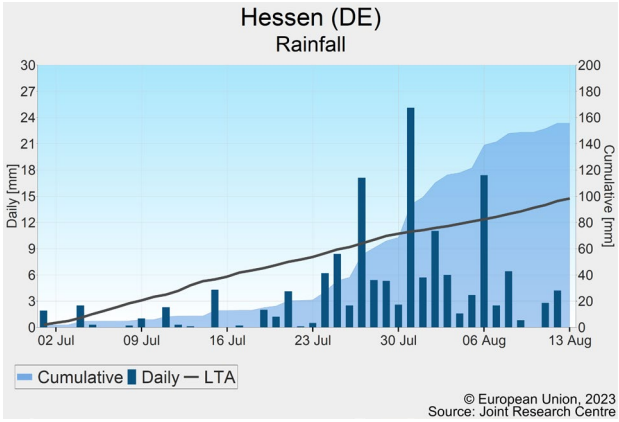


Germany

Frequent rain delayed winter crop harvest, while being beneficial for summer crops

A mix of very warm temperatures and limited rainfall during the first two dekads of July was followed by abundant daily precipitation in the remaining review period, especially in the west and south of Germany.

While most of the winter barley harvest was completed before about 20 July, the ongoing campaign for other winter and spring crops had to be interrupted in many regions (e.g. in *Hessen* and *Bavaria*) for more than 2 weeks, risking local yield losses and a reduction in grain quality. A few rain-free days in early August helped the harvest to continue, but the overall impacts on harvest and final grain quality nationwide remain uncertain. Yield expectations for most winter crops so far have been kept unchanged or slightly reduced. On the other hand, the development of summer crops profited from the wet and temperate conditions starting from the second dekad in July, after having suffered from scarce or absent precipitation in the weeks before. The forecasts for sugar beet and sunflowers were slightly revised upwards.



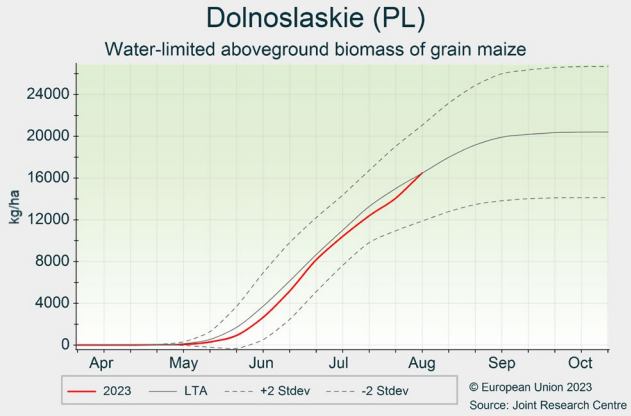
Poland

Winter crop harvest delayed by rain

Harvests of winter crops have been considerably delayed by persistent rain since the last dekad of July. The overly wet conditions exerted negative impacts on grain quality. Less rain at the end of the review period let farmers resume field operations eventually, resulting in an almost completed harvest in the south, with harvests ongoing elsewhere.

After the dry and warm first two dekads of July, mild temperatures and above-average precipitation generally improved conditions for summer crops. In regions with replenished soil moisture supply, summer crops started recuperating biomass and storage organ accumulation, after the dry period before. In central Poland, however, grain maize yield expectations remain below average, as the water deficit before and during grain maize flowering had already caused an irreversible reduction of yield potentials. In contrast, sugar beet still has the potential to recover from the dry spell, and for potatoes dry conditions were frequently alleviated by irrigation. In the south, summer crop conditions are generally good, with biomass accumulation around or above average levels.

The outlook for grain maize is slightly lower than in the last bulletin because of the reduction in yield potential in the centre, while yield expectations for sugar beet and potatoes remain close to the 5-year average.



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Romania

Deteriorating yield outlook for grain maize and sunflowers

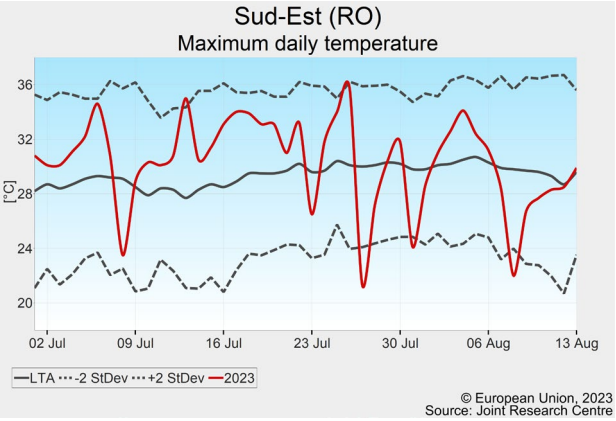
A mild positive thermal anomaly characterised western Romania. The eastern and (in particular) south-eastern regions were, on average, from 1 °C to 2 °C warmer than usual, but with temperatures fluctuating from extremely warm for long periods and much colder-than-usual for very short periods. Maximum temperatures reached 36–41 °C during heatwave periods.

Precipitation was frequent and abundant in western and central Romania. However, the long-lasting precipitation deficit continued in the north-eastern and south-eastern regions, which combined with the exceptionally hot temperatures led to the formation of drought.

Conditions were favourable for harvesting, which progressed well, even in the western and central regions. The yield forecasts for winter crops are close to the historical trend (i.e. above the 5-year average), with only minor adjustments from our July forecasts.

Summer crops are in fair condition in the western areas, where soil moisture contents are near or above average. However, water supply is a problem in most of eastern Romania, with negative impacts on crop biomass accumulation. The extremely high temperatures during flowering further worsened the situation.

At national level, the yield forecasts for grain maize and sunflowers were reduced further below the 5-year average.



Spain and Portugal

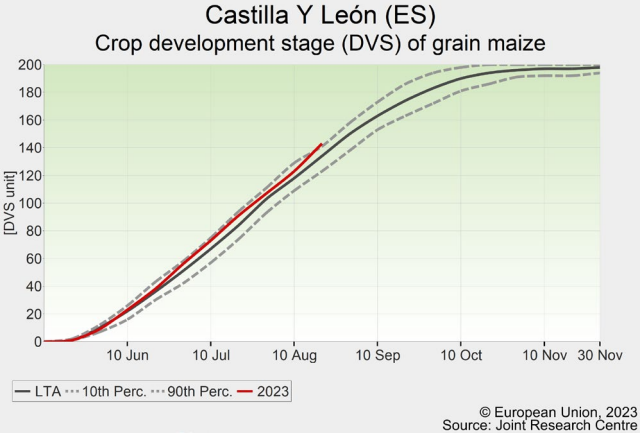
Summer crops in fair condition

For the period of review, rainfall, temperature and radiation in the main crop areas have been at the LTA. Water levels in reservoirs in Spain are still at the very low level of 2022 ([1]). In Portugal, water levels are normal for this time of year, i.e. close to half capacity in *Alentejo* and in *Algarve* ([2]).

Summer crops have passed the flowering stage and are slightly advanced in development. Grain maize, which is practically all irrigated, did not suffer heat stress during flowering and is in good condition. The same is true of potatoes. Sugar beet has been sown in nearly twice as large an area as in 2022 in *Castilla y León* and is doing well; this crop will only be harvested in 2024.

Sunflowers benefited from rainfall after sowing, and heat did not reach extreme levels as it did last year. Therefore, we have increased our yield forecast to above the level of 2022.

The yield forecasts for the other summer crops were also revised upwards and are now close to the 5-year average.



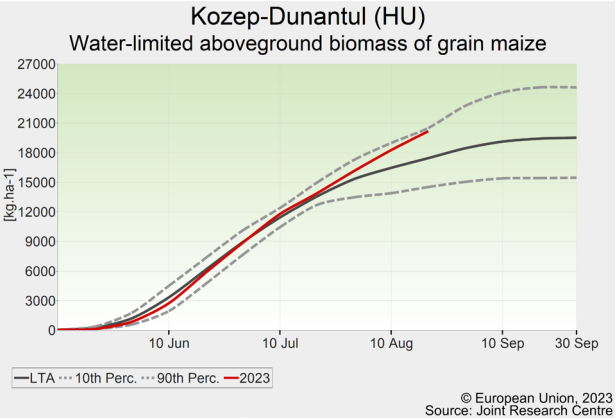
Hungary

Promising yield outlook for summer crops

Most of July was significantly warmer than usual with soaring temperatures up to 34-38°, while from 25 July onward below-average temperatures dominated until mid-August. During our review period, rain was persistent and well distributed in time. *Észak-Alföld* and *Dél-Alföld* regions received precipitation levels close to normal, while in *Észak-Magyarország* and especially in *Dunántúl* regions rainfall exceeded the average; along the Austrian border, the rain surplus reached 100-150 mm.

Abundant rainfall led to delays in winter crop harvest, locally also to yield losses, particularly in western Hungary. As a result, the yield forecasts of winter barley and rapeseed were slightly adjusted downward. Grain quality of cereals is lower than usual this year.

In the south-east where soil moisture conditions were still below average, the heat waves of mid-July could have caused pollination problems of grain maize. Elsewhere, summer crops present high biomass accumulation, albeit with an increased pest pressure due to the warm and wet conditions. Overall yield expectations of summer crops are promising, our yield outlook was increased for sunflower and grain maize.



([1]) www.embalses.net
([2]) sir.dgadr.gov.pt/reservas

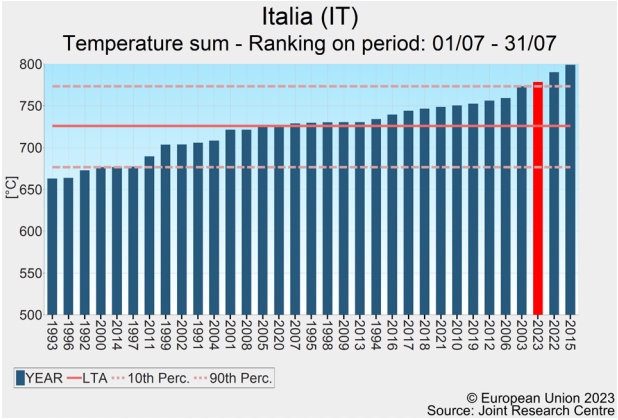
Italy

Hail damage reduced expectations for summer crop yields

The weather in Italy was characterised by a long-lasting heatwave, from 5 to 25 July. During this period, average daily temperatures were 4–6 °C above the LTA, and maximum temperatures regularly exceeded 35 °C, especially in the south. The temperature trend changed from late July to mid August, when daily temperatures dropped below the LTA. The review period was also marked by more than 500 hail episodes ([3]), which occurred in the last dekad of July in the northern regions of the country.

Despite the prolonged heatwave, our simulation models indicate a low incidence of heat-induced sterility for summer crops, with no significant effects on final production. However, summer crops (particularly second-cycle maize, e.g. sown after the harvesting of winter cereals) were negatively affected by the frequent and severe hail events, which led to a worsening of yield expectations.

Our forecasts for summer crops are revised downwards compared with the previous outlook.



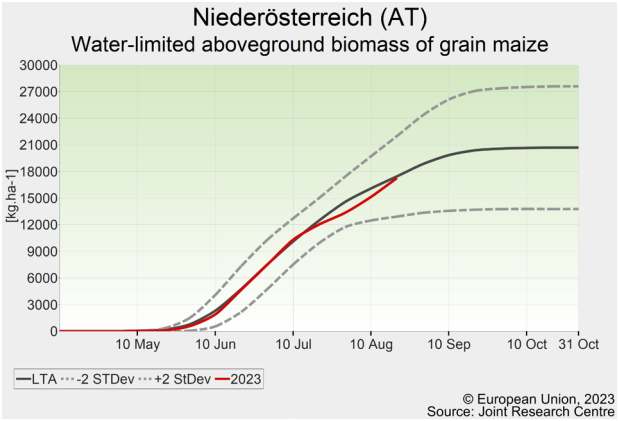
Czechia, Austria and Slovakia

Rainfall improves conditions for summer crops

A drier-than-usual July was favourable for the ripening and harvesting of winter crops in Austria, with generally positive harvest results. In Czechia and Slovakia, persistent precipitation since the last dekad of July prolonged harvest operations, with initial field reports indicating around-average results in Czechia, and above-average yields in Slovakia.

Continuing rainfall deficits during the first two dekads of July (all of July in north-east Austria), combined with hot temperatures in mid July, were not favourable for biomass accumulation of summer crops. The subsequent wetter-than-usual conditions allowed grain maize to start recuperating biomass accumulation and helped maintain fair yield expectations. In Czechia, however, despite some improvement, biomass of grain maize still remains below average.

Our yield forecasts for grain maize are maintained at the 5-year average in Austria and above the 5-year average, whereas the yield forecast for Czechia has been revised further downwards below the 5-year average.



([3]) According to the European Severe Weather Database (https://eswd.eu/cgi-bin/eswd.cgi), accessed 14.8.2023.

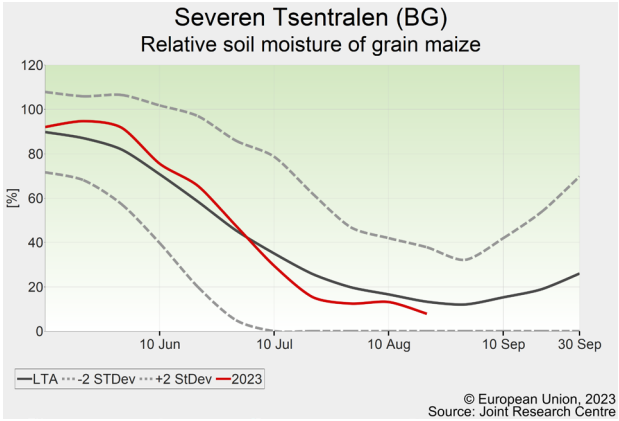
Bulgaria

Unfavourable weather conditions for summer crops

Between 1 July and 14 August, above-average temperatures predominated, resulting in a 0.5–2.5 °C positive thermal anomaly for the period as a whole. The number of hot days (T_{max} > 30 °C) exceeded the LTA by 5–15 days, and maximum temperatures on the hottest days reached 37–41 °C.

Rainfall was scarce in the first two dekads of July, especially in the central and eastern parts of Bulgaria. It then increased, but remained 20–75 % below the LTA for the review period as a whole.

The harvest of winter cereals progressed well and is close to completion. Yield expectations of winter crops are above last year's results and close to the historical trend. In contrast, the condition of summer crops has deteriorated as a result of the extremely high temperatures and low soil moisture content during flowering and early grain-filling periods. The yield forecast for summer crops was revised sharply downwards, particularly for grain maize.



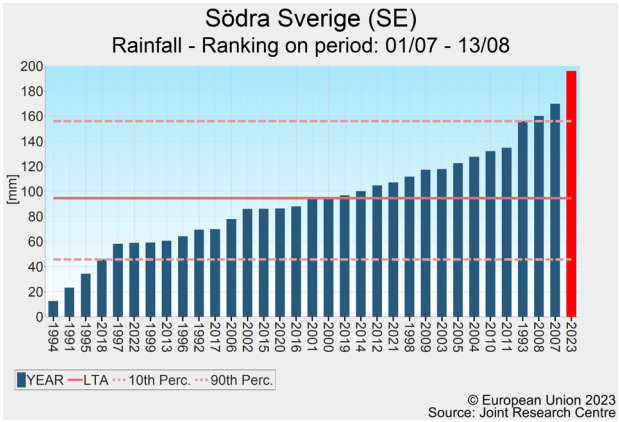
Denmark and Sweden

Cereals harvest complicated by rainy conditions

During the review period, almost uninterrupted rainfall was reported in both countries, totalling 100 % more than the LTA, and the highest levels on record. Daily temperatures were below average except for a couple of warmer days in the first half of July. Both countries report a slightly negative anomaly for radiation.

According to our models, both spring barley and winter wheat reached maturity in early August, while potatoes and sugar beet are in the yield formation stage, in line with the LTA.

The exceptionally wet conditions reported are complicating the harvest in both countries and could lead to an increase in disease occurrences in potatoes and sugar beet. However, no major impacts on final yields are expected so far, and our yield forecasts for both winter and summer crops are maintained, except that for winter barley in Denmark, which has been slightly reduced, following our model estimates.

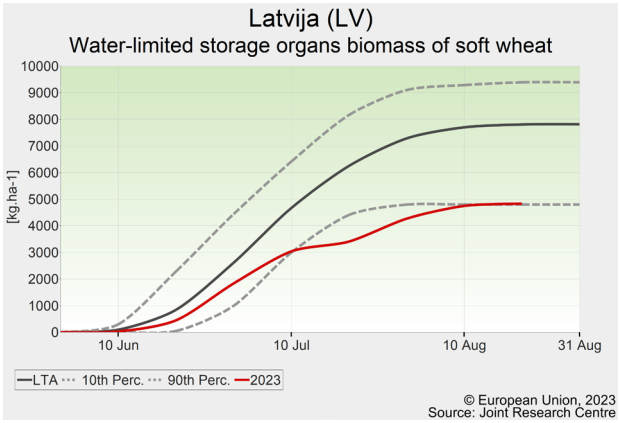


Estonia, Latvia, Lithuania, Finland

Start of harvest of winter cereals in cool and wet conditions

Temperatures in the Baltic region remained close to or below the LTA for most of the review period, except a few days in mid July and early August when average temperatures were above seasonal values. Regular precipitation was recorded in all countries, with significant (> 5 mm) daily rainfall events recorded in Finland and Estonia in early July, and in all countries during the last week of July and early August.

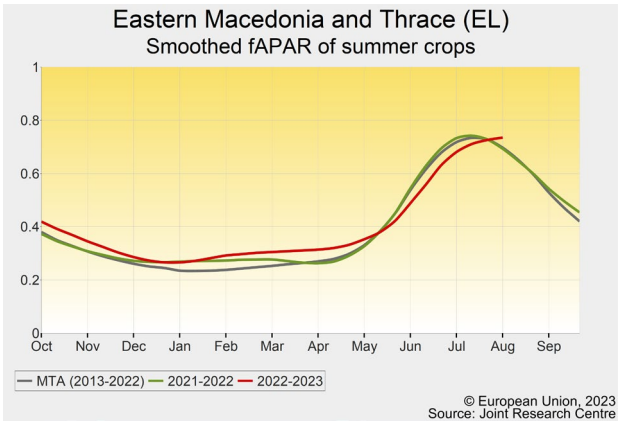
According to our models, spring barley reached maturity in line with the LTA, while winter wheat and rapeseed reached maturity slightly ahead of the normal dates (by approximately 5 days). Harvest has begun in all countries. Our forecasts are maintained below the 5-year average because of the dry and warm spring, which reduced the yield potential of winter crops, and probably also of grain maize.



Greece

Positive progress for summer crops despite seasonal low precipitation

July and the first half of August brought very little to no rainfall in the regions of *Anatoliki Makedonia kai Thraki, Kentriki Makedonia, Thessalia* and *Dytiki Elláda*, where summer crops are primarily grown. Among these regions, *Thessalia* experienced the driest and hottest weather conditions. This is reflected in lower biomass accumulation in *Thessalia*, than the other regions above, where the fAPAR indicator was above average as a result. Nevertheless, even in *Thessalia* summer crops are not at risk, as they are typically irrigated and have already entered the grain-filling stage, which is less susceptible to abiotic stress. Overall, at national level, our yield forecasts for summer crops have been kept as in our July outlook, above the 5-year average.



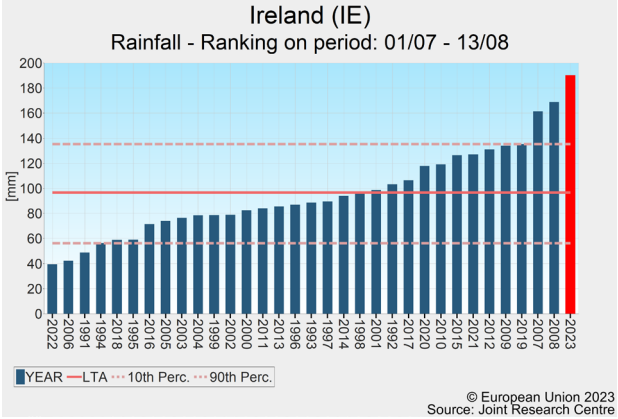
Ireland

Harvest in full swing, complicated by wet conditions

Almost daily precipitation was reported across the country, resulting in the largest rainfall totals on record for the review period, approximately 100% more than the LTA. Daily temperatures remained below the seasonal values for most of July. However, the first few days of August were warmer than usual. Average temperatures for the review period as a whole are slightly below the LTA, as is global radiation.

According to our models, spring barley and winter wheat reached maturity around late July, approximately 10 days earlier than usual, and field reports confirm that the harvest has started throughout the country.

The very wet conditions have been reported to hamper the harvest, but no major impact on yields is expected so far. This year, spring barley yields seem to be strongly dependent on sowing dates (with locally considerable delays), so our yield expectations have been revised down to below the 5-year average, while winter cereal forecasts are maintained slightly above the 5-year average.



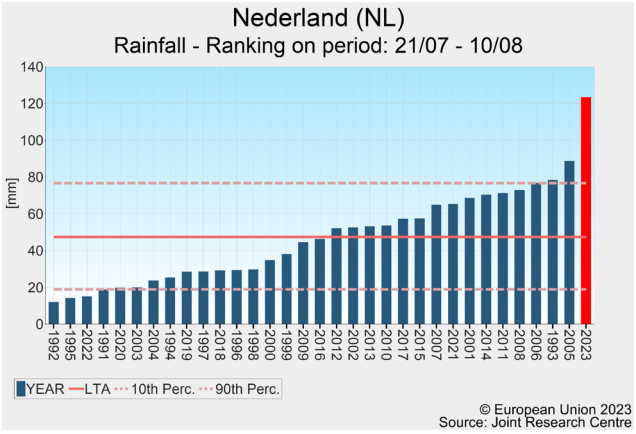
Belgium, Luxembourg and the Netherlands

Abundant rain positive for summer crops but negative for wheat yields and quality

The review period was marked by frequent and abundant rain, particularly in the last week of July and the first week of August. While winter barley had mostly been harvested before the end of July, the harvesting of winter wheat was delayed and/or occurred under difficult/wet conditions leading to losses in the field – particularly in lodged stands – and reduced grain quality, making it in many cases unfit for milling and, in the worst cases, even for shredding.

Summer crops benefited from the restored soil moisture levels. Groundwater and surface water levels were also restored and water use restrictions for irrigation have been lifted. On the other hand, the wet and cool weather also favoured the proliferation of pests and diseases that now need to be dealt with.

Our yield forecast for wheat was revised slightly downwards. The forecast for grain maize was revised slightly upwards, while they were essentially maintained for other crop.



Slovenia and Croatia

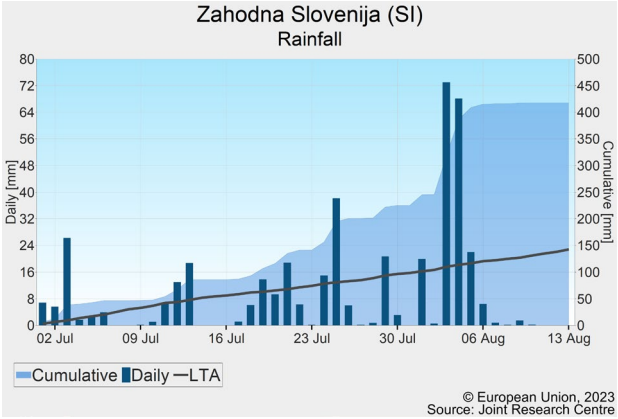
Torrential rains lower yield expectations

During our review period, Slovenia presented slightly colder, while Croatia moderately warmer-than-usual overall thermal conditions. The second dekad of July was particularly hot in both countries with daily maximum temperatures up to 39°C.

Rain was abundant and precipitation totals exceeded the normal level during July. Damages from severe hail and storm events were reported for about 10'000 ha of agricultural land already in July[4]. In early August, torrential and devastating rain occurred during 4-5 days with totals in the range of 100-250 mm, hitting hard Slovenia and western Croatia, causing severe flooding and inundation. Rainfall totals of the review period reached 240-510 mm in Slovenia, 150-300 mm in western Croatia, and 100-150 mm in eastern Croatia. Agricultural land suffered serious damage in Slovenia (inundation, destruction, contamination), affecting arable land, pastures, fodder production, horticulture, and farm infrastructure.

Our yield forecast for all crops, but particularly winter crops, were lowered further for Slovenia and – to a lesser extend – for Croatia.

Crop development and biomass accumulation of the remaining summer crops are estimated as adequate by our model simulations. The effect of inundation on harvestable areas and hence yield, as well as the increased pest pressure, cannot be quantitatively assessed at the current stage. For the areas not affected by inundation, our previous yield forecasts for summer crops are maintained.



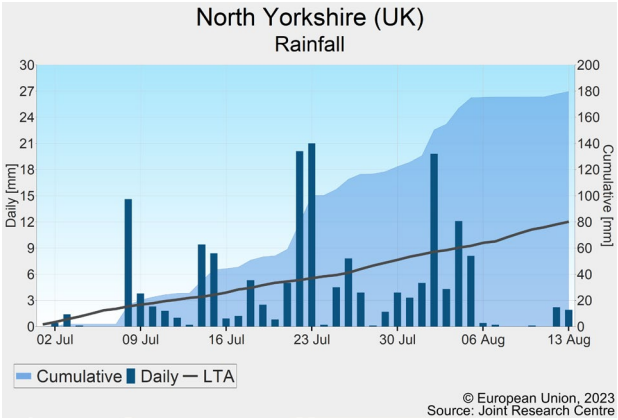
[4] https://www.delo.si/novice/slovenija/na-upravi-za-zascito-in-resevanje-zabelezili-skoraj-2000-dogodkov/

4.2. United Kingdom

Crop ripening and harvest under wet conditions

Throughout the review period, weather conditions were characterised by above-average rainfall and below-average temperatures. Rainfall events occurred nearly daily across the country, most markedly in northern England, where more than 20 days with precipitation exceeding 3 mm were recorded. Radiation was on average 12 % below the LTA.

Although the rainfall had positive effects on the final stages of grain filling in spring and winter cereals (particularly in the north), the below-average temperatures and radiation levels extended the time required for cereals to ripen. The excessive frequency of rainy days at the end of July and early August disrupted the harvesting of the cereals. The winter barley harvest is estimated to be 60 % complete, slightly lagging behind the typical pace, and grain quality is expected to be negatively affected. Our yield forecasts for winter and spring cereals were slightly adjusted downwards.



4.3. Black Sea Area

Ukraine

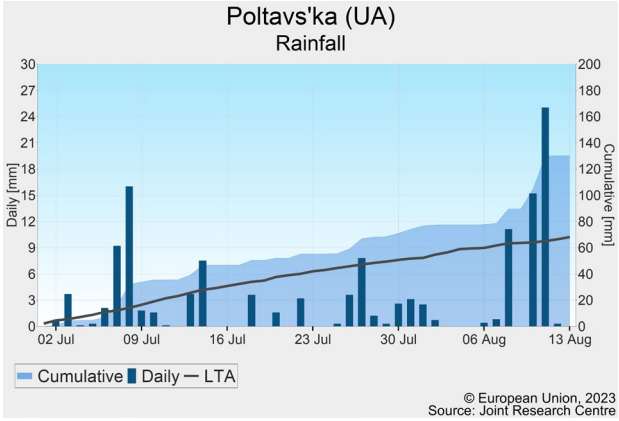
Favourable conditions for grain maize

Substantial and regular rainfall occurrences were experienced in the country's eastern and northern regions. In the south (*Odes'ka* oblast), precipitation exceeded the LTA by 25 % to 40 %. Temperature and radiation levels have been congruent with the LTA, with no significant heatwave recorded.

Grain maize benefited from the relatively wet conditions, which maintained soil moisture at adequate levels. In the *Odes'ka* oblast, where the rain deficit in June had a negative effect on biomass accumulation, soil moisture was restored to normal levels. The yield forecast for grain maize was revised upwards for Ukraine.

Despite the regular rainfall, the winter wheat harvest progressed well and is consistent with last year's progress; the government's reported yields ([5]) align with our earlier forecasts.

A more detailed analysis will be provided in the September edition of the Bulletin on Ukraine in the Global Outlook Series ([6]).



Türkiye

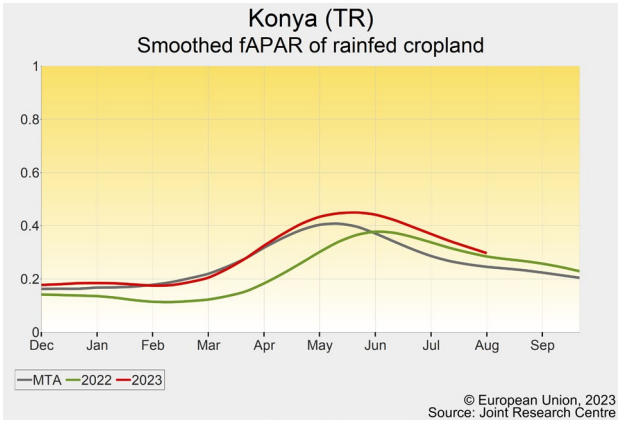
Favourable yield perspectives for summer crops

During the period under review, temperatures in Türkiye stayed around 2 °C to 3 °C below the LTA in *Manisa* and in the eastern part of *Central Anatolia*, while the rest of the country experienced temperatures 1 °C to 2 °C above the LTA.

Drier-than-usual conditions prevailed in western and central Türkiye, with a rainfall deficit ranging from 10 mm to 20 mm compared with the LTA. However, that was not a concern thanks to the rainfall surplus in June.

The harvest of winter crops was completed by the end of July under favourable conditions. Regarding summer crops, maize and soybean are in the grain maturity phase. Our remote sensing analysis shows, compared with an average season, a longer accumulation phase during crop heading, and an overall biomass accumulation above the MTA.

Our yield forecasts for summer crops are above the 5-year average.



([5]) https://minagro.gov.ua/news/zhniva-23-namolotili-majzhe-23-mln-tonn.

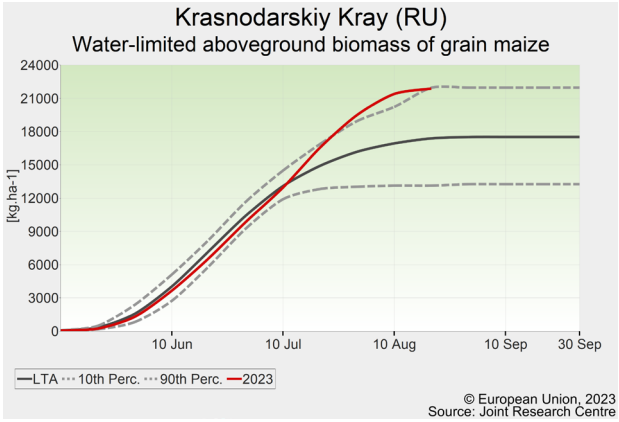
([6]) https://publications.jrc.ec.europa.eu/repository/handle/JRC133194 (to be published on 11 September 2023).

4.4. European Russia and Belarus

European Russia

Favourable weather conditions for maize yield formation

Frequent and abundant rainfall hampered the harvest of winter wheat until late July. The drier and warmer conditions since early August have allowed harvesting to catch up, but it is still considerably delayed and has not been finished yet. Yield expectations for winter wheat remain above the 5-year average, but a decrease in grain quality is probable due to the wet conditions in July. The wet and mild weather of July was favourable for the grain filling of spring cereals. Grain maize also profited from adequate crop water supply conditions during the cardinal flowering and early grain-filling pheno-phases. For these crops, the less favourable conditions of August have had no negative effect on the yield formation so far. Overall, the yield expectations of spring cereals and grain maize in European Russia exceed the 5-year average.

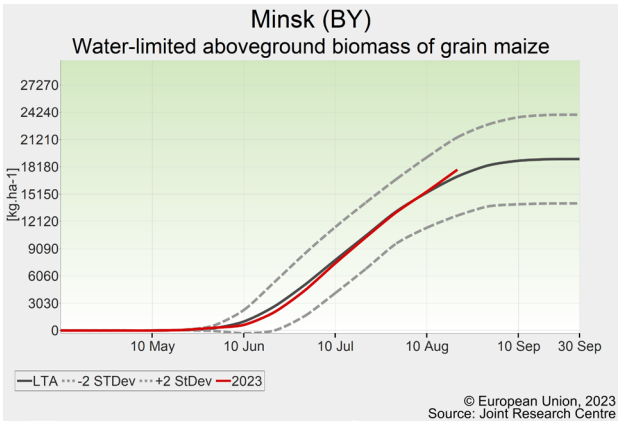


Belarus

Improved conditions for maize

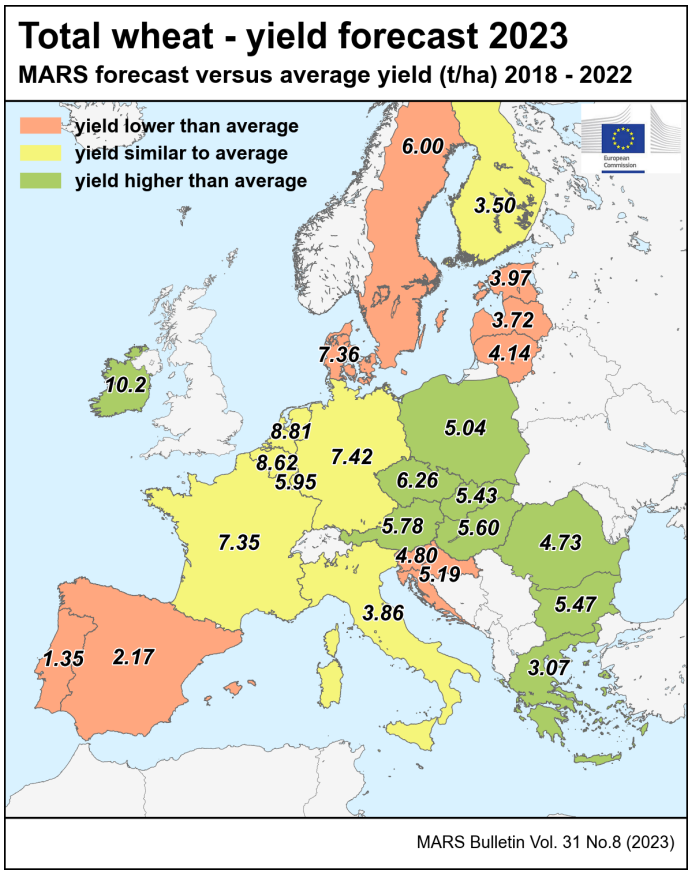
Moderate temperatures and satisfactory moisture supply supported the final grain-filling phases of winter and spring crops during the first two dekads of July. The harvest of winter crops gained intensity during the last dekad of July and is still in progress. It has been interrupted by a few high-intensity rainfall events, but with no expected impacts on yield potentials.

Around-average temperatures and average to above-average rainfall totals were favourable for the growth and development of grain maize. The crop is now slightly advanced in its development, and biomass accumulation is slightly above the seasonal average in most of the country, as estimated by our model. Sufficient rain in the review period eventually helped to sustain good maize yields, which had been threatened by the dry spring and early summer. We maintain our positive yield forecasts above the 5-year average for both winter crops and grain maize.

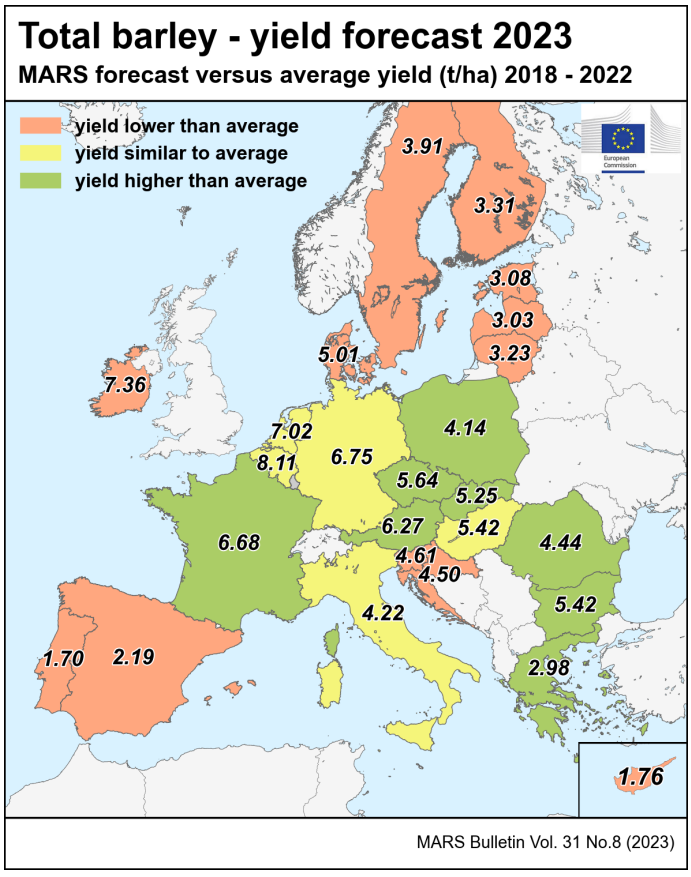


5. Crop yield forecast

Country	Total wheat (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	5.58	5.56	**5.58**	+ 0	+ 0
AT	5.52	5.73	**5.78**	+ 5	+ 1
BE	8.69	8.91	**8.62**	– 1	– 3
BG	4.99	5.17	**5.47**	+ 10	+ 6
CY	—	—	**—**	—	—
CZ	5.93	6.07	**6.26**	+ 6	+ 3
DE	7.35	7.58	**7.42**	+ 1	– 2
DK	7.80	8.47	**7.36**	– 6	– 13
EE	4.38	4.72	**3.97**	– 9	– 16
EL	2.93	2.72	**3.07**	+ 5	+ 13
ES	3.52	2.79	**2.17**	– 38	– 22
FI	3.56	3.80	**3.50**	– 2	– 8
FR	7.12	7.08	**7.35**	+ 3	+ 4
HR	5.87	5.95	**5.19**	– 12	– 13
HU	5.23	4.40	**5.60**	+ 7	+ 27
IE	9.79	10.7	**10.2**	+ 4	– 5
IT	3.83	3.63	**3.86**	+ 1	+ 6
LT	4.54	4.74	**4.14**	– 9	– 13
LU	6.04	6.21	**5.95**	– 2	– 4
LV	4.59	4.72	**3.72**	– 19	– 21
MT	—	—	**—**	—	—
NL	8.95	9.47	**8.81**	– 2	– 7
PL	4.84	5.34	**5.04**	+ 4	– 6
PT	2.36	1.82	**1.35**	– 43	– 26
RO	4.30	4.18	**4.73**	+ 10	+ 13
SE	6.53	6.99	**6.00**	– 8	– 14
SI	5.22	4.90	**4.80**	– 8	– 2
SK	5.06	4.69	**5.43**	+ 7	+ 16



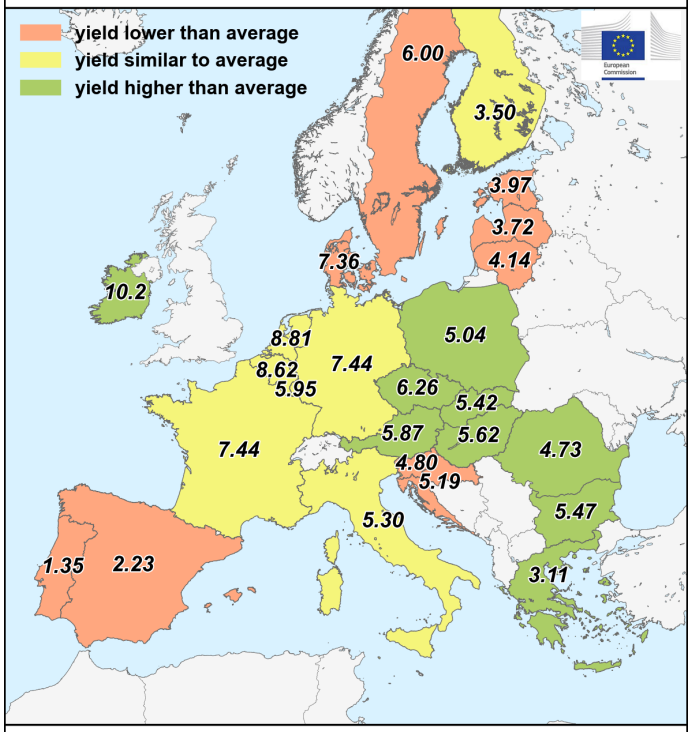
Country	Total barley (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	4.89	5.03	**4.74**	– 3	– 6
AT	5.92	6.19	**6.27**	+ 6	+ 1
BE	8.14	8.32	**8.11**	– 0	– 3
BG	4.76	4.97	**5.42**	+ 14	+ 9
CY	1.84	2.26	**1.76**	– 4	– 22
CZ	5.35	5.61	**5.64**	+ 5	+ 1
DE	6.56	7.08	**6.75**	+ 3	– 5
DK	5.83	6.79	**5.01**	– 14	– 26
EE	3.67	4.20	**3.08**	– 16	– 27
EL	2.82	2.44	**2.98**	+ 6	+ 22
ES	3.33	2.77	**2.19**	– 34	– 21
FI	3.51	3.82	**3.31**	– 6	– 14
FR	6.27	6.12	**6.68**	+ 7	+ 9
HR	5.04	5.10	**4.50**	– 11	– 12
HU	5.41	4.80	**5.42**	+ 0	+ 13
IE	7.89	8.32	**7.36**	– 7	– 12
IT	4.13	4.20	**4.22**	+ 2	+ 1
LT	3.48	3.92	**3.23**	– 7	– 18
LU	—	—	**—**	—	—
LV	3.22	3.67	**3.03**	– 6	– 18
MT	—	—	**—**	—	—
NL	7.05	7.77	**7.02**	– 1	– 10
PL	3.83	4.43	**4.14**	+ 8	– 7
PT	2.97	2.47	**1.70**	– 43	– 31
RO	3.97	4.25	**4.44**	+ 12	+ 5
SE	4.51	5.50	**3.91**	– 13	– 29
SI	5.00	4.99	**4.61**	– 8	– 8
SK	4.73	4.72	**5.25**	+ 11	+ 11



Country	Soft wheat (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	5.79	5.79	**5.78**	– 0	– 0
AT	5.58	5.78	**5.87**	+ 5	+ 1
BE	8.69	8.91	**8.62**	– 1	– 3
BG	4.99	5.17	**5.47**	+ 10	+ 6
CY	—	—	**—**	—	—
CZ	5.93	6.07	**6.26**	+ 6	+ 3
DE	7.37	7.61	**7.44**	+ 1	– 2
DK	7.80	8.47	**7.36**	– 6	– 13
EE	4.38	4.72	**3.97**	– 9	– 16
EL	2.98	3.01	**3.11**	+ 4	+ 3
ES	3.62	2.87	**2.23**	– 38	– 22
FI	3.56	3.80	**3.50**	– 2	– 8
FR	7.22	7.18	**7.44**	+ 3	+ 4
HR	5.87	5.95	**5.19**	– 12	– 13
HU	5.26	4.43	**5.62**	+ 7	+ 27
IE	9.79	10.7	**10.2**	+ 4	– 5
IT	5.36	5.12	**5.30**	– 1	+ 3
LT	4.54	4.74	**4.14**	– 9	– 13
LU	6.04	6.21	**5.95**	– 2	– 4
LV	4.59	4.72	**3.72**	– 19	– 21
MT	—	—	**—**	—	—
NL	8.95	9.47	**8.81**	– 2	– 7
PL	4.84	5.34	**5.04**	+ 4	– 6
PT	2.36	1.82	**1.35**	– 43	– 26
RO	4.30	4.18	**4.73**	+ 10	+ 13
SE	6.53	6.99	**6.00**	– 8	– 14
SI	5.22	4.90	**4.80**	– 8	– 2
SK	5.07	4.65	**5.42**	+ 7	+ 17

Soft wheat - yield forecast 2023

MARS forecast versus average yield (t/ha) 2018 - 2022



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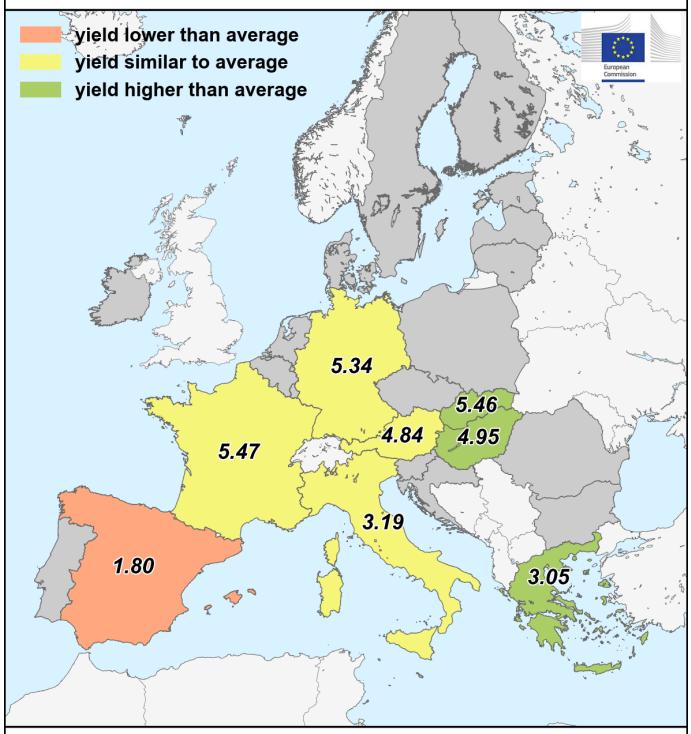
Country	Durum wheat (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	3.50	3.26	**3.41**	– 3	+ 5
AT	4.68	5.09	**4.84**	+ 3	– 5
BE	—	—	**—**	—	—
BG	—	—	**—**	—	—
CY	—	—	**—**	—	—
CZ	—	—	**—**	—	—
DE	5.18	5.35	**5.34**	+ 3	– 0
DK	—	—	**—**	—	—
EE	—	—	**—**	—	—
EL	2.91	2.59	**3.05**	+ 5	+ 18
ES	2.92	2.26	**1.80**	– 38	– 21
FI	—	—	**—**	—	—
FR	5.42	5.30	**5.47**	+ 1	+ 3
HR	—	—	**—**	—	—
HU	4.53	3.72	**4.95**	+ 9	+ 33
IE	—	—	**—**	—	—
IT	3.18	2.98	**3.19**	+ 0	+ 7
LT	—	—	**—**	—	—
LU	—	—	**—**	—	—
LV	—	—	**—**	—	—
MT	—	—	**—**	—	—
NL	—	—	**—**	—	—
PL	—	—	**—**	—	—
PT	—	—	**—**	—	—
RO	—	—	**—**	—	—
SE	—	—	**—**	—	—
SI	—	—	**—**	—	—
SK	5.00	4.90	**5.46**	+ 9	+ 11

Durum wheat - yield forecast 2023

MARS forecast versus average yield (t/ha) 2018 - 2022



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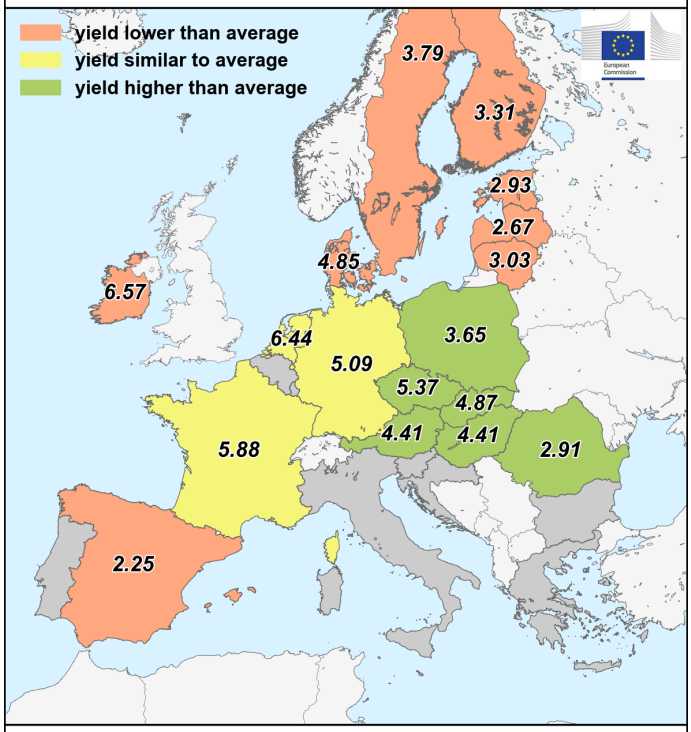
Country	Spring barley (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	4.19	4.21	**3.60**	– 14	– 14
AT	4.17	4.38	**4.41**	+ 6	+ 1
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	5.11	5.31	**5.37**	+ 5	+ 1
DE	5.19	5.32	**5.09**	– 2	– 4
DK	5.71	6.74	**4.85**	– 15	– 28
EE	3.43	3.99	**2.93**	– 14	– 27
EL	—	—	—	—	—
ES	3.38	2.81	**2.25**	– 34	– 20
FI	3.51	3.82	**3.31**	– 6	– 14
FR	5.83	5.16	**5.88**	+ 1	+ 14
HR	—	—	—	—	—
HU	4.13	4.30	**4.41**	+ 7	+ 3
IE	7.28	8.10	**6.57**	– 10	– 19
IT	—	—	—	—	—
LT	3.37	3.81	**3.03**	– 10	– 21
LU	—	—	—	—	—
LV	2.99	3.24	**2.67**	– 11	– 18
MT	—	—	—	—	—
NL	6.64	7.40	**6.44**	– 3	– 13
PL	3.44	3.95	**3.65**	+ 6	– 8
PT	—	—	—	—	—
RO	2.61	2.83	**2.91**	+ 12	+ 3
SE	4.41	5.44	**3.79**	– 14	– 30
SI	—	—	—	—	—
SK	4.41	4.26	**4.87**	+ 10	+ 14

Spring barley - yield forecast 2023

MARS forecast versus average yield (t/ha) 2018 - 2022



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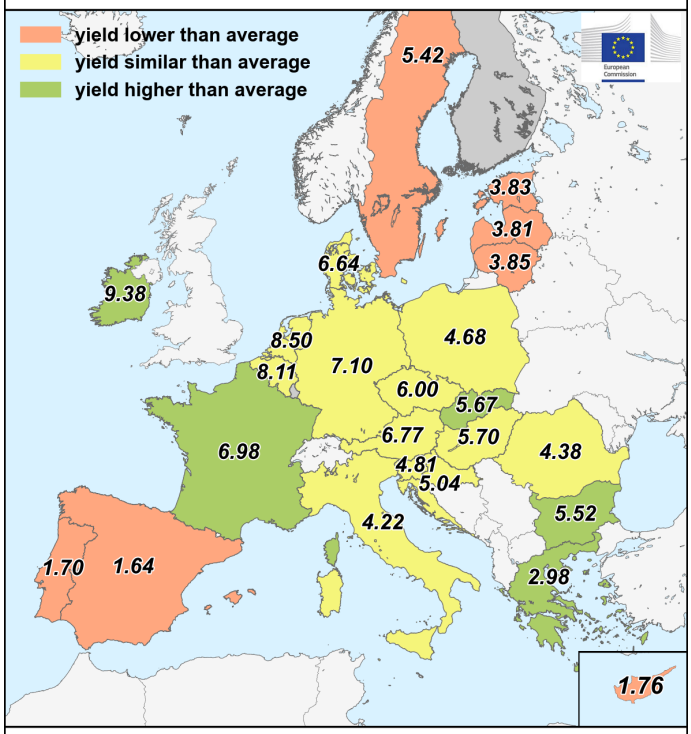
Country	Winter barley (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	5.77	5.92	**5.92**	+ 3	+ 0
AT	6.54	6.66	**6.70**	+ 3	+ 1
BE	8.14	8.32	**8.11**	– 0	– 3
BG	4.76	4.97	**5.42**	+ 14	+ 9
CY	1.84	2.26	**1.76**	– 4	– 22
CZ	5.83	6.13	**6.04**	+ 4	– 1
DE	6.96	7.62	**7.18**	+ 3	– 6
DK	6.63	7.22	**6.43**	– 3	– 11
EE	4.89	4.68	**3.83**	– 22	– 18
EL	2.82	2.44	**2.98**	+ 6	+ 22
ES	2.86	2.41	**1.64**	– 43	– 32
FI	—	—	—	—	—
FR	6.48	6.55	**6.98**	+ 8	+ 7
HR	5.04	5.10	**4.50**	– 11	– 12
HU	5.54	4.84	**5.49**	– 1	+ 14
IE	8.98	8.68	**9.18**	+ 2	+ 6
IT	4.13	4.20	**4.22**	+ 2	+ 1
LT	4.19	4.26	**3.85**	– 8	– 10
LU	—	—	—	—	—
LV	4.81	4.85	**3.81**	– 21	– 21
MT	—	—	—	—	—
NL	8.17	8.69	**8.50**	+ 4	– 2
PL	4.65	4.95	**4.68**	+ 1	– 5
PT	2.97	2.47	**1.70**	– 43	– 31
RO	4.27	4.43	**4.66**	+ 9	+ 5
SE	5.90	6.17	**5.42**	– 8	– 12
SI	5.00	4.99	**4.61**	– 8	– 8
SK	5.30	5.32	**5.67**	+ 7	+ 7

Winter barley - yield forecast 2023

MARS forecast versus average yield (t/ha) 2018 - 2022



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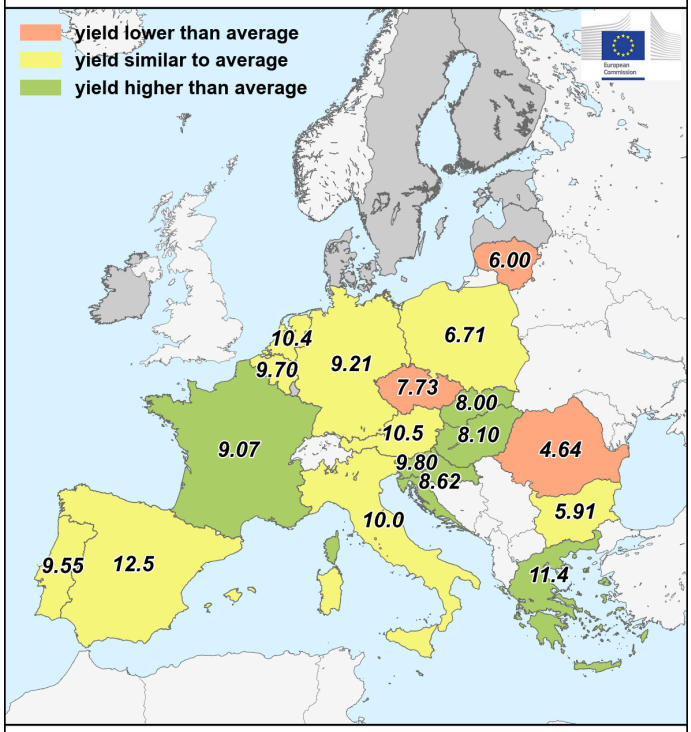
Country	Grain maize (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	7.48	5.90	**7.45**	– 0	+ 26
AT	10.6	9.82	**10.5**	– 1	+ 7
BE	10.0	9.27	**9.70**	– 3	+ 5
BG	6.08	4.80	**5.91**	– 3	+ 23
CY	—	—	—	—	—
CZ	8.35	7.95	**7.73**	– 8	– 3
DE	9.06	8.40	**9.21**	+ 2	+ 10
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	10.8	9.75	**11.4**	+ 5	+ 17
ES	12.1	11.7	**12.5**	+ 3	+ 7
FI	—	—	—	—	—
FR	8.61	7.54	**9.07**	+ 5	+ 20
HR	8.06	6.11	**8.62**	+ 7	+ 41
HU	7.04	3.42	**8.10**	+ 15	+ 137
IE	—	—	—	—	—
IT	10.0	8.31	**10.0**	+ 0	+ 21
LT	6.40	5.31	**6.00**	– 6	+ 13
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	10.5	10.8	**10.4**	– 2	– 4
PL	6.79	6.98	**6.71**	– 1	– 4
PT	9.43	9.44	**9.55**	+ 1	+ 1
RO	5.39	3.01	**4.64**	– 14	+ 54
SE	—	—	—	—	—
SI	9.09	6.68	**9.80**	+ 8	+ 47
SK	7.37	4.47	**8.00**	+ 9	+ 79

Grain maize - yield forecast 2023

MARS forecast versus average yield (t/ha) 2018 - 2022



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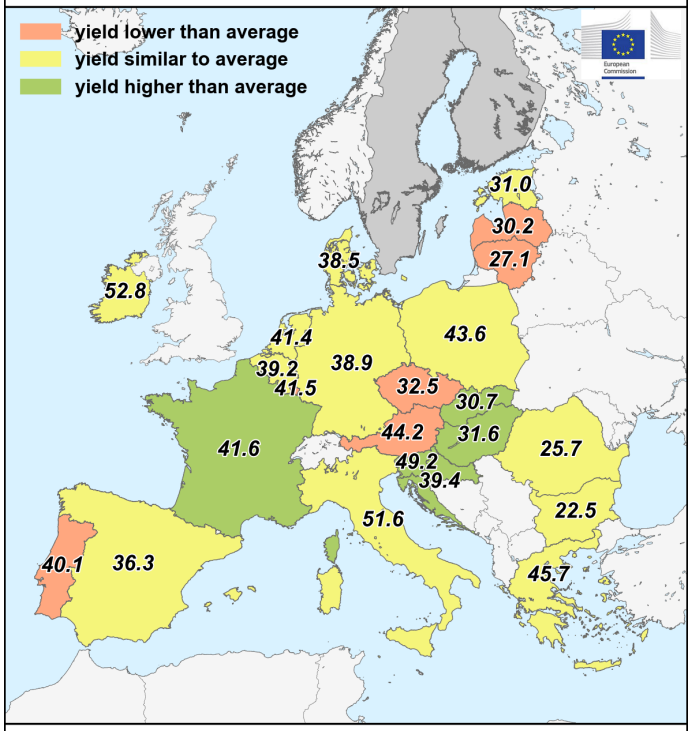
Country	Green maize (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU*	40.7	38.0	**40.3**	– 1	+ 6
AT	47.0	47.0	**44.2**	– 6	– 6
BE	39.4	38.7	**39.2**	– 0	+ 1
BG	22.2	24.1	**22.5**	+ 1	– 7
CY	—	—	—	—	—
CZ	35.8	36.0	**32.5**	– 9	– 10
DE	40.1	36.1	**38.9**	– 3	+ 8
DK	38.5	39.7	**38.5**	– 0	– 3
EE	31.9	30.7	**31.0**	– 3	+ 1
EL	44.7	47.0	**45.7**	+ 2	– 3
ES	36.4	34.5	**36.3**	– 0	+ 5
FI	—	—	—	—	—
FR	39.9	35.6	**41.6**	+ 4	+ 17
HR	36.4	26.7	**39.4**	+ 8	+ 48
HU	27.7	17.6	**31.6**	+ 14	+ 80
IE	52.0	52.8	**52.8**	+ 1	+ 0
IT	51.8	47.8	**51.6**	– 0	+ 8
LT	28.4	26.6	**27.1**	– 4	+ 2
LU	44.5	41.2	**41.5**	– 7	+ 1
LV	32.1	30.5	**30.2**	– 6	– 1
MT	—	—	—	—	—
NL	42.5	42.7	**41.4**	– 3	– 3
PL	45.2	47.7	**43.6**	– 4	– 9
PT	42.1	43.2	**40.1**	– 5	– 7
RO	25.8	20.2	**25.7**	– 0	+ 27
SE	—	—	—	—	—
SI	43.8	31.8	**49.2**	+ 13	+ 55
SK	29.4	22.3	**30.7**	+ 5	+ 38

Green maize - yield forecast 2023

MARS forecast versus average yield (t/ha) 2018 - 2022



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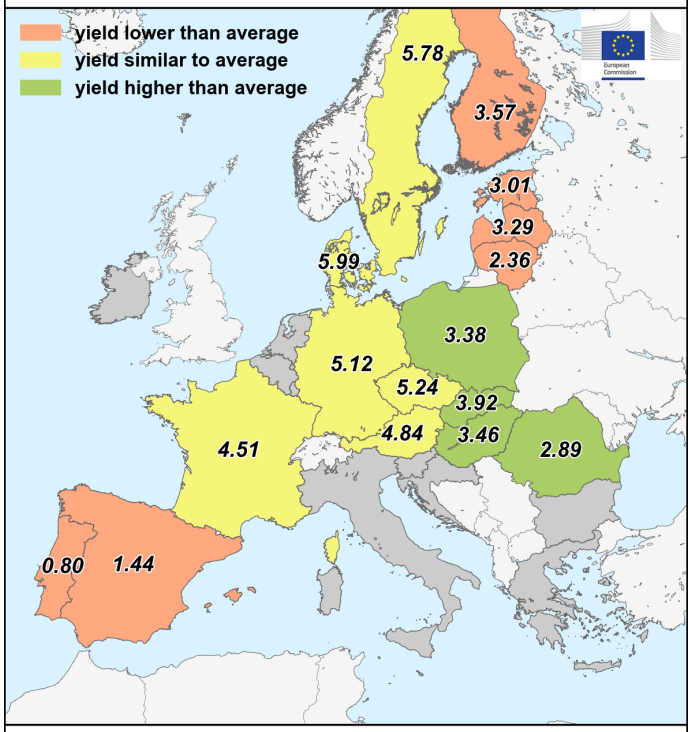
Country	Rye (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	3.98	4.29	**4.12**	+ 4	– 4
AT	4.72	4.87	**4.84**	+ 3	– 1
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	5.14	5.31	**5.24**	+ 2	– 1
DE	5.16	5.32	**5.12**	– 1	– 4
DK	6.06	6.42	**5.99**	– 1	– 7
EE	3.75	3.85	**3.01**	– 20	– 22
EL	—	—	—	—	—
ES	2.42	1.87	**1.44**	– 41	– 23
FI	3.84	3.38	**3.57**	– 7	+ 6
FR	4.34	3.84	**4.51**	+ 4	+ 17
HR	—	—	—	—	—
HU	3.29	3.01	**3.46**	+ 5	+ 15
IE	—	—	—	—	—
IT	—	—	—	—	—
LT	2.56	2.41	**2.36**	– 8	– 2
LU	—	—	—	—	—
LV	4.05	3.66	**3.29**	– 19	– 10
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	3.07	3.58	**3.38**	+ 10	– 6
PT	1.11	1.03	**0.80**	– 28	– 22
RO	2.72	2.58	**2.89**	+ 6	+ 12
SE	5.99	6.22	**5.78**	– 4	– 7
SI	—	—	—	—	—
SK	3.60	3.84	**3.92**	+ 9	+ 2

Rye - yield forecast 2023

MARS forecast versus average yield (t/ha) 2018 - 2022



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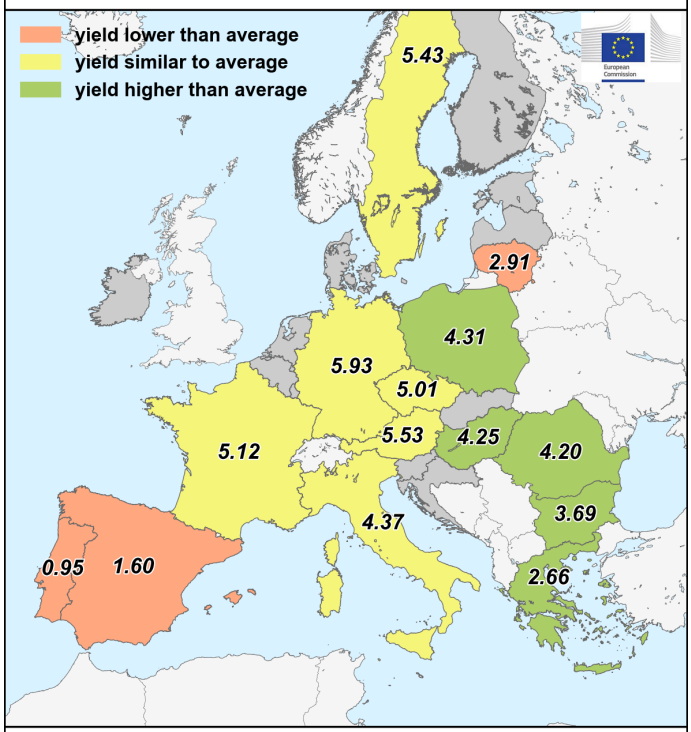
Country	Triticale (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	4.22	4.42	**4.31**	+ 2	– 2
AT	5.44	5.62	**5.53**	+ 2	– 2
BE	—	—	—	—	—
BG	2.96	3.00	**3.69**	+ 24	+ 23
CY	—	—	—	—	—
CZ	4.88	5.12	**5.01**	+ 3	– 2
DE	5.85	5.95	**5.93**	+ 1	– 0
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	2.53	2.79	**2.66**	+ 5	– 5
ES	2.64	2.18	**1.60**	– 40	– 27
FI	—	—	—	—	—
FR	5.00	4.79	**5.12**	+ 2	+ 7
HR	—	—	—	—	—
HU	3.98	3.43	**4.25**	+ 7	+ 24
IE	—	—	—	—	—
IT	4.42	4.31	**4.37**	– 1	+ 1
LT	3.25	3.24	**2.91**	– 11	– 10
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	3.98	4.51	**4.31**	+ 8	– 4
PT	1.54	1.25	**0.95**	– 38	– 24
RO	3.86	3.80	**4.20**	+ 9	+ 11
SE	5.55	5.68	**5.43**	– 2	– 5
SI	—	—	—	—	—
SK	—	—	—	—	—

Triticale - yield forecast 2023

MARS forecast versus average yield (t/ha) 2018 - 2022

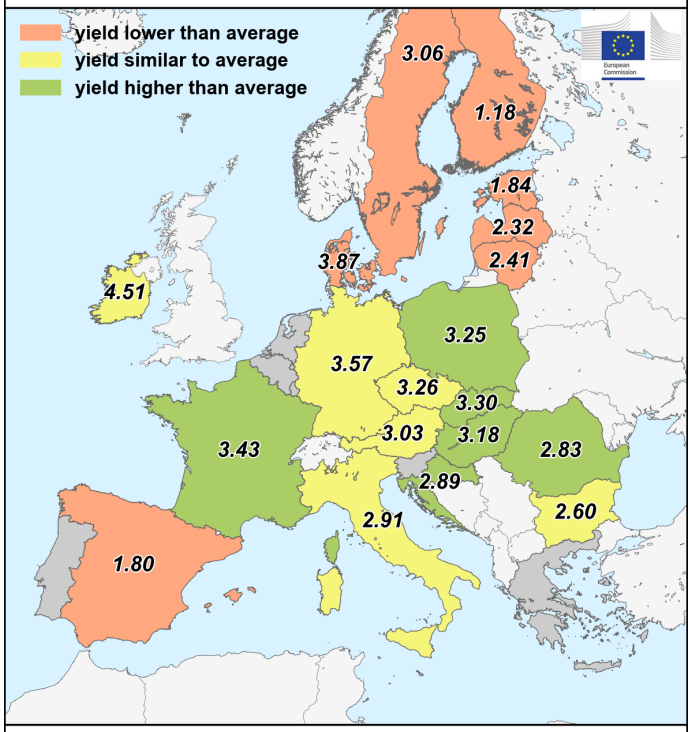


MARS Bulletin Vol. 31 No.8 (2023)

Country	Rape and turnip rape (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	3.10	3.33	**3.19**	+ 3	– 4
AT	3.06	3.21	**3.03**	– 1	– 5
BE	—	—	**—**	—	—
BG	2.57	2.29	**2.60**	+ 1	+ 13
CY	—	—	**—**	—	—
CZ	3.25	3.39	**3.26**	+ 0	– 4
DE	3.47	3.95	**3.57**	+ 3	– 10
DK	4.08	4.49	**3.87**	– 5	– 14
EE	2.47	2.53	**1.84**	– 26	– 28
EL	—	—	**—**	—	—
ES	2.35	2.16	**1.80**	– 23	– 17
FI	1.31	1.37	**1.18**	– 10	– 14
FR	3.24	3.68	**3.43**	+ 6	– 7
HR	2.72	2.59	**2.89**	+ 6	+ 12
HU	2.88	2.50	**3.18**	+ 11	+ 28
IE	4.44	4.92	**4.51**	+ 2	– 8
IT	2.84	2.85	**2.91**	+ 3	+ 2
LT	2.80	2.57	**2.41**	– 14	– 6
LU	—	—	**—**	—	—
LV	2.62	2.21	**2.32**	– 12	+ 5
MT	—	—	**—**	—	—
NL	—	—	**—**	—	—
PL	3.05	3.38	**3.25**	+ 7	– 4
PT	—	—	**—**	—	—
RO	2.56	2.62	**2.83**	+ 10	+ 8
SE	3.20	3.35	**3.06**	– 4	– 9
SI	—	—	**—**	—	—
SK	3.03	3.12	**3.30**	+ 9	+ 6

Rapeseed - yield forecast 2023

MARS forecast versus average yield (t/ha) 2018 - 2022



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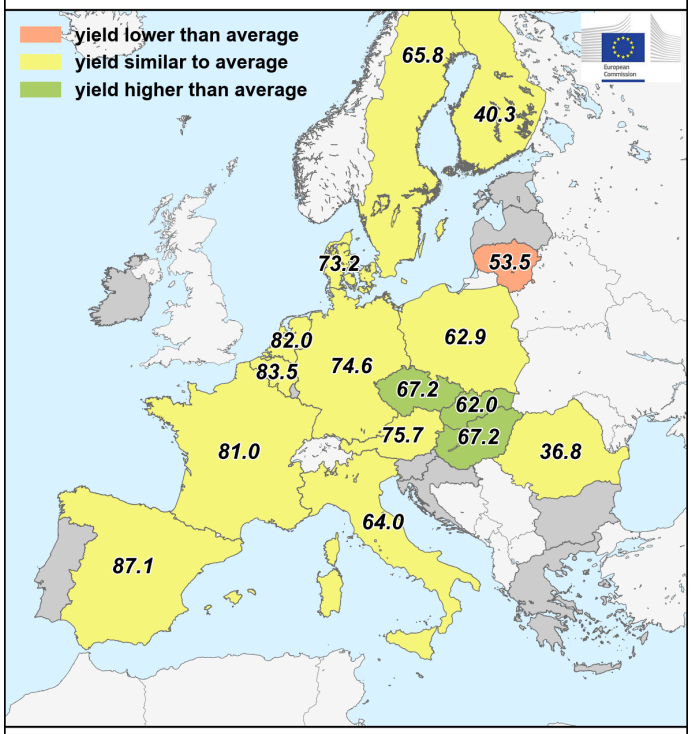
Country	Sugar beet (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	72.0	N/A	**73.7**	+ 2	N/A
AT	75.9	79.7	**75.7**	– 0	– 5
BE	85.3	89.3	**83.5**	– 2	– 7
BG	—	—	**—**	—	—
CY	—	—	**—**	—	—
CZ	63.5	69.6	**67.2**	+ 6	– 4
DE	72.5	71.2	**74.6**	+ 3	+ 5
DK	73.6	72.3	**73.2**	– 0	+ 1
EE	—	—	**—**	—	—
EL	—	—	**—**	—	—
ES	85.8	84.1	**87.1**	+ 2	+ 4
FI	40.1	43.1	**40.3**	+ 1	– 7
FR	78.6	78.6	**81.0**	+ 3	+ 3
HR	—	—	**—**	—	—
HU	57.4	47.2	**67.2**	+ 17	+ 42
IE	—	—	**—**	—	—
IT	63.1	N/A	**64.0**	+ 1	N/A
LT	63.2	62.5	**53.5**	– 15	– 15
LU	—	—	**—**	—	—
LV	—	—	**—**	—	—
MT	—	—	**—**	—	—
NL	82.4	88.8	**82.0**	– 1	– 8
PL	60.6	63.8	**62.9**	+ 4	– 2
PT	—	—	**—**	—	—
RO	37.5	31.8	**36.8**	– 2	+ 16
SE	66.5	64.7	**65.8**	– 1	+ 2
SI	—	—	**—**	—	—
SK	59.4	56.3	**62.0**	+ 4	+ 10

Sugar beet - yield forecast 2023

MARS forecast versus average yield (t/ha) 2018 - 2022



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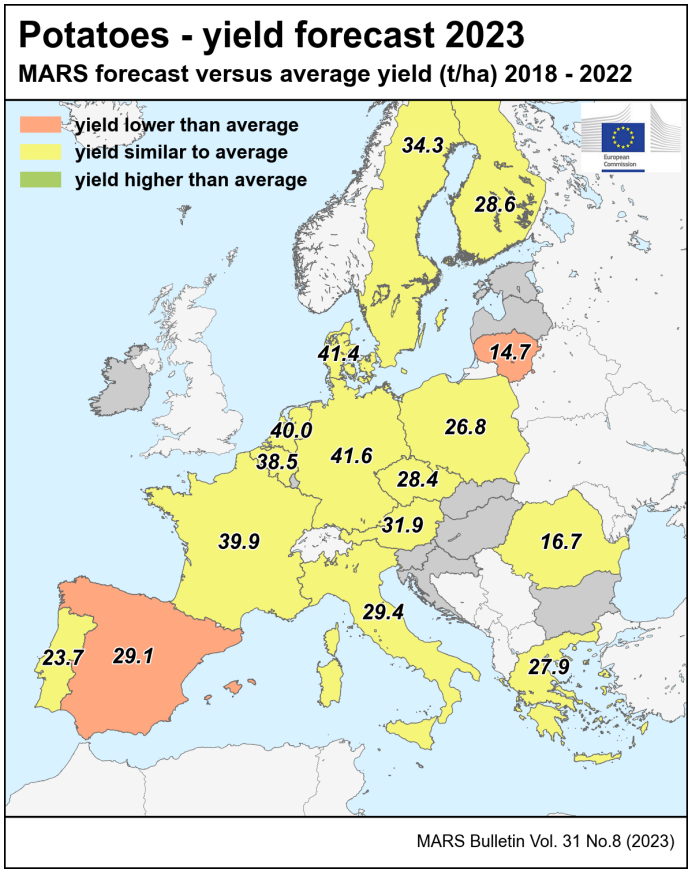
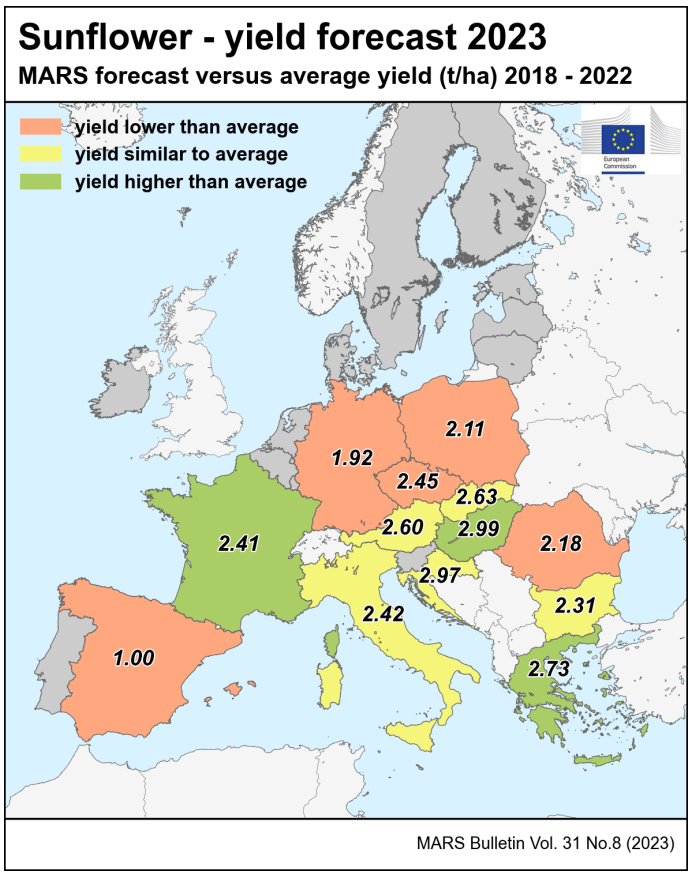
Country	Potatoes (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	34.1	35.3	**34.4**	+ 1	– 3
AT	32.7	32.0	**31.9**	– 2	– 0
BE	39.1	38.6	**38.5**	– 2	– 0
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	28.3	30.2	**28.4**	+ 0	– 6
DE	40.3	40.1	**41.6**	+ 3	+ 4
DK	41.7	44.2	**41.4**	– 1	– 6
EE	—	—	—	—	—
EL	27.3	26.5	**27.9**	+ 2	+ 6
ES	31.7	30.5	**29.1**	– 8	– 5
FI	28.6	28.1	**28.6**	+ 0	+ 2
FR	40.4	38.0	**39.9**	– 1	+ 5
HR	—	—	—	—	—
HU	—	—	—	—	—
IE	—	—	—	—	—
IT	29.2	28.3	**29.4**	+ 1	+ 4
LT	15.6	14.9	**14.7**	– 5	– 1
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	41.2	42.6	**40.0**	– 3	– 6
PL	27.8	30.8	**26.8**	– 3	– 13
PT	23.1	24.0	**23.7**	+ 2	– 1
RO	16.2	15.9	**16.7**	+ 3	+ 5
SE	34.7	36.3	**34.3**	– 1	– 6
SI	—	—	—	—	—
SK	—	—	—	—	—



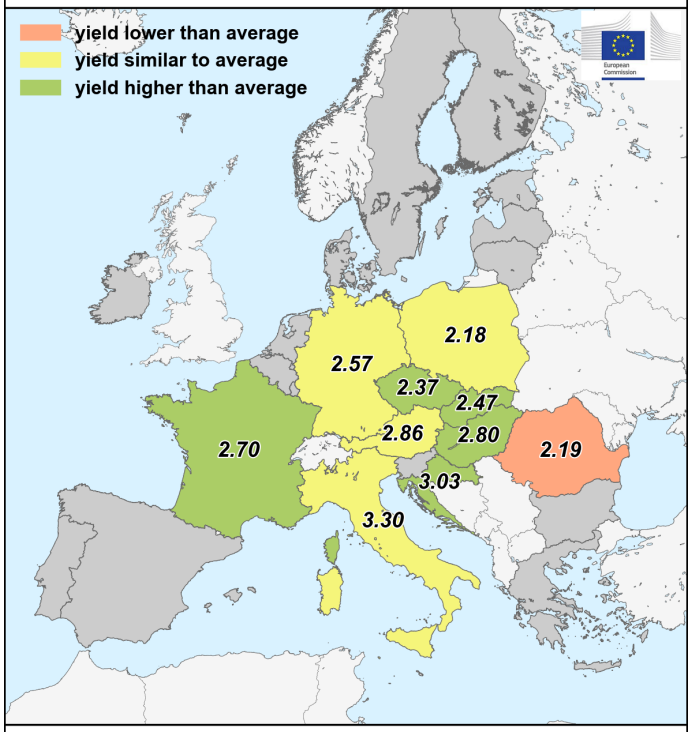
Country	Sunflower (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	2.21	1.87	**2.18**	– 2	+ 16
AT	2.70	2.32	**2.60**	– 4	+ 12
BE	—	—	—	—	—
BG	2.32	2.31	**2.31**	– 0	+ 0
CY	—	—	—	—	—
CZ	2.60	2.65	**2.45**	– 6	– 8
DE	2.07	1.88	**1.92**	– 7	+ 2
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	2.59	2.67	**2.73**	+ 5	+ 2
ES	1.17	0.90	**1.00**	– 15	+ 11
FI	—	—	—	—	—
FR	2.25	2.07	**2.41**	+ 7	+ 17
HR	3.02	2.99	**2.97**	– 2	– 1
HU	2.64	1.84	**2.99**	+ 13	+ 62
IE	—	—	—	—	—
IT	2.42	2.39	**2.42**	+ 0	+ 1
LT	—	—	—	—	—
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	2.27	2.40	**2.11**	– 7	– 12
PT	—	—	—	—	—
RO	2.43	1.92	**2.18**	– 10	+ 13
SE	—	—	—	—	—
SI	—	—	—	—	—
SK	2.62	2.33	**2.63**	+ 0	+ 13



Country	Soybeans (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	2.76	2.24	**2.82**	+ 2	+ 26
AT	2.88	2.62	**2.86**	– 1	+ 9
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	2.26	2.30	**2.37**	+ 5	+ 3
DE	2.67	2.34	**2.57**	– 4	+ 10
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	—	—	—	—	—
ES	—	—	—	—	—
FI	—	—	—	—	—
FR	2.43	2.05	**2.70**	+ 11	+ 32
HR	2.83	2.16	**3.03**	+ 7	+ 40
HU	2.58	1.85	**2.80**	+ 8	+ 52
IE	—	—	—	—	—
IT	3.30	2.64	**3.30**	– 0	+ 25
LT	—	—	—	—	—
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	2.17	2.36	**2.18**	+ 0	– 8
PT	—	—	—	—	—
RO	2.33	1.80	**2.19**	– 6	+ 22
SE	—	—	—	—	—
SI	—	—	—	—	—
SK	2.22	1.45	**2.47**	+ 11	+ 71

Soybeans - yield forecast 2023

MARS forecast versus average yield (t/ha) 2018 - 2022



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Country	Wheat (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
BY	3.42	3.48	**3.47**	+ 2	– 0
TR	2.83	2.99	**3.06**	+ 8	+ 2
UA	4.07	4.12	**4.58**	+ 13	+ 11
UK	8.10	8.60	**8.25**	+ 2	– 4

Country	Barley (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
BY	2.76	2.75	**3.03**	+ 10	+ 10
TR	2.48	2.63	**2.72**	+ 9	+ 3
UA	3.38	3.47	**3.59**	+ 6	+ 4
UK	6.25	6.67	**6.41**	+ 3	– 4

Country	Grain maize (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
BY	5.61	5.57	**5.78**	+ 3	+ 4
TR	9.32	9.33	**9.69**	+ 4	+ 4
UA	6.99	6.69	**7.25**	+ 4	+ 8
UK	—	—	—	—	—

Country	Soybean (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
BY	—	—	—	—	—
TR	4.23	4.08	**4.59**	+ 9	+ 13
UA	2.40	2.43	**2.53**	+ 5	+ 4
UK	—	—	—	—	—

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

Sources: 2018-2023 data come from DG Agriculture and Rural Development short-term-outlook data (dated July 2023, received on 09.082023), Eurostat Eurobase (last update: 03.082023), ELSTAT, Statistics Netherlands (CBS) and EES (last update: 15.112017).

Non-EU 2018-2022 data come from USDA, Turkish Statistical Institute (TurkStat), Eurostat Eurobase (last update: 03.082023), Ministry for Development of Economy, Trade and Agriculture of Ukraine, Department for Environment, Food & Rural Affairs of UK (DEFRA), FAO and PSD-online.

2023 yields come from MARS Crop Yield Forecasting System (output up to 10.082023).

EU aggregate after 12.2020 is reported.

N/A = Data not available.

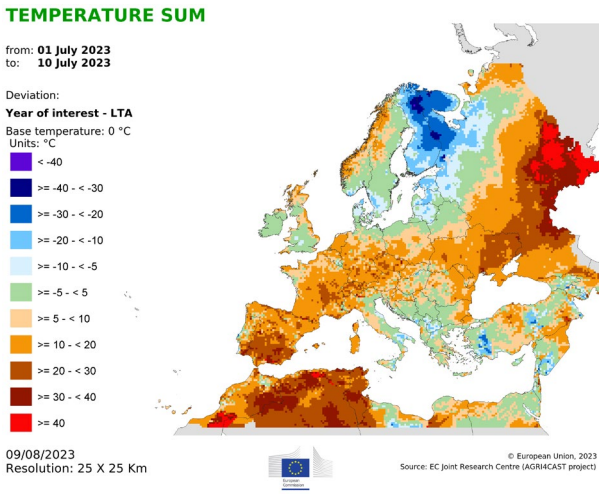
The column header '%23/5yrs' stands for the 2023 change with respect to the 5-year average(%). Similarly, '%23/22' stands for the 2023 change with respect to 2022(%).

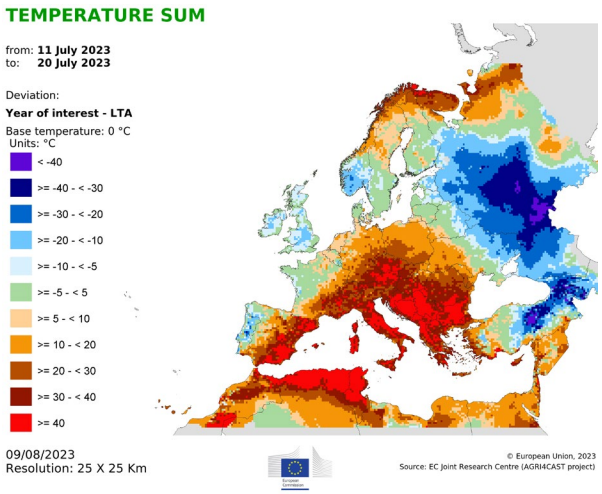
* The EU figures do not include green maize forecasts for Sweden since recent data on yields were not consistent.

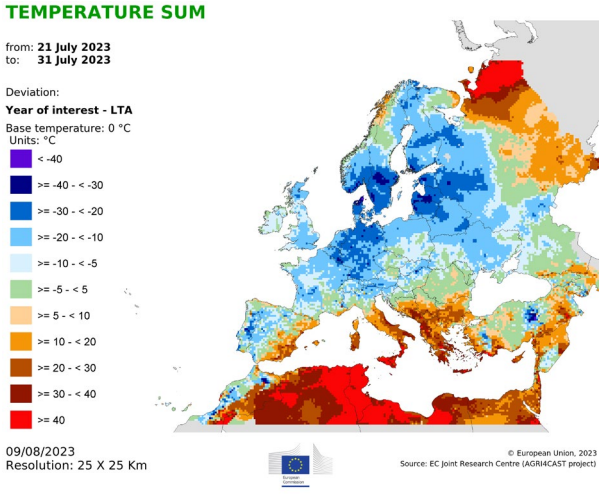
Cop name	Eurostat Crop name	Eurostat Crop Code	Official Eurostat Crop definition*
Total wheat	Wheat and spelt	C1100	Common wheat (*Triticum aestivum* L. emend. Fiori et Paol.), spelt (*Triticum spelta* L), einkorn wheat (*Triticum monococcum* L.) and durum wheat (*Triticum durum* Desf.).
Total barley	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.
Soybeans	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)		

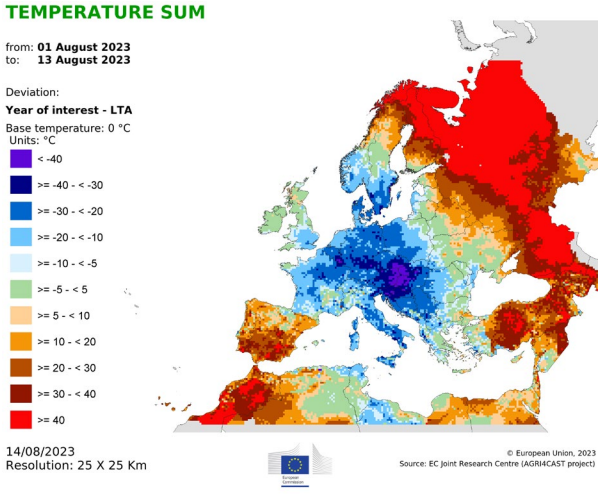
6. Atlas

Temperature regime

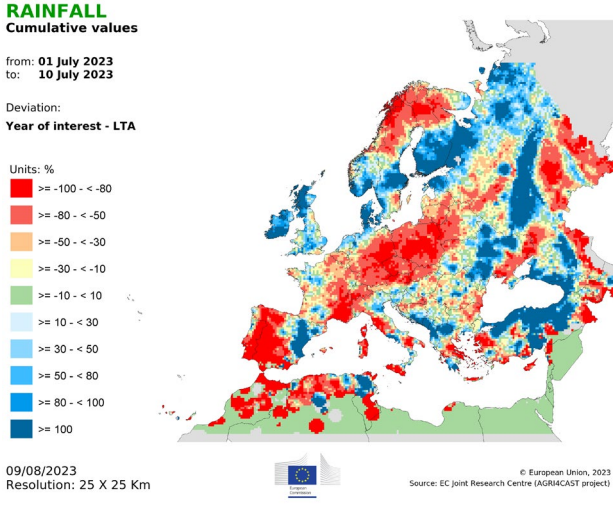


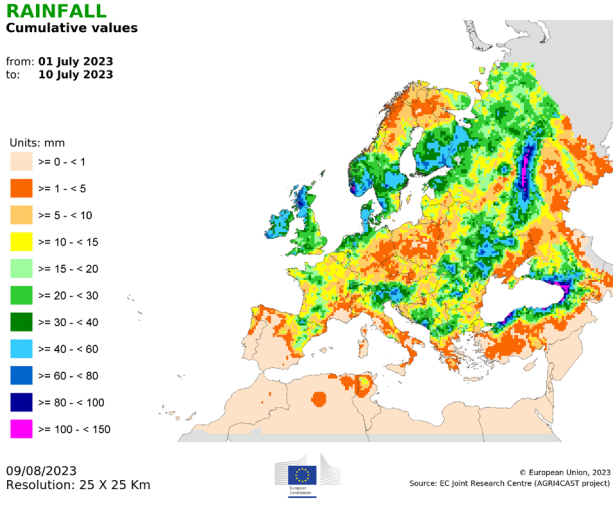






Precipitation



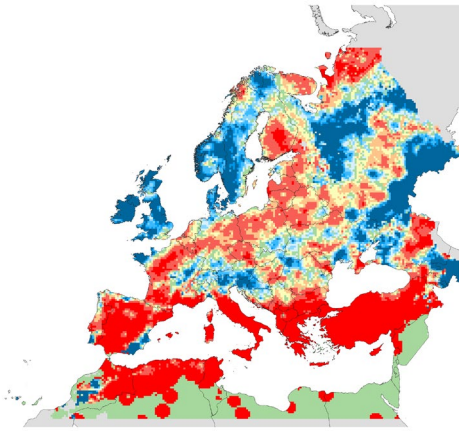


RAINFALL
Cumulative values

from: **11 July 2023**
to: **20 July 2023**

Deviation:
Year of interest - LTA

Units: %
- >= -100 - < -80
- >= -80 - < -50
- >= -50 - < -30
- >= -30 - < -10
- >= -10 - < 10
- >= 10 - < 30
- >= 30 - < 50
- >= 50 - < 80
- >= 80 - < 100
- >= 100



09/08/2023
Resolution: 25 X 25 Km

RAINFALL
Cumulative values

from: **11 July 2023**
to: **20 July 2023**

Units: mm
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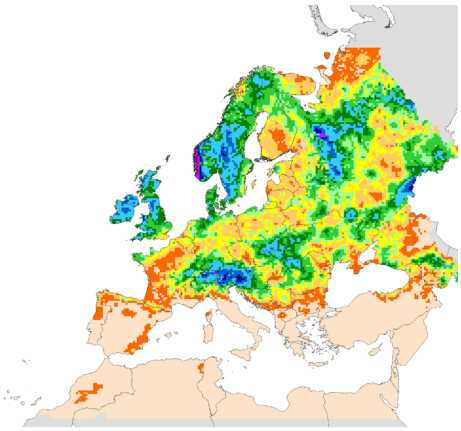
- >= 1 - < 5
- >= 5 - < 10
- >= 10 - < 15
- >= 15 - < 20
- >= 20 - < 30
- >= 30 - < 40
- >= 40 - < 60
- >= 60 - < 80
- >= 80 - < 100
- >= 100 - < 150
- >= 150



09/08/2023
Resolution: 25 X 25 Km

RAINFALL
Cumulative values

from: **21 July 2023**
to: **31 July 2023**

Deviation:
Year of interest - LTA

Units: %
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- >= -50 - < -30
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- >= -10 - < 10
- >= 10 - < 30
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- >= 80 - < 100
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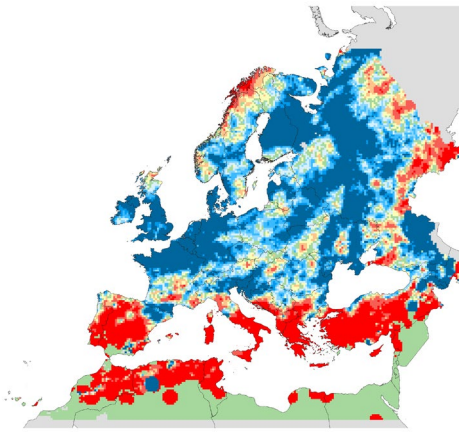

09/08/2023
Resolution: 25 X 25 Km

RAINFALL
Cumulative values

from: **21 July 2023**
to: **31 July 2023**

Units: mm
- >= 0 - < 1
- >= 1 - < 5
- >= 5 - < 10
- >= 10 - < 15
- >= 15 - < 20
- >= 20 - < 30
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- >= 40 - < 60
- >= 60 - < 80
- >= 80 - < 100
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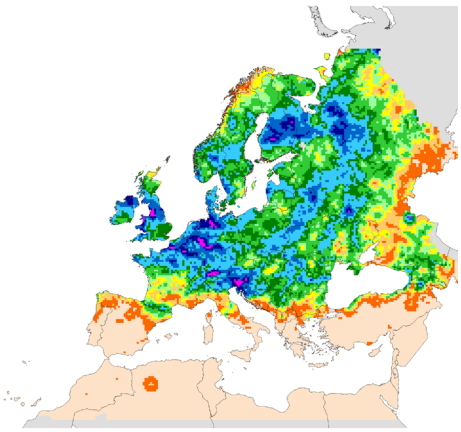

09/08/2023
Resolution: 25 X 25 Km

RAINFALL
Cumulative values

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to: **13 August 2023**

Deviation:
Year of interest - LTA

Units: %
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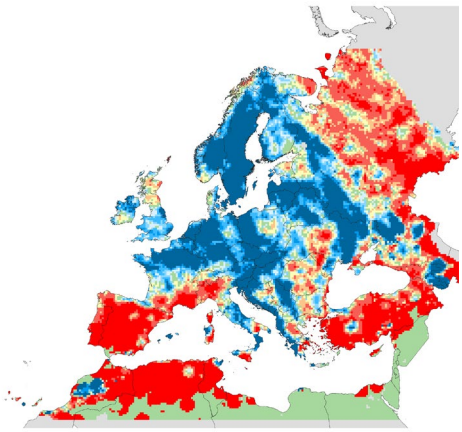
- >= -50 - < -30
- >= -30 - < -10
- >= -10 - < 10
- >= 10 - < 30
- >= 30 - < 50
- >= 50 - < 80
- >= 80 - < 100
- >= 100

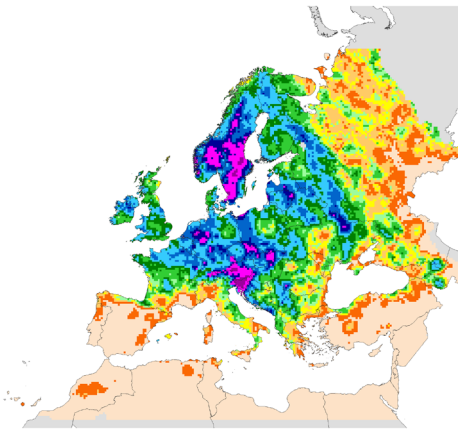


14/08/2023
Resolution: 25 X 25 Km

RAINFALL
Cumulative values

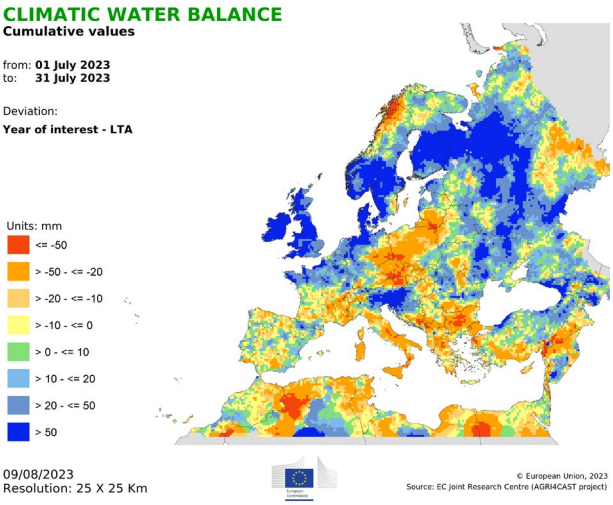
from: **01 August 2023**
to: **13 August 2023**

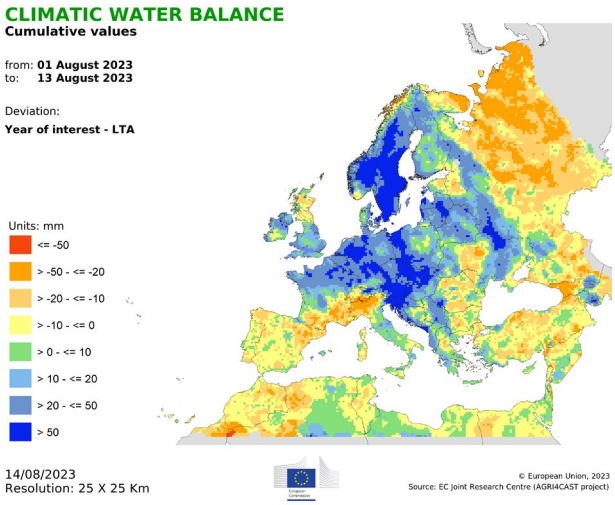
Units: mm
- >= 0 - < 1
- >= 1 - < 5
- >= 5 - < 10
- >= 10 - < 15
- >= 15 - < 20
- >= 20 - < 30
- >= 30 - < 40
- >= 40 - < 60
- >= 60 - < 80
- >= 80 - < 100
- >= 100 - < 150
- >= 150



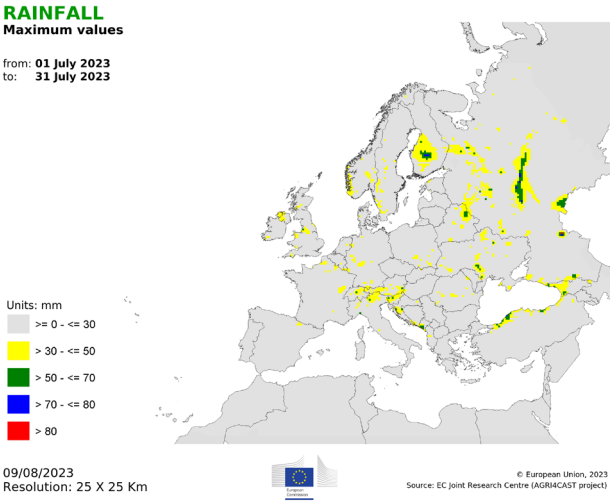
14/08/2023
Resolution: 25 X 25 Km

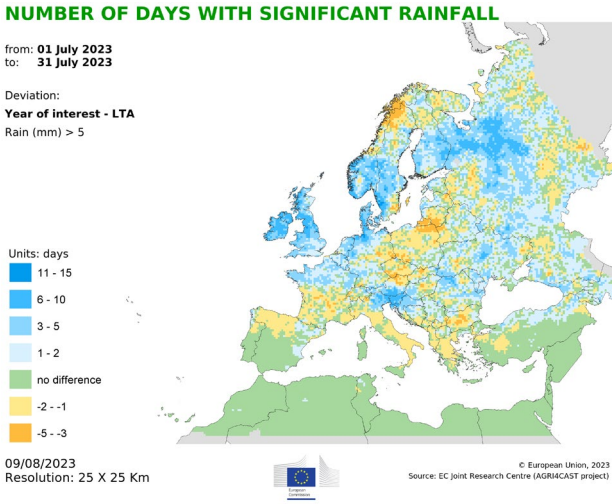
Climatic water balance

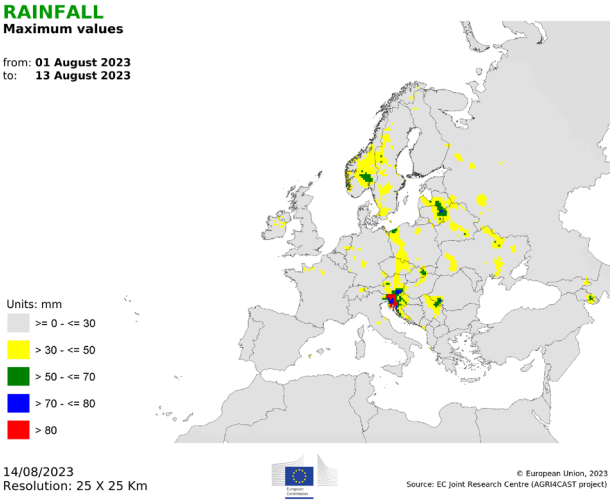


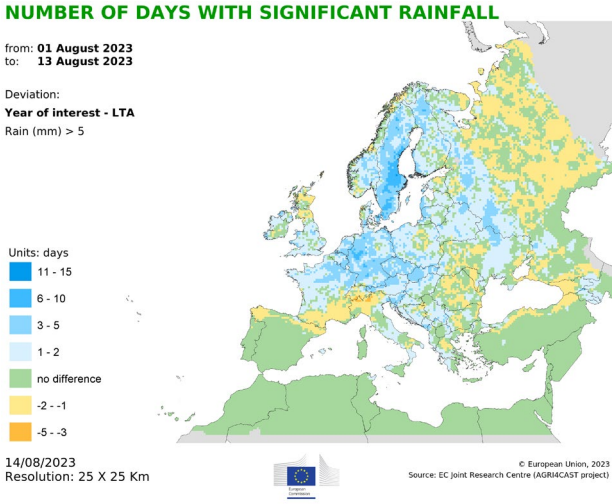


Weather events





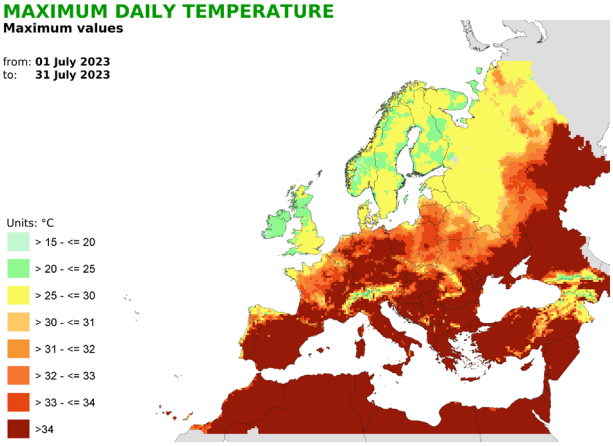




MAXIMUM DAILY TEMPERATURE

Maximum values

from: **01 July 2023**
to: **31 July 2023**



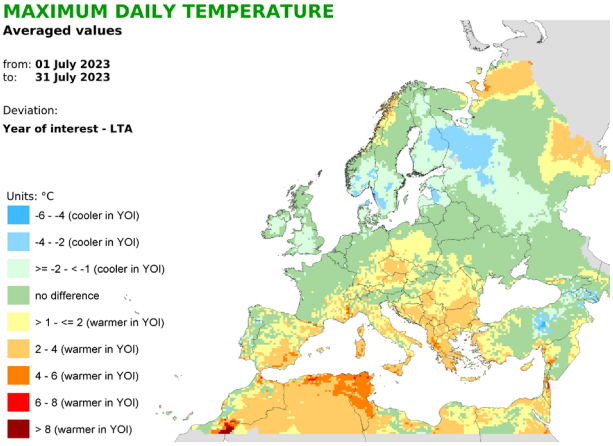
09/08/2023
Resolution: 25 X 25 Km

MAXIMUM DAILY TEMPERATURE

Averaged values

from: **01 July 2023**
to: **31 July 2023**

Deviation:
Year of interest - LTA

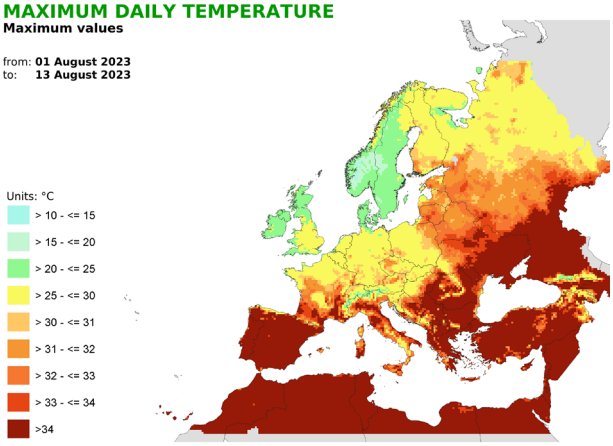


09/08/2023
Resolution: 25 X 25 Km

MAXIMUM DAILY TEMPERATURE

Maximum values

from: **01 August 2023**
to: **13 August 2023**



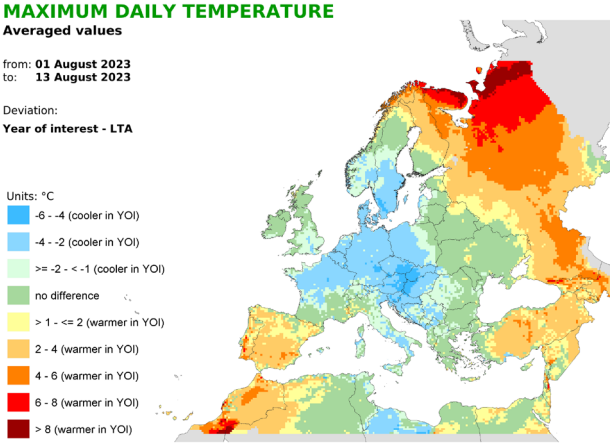
14/08/2023
Resolution: 25 X 25 Km

MAXIMUM DAILY TEMPERATURE

Averaged values

from: **01 August 2023**
to: **13 August 2023**

Deviation:
Year of interest - LTA

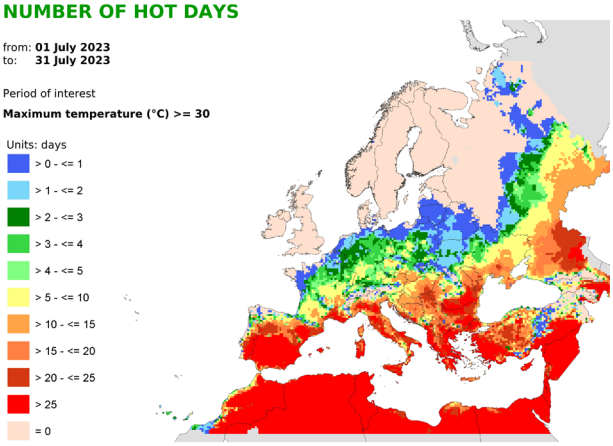


14/08/2023
Resolution: 25 X 25 Km

NUMBER OF HOT DAYS

from: **01 July 2023**
to: **31 July 2023**

Period of interest
Maximum temperature (°C) >= 30

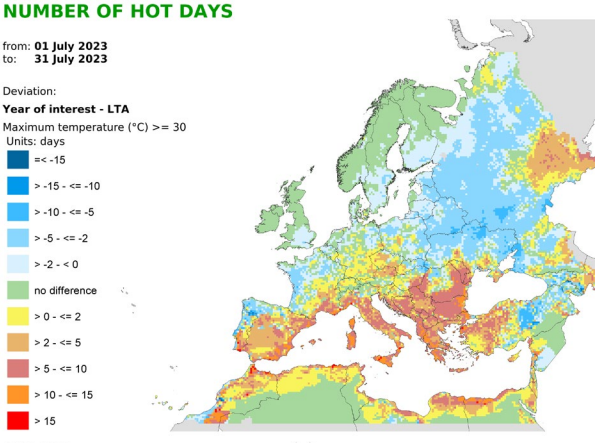


09/08/2023
Resolution: 25 X 25 Km

NUMBER OF HOT DAYS

from: **01 July 2023**
to: **31 July 2023**

Deviation:
Year of interest - LTA
Maximum temperature (°C) >= 30

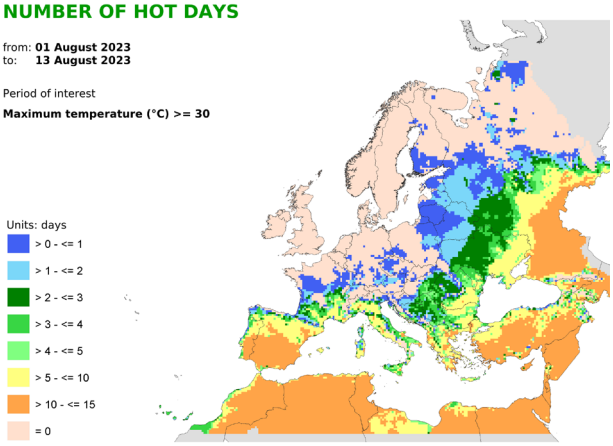


09/08/2023
Resolution: 25 X 25 Km

NUMBER OF HOT DAYS

from: **01 August 2023**
to: **13 August 2023**

Period of interest
Maximum temperature (°C) >= 30

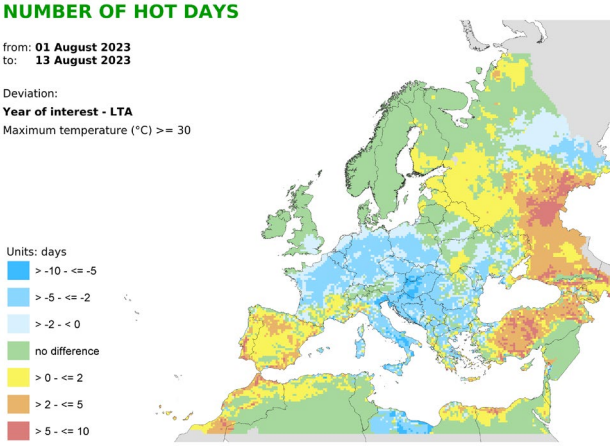


14/08/2023
Resolution: 25 X 25 Km

NUMBER OF HOT DAYS

from: **01 August 2023**
to: **13 August 2023**

Deviation:
Year of interest - LTA
Maximum temperature (°C) >= 30

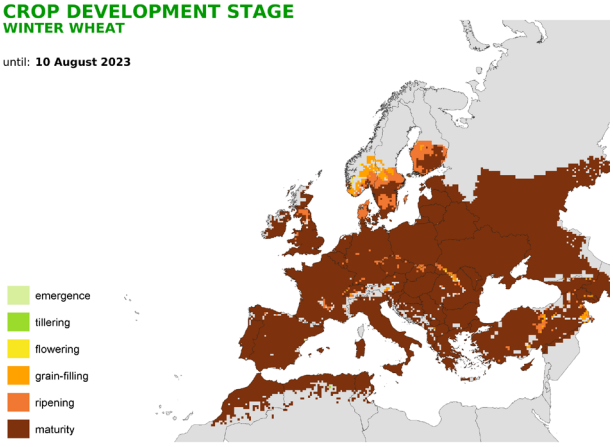


14/08/2023
Resolution: 25 X 25 Km

Crop development stages and precocity

CROP DEVELOPMENT STAGE
WINTER WHEAT

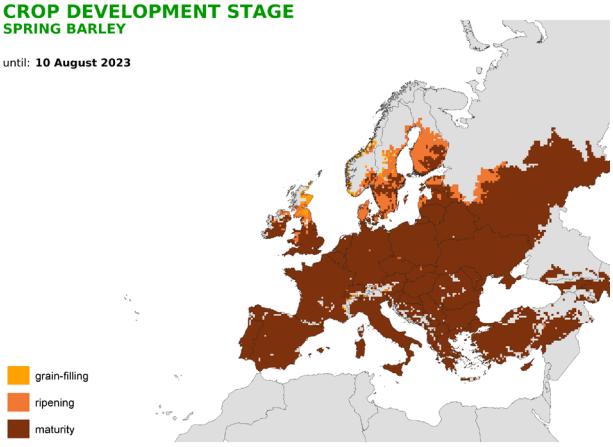
until: **10 August 2023**



14/08/2023
Resolution: 25 X 25 Km

CROP DEVELOPMENT STAGE
SPRING BARLEY

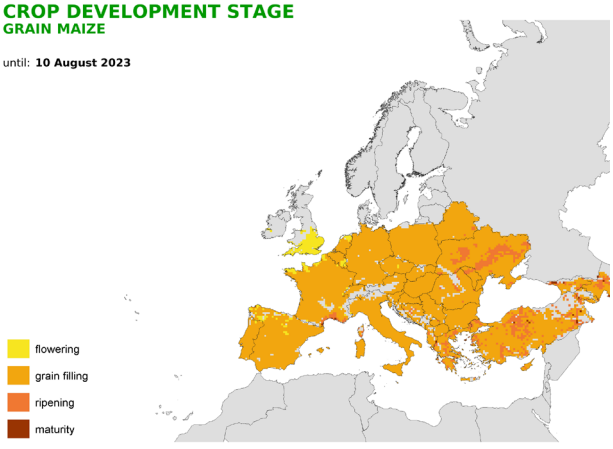
until: **10 August 2023**



14/08/2023
Resolution: 25 X 25 Km

CROP DEVELOPMENT STAGE
GRAIN MAIZE

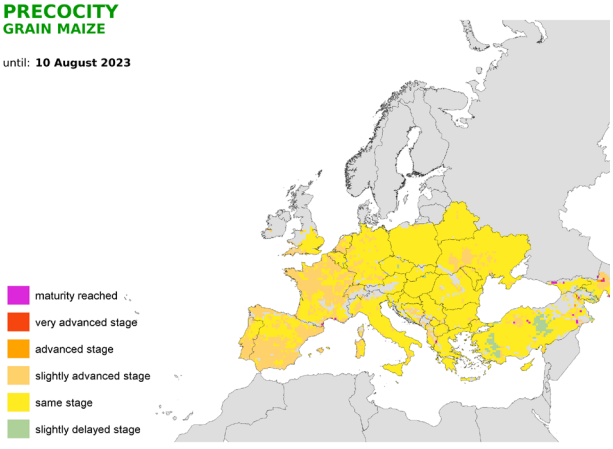
until: **10 August 2023**



14/08/2023
Resolution: 25 X 25 Km

PRECOCITY
GRAIN MAIZE

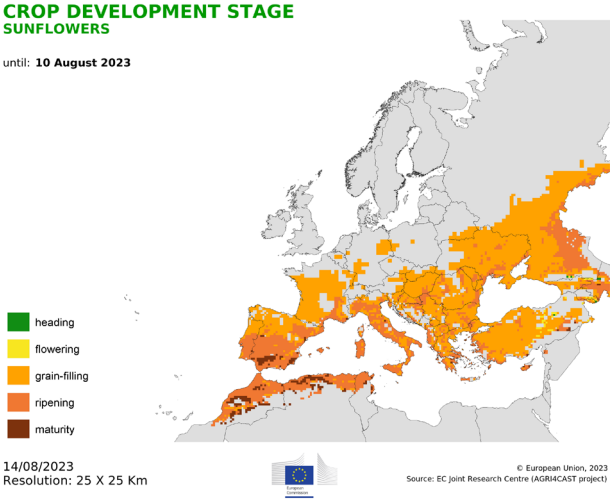
until: **10 August 2023**



14/08/2023
Resolution: 25 X 25 Km

CROP DEVELOPMENT STAGE
SUNFLOWERS

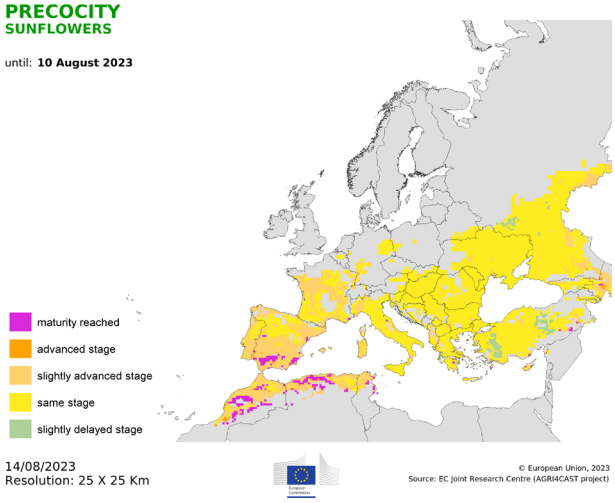
until: **10 August 2023**



14/08/2023
Resolution: 25 X 25 Km

PRECOCITY
SUNFLOWERS

until: **10 August 2023**

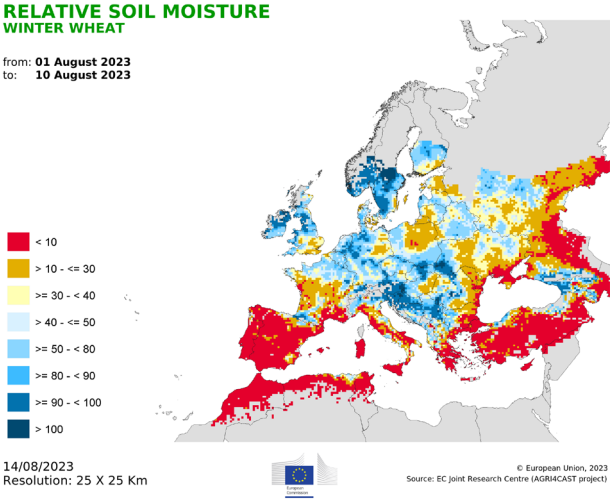


14/08/2023
Resolution: 25 X 25 Km

Relative soil moisture

RELATIVE SOIL MOISTURE
WINTER WHEAT

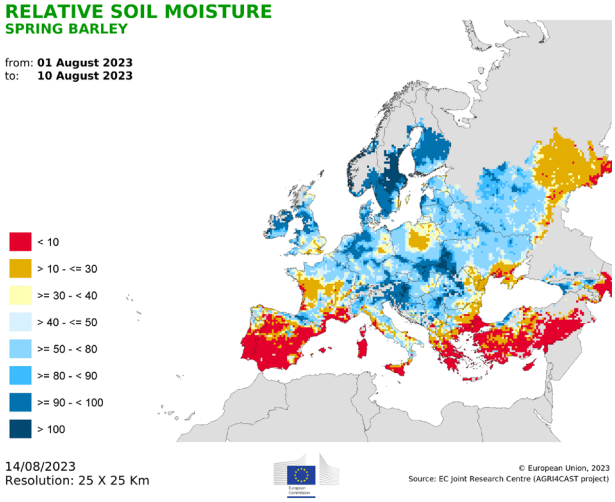
from: **01 August 2023**
to: **10 August 2023**



14/08/2023
Resolution: 25 X 25 Km

RELATIVE SOIL MOISTURE
SPRING BARLEY

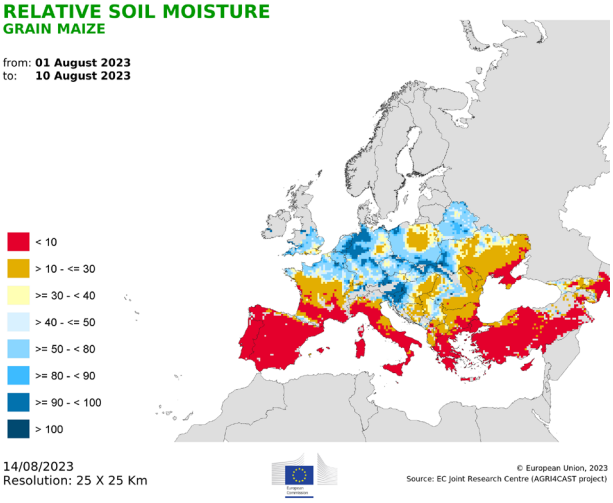
from: **01 August 2023**
to: **10 August 2023**



14/08/2023
Resolution: 25 X 25 Km

RELATIVE SOIL MOISTURE
GRAIN MAIZE

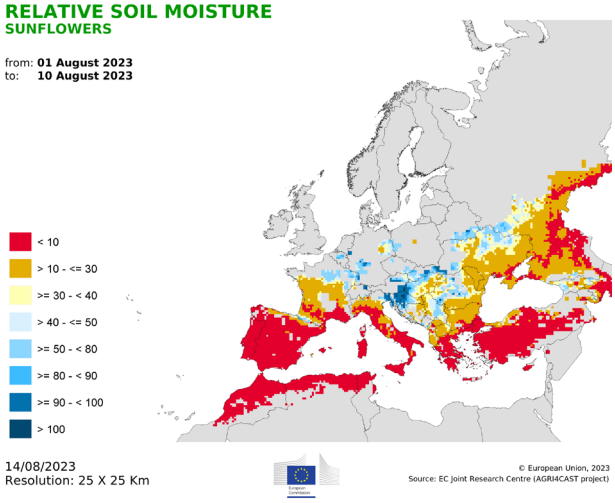
from: **01 August 2023**
to: **10 August 2023**



14/08/2023
Resolution: 25 X 25 Km

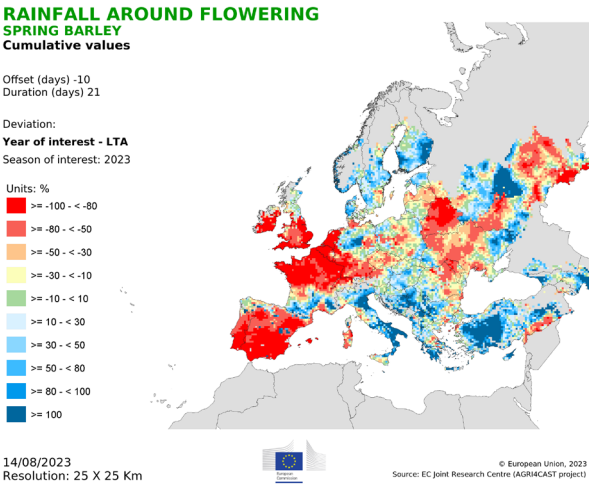
RELATIVE SOIL MOISTURE
SUNFLOWERS

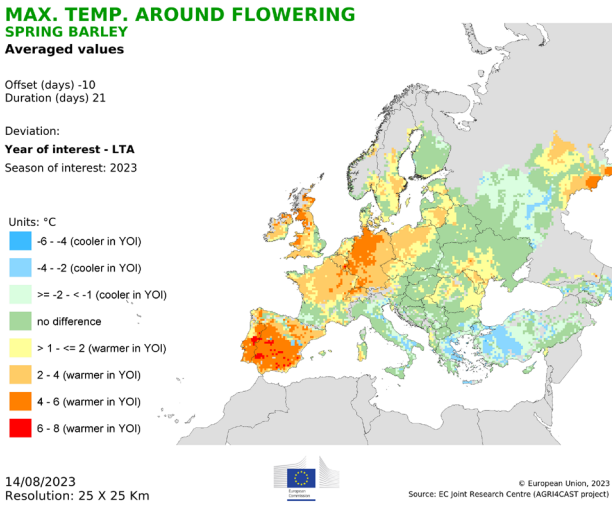
from: **01 August 2023**
to: **10 August 2023**

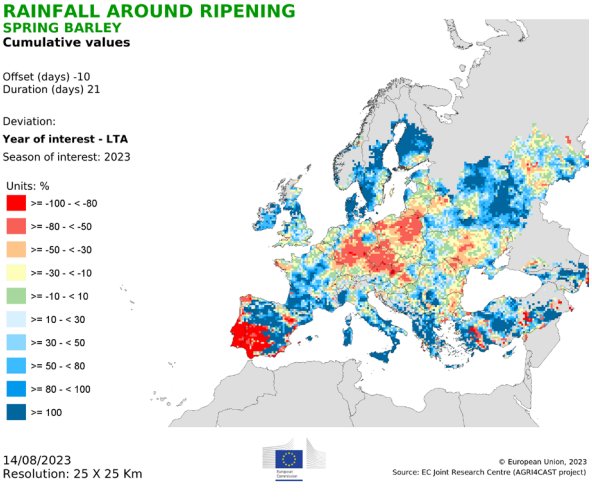


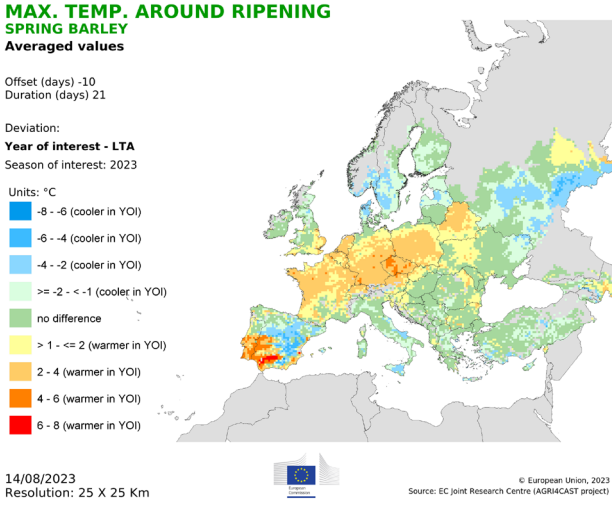
14/08/2023
Resolution: 25 X 25 Km

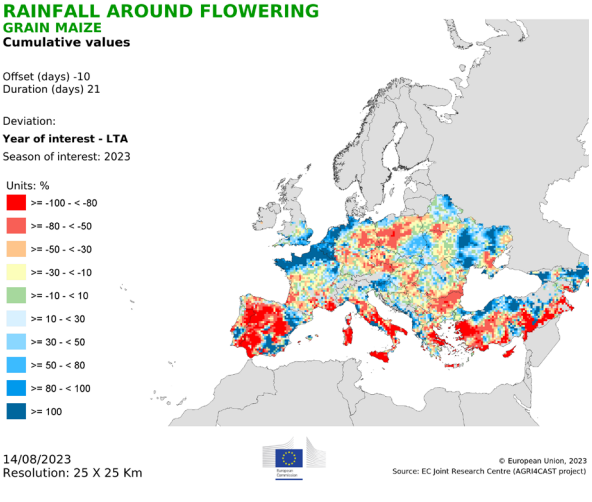
Precipitation and temperature anomalies around flowering and ripening

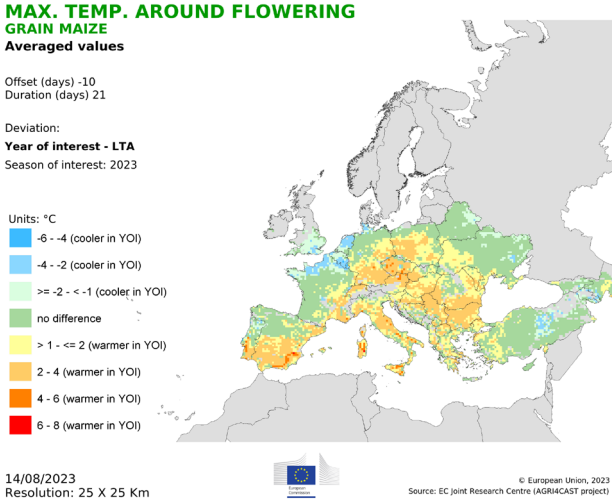










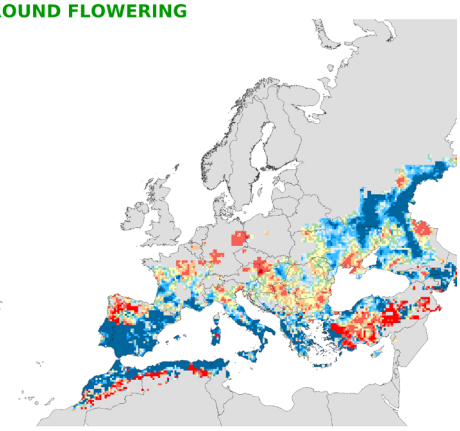


RAINFALL AROUND FLOWERING
SUNFLOWERS
Cumulative values

Offset (days) -10
Duration (days) 21

Deviation:
Year of interest - LTA
Season of interest: 2023

Units: %
- >= -100 - < -80
- >= -80 - < -50
- >= -50 - < -30
- >= -30 - < -10
- >= -10 - < 10
- >= 10 - < 30
- >= 30 - < 50
- >= 50 - < 80
- >= 80 - < 100
- >= 100



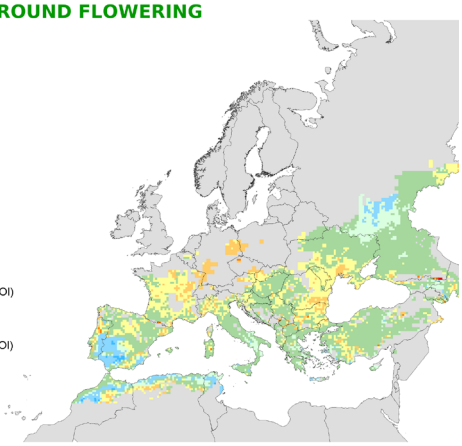
14/08/2023
Resolution: 25 X 25 Km

MAX. TEMP. AROUND FLOWERING
SUNFLOWERS
Averaged values

Offset (days) -10
Duration (days) 21

Deviation:
Year of interest - LTA
Season of interest: 2023

Units: °C
- -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)



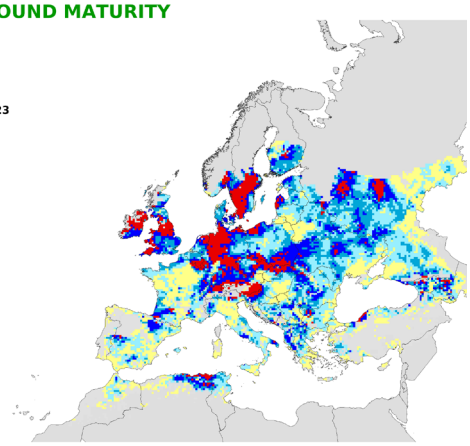
14/08/2023
Resolution: 25 X 25 Km

Precipitation around harvesting

RAINFALL AROUND MATURITY
WINTER WHEAT
Cumulative values

Offset (days) -10
Duration (days) 21
Season of interest: 2023

Units: mm
- >= 0 - <= 10
- > 10 - <= 30
- > 30 - <= 50
- > 50 - <= 70
- > 70 - <= 100
- > 100

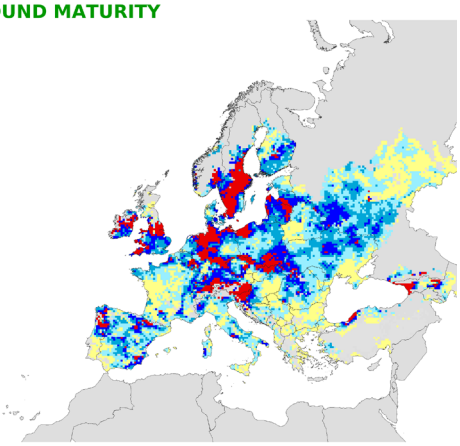


14/08/2023
Resolution: 25 X 25 Km

RAINFALL AROUND MATURITY
SPRING BARLEY
Cumulative values

Offset (days) -10
Duration (days) 21
Season of interest: 2023

Units: mm
- >= 0 - <= 10
- > 10 - <= 30
- > 30 - <= 50
- > 50 - <= 70
- > 70 - <= 100
- > 100

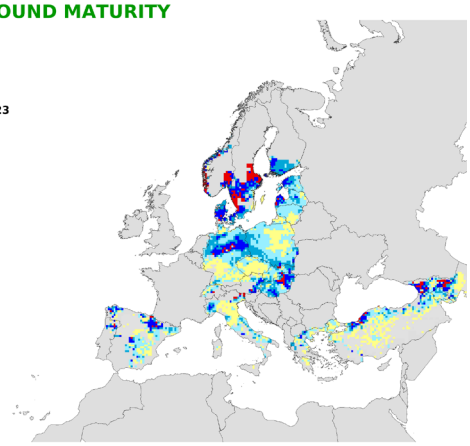


14/08/2023
Resolution: 25 X 25 Km

RAINFALL AROUND MATURITY
RYE
Cumulative values

Offset (days) -10
Duration (days) 21
Season of interest: 2023

Units: mm
- >= 0 - <= 10
- > 10 - <= 30
- > 30 - <= 50
- > 50 - <= 70
- > 70 - <= 100
- > 100

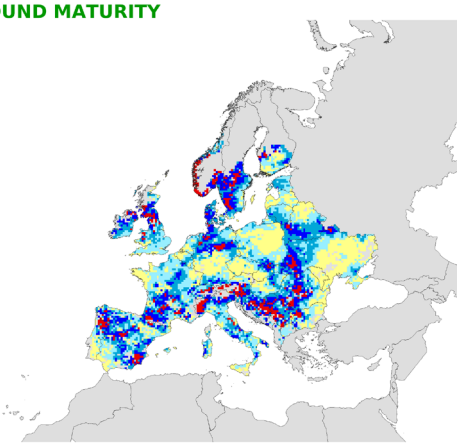


14/08/2023
Resolution: 25 X 25 Km

RAINFALL AROUND MATURITY
WINTER RAPESEED
Cumulative values

Offset (days) -10
Duration (days) 21
Season of interest: 2023

Units: mm
- >= 0 - <= 10
- > 10 - <= 30
- > 30 - <= 50
- > 50 - <= 70
- > 70 - <= 100
- > 100



14/08/2023
Resolution: 25 X 25 Km

JRC MARS Bulletins 2023

Date	Publication	Reference
23 Jan	Agromet analysis	Vol. 31 No 1
20 Feb	Agromet analysis	Vol. 31 No 2
20 Mar	Agromet analysis, pasture analysis, yield forecast	Vol. 31 No 3
24 Apr	Agromet analysis, remote sensing, pasture analysis, sowing conditions, yield forecast	Vol. 31 No 4
22 May	Agromet analysis, remote sensing, pasture analysis, sowing update, yield forecast	Vol. 31 No 5
19 Jun	Agromet analysis, remote sensing, pasture analysis, rice analysis, yield forecast	Vol. 31 No 6
24 Jul	Agromet analysis, remote sensing, pasture analysis, harvesting conditions, yield forecast	Vol. 31 No 7
21 Aug	Agromet analysis, remote sensing, pasture update, harvesting update, yield forecast	Vol. 31 No 8
18 Sep	Agromet analysis, remote sensing, pasture analysis, rice analysis, harvesting update, yield forecast	Vol. 31 No 9
23 Oct	Agromet analysis, pasture update, sowing conditions, harvesting update, yield forecast	Vol. 31 No 10
27 Nov	Agromet analysis, sowing update, harvesting update	Vol. 31 No 11
18 Dec	Agromet analysis	Vol. 31 No 12

Mission statement

The Joint Research Centre provides independent, evidence-based knowledge and science, supporting EU policies to positively impact society.

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AGRI4CAST Resources are available at https://agri4cast.jrc.ec.europa.eu

Analysis and reports

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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 1991-2022.

Publications Office of the European Union