Issued: 23 September 2024
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European Commission

JRC MARS Bulletin
Crop monitoring in Europe
September 2024

Worsened outlook in central and eastern Europe
Improved yield expectations in western regions

The 3% downward revision of the yield forecasts for grain maize and sunflowers at EU level, is mainly due to a worsened outlook for summer crops in southern-central and eastern Europe. The yield outlook is particularly poor in Bulgaria and Romania.

While favourable weather conditions prevailed in western parts of Europe, very high temperatures in most of southern-central and eastern Europe negatively impacted biomass accumulation and shortened the grain-filling period of summer crops. In large parts of Romania, Bulgaria, Hungary, Slovakia and Austria, these impacts were exacerbated by a persistent rainfall deficit.

A distinct and long-lasting rainfall deficit also continued and expanded in eastern Ukraine, southern Russia and Belarus, with negative impacts on the grain filling of summer crops, in particular grain maize and sunflowers.

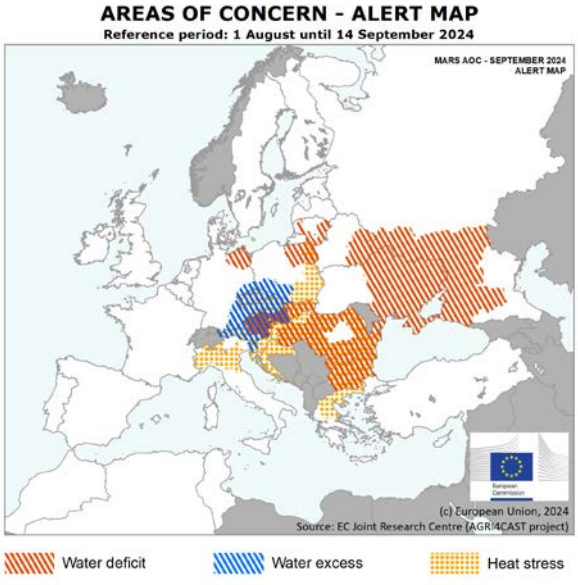
Dry conditions, reducing the yield potential of maize, were also observed in Poland, north-eastern Germany and Lithuania.

In September, wet and cooler weather arrived in large parts of Europe, which in central Europe took the form of long-lasting heavy storms (see section on Storm Boris on page 7) and extended flooding, with negative impacts on crops, which at this moment are difficult to quantify.

This issue of the Bulletin features a special section on rice in Europe, which has performed well in most EU rice-producing districts, and presents an above-average yield outlook at EU level.

Contents:

Covers the period from 1 August until 14 September



Crop	Yield t/ha				
	Avg 5yrs	August Bulletin	MARS 2024 forecasts	%24/5yrs	% Diff August
Spring barley	4.08	4.43	**4.40**	+ 8	– 1
Grain maize	7.35	7.03	**6.84**	– 7	– 3
Potatoes	35.4	35.1	**35.8**	+ 1	+ 2
Sugar beet	73.1	73.4	**74.7**	+ 2	+ 2
Sunflower	2.15	2.04	**1.98**	– 8	– 3
Soybeans	2.73	2.75	**2.81**	+ 3	+ 2
Field beans	2.72	2.81	**2.81**	+ 3	+ 0
Field peas	2.34	2.24	**2.21**	– 5	– 1
Green maize	41.7	42.7	**43.2**	+ 4	+ 1
Rice	6.38	—	**6.78**	+ 6	—

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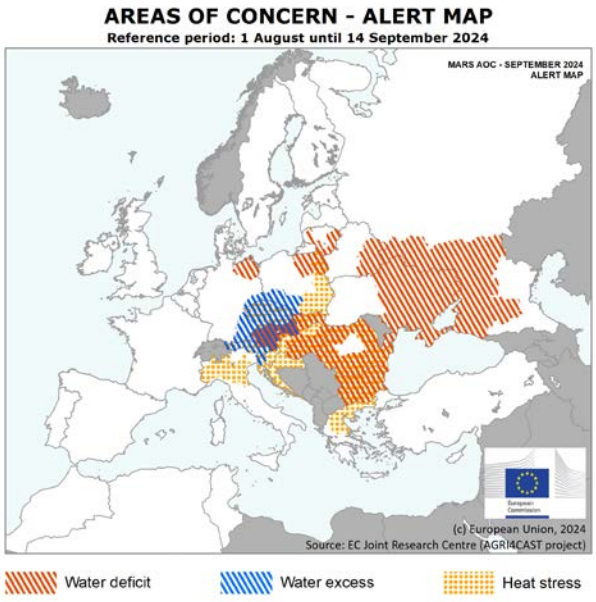
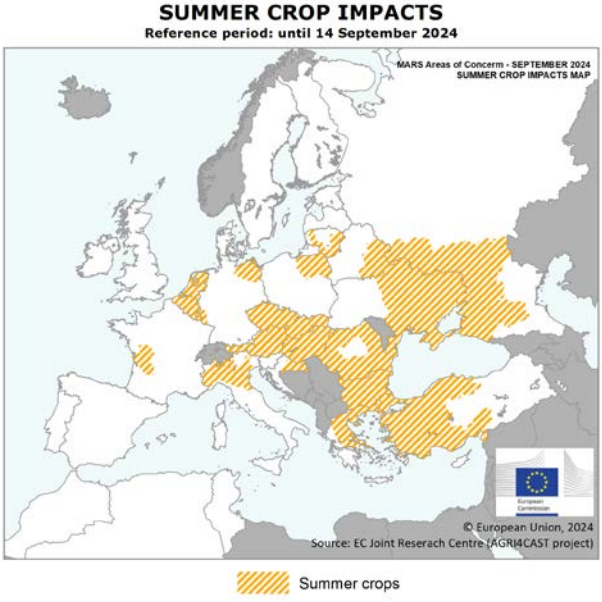
Joint Research Centre

1. Agrometeorological overview

1.1. Areas of concern





*Since March, the areas-of-concern analysis has followed a different approach from that used in previous MARS bulletins. The **alerts map** above shows unusual weather events **that occurred during the analysis period, from 1 August to 14 September**, and potentially had negative **impacts on crops**. The **crop impacts** map shows regions where crops have been negatively affected in terms of area and/or yield. This map shows **impacts that have occurred since the start of the season**. However, reduced areas or the resowing of specific crops without a substantial impact on the yield potential of the remaining sown areas of that crop are not repeated in subsequent editions of the Bulletin once the reduced areas have been reflected in the statistics.*

Very high temperatures were recorded in most of southern (Italy, Greece), southern-central (Slovenia, eastern Croatia, Austria, Czechia, Slovakia, eastern Poland, Hungary,) and eastern Europe (Romania, Bulgaria), causing extensive problems for summer crops. Several heatwaves have occurred since 1 August, with maximum temperatures often exceeding 35 °C. The hot weather had a negative impact on biomass accumulation and shortened the grain-filling period of summer crops in all the above-mentioned countries. Most notably in Romania, Bulgaria, Hungary, Slovakia and Austria, continued hot weather was coupled with a persistent rainfall deficit, which strongly reduced soil moisture and contributed to early senescence of summer crops.

A distinct and long-lasting rainfall deficit also continued and expanded in eastern Ukraine, southern Russia and Belarus, with negative impacts on the grain filling of summer crops.

Even Poland, north-eastern Germany and Lithuania faced dry conditions, which reduced the yield potential of maize.

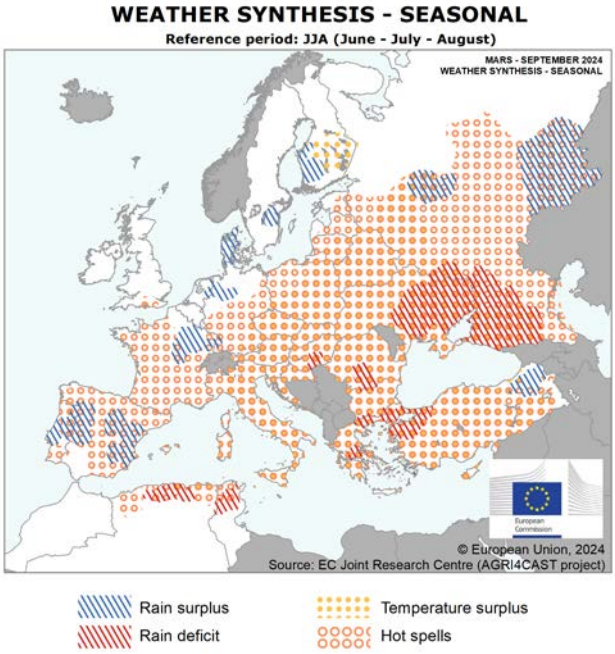
In September, wet (and cooler) weather arrived in large areas of Europe, notably in central Europe (southern and eastern Germany, Czechia, Austria, western Slovakia and western Slovenia), where it took the form of long-lasting heavy storms (see section on Storm Boris on page 7) and extended flooding, with negative impacts on crops, which at this moment are difficult to quantify.

The impact shown on summer crops in the Netherlands, Belgium and Luxembourg is related to the late start of the season as described in the June issue of this bulletin.

Negative impacts on winter crops are not reported, as the season closed in August.

1.2. Summer review (June, July, August)

Distinctly warmer-than-usual conditions prevailed in most of Europe, with series of hot spells in the central and eastern regions. While wetter-than-usual conditions characterised parts of south-western, western and northern Europe, it was drier than usual in the south-eastern regions and north of the Black Sea.



The weather synthesis map above summarises the most distinct weather anomalies during summer 2024 (1 June to 31 August) compared with the 1991–2023 long-term average (LTA) for the same period. Temperature and rainfall surplus and deficit are unusual absolute and relative deviations from the LTA, considering the entire reporting period. Hot spells and cold spells are 5-day periods with temperatures above the 90th and below the 10th percentile, respectively, of the years since 1991. The weather indicator maps below provide further context for each event.

A rainfall surplus was observed mainly in the Iberian peninsula, north-eastern France, north-western Germany, Denmark, southern Sweden, Finland, central and eastern parts of European Russia, and eastern Türkiye. In most of these regions, cumulative rainfall exceeded the LTA by between 50 % and 150 % (and by more than 150 % in central Portugal, parts of Spain, parts of central and eastern Türkiye, and the southernmost and eastern regions of European Russia). The summer period ranked among the wettest three in our records since 1991.

A rainfall deficit was observed mainly north of the Black Sea in eastern Ukraine and southern European Russia, as well as in southern Hungary, southern Romania, parts of Bulgaria and Greece, in north-western Türkiye, and along the Mediterranean coast in Algeria and Tunisia. In these regions, cumulative rainfall was up to 100 % below the LTA, and the summer period ranked among the driest three since 1991.

A temperature surplus was observed in most central, south-eastern and eastern parts of Europe, as well as in northern Scandinavia. In many of these regions, the summer period ranked among the warmest three since 1991. Temperature anomalies were particularly high in the Balkan peninsula and northern Scandinavia, where average daily temperatures exceeded the LTA by 2 °C to 3 °C.

Series of **hot spells** were observed in most of Europe. They were particularly pronounced in southern and eastern regions such as Italy, the Balkan peninsula, southern parts of eastern Europe and Türkiye, where over 30 days with daily maximum temperatures above 35 °C were observed.

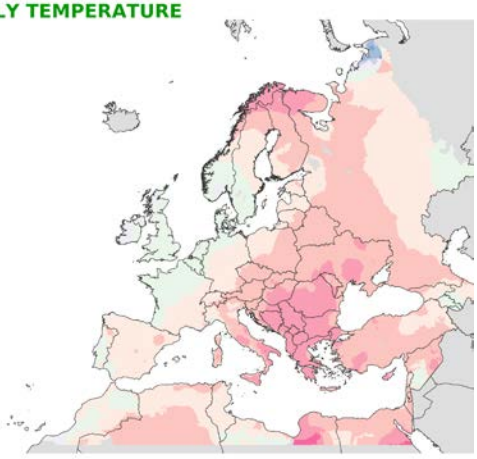
AVERAGE DAILY TEMPERATURE

Averaged values

from: **01 June 2024**
to: **31 August 2024**

Deviation:
Year of interest - LTA

Units: °C
-4 - -3 (cooler in YOI)
-3 - -2 (cooler in YOI)
-2 - -1 (cooler in YOI)
-1 - -0.5 (cooler in YOI)
-0.5 - 0.5
0.5 - 1 (warmer in YOI)
1 - 2 (warmer in YOI)
2 - 3 (warmer in YOI)
3 - 4 (warmer in YOI)



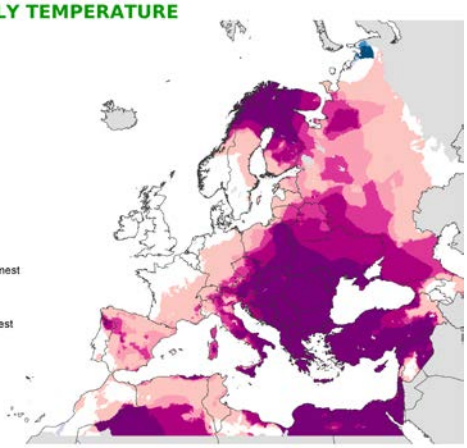
18/09/2024
Resolution: 10 x 10 km

AVERAGE DAILY TEMPERATURE

from: **01 June 2024**
to: **31 August 2024**

Ranking since 1991

Warmest year
Second warmest
Third warmest
Fourth warmest
From fifth to tenth warmest
Others
From fifth to tenth coldest
Fourth coldest
Third coldest
Second coldest
Coldest year



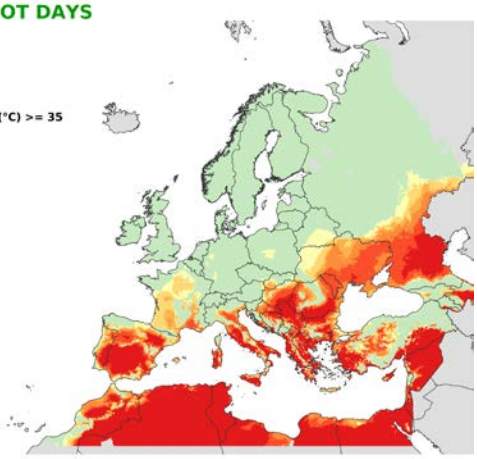
18/09/2024
Resolution: 10 x 10 km

NUMBER OF HOT DAYS

from: **01 June 2024**
to: **31 August 2024**

Period of interest
Maximum temperature (°C) >= 35

Units: days
0
1
2 - 3
4 - 5
6 - 10
11 - 20
>= 20



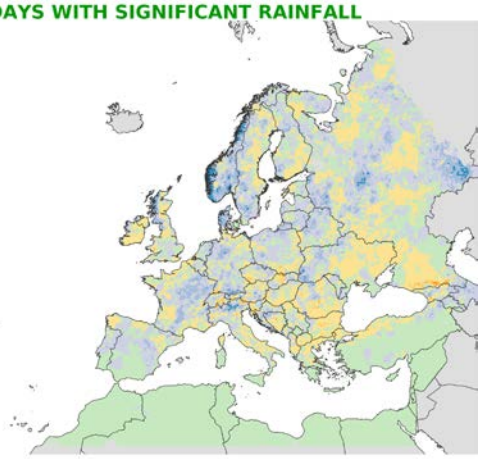
23/09/2024
Resolution: 10 x 10 km

NUMBER OF DAYS WITH SIGNIFICANT RAINFALL

from: **01 June 2024**
to: **31 August 2024**

Deviation:
Year of interest - LTA
Rain (mm) > 15

Units: days
>=10 - <15
>=5 - <10
>=2 - <5
>=1 - <2
no difference
>=-2 - <-1
>=-5 - <-2
>=-10 - <-5



18/09/2024
Resolution: 10 x 10 km

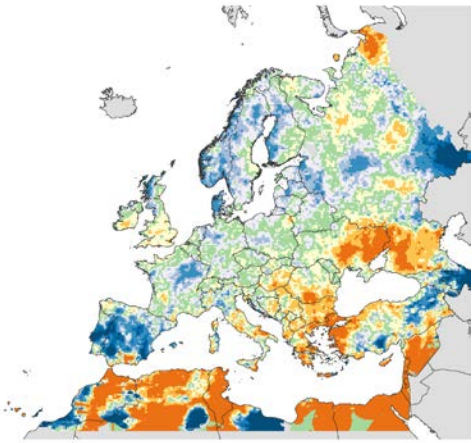
RAINFALL

Cumulative values

from: **01 June 2024**
to: **31 August 2024**

Deviation:
Year of interest - LTA

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



18/09/2024
Resolution: 10 x 10 km

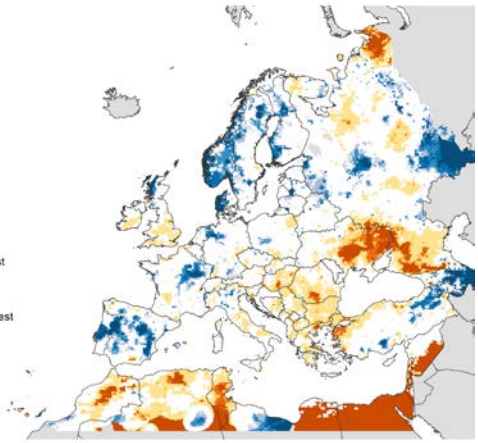
RAINFALL

Cumulative values

from: **01 June 2024**
to: **31 August 2024**

Ranking since 1991

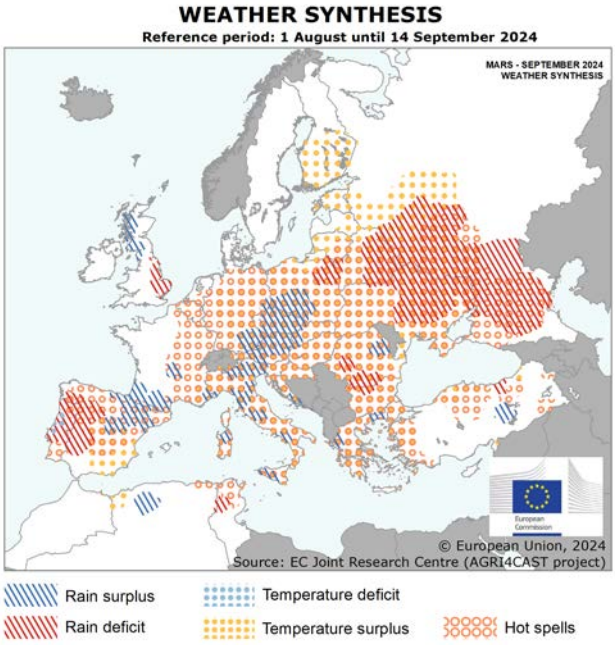
Driest year
Second driest
Third driest
Fourth driest
From fifth to tenth driest
Others
From fifth to tenth wettest
Fourth wettest
Third wettest
Second wettest
Wettest year



18/09/2024
Resolution: 10 x 10 km

1.3. Meteorological review (1 August –14 September 2024)

While unusually warm conditions persisted in most of Europe, cooler air masses brought wetter-than-usual conditions to parts of the continent, with particularly heavy downpours in the central and eastern European regions in the last days of the review period.



The weather synthesis map above summarises the most distinct weather anomalies during the review period (1 August to 14 September 2024) compared with the 1991–2023 LTA for the same period. Temperature and rainfall surplus and deficit are unusual absolute and relative deviations from the LTA, considering the entire reporting period. Hot spells and cold spells are 5-day periods with temperatures above the 90th and below the 10th percentile, respectively, of temperatures for the years since 1991. The weather indicator maps provide further context for each event.

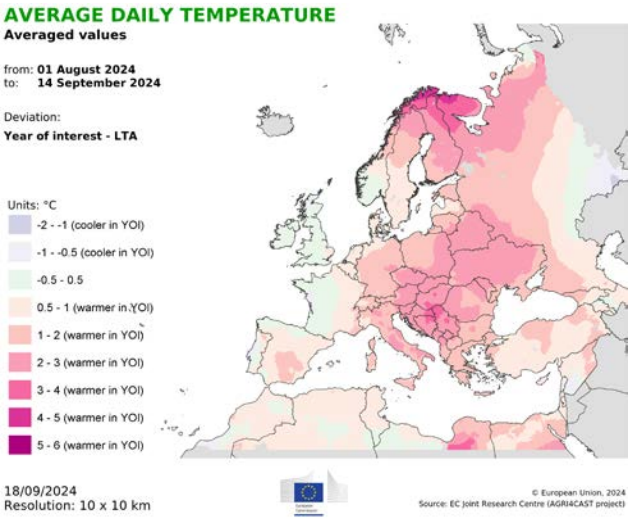
A distinct rainfall surplus was observed in northern Spain, parts of southern France, Italy, Greece, eastern Türkiye, north-eastern Romania, and western Scotland. Due to heavy rainfall downpours during Storm Boris in the last 2 days of the review period, a distinct rainfall surplus was observed in parts of central Europe, which has led to severe rainstorms and flooding in southern Poland (mainly *Dolnośląskie*, *Opolskie*, *Śląskie*), Czechia, and northern Austria (*Oberösterreich*, *Niederösterreich*), as well as neighbouring regions to the west in eastern Germany (*Dresden*) and to the east in western Slovakia (*Bratislavský* kraj, *Západné Slovensko*). In most of these regions, cumulative rainfall exceeded the LTA by up to 150 % (locally to nearly 240 % during Storm Boris), and the review period ranked among the wettest three in our records since 1991. In parts of northern Europe (Scotland, Norway) and most of central Europe, more than 10 days with daily rainfall above 5 mm were observed, and more than 15 days in the Alps region.

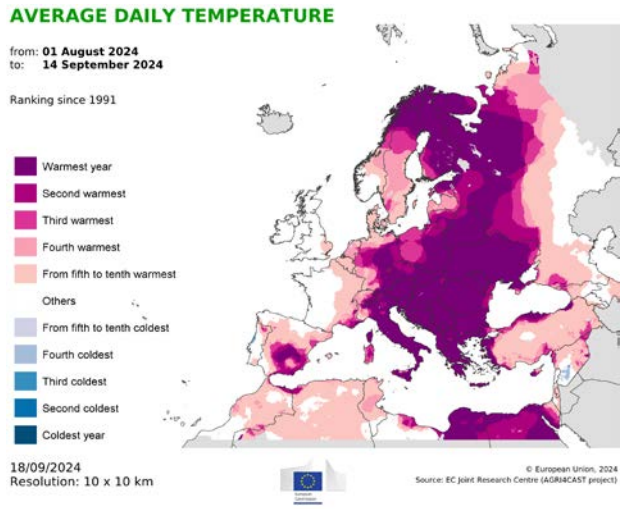
A rainfall deficit was observed in most of Portugal, parts of western Spain, the eastern United Kingdom, parts of western Romania and northern Bulgaria, north-eastern Poland, eastern Belarus, eastern Ukraine, and central and southern European Russia, as well as parts of northern Tunisia. Cumulative rainfall in these areas was between 50 % and 100 % below the LTA, and the review period ranked among the three driest in our records since 1991, with only up to 3 days with rainfall above the 5-mm threshold.

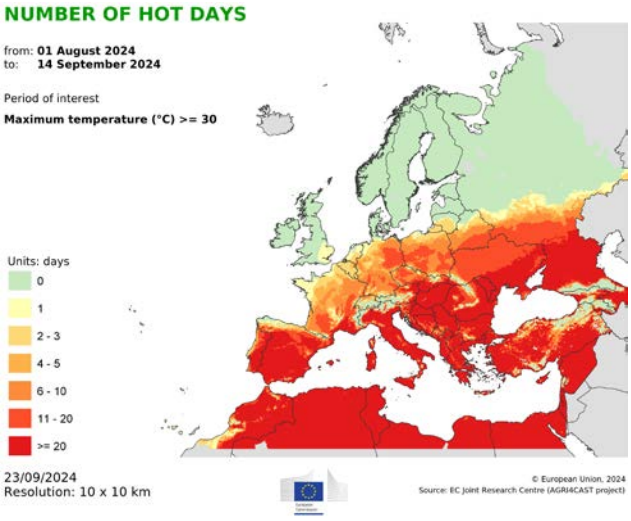
A temperature surplus was observed in parts of Spain, Italy, central Europe, most of eastern Europe, and southern Finland, as well as the Balkan Peninsula and parts of Turkyie. In many of these regions, average daily temperatures exceeded the LTA by up to 4 °C and the review period ranked among the warmest three since 1991.

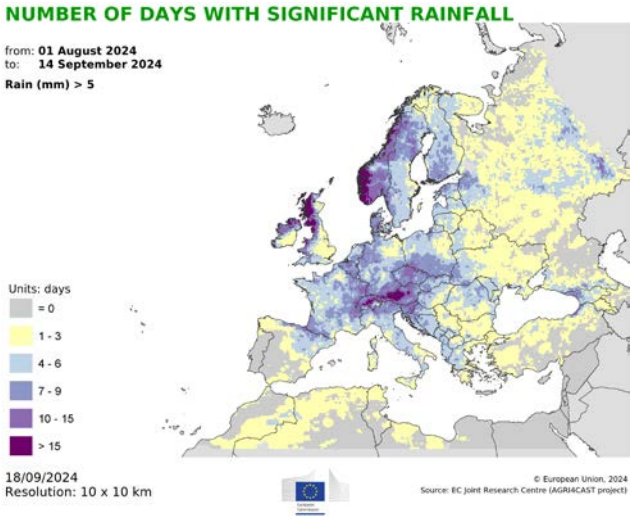
Exceptional **hot spells** were observed in most of Europe south from the Great European Plain, as well as in most of European Russia and the coastal regions of Algeria. In most of these regions, average daily temperatures above 35 °C were observed for 20 or more days due to distinct heatwave episodes of more than 5 consecutive days with maximum daily temperatures above 40 °C.

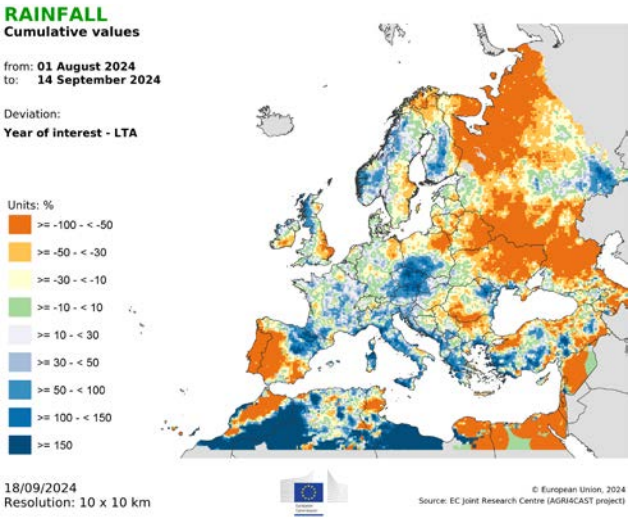
Following a period of overall warmer-than-usual conditions, a **temperature deficit** (average daily temperatures up to 4 °C below the LTA) was observed in parts of Portugal from the end of August to the first dekad of September due to persistent northerly winds. In coastal Portugal, the review period ranked among the three coldest since 1991.

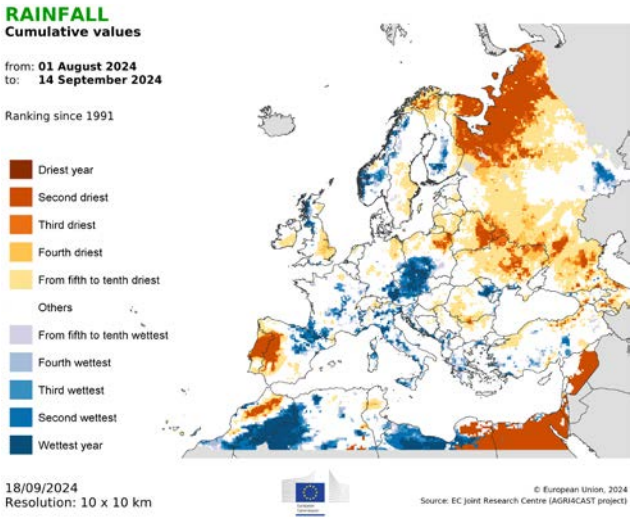










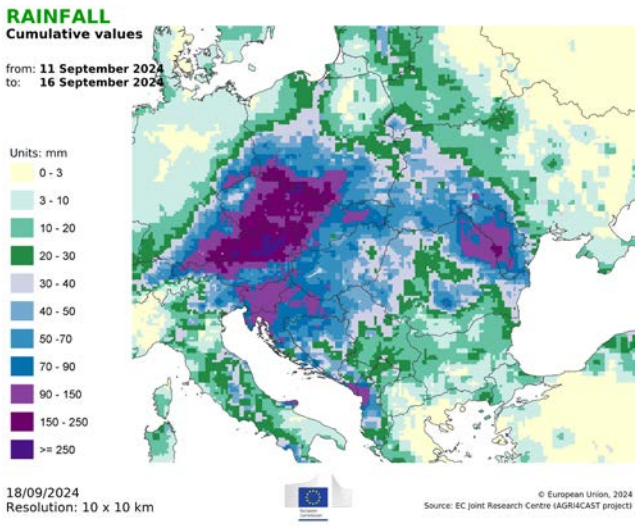


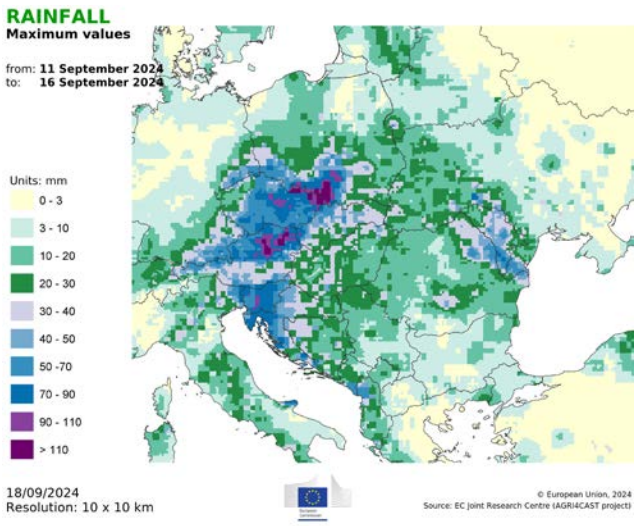
1.4. Storm Boris (11-16 September)

Following the hottest summer on record, below-average river levels (e.g. in the Danube ([1])), regionally dry soils and record-high sea-surface temperatures in the Mediterranean and the Black Sea in August ([2])[3], a low-pressure air mass moved slowly from the Mediterranean into central Europe. Excess heat and moisture developed into storm conditions due to a blocked weather pattern. Storm Boris (called Anett in Germany) brought heavy downpours and strong winds, causing severe regional flooding in southern Poland, south-eastern Germany, Austria, Czechia, western Slovakia and parts of Hungary and Romania.

A warning for the heavy rain event (an orange alert) was issued by the JRC Copernicus Emergency Management Service (CEMS EFAS ([4])) as early as 9 September. Heavy rainfall was observed in these regions since the onset of the event on 13 September. Locally, daily rainfall totals exceeded 100 mm at several stations, with maximum daily rainfall of 172 mm in Austria and approximately 145 mm in north-east Czechia, both accumulating approximately 350 mm of precipitation between 11 and 16 September. These rainfall totals exceeded the average cumulative rainfall for the entire month of September, and in some cases even for the entire autumn season.

The storm in this area is considered to have concluded by 16 September, with heavy rains moving southwards into Italy (*Emilia-Romagna*, *Le Marche*). According to the ECMWF's short-range weather forecast, the storm conditions are expected to last a few more days, as high pressure builds up from the north. However, as downstream (regional) discharge continues and river levels subside, impacts on agricultural areas are yet to unfold.





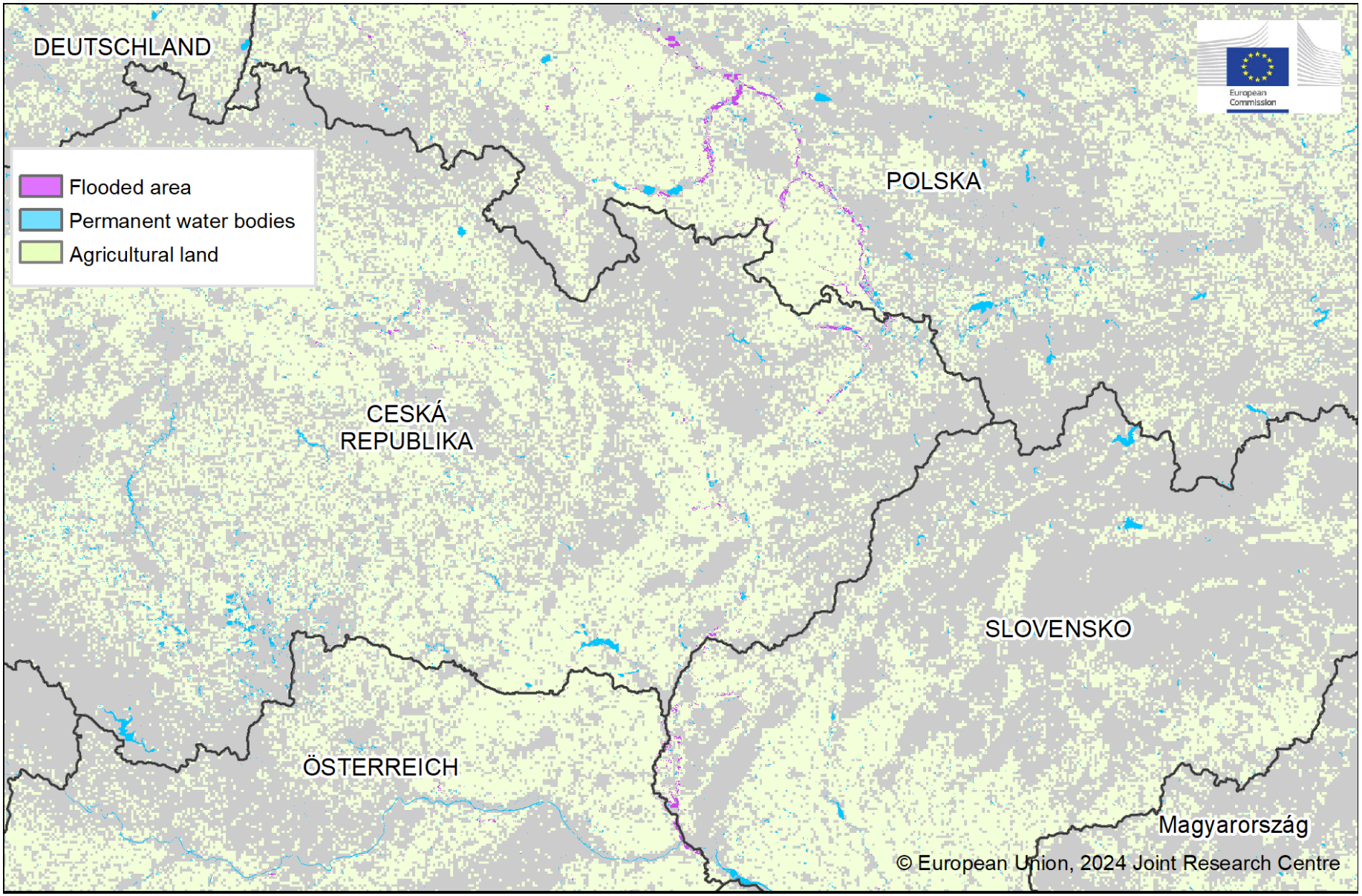
For illustration, the map below shows - for part of the region affected - the extent of the flooded areas (with a minimum value of water depth of 10 cm), from 13 September until the morning of 19 September, as inferred from satellite data, with a spatial resolution of 20 m. Only floods in agricultural areas are shown on the map. Most of the flooded land occurs in flat areas bordering permanent water bodies, such as rivers and lakes.

Note that the floods are still ongoing, in particular in downstream areas. However, it is expected that those flood waves will not cause large flooded areas.

Potential negative impacts on crops are not only due to floods, but also due to damage to ripening crops, increased risk of pests and diseases, harvesting delays, and damage to seedbeds and recently sown winter crops, as well as to long-lasting (or permanent) damage by soil erosion on sloping land.

([1]) https://www.copernicus.eu/en/media/image-day-gallery/low-water-levels-impact-danube-navigation-romania.
([2]) https://climate.copernicus.eu/surface-air-temperature-august-2024;
([3]) https://x.com/CMEMS_EU/status/1826529749214093498.
([4]) https://european-flood.emergency.copernicus.eu/en.

Extent of flooded areas after storm Boris



Data source: EC Joint Research Centre, based on CLC 2018 and Copernicus Emergency Management Service information 2024

1.5. Weather forecast (19 - 28 September)

Cool air from the Atlantic brings rain into most of western and south-western Europe. Warmer-than-usual conditions are forecast for most of Europe east from Germany.

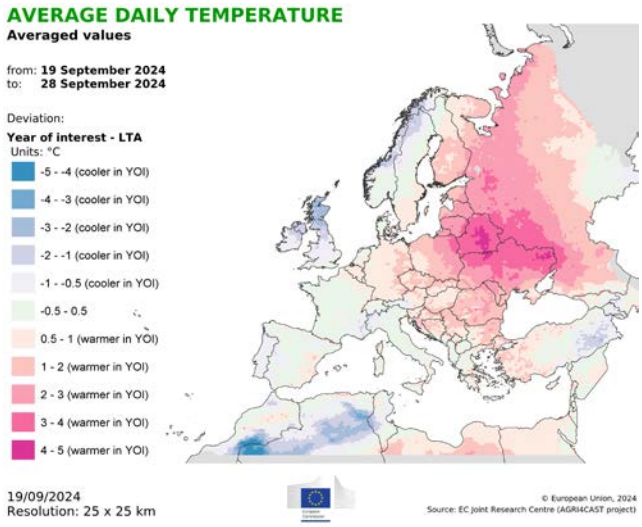
Slightly colder-than-usual conditions (average daily temperatures up to 2 °C below the LTA) are forecast for parts of the Iberian Peninsula, the United Kingdom, Scandinavia, the Alps region, and eastern Türkyie. **Much colder-than-usual conditions** (up to 5 °C below the LTA) are forecast for Scotland, and locally in Scandinavia and eastern Türkyie.

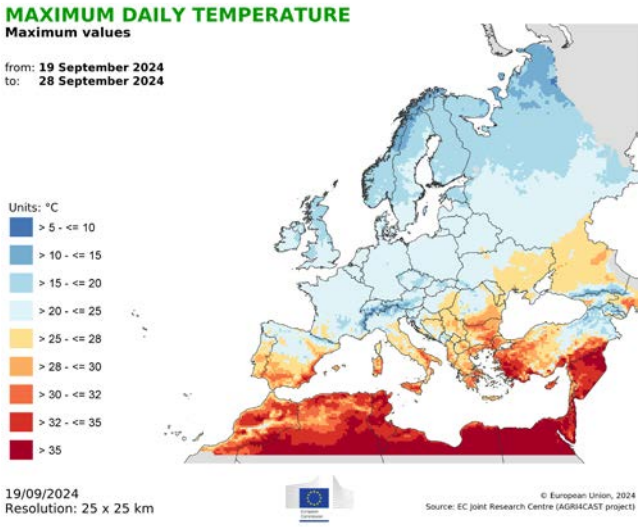
Warmer-than-usual conditions are forecast for most of central, eastern, and south-eastern Europe. The most substantial positive temperature anomalies (2 °C to 5 °C above the LTA) are forecast for eastern Europe.

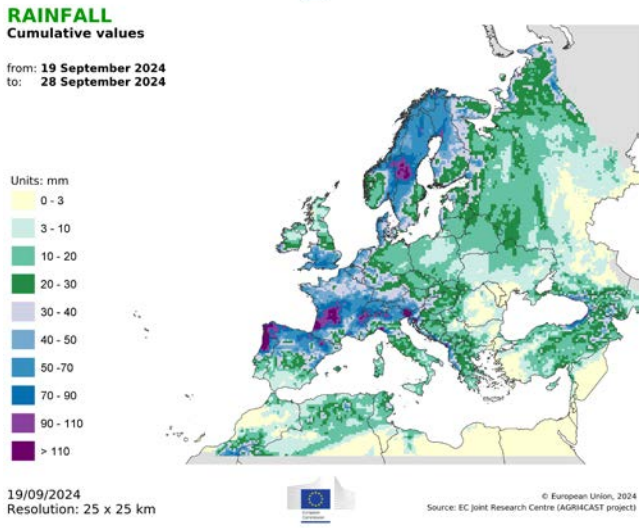
Wet conditions (precipitation above 40 mm and up to 70 mm) are forecast for most of Scandinavia, the northern Iberian Peninsula, western Europe, the Alps region, along the coast in the western Balkans, and in north-eastern Türkyie. **Very wet conditions** (above 70 mm) are forecast for northern Portugal and Spain, parts of the southern United Kingdom, western and central France, the Alps region, north-eastern Italy, western Croatia, and north-east Türkyie.

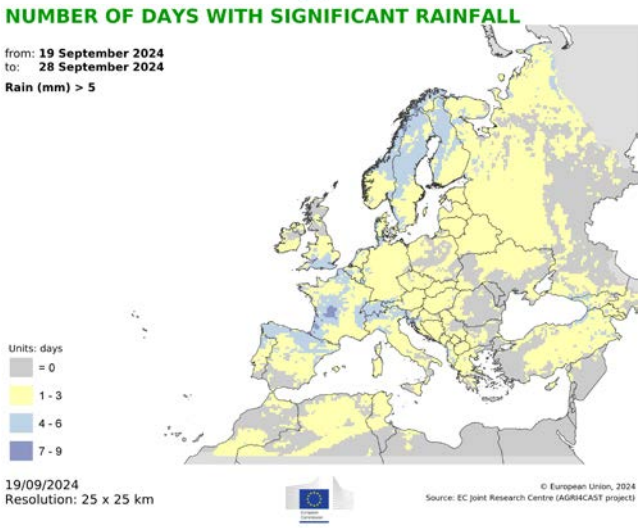
Dry conditions (total precipitation below 3 mm) are forecast for most of Romania and Moldova, southern Ukraine, eastern Bulgaria, western Türkyie, and parts of eastern and southern European Russia.

The long-range weather forecast points to moderately likely warm conditions, exceeding the 24-year climatological median by up to 1 °C in most of Europe (October-November); up to 2 °C in eastern Europe (December). Albeit with high uncertainty, 0-50 mm below-average precipitation is forecast for the Iberian Peninsula and parts of western Europe.



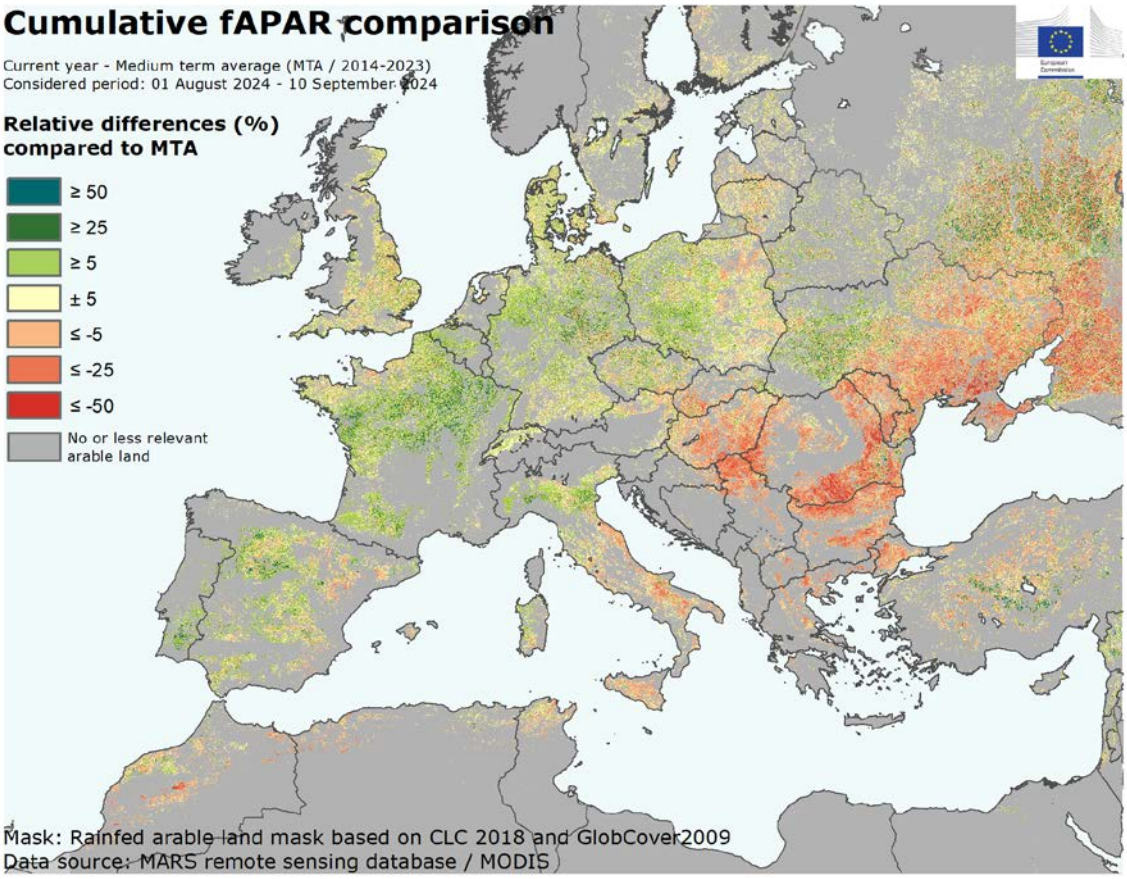






2. Remote sensing – observed canopy conditions

Crop failure in the Black Sea regions; above-average crop growth in western Europe



The map above displays the difference between the fraction of absorbed photosynthetically active radiation (fAPAR) accumulated from 1 August to 10 September 2024 and the 2014–2023 medium-term average (MTA) for the same period. Positive anomalies (in green) reflect above-average canopy density associated with above-average biomass accumulation, while negative anomalies (in red) reflect below-average biomass accumulation.

The map illustrates predominantly summer crop conditions, as the winter crop season has concluded, except in the northernmost countries. The predominantly green colours suggest above-average biomass accumulation in most of Europe, whereas a pronounced negative anomaly is evident from **Hungary** to the Black Sea and the Mediterranean region.

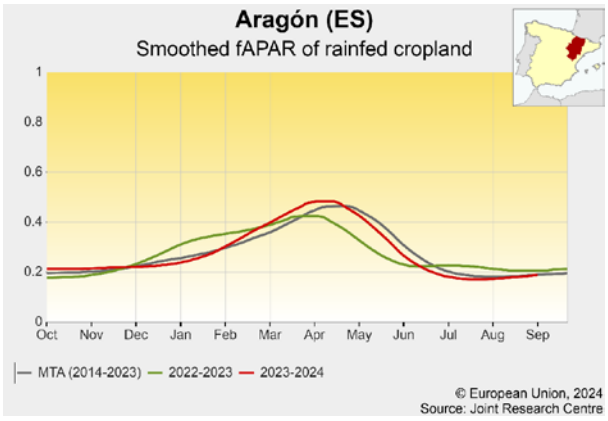
In the **Iberian peninsula**, summer crops are nearing the end of their phenological cycle, maintaining a positive biomass anomaly, except in the eastern regions (e.g. *Aragón*), where a slightly negative anomaly reflects the rainfall deficit and hot temperature during the summer.

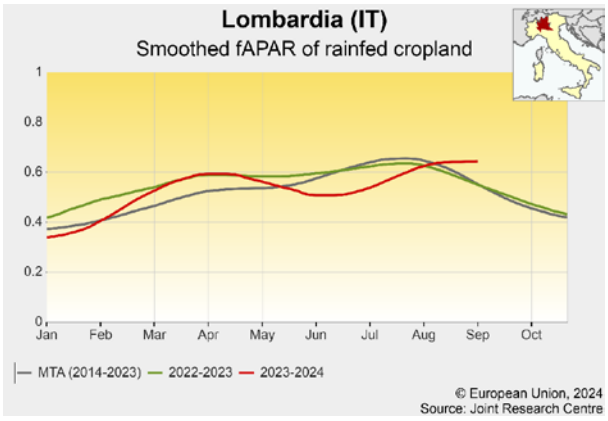
In northern **Italy** (e.g. *Lombardia*), a delay in growing phenology is apparent from the fAPAR time series, although overall biomass accumulation appears to be in line with the MTA. In **France**, **Belgium** and western and central **Germany**, a positive anomaly is observed, driven by a combination of shifted phenology (due to late sowing) and above-average biomass accumulation supported by well-distributed summer rainfall. The **United Kingdom** experienced abundant rainfall and below-average temperatures, resulting in a longer-than-normal senescence phase and a slight positive anomaly.

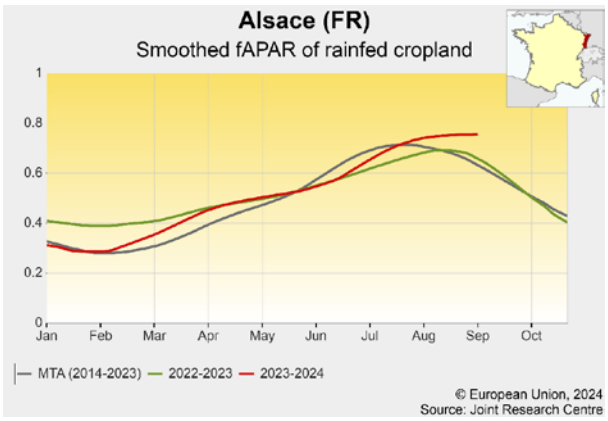
In south-eastern **Germany**, **Austria** and south-western **Czechia**, biomass accumulation follows the MTA, as summer crops began to suffer from rainfall deficits in mid August. In eastern **Germany** and western **Poland**, the overall forecast for summer crops remains positive, but the rain deficit in August lowered soil moisture levels and caused the early ripening of summer crops. In eastern **Poland** and the **Baltic countries**, spring cereals reached the end of their cycle in August, at a pace ahead of the average, reflecting an advanced season.

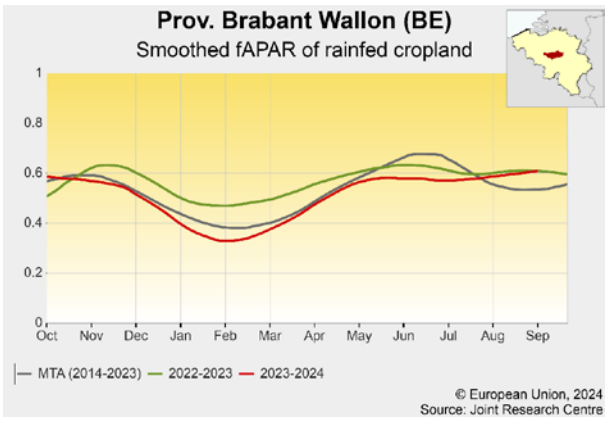
In **Slovakia**, **Hungary** and western **Romania**, the rain deficit, which has affected the region since early July, significantly affected biomass accumulation. In western **Türkiye**, **Bulgaria**, southern and eastern **Romania** and southern **Ukraine**, the drought is even more severe, with

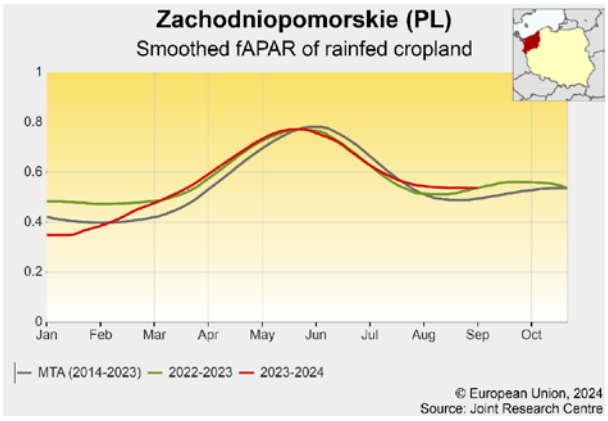
a persistent strong negative fAPAR anomaly evident throughout the summer.

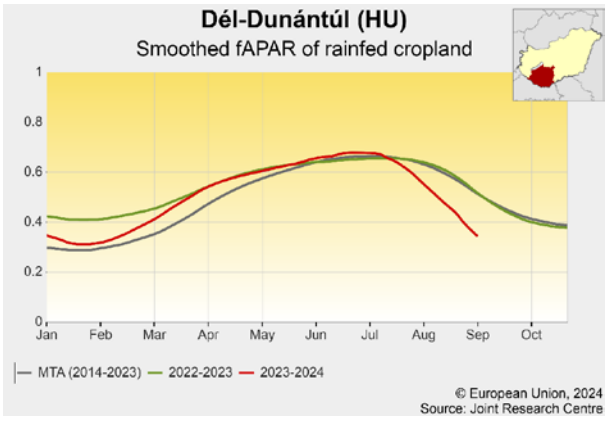


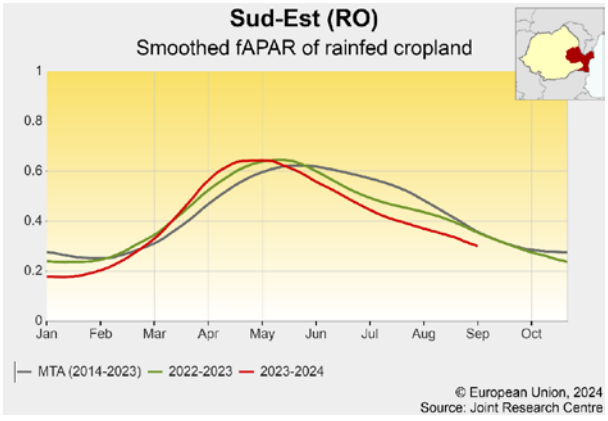


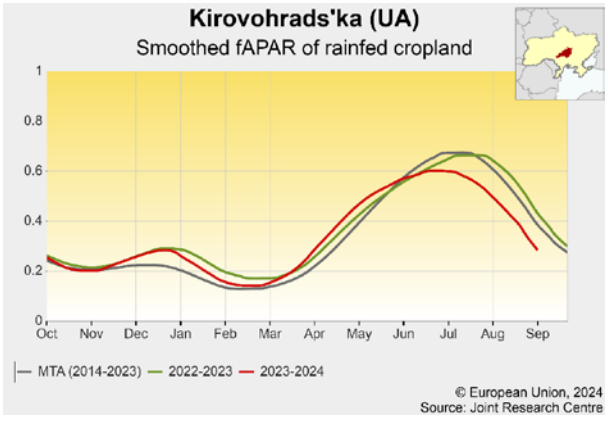










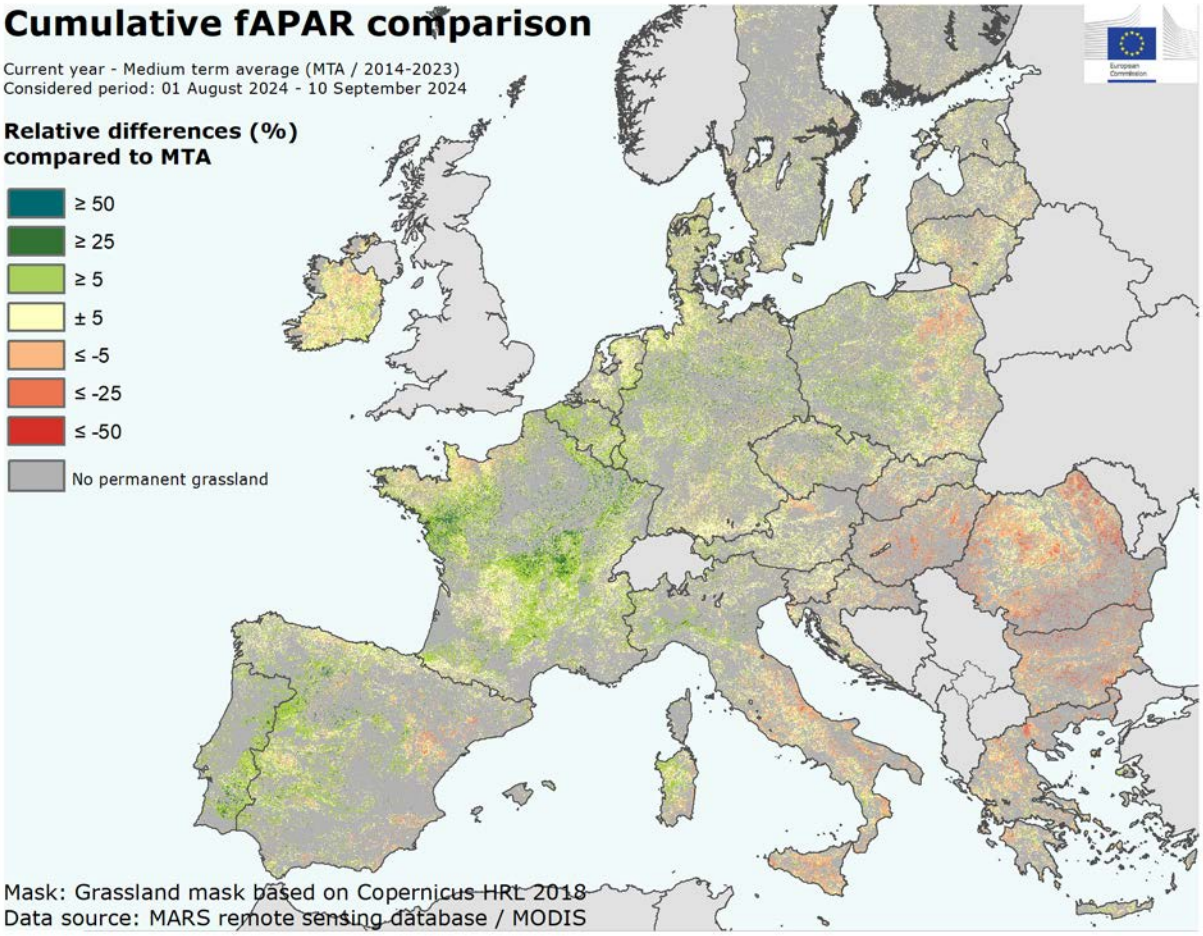


3. Grassland and fodder monitoring

Heat and rain deficits further reduce yield potential in the east

Western and northern Europe saw a continuation of adequate conditions for grassland biomass accumulation and the development of fodder crops. In central and eastern Europe, grasslands were hit by an extreme heatwave from mid August to September, regionally paired with a rainfall deficit that lowered the yield potential in grasslands, before a significant temperature drop and heavy precipitation led to extensive flooding in central Europe.

The map below displays the differences between the fAPAR accumulated from 1 August to 10 September 2024 and the MTA (2014–2023) for the same period. Positive anomalies (in green) reflect above-average photosynthetic activity and biomass accumulation, while negative anomalies (in red) reflect the opposite.



In **Ireland**, grassland productivity is expected to return to average levels, despite drier-than-usual conditions in the *Southern* and *Eastern and Midlands* regions and a slight radiation deficit. In **France**, adequate temperatures and precipitation maintained grassland productivity above average, despite locally limited field access due to excessive rainfall in some regions such as *Aquitaine*. Green maize yield expectations improved thanks to the adequate conditions. In the **Benelux** countries and western **Germany**, grasslands and green maize benefited from favourable weather conditions, but the late-sown fodder crops are not expected to fully catch up in growth and development, which is expected to lead to below-average yields. In northern **Germany**, **Denmark**, **Sweden** and **Finland**, favourable conditions with adequate temperatures, average radiation and well-distributed rainfall sustained biomass production at close-to-average or slightly above-average levels. In **Estonia** and **Latvia**, warmer-than-usual temperatures, coupled with close-to-average or above-average radiation, benefited grassland development.

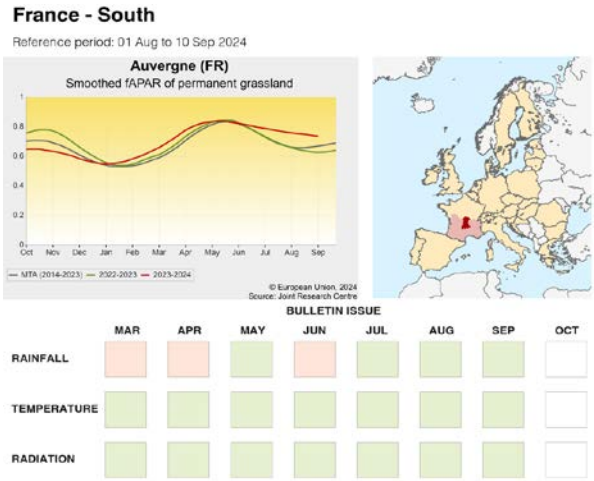
In **Lithuania** and eastern **Poland**, the relatively scarce rainfall reduced growth potential, with the fAPAR signal locally dropping below the MTA. In western **Poland** and

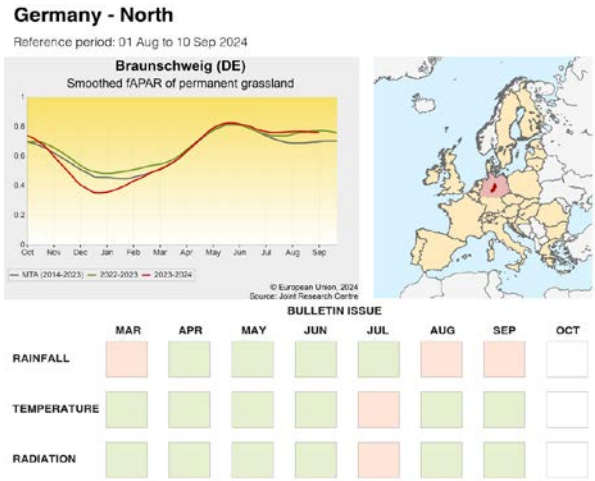
central and eastern **Germany**, the lack of rainfall pressured grassland development as well, but the fAPAR signals remain above average. In **Austria**, **Czechia**, **Slovakia** and southern and eastern **Hungary**, exceptionally high temperatures were accompanied by a severe rain deficit that resulted in below-average pasture productivity. However, heavy precipitation from 11 to 14 September led to flooding that will most probably affect grasslands and non-harvested fodder crops, especially in Austria, Czechia, southern Poland, western Slovakia and northern Hungary and along the Danube River. Estimates of its impacts are yet to be made.

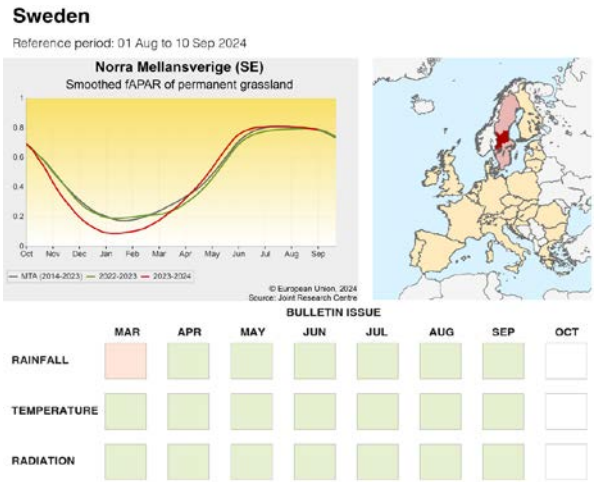
In **Croatia** and **Slovenia**, high temperatures and a rainfall deficit resulted in a notable decline in grassland productivity, but precipitation in the first half of September in both countries is expected to benefit growth.

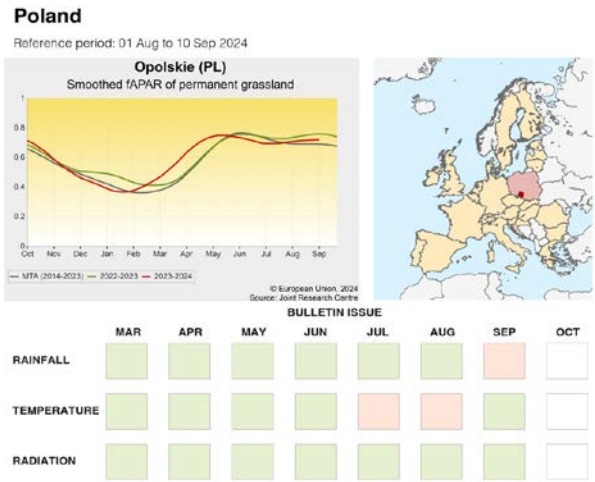
In **Romania** and **Bulgaria**, the persistent hot and dry weather further compromised the biomass accumulation of grassland and fodder crops, resulting in very low yields, as shown by the significantly lower-than-average fAPAR signals. Rain at the end of the review period somewhat mitigated the negative effect of severe heat stress in eastern **Romania**, but caused flooding as well.

In northern **Italy**, grasslands, notably those at low altitude, suffered from the constantly hot weather, which hampered biomass accumulation. Green maize also suffered from the very high temperatures as well as from humid conditions that favoured the spread of pests and diseases. In northern **Spain** and **Portugal**, above-average temperatures and widespread rainfall sustained average to above-average biomass accumulation. In **Greece**, **Cyprus** and southern **Spain**, **Portugal** and **Italy**, the dormancy phase of grasslands continued throughout the reporting period and is now gradually coming to an end.



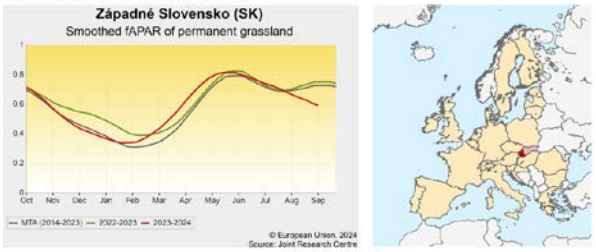






Slovakia

Reference period: 01 Aug to 10 Sep 2024

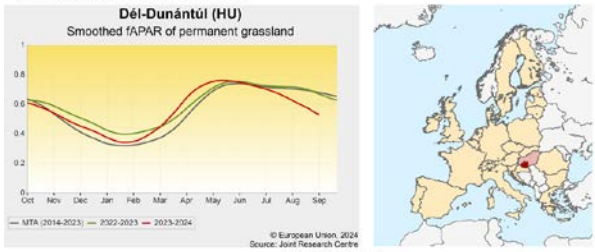


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL								
TEMPERATURE								
RADIATION								

Hungary

Reference period: 01 Aug to 10 Sep 2024

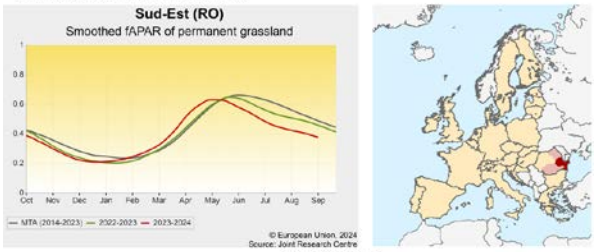


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL								
TEMPERATURE								
RADIATION								

Romania - East and South

Reference period: 01 Aug to 10 Sep 2024

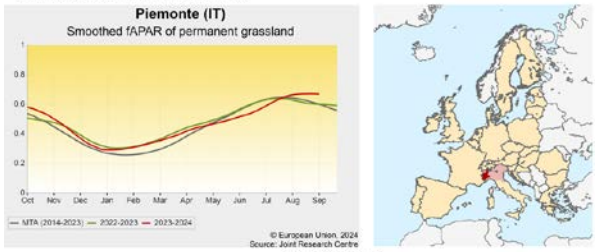


BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL								
TEMPERATURE								
RADIATION								

Italy - North and central

Reference period: 01 Aug to 10 Sep 2024



BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL								
TEMPERATURE								
RADIATION								

4. Rice in Europe

Positive outlook for rice in Europe

The growing season in many of Europe's rice-producing regions was marked by heatwaves and high peak temperatures. The rice crops in most of these regions withstood these conditions well and performed above the average. However, the rice-producing districts in Bulgaria and Romania were negatively affected during the vegetative and/or reproductive stages. Our rice yield forecast at the EU level is set at 6.78 t/ha, 6 % above the 5-year average.

This season in **Italy** saw a nearly 15-day delay in rice development due to frequent rainy events during April's sowing phase and the June–July vegetative phase; however, this delay was partly recovered over the summer. In August and September, daily temperatures, air humidity and solar radiation exceeded the LTA, providing excellent growth conditions for rice during late vegetative, reproductive and ripening stages. An increase of 16 000 ha in the rice-sown area (+ 7.5 % from 2023) is reported. Our satellite image analysis shows above-average biomass accumulation, particularly in the north-eastern rice-growing areas (e.g. *Verona*, *Ferrara*); simulation results show low biotic risk pressure. The crop is approaching the harvesting period, and our yield forecast is above the 5-year average.

In **Spain**, there was a 15-day delay in rice development in *Andalucía*, due to the low temperatures in June. However, satellite data analysis shows above-average biomass accumulation at heading. The rice-growing districts of *Extremadura* had a season mostly in line with or moderately above the MTA in terms of biomass accumulation. In this region, some cases of high insect pressure (*Eysarcoris ventralis*) were observed. In the rice-growing districts of *Valencia*, a heatwave during the period from 25 July to 10 August (T_{max} > 34 °C) had a moderately negative impact on rice during the reproductive phase. The rice conditions in *Cataluña* are in line with an average season and there is below-average biotic pressure. Harvesting is about to start and our rice yield forecast for Spain is above the 5-year average.

Rice in **Greece** is faring well despite an extended hot summer. July was particularly hot, with average daily temperatures 3–5 °C above the LTA and maximum temperatures reaching above 36 °C. However, constant availability of irrigation water sustained crop growth and development, preventing any negative impact. The crop is at the end of the ripening stage and the harvest is expected to start in early October. Our forecast is above the 5-year average.

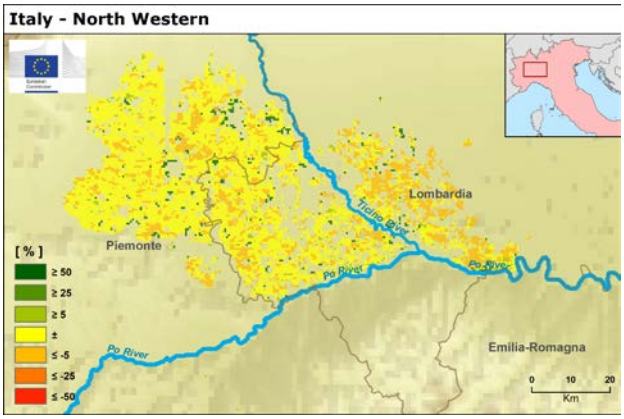
Favourable weather conditions prevailed in the rice-growing districts of **Portugal**. Satellite imagery analysis shows there was an initial delay in development in *Alentejo*, which was recovered at the beginning of flowering. To the north, in the region of *Centro*, rice biomass accumulation improved to above-average levels after the flowering period. Our yield forecast is above the 5-year average.

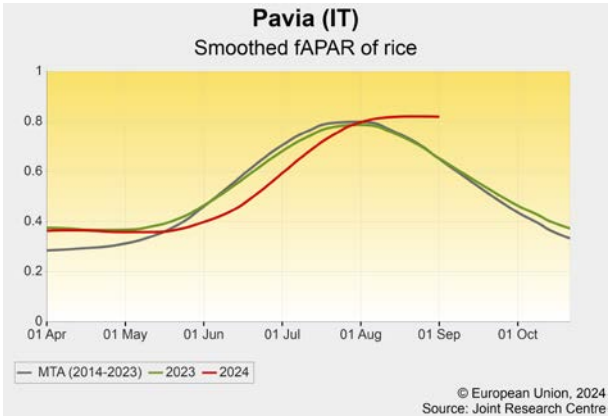
Rice crops in southern **France** (*Bouches-du-Rhône*) were not affected by the heatwave in August, which was not severe enough to hamper crops during flowering. Monitored biomass accumulation levels have been above average since mid August. Our yield forecast is above the 5-year average.

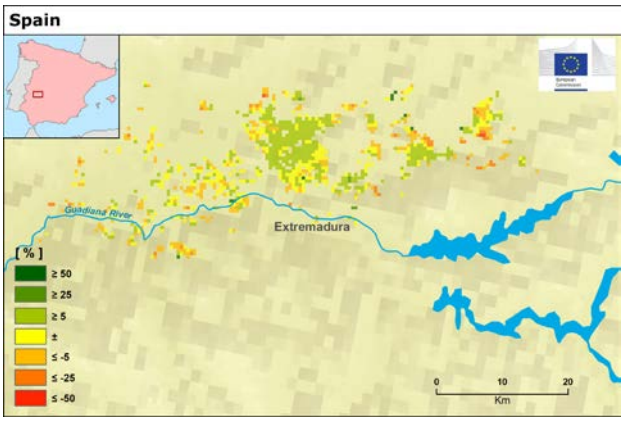
In **Bulgaria**, the rice season was characterised by exceptionally hot and dry weather. The high temperatures hampered crops during the reproductive phase at the end of July, while drought affected the supply of water to the fields. Satellite images confirm below-average biomass accumulation. Harvesting is about to be started. Our forecast is below the 5-year average.

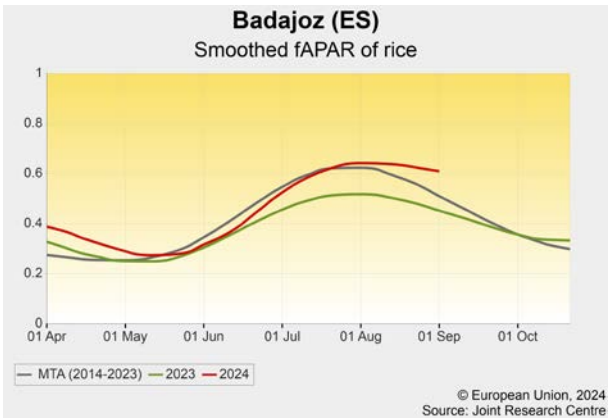
In **Romania**, the main rice-growing regions were affected by anomalous temperatures during the vegetative phase. During 10–18 July, the average daily temperatures were 4–6 °C above the LTA, and the maximum daily temperatures were consistently above 36 °C. As a result, our yield forecast has been revised downwards, below the 5-year average.

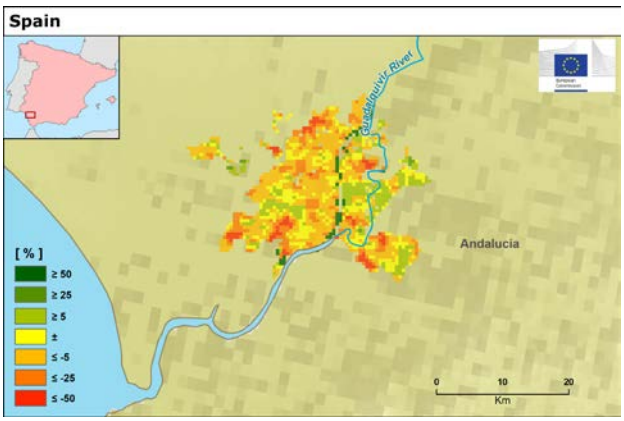
The main rice-growing districts of **Hungary** (i.e. *Jász–Nagykun–Szolnok*, *Békés*) experienced near-average precipitation levels and above-average temperatures during most of the season, without reaching critical extremes. Rice growth advanced by nearly 10 days compared with an average season. Remote sensing and modelled biomass indicators indicate above-average growing conditions. Our forecast for the final yield is above average.

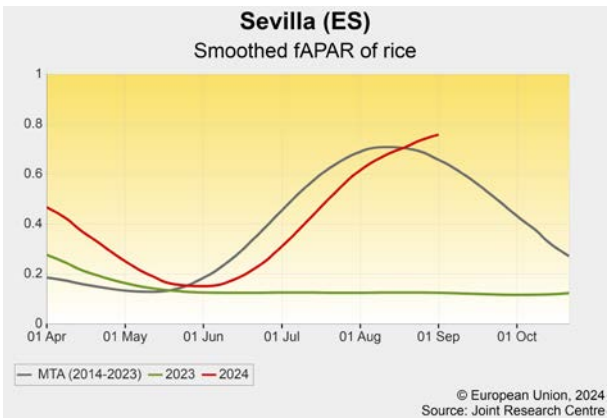

Italy - North Western
Lombardia
Piemonte
Emilia-Romagna
Ticino River
Po River
[%]
≥ 50
≥ 25
≥ 5
±
≤ -5
≤ -25
≤ -50
0 10 20
Km

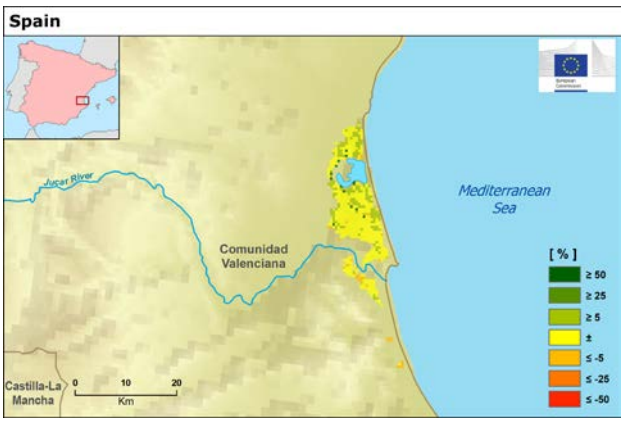

Pavia (IT)
Smoothed fAPAR of rice
1
0.8
0.6
0.4
0.2
0
01 Apr
01 May
01 Jun
01 Jul
01 Aug
01 Sep
01 Oct
MTA (2014-2023)
2023
2024
© European Union, 2024
Source: Joint Research Centre

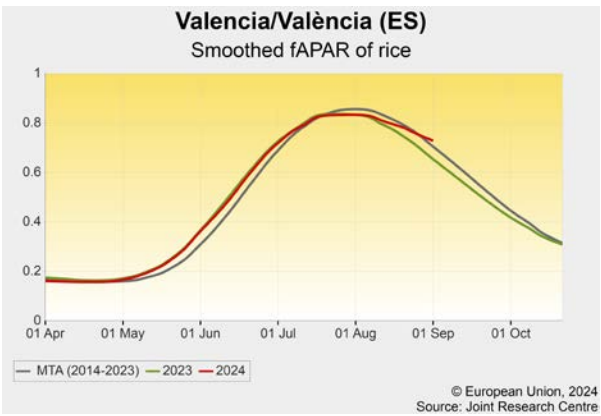

Spain
Extremadura
Guadiana River
[%]
≥ 50
≥ 25
≥ 5
±
≤ -5
≤ -25
≤ -50
0 10 20
Km

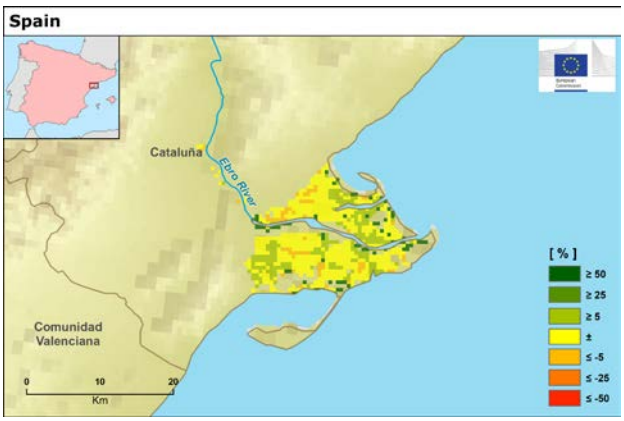

Badajoz (ES)
Smoothed fAPAR of rice
1
0.8
0.6
0.4
0.2
0
01 Apr
01 May
01 Jun
01 Jul
01 Aug
01 Sep
01 Oct
MTA (2014-2023)
2023
2024
© European Union, 2024
Source: Joint Research Centre

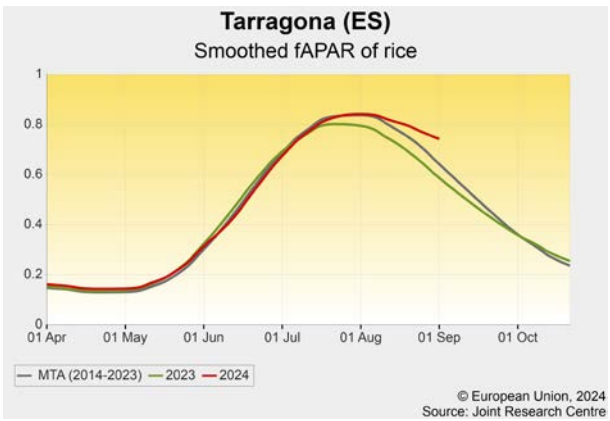

Spain
Andalucia
Guadalquivir River
[%]
≥ 50
≥ 25
≥ 5
±
≤ -5
≤ -25
≤ -50
0 10 20
Km

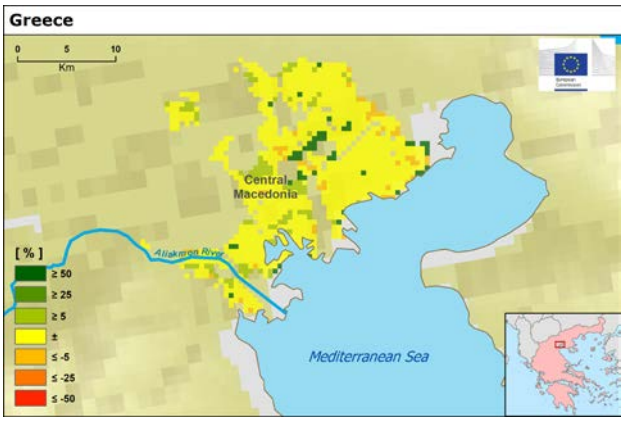

Sevilla (ES)
Smoothed fAPAR of rice
1
0.8
0.6
0.4
0.2
0
01 Apr
01 May
01 Jun
01 Jul
01 Aug
01 Sep
01 Oct
MTA (2014-2023)
2023
2024
© European Union, 2024
Source: Joint Research Centre

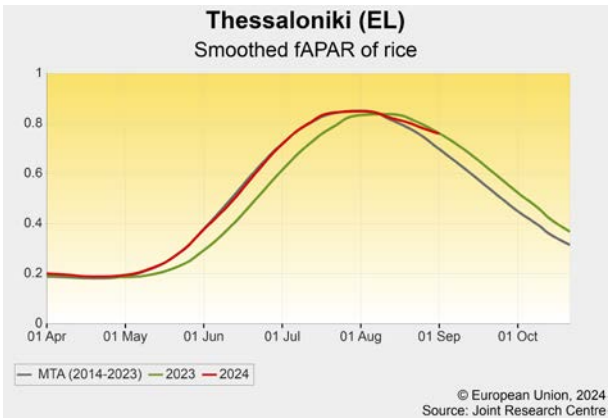

Spain
Mediterranean Sea
Comunidad Valenciana
Castilla-La Mancha
Jucar River
[%]
≥ 50
≥ 25
≥ 5
±
≤ -5
≤ -25
≤ -50
0 10 20
Km

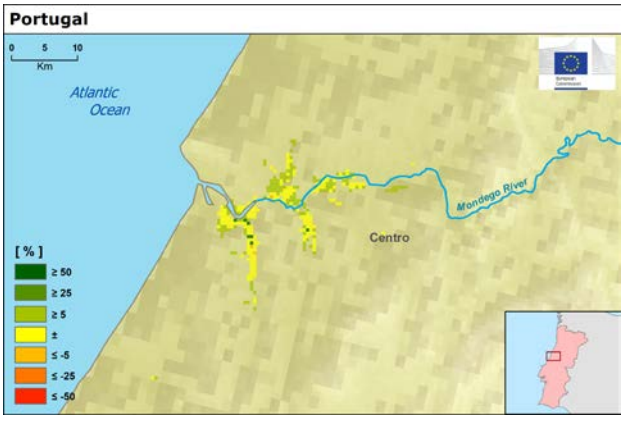

Valencia/València (ES)
Smoothed fAPAR of rice
1
0.8
0.6
0.4
0.2
0
01 Apr
01 May
01 Jun
01 Jul
01 Aug
01 Sep
01 Oct
MTA (2014-2023)
2023
2024
© European Union, 2024
Source: Joint Research Centre

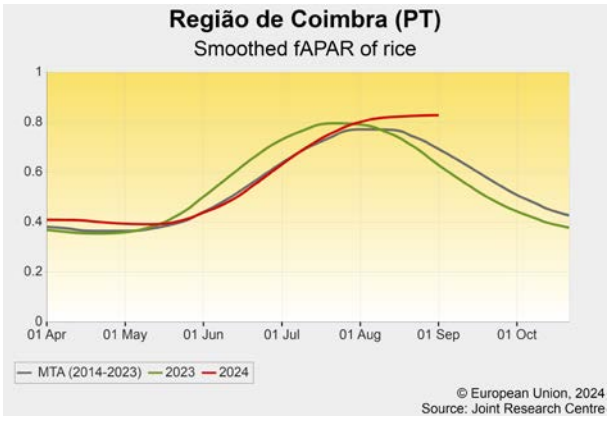

Spain
Cataluña
Ebro River
Comunidad Valenciana
[%]
≥ 50
≥ 25
≥ 5
±
≤ -5
≤ -25
≤ -50
0 10 20
Km

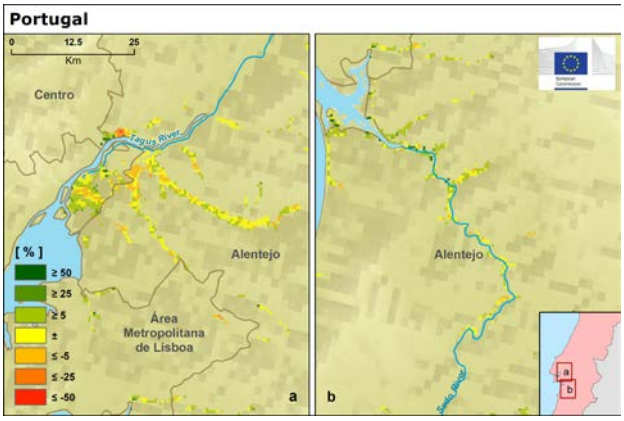

Tarragona (ES)
Smoothed fAPAR of rice
1
0.8
0.6
0.4
0.2
0
01 Apr
01 May
01 Jun
01 Jul
01 Aug
01 Sep
01 Oct
MTA (2014-2023)
2023
2024
© European Union, 2024
Source: Joint Research Centre

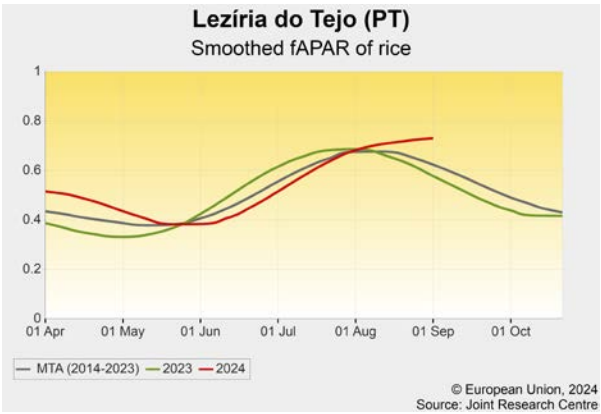

Greece
0 5 10
Km
Central Macedonia
Aliakmon River
[%]
≥ 50
≥ 25
≥ 5
±
≤ -5
≤ -25
≤ -50
Mediterranean Sea

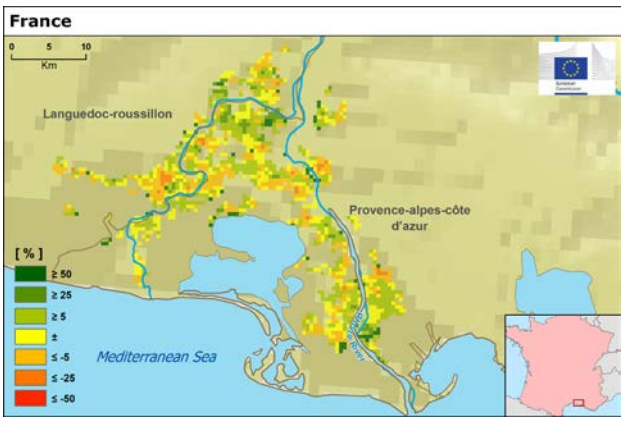

Thessaloniki (EL)
Smoothed fAPAR of rice
1
0.8
0.6
0.4
0.2
0
01 Apr
01 May
01 Jun
01 Jul
01 Aug
01 Sep
01 Oct
MTA (2014-2023)
2023
2024
© European Union, 2024
Source: Joint Research Centre

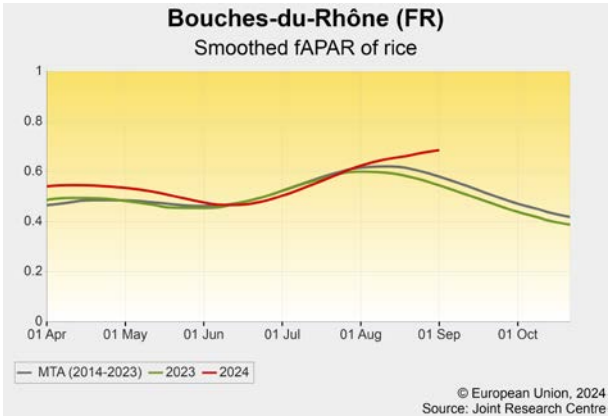

Portugal
0 5 10
Km
Atlantic Ocean
Mondego River
Centro
[%]
≥ 50
≥ 25
≥ 5
±
≤ -5
≤ -25
≤ -50

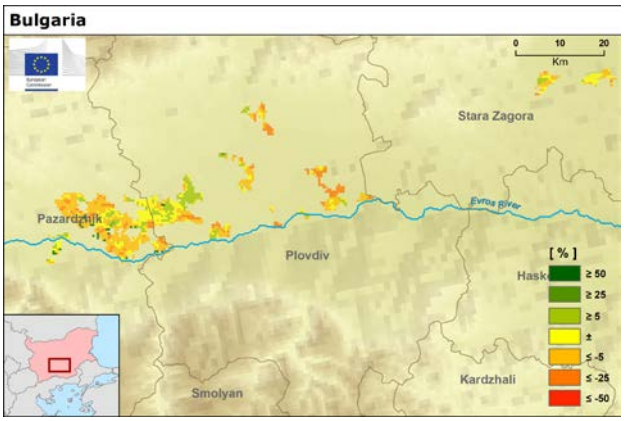

Região de Coimbra (PT)
Smoothed fAPAR of rice
1
0.8
0.6
0.4
0.2
0
01 Apr
01 May
01 Jun
01 Jul
01 Aug
01 Sep
01 Oct
MTA (2014-2023)
2023
2024
© European Union, 2024
Source: Joint Research Centre

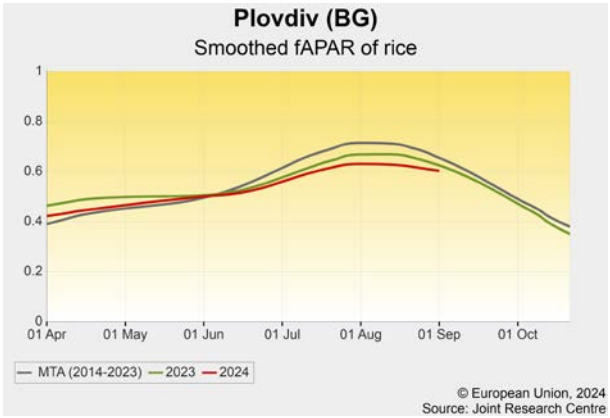

Portugal
0 12.5 25
Km
Centro
Tagus River
Alentejo
Área Metropolitana de Lisboa
[%]
≥ 50
≥ 25
≥ 5
±
≤ -5
≤ -25
≤ -50
a
b

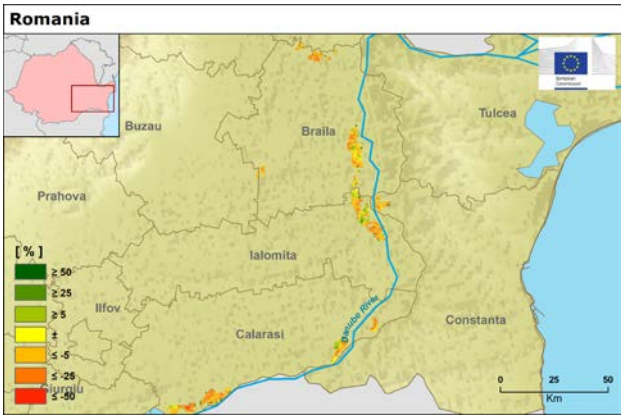

Lezíria do Tejo (PT)
Smoothed fAPAR of rice
1
0.8
0.6
0.4
0.2
0
01 Apr
01 May
01 Jun
01 Jul
01 Aug
01 Sep
01 Oct
MTA (2014-2023)
2023
2024
© European Union, 2024
Source: Joint Research Centre

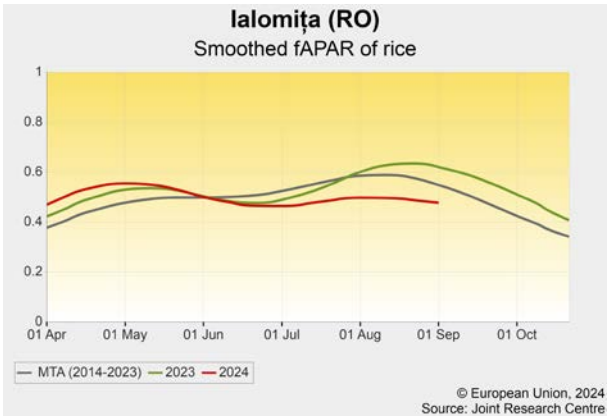


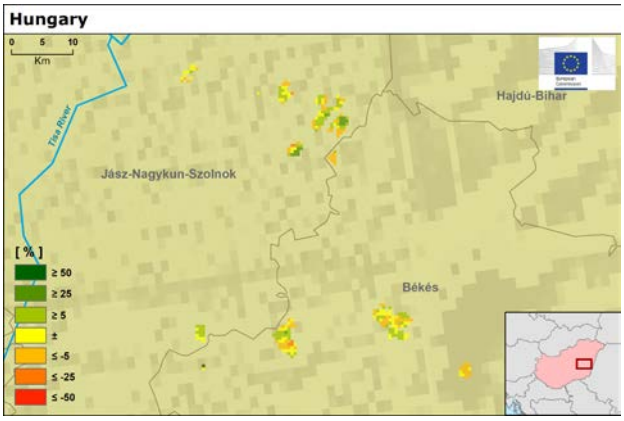


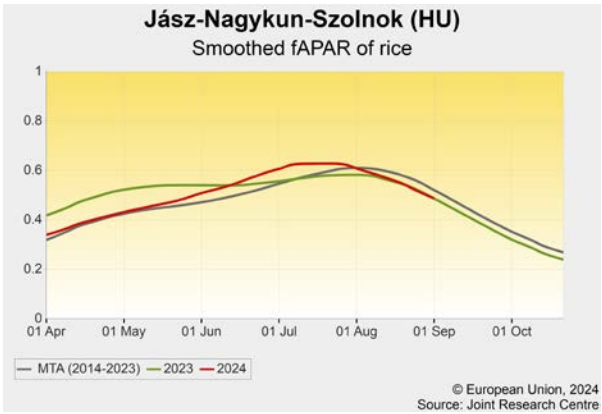












The maps above display the difference between the fraction of absorbed photosynthetic active radiation (fAPAR) accumulated from 1 June to 10 September 2024 and the medium-term average (2014–2023) for the same period. Mask: Rice-growing areas based on CLC 2018. Data source: JRC MARSOP6 remote sensing database / MODIS.

5. Country analysis

5.1. European Union

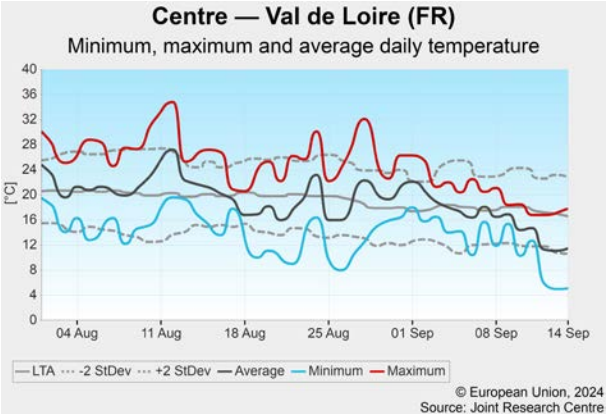
France

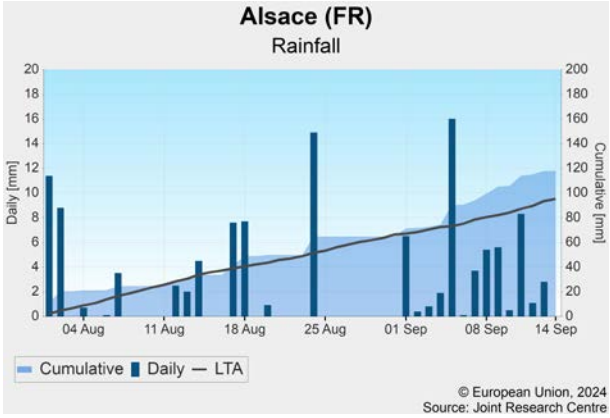
Overall positive outlook for summer crops

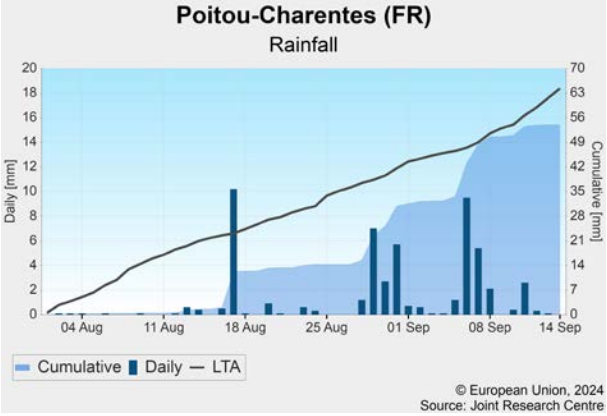
France experienced varied weather conditions this review period, with western areas facing a rainfall deficit until mid-August, while the east and north received above-average rainfall. Despite these regional differences, the overall outlook for summer crops remains positive.

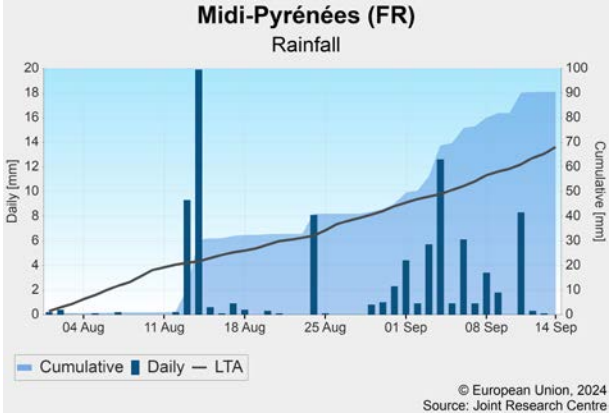
France experienced average rainfall during the review period, although the temporal distribution was marked by significant disparities. Western and southern France faced some rain deficits from July to mid-August, resulting in dry conditions that impacted various regions. Conversely, the second half of August and early September saw a notable increase in rainfall, replenishing the region's water reserves. In contrast, eastern and northern France received regular rainfall throughout the review period, maintaining optimal soil moisture levels. From a temperature perspective, western France remained close to average throughout the review period, while eastern France experienced temperatures ranging from 0.5-2.5°C above the LTA.

Summer crops are still behind in development due to the delayed sowing and cooler-than-usual temperatures during spring and early summer. However, despite this initial setback, crop development is expected to fully catch up, allowing the crops to reach maturity by the end of the season. The close-to-average weather conditions in northern and eastern France were highly beneficial for summer crops. The dry conditions that prevailed in western and southern France hampered grain filling, but the yield outlook remains above average. The overall outlook for summer crops at national level is also positive. The yield forecasts for all crops have been revised upwards. The rapeseed sowing campaign is progressing well.









Germany

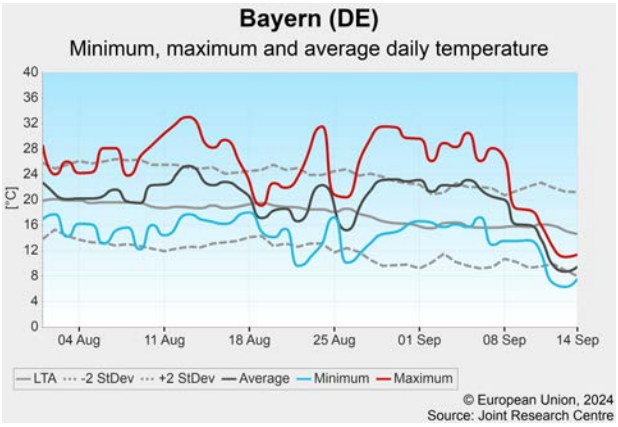
Hot and dry weather depleted soil moisture and caused early harvest

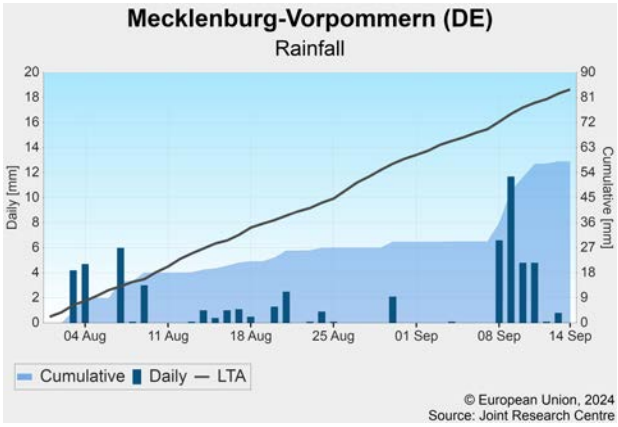
A warm and dry August and temperatures at a record-breaking high at the start of September dried soils in eastern and central Germany and caused the grain maize harvest to be brought forward. Winter crops are being sown and will need additional rain during emergence.

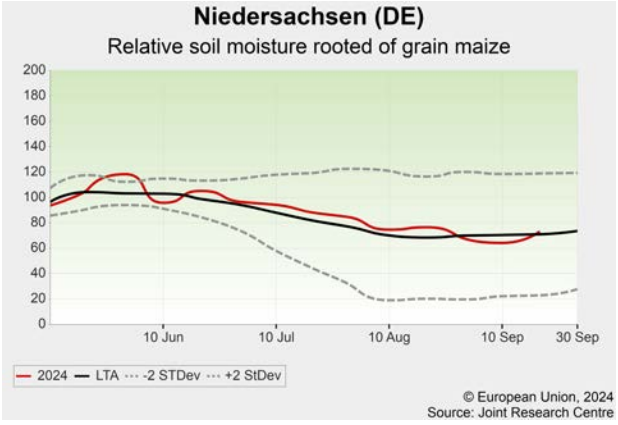
Above-average temperatures have been recorded since the second dekad of August, with maximum temperatures up to 35 °C. Rainfall during the reporting period was average, except in the dry north-east and in the east and centre, where it remained well below average until 7 September, further increasing the soil water deficit there. Rainfall since 8 September has brought some relief to the depleted soils. Heavy rainfall has occurred in *Sachsen* and *Bayern* since 12 September.

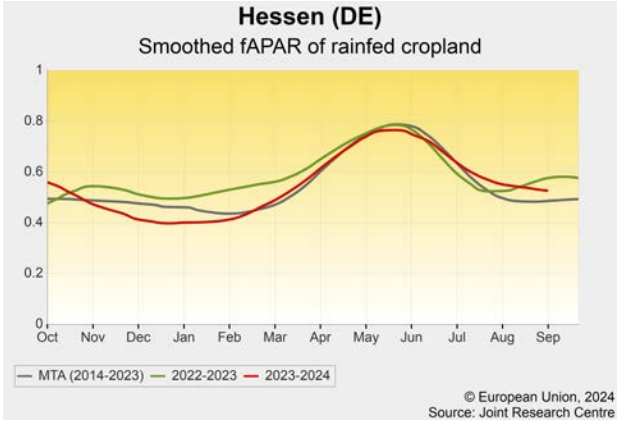
The winter crop harvest ended in mid August and the spring barley harvest concluded by the end of August. The start of the winter crop sowing campaign benefited from the rain-free days around mid August, and has been accomplished already for winter rapeseed; for other winter crops, sowing is still ongoing. Summer crops generally benefited from the warm and dry weather. The grain maize harvest started early, most notably in the north-east, due to the hot and dry weather, which threatened to reduce grain quality. Potatoes and sugar beet benefited from the warm weather, abundant radiation and drying soils of the review period. However, the overly wet conditions during emergence and high pest pressure early in the season have prevented high potato yields this year. The recent heavy rainfall in the south could affect summer crops and already-sown winter crops, but the quantification cannot yet be done reliably.

Our yield forecasts for green and grain maize remain largely unchanged, while sunflower yields have been corrected upwards due to above-average solar radiation input. Our yield forecasts for sugar beet and potatoes have been raised slightly above the 5-year average to reflect the recently positive conditions. Winter crop estimates have been left unchanged.









Poland

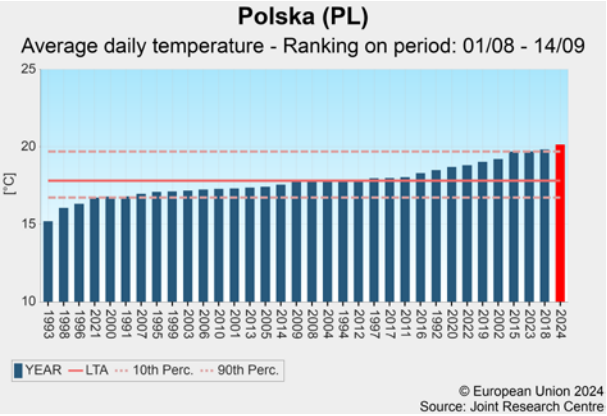
Positive summer crop yield forecast despite temporary soil water deficit

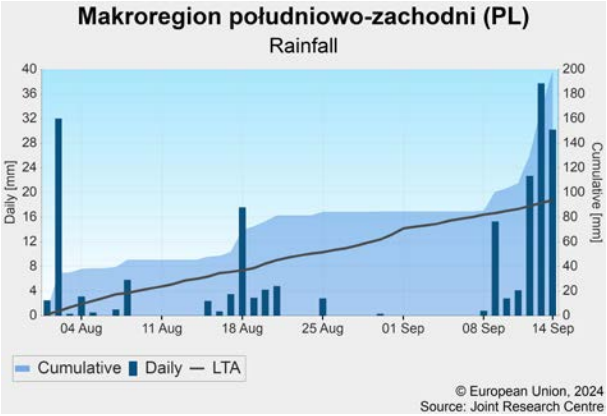
High temperatures paired with limited rainfall were beneficial for the harvest and sowing of winter crops, but put pressure on summer crops during the final development stages. Soil moisture was restored in time by returning precipitation, but heavy rainfall in the south-west created new stress.

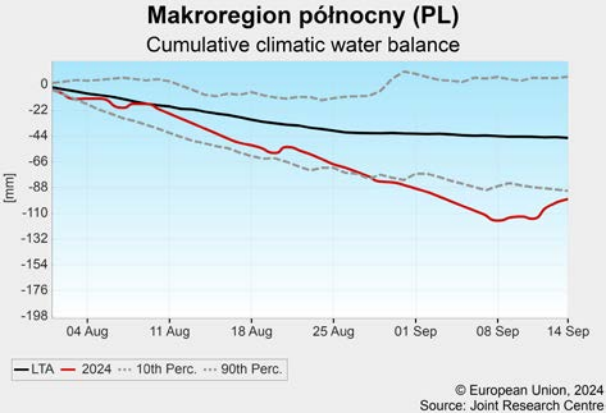
Average temperatures were recorded in the first half of August, followed by very high temperatures until the first week of September – locally surpassing 33 °C. Since then, cooler weather has been approaching from the west. At the same time, rainfall deficits were recorded in the north and east, while the centre and south profited from precipitation in early August but are now experiencing record rainfall and extensive flooding.

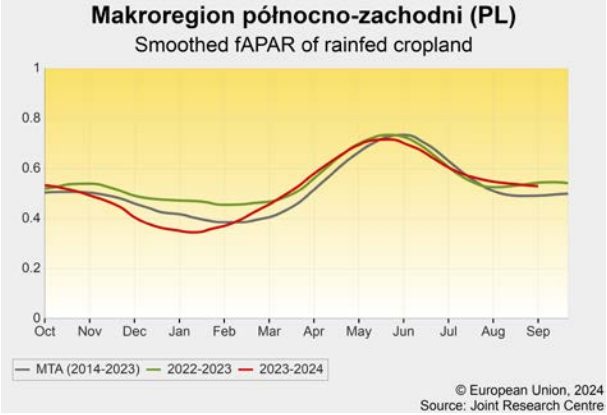
The winter crop harvest was completed in August, suggesting average yields at the national scale – notably best in the north, with lower yields in the south due to the dry conditions during grain filling. Rapeseed sowing started early around mid August, and emergence was facilitated by precipitation right beforehand. Since then, seedlings have started suffering from water deficit and high temperatures, which are increasing the need for additional rainfall – especially in the north-east. Summer crops benefited from the warm weather and local showers until mid August, maintaining appropriate soil moisture levels during flowering and the beginning of grain filling. Since mid August, the hot and dry weather has accelerated summer crop development, leading to an early start of the grain maize and sunflower harvest. The return of rainfall and average temperatures in the second dekad of September most likely arrived just in time to avoid further damage to potatoes and sugar beet, but the extreme precipitation in the south-west has caused local flooding with negative – but not yet quantifiable – impacts.

Our yield estimates for winter crops remain unchanged, while our yield forecasts for summer crops have been slightly adjusted within ± 1 %, but remain above the 5-year average.









Romania

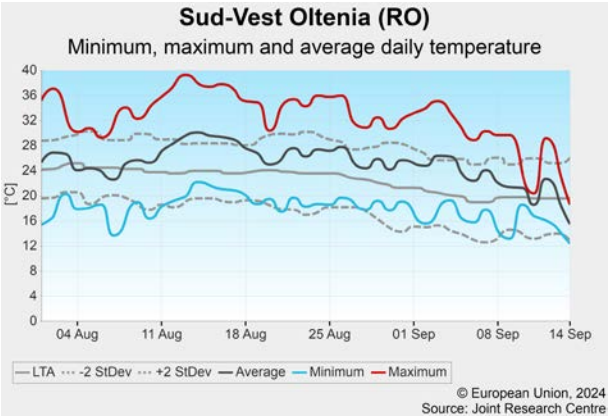
Very low summer crop yields

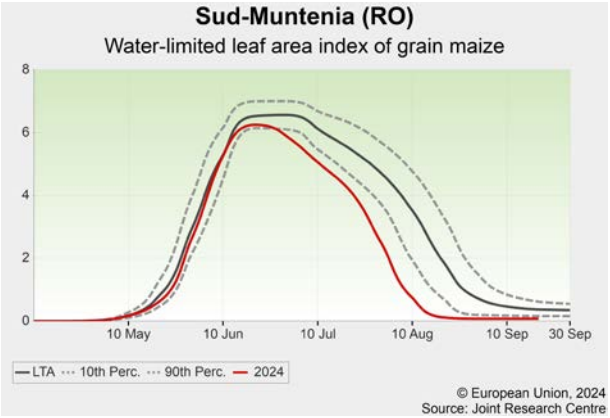
Drought and heatwaves further reduced the yield potential of summer crops. Consequently our yield forecasts have been revised downwards again. The harvest of sunflowers and maize started 3–4 weeks earlier than usual. Abundant rainfall in mid September caused losses and worsened the harvesting conditions.

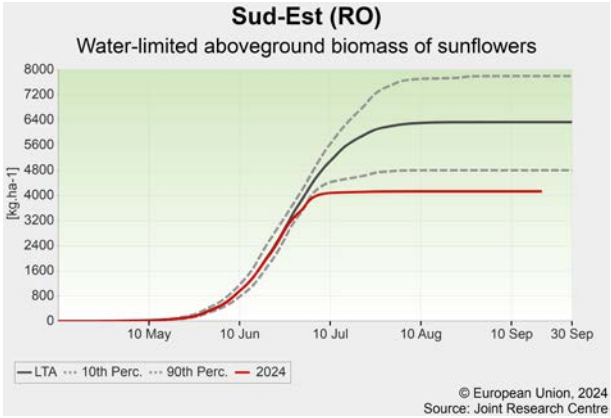
Extraordinarily hot and dry summer conditions persisted until the second dekad of September. Temperatures were on average 1.5 °C to 3.5 °C higher than usual, with daily maxima predominantly exceeding 30 °C, making this the warmest 1 August to 14 September period in our database. Temperatures returned to near or below seasonal levels during the second dekad of September.

Until 9 September, Romania experienced scarce (5–50 % of the LTA) rainfall in the western and southern regions. The central and north-eastern regions had a moderate rainfall deficit and received 40–70 mm of rain. Even there, a high evaporation demand constrained the improvement of soil moisture levels, which remained critically low in most of the country. In the last 4 days of the review period, ample and locally very heavy rainfall (up to 170 mm) occurred in the regions along the Moldavian and Hungarian borders and in *Sud-Muntenia*, causing floods and damage to crops.

In August, in addition to a severe soil water deficit, hot temperatures intensified the thermal stress, which led to early senescence and negatively affected the yield potential of grain maize and sunflowers. Harvest started in mid August and progressed well until mid September thanks to mostly dry conditions. Our yield forecast has been revised further downwards, to the level of the severe drought year 2022. Possible additional losses due to damage caused by the heavy rain and floods are still to be assessed. The rapeseed sowing campaign started in the second half of August, but was hampered by dry topsoils until 10 September, and by the heavy rainfall since then.







Spain and Portugal

Fair conditions overall for summer crops

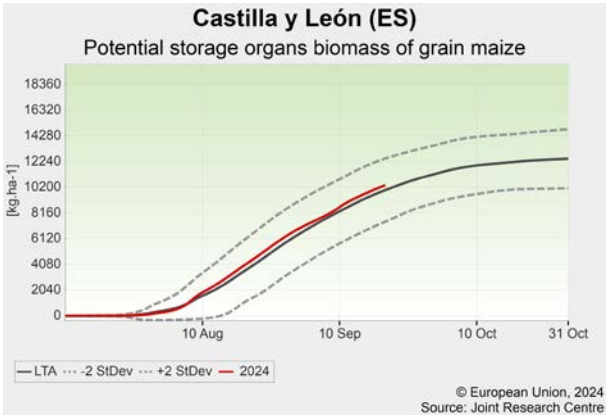
The moderation of temperatures after the early August heatwave, along with the availability of irrigation water throughout the growing season, has kept summer crops in fair condition across the Iberian Peninsula. Harvesting is progressing from south to north, with yield forecasts slightly above the 5-year average.

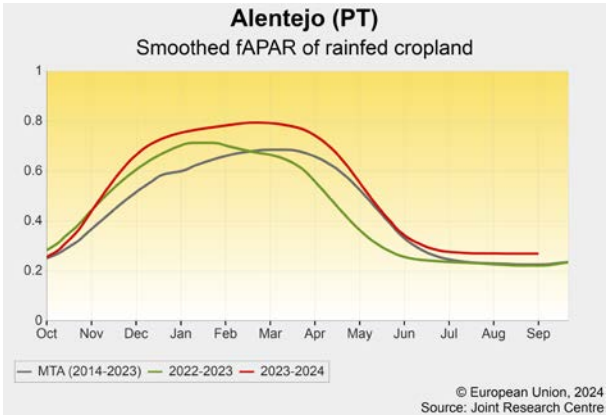
The southern and western parts of the peninsula did not receive significant rainfall during the review period, while the north-east experienced rainfall events in late August and early September. Although these rains caused some localized damage, they improved soil moisture conditions for the upcoming sowings (typically starting in mid-October), particularly in *Aragón* and southern *Cataluña*, two regions affected by drought this season.

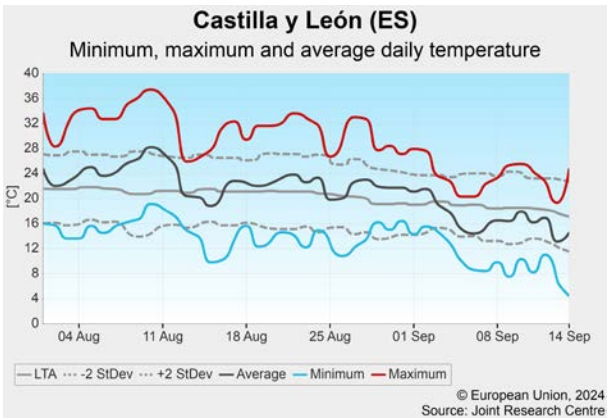
Following an intense heatwave during the first dekad of August, with peak temperatures reaching 35-40 ºC, conditions returned to normal, with some cooler-than-usual days in the second week of September. The moderate temperatures, combined with the availability of irrigation water, allowed summer crops to grow well in most regions.

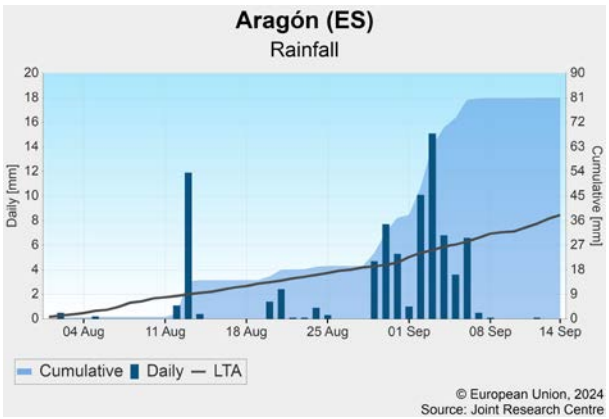
Grain maize harvest has begun in the south, while crops in the north are in the final stages of grain-filling. Sunflower harvest has begun in *Castilla La Mancha*, while crops are still ripening in *Castilla y León*. The sugar beet harvest is almost complete in *Andalucía*, with regional authorities[3] reporting positive yield estimates. Early potato varieties are being harvested in northern regions.

Our yield forecasts for grain maize, sunflower and sugar beet were revised slightly upwards, and are above the 5-year average. Our forecasts for potatoes and green maize remain around or slightly below the 5-year average.









Hungary

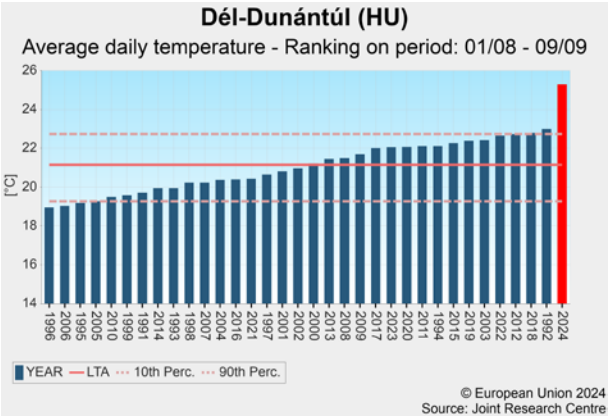
Reduced yield expectations

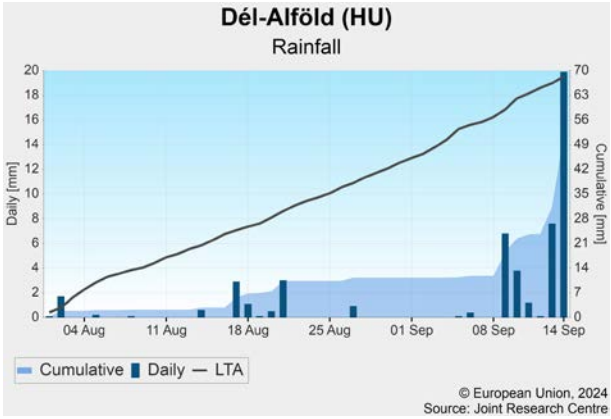
A rainfall deficit and high temperatures affected the yield formation of summer crops throughout the summer until early September. Abundant rainfall in September arrived too late to improve the yield potential but caused harvesting problems. Our yield forecasts are below the 5-year average.

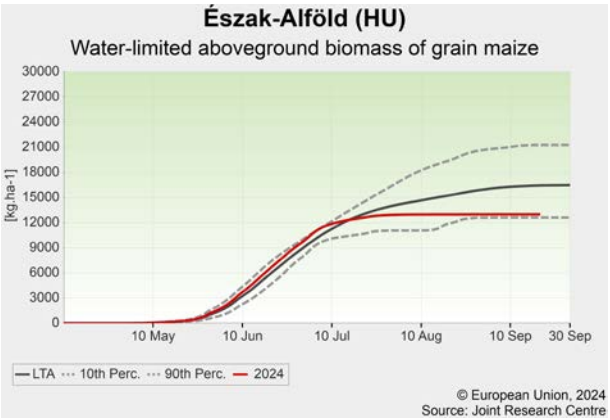
The drought conditions of July continued and even intensified in August. Daily temperatures were exceptionally high and exceeded the average by 2.5–4.5 °C until 10 September, when a sharp drop reduced maximum temperatures down to 15–20 °C. Between 1 August and 9 September, 24–36 hot days (T_{max} > 30 °C) were recorded, double to triple the expected frequency. This heatwave – and the summer as a whole – was by far the hottest in our 33-year archive.

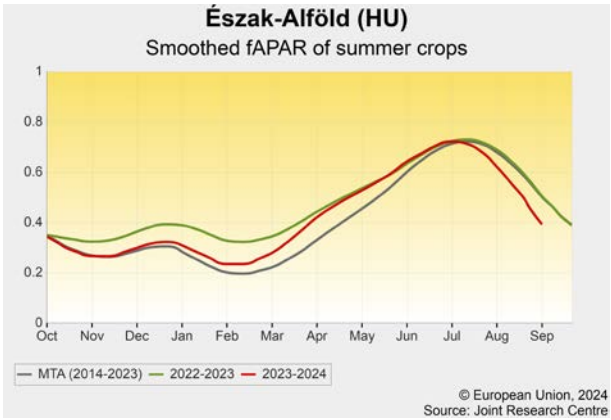
In August, precipitation remained well below the LTA; a rainfall deficit of 50–90 % affected most of the country, and only the region around the capital remained close to the LTA. In the second dekad of September, abundant and locally torrential precipitation occurred across Hungary (up to 130 mm in the west, 70 mm in the east), causing the local flooding of fields. The soil moisture deficit and heat stress during summer seriously affected the grain filling of summer crops, although the impact was less alarming in western Hungary. Crops in the east reached maturity 2–4 weeks earlier than normal. The strongly advanced crop cycle provided less time for grain filling and hence reduced yield formation. The rain in September arrived too late to compensate for the yield losses. Our yield forecast for summer crops has therefore been revised further downwards to below the 5-year average. The grain maize area could be affected by the drought and later by the flooding as well. In addition, both dry and over-wet conditions reduced the grain maize quality.

The sowing campaign of rapeseed was hampered and delayed by first too dry and then overly wet soil conditions.









Italy

A hot summer compromised summer crop potential in the north

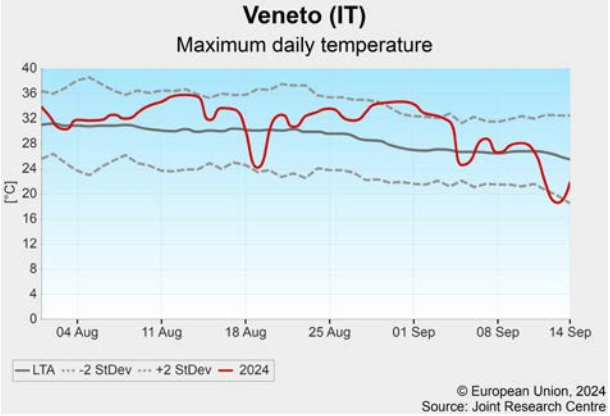
Summer crops suffered heat stress during storage organ formation, while the persistent hot and humid conditions favoured the spread of pests and diseases; as a consequence, yield potential decreased.

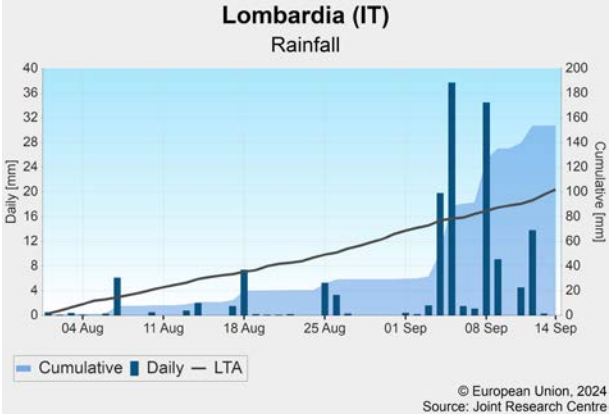
In the north, August was very hot, with three heatwaves (around 10, 25 and 30 August) when maximum temperatures were well above 30° C. Notably, the first heatwave had maximum temperatures of 38 °C in the central Po Valley and lasted 3 to 5 days. Cumulative rainfall was around average but concentrated in a few intense events. September started out as hot as August, but, after the end of the first week, temperatures decreased to average conditions, while intense rainfall occurred repeatedly, with daily totals up to 90 mm locally in *Lombardia*.

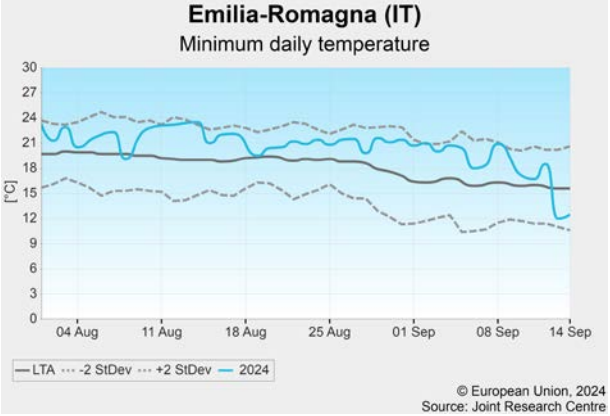
In northern Italy, the high temperatures of early August boosted maize growth, but the heat stress around 15 August, when flowering started, was suboptimal for flower fertility and grain filling. Soybean, which flowered later, did not suffer from the heat. The overall wet and hot conditions favoured pest and disease spread, especially in sugar beet cultivation. The harvest of summer crops started at the end of August for green maize, and will continue through September for other crops, 15 to 30 days later than usual.

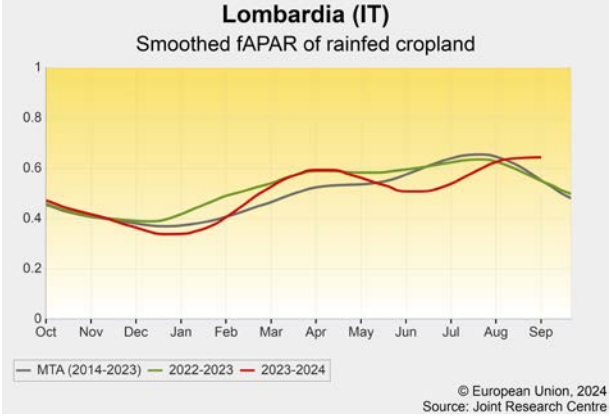
In central Italy, the sunflower season closed around 15 August, with a shortened grain-filling period due to the very high temperatures. In southern Italy, the growing season finished in June.

Our yield forecasts have been revised downwards to below average for sugar beet, green maize and sunflowers; they remain unchanged at average for grain maize, while increasing for soybean to above average.









Czechia, Austria and Slovakia

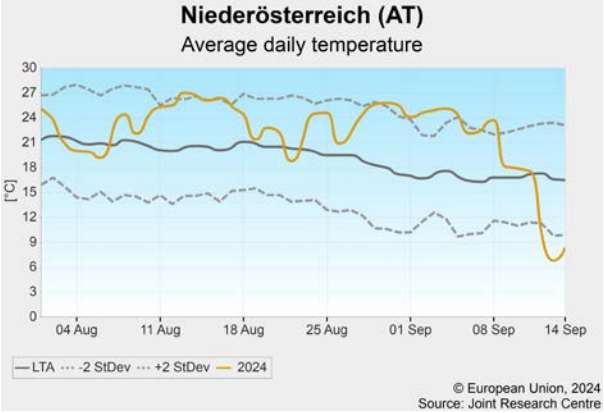
A hot and dry summer followed by heavy rain raised concerns for summer crops

A dry and hot August with a strong soil water deficit in Austria and Slovakia, followed by heavy rainfall in September in all three countries, diminished the yield expectations for summer crops.

During the review period, the three countries were exposed to a heatwave from the second dekad of August until early September. Average temperatures ranked as the warmest in our records for the review period. In addition, a lack of rainfall in Austria and Slovakia in the third dekad of August and the first dekad of September further deepened the soil moisture deficit already reported in the previous bulletin. The climatic water balance deficit exceeded twice the LTA in Slovakia. At the end of the review period, all three countries were hit by torrential rainfall. While the impacts of it are still difficult to quantify, the heavy rainfall further challenged the ripening and harvest of summer crops and the sowing of winter crops.

The dry and hot conditions in August triggered an earlier-than-usual desiccation of crops, which may eventually not be able to reach maturity and the required quality for harvest. The harvest of sunflowers was brought forward in some regions of Slovakia, shortening the growing season by 1 month, with lower-than-average yields expected. Overall, the harvest of summer crops has started in the three countries, and the recent rainfall and flooded fields will pose additional challenges to concluding the harvest successfully in affected regions.

Our yield forecasts for summer crops remain close to the historical trend, but have been revised downwards for sunflowers and grain maize in Austria and Slovakia, and for soybean in Austria.



Bulgaria

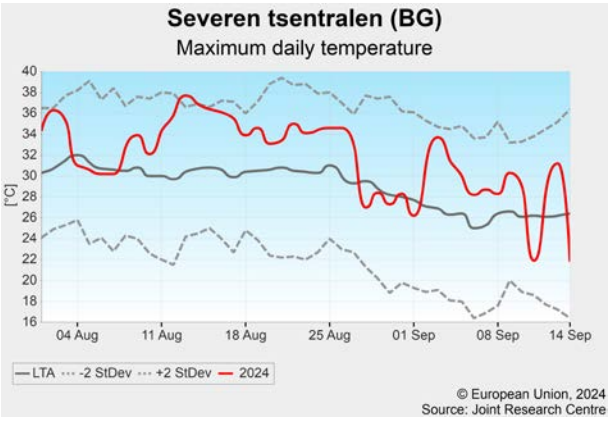
Worsened yield outlook for summer crops

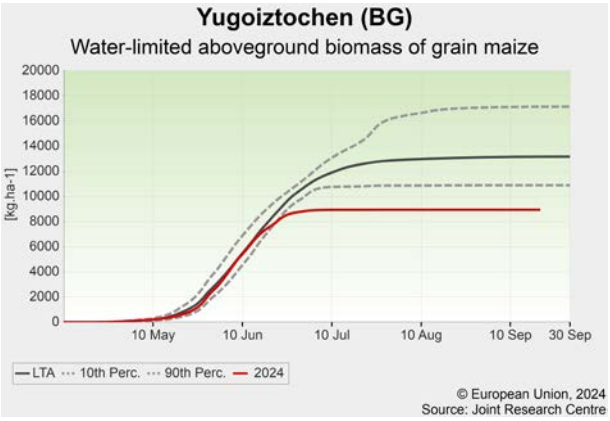
Continued hot and dry weather further compromised the yield formation of summer crops. The harvest campaign started early, with very low yield expectations. Rainfall in September arrived too late for summer crops, but improved the conditions for the sowing of winter rapeseed.

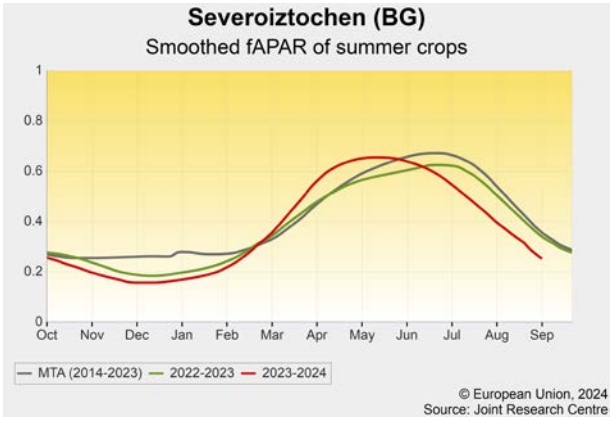
During the review period (1 August to 14 September), daily temperatures fluctuated above the LTA by 2–3° C. The number of hot days (with T_{max} > 30 °C) exceeded the LTA by 6–17 days and typically reached 25–37 days. After the dry June and July, extremely dry and hot weather conditions persisted in August. Rainfall varied from less than 20 mm in most northern and south-eastern regions to 20–40 mm in south-western regions. It increased in the first 2 weeks of September, when 20–60 mm was recorded in most regions, but the north-western regions remained dry.

The September precipitation arrived too late to be of benefit for summer crops, which, with few exceptions, had already reached maturity because of the highly accelerated crop phenological development driven by this summer's hot and dry conditions. Our yield forecasts for maize and sunflowers were revised substantially further downwards. Our current forecast for these crops is the worst in the past 15 years. The sunflower harvest campaign started in early August and has progressed well so far thanks to scarce rain. Maize harvesting began in late August.

Recent rainfall favourably increased soil moisture content, thus improving the conditions for the seedbed preparation, sowing and sprouting of winter rapeseed. However, the northern regions still suffer from the rainfall deficit.







Denmark and Sweden

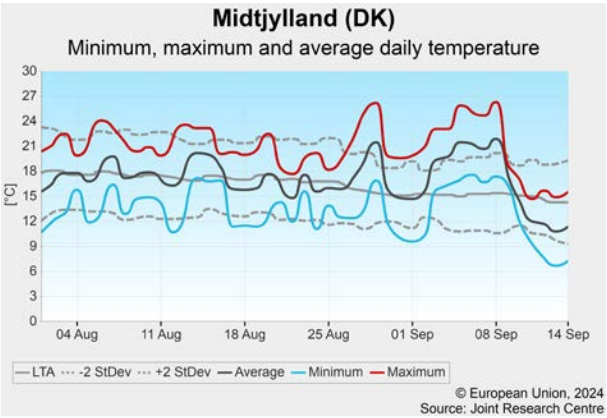
Grain harvest almost complete with moderate to average results

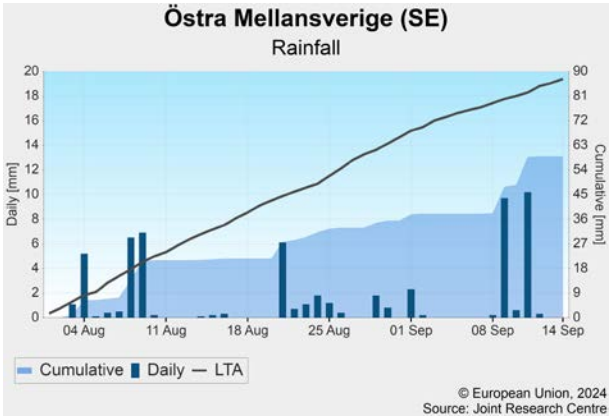
The winter crop and spring barley harvest has almost been completed under favourable conditions. However, grain yields remain below expectations in Denmark.

Rainfall totals have been close to normal in Denmark and western Sweden during the review period, while in the rest of Sweden, rainfall approximately – 30 % below average was observed. Well-distributed rainfall occurred in *Jutland* and *Västsverige*, while in *Sjælland* and some regions of Sweden, rainy days alternated with dry periods. Temperatures close to or above the LTA prevailed in both countries in August. During the first week of September, average temperatures were approximately 6 °C warmer than usual, before falling below the LTA after 10 September. Over the entire review period, a temperature accumulation surplus was reported. Cumulative radiation levels were close to or above normal.

The winter crop harvest has been completed, and the spring barley harvest should come to an end within the coming week. Large yield variations are expected in Denmark, for winter crops because of the very wet autumn and winter, and for spring crops because of the extended sowing period, as reported in previous bulletins. In addition, the impact of the overly wet conditions in spring in Denmark (especially *Jutland*) was probably underestimated, as suggested by the recently published results of national field trials ([5]) for wheat and barley.

Our grain forecasts have been revised further downwards to below the 5-year average in Denmark. In Sweden, the spring barley forecast has been revised sightly downwards but remains above the 5-year average. Summer crop forecasts remain close to the 5-year average. The autumn rapeseed sowing campaign is progressing well.





([5]) https://sortinfo.dk/#/.

Estonia, Latvia, Lithuania, Finland

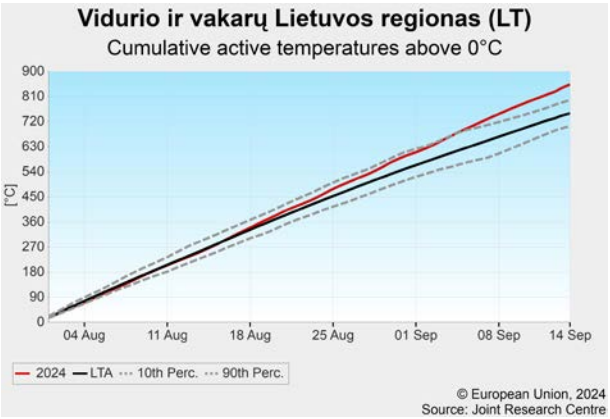
Grain harvest finishing with contrasting results

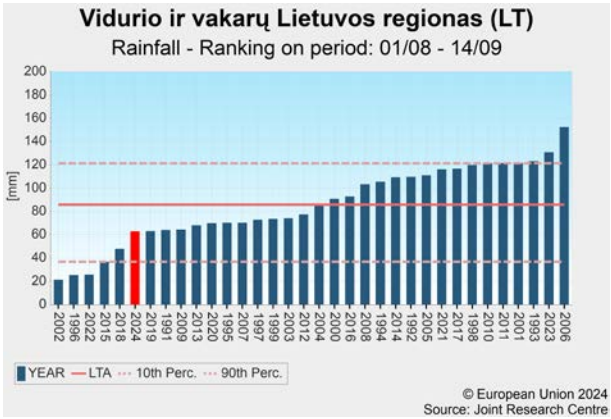
Harvest progressed swiftly in Finland and the Baltic countries, and autumn sowing started on time under favourable conditions. Grain yields are expected to be average in Finland, while in the Baltic countries yields are estimated to remain below average.

In Lithuania and Latvia, rainfall in August occurred only sporadically, whereas in Estonia and Finland it was well distributed. The first week of September was particularly dry in all countries, whereas rain resumed after that. Total precipitation levels were below average in the Baltic countries and close to or above average in Finland. The negative anomaly was most pronounced in Lithuania, where rainfall totals of approximately 60 mm were about 30 % lower than average. Temperatures remained close to the LTA during the first half of August and were prevalently above average thereafter, resulting in a temperature accumulation surplus of approximately 10 %. Radiation levels were close to average in Finland and Estonia, below average by approximately 5 % in Latvia and above average by approximately 10 % in Lithuania.

The winter and spring crop harvest advanced rapidly thanks to adequate weather and soil moisture conditions. In the Baltic countries, the exceptionally intense rainfall at the end of July may have had more impact on summer crops than expected and further reduced the yield potential, especially in Lithuania. The autumn sowing of winter crops started on time and progressed well, and the emerging plants should benefit from recent rainfall.

Our yield forecasts have been revised slightly downwards to below the 5-year average for grain maize and potatoes in Lithuania, and remain the same for other crops and countries.





Greece

Persistent hot and dry conditions further worsen summer crop expectations

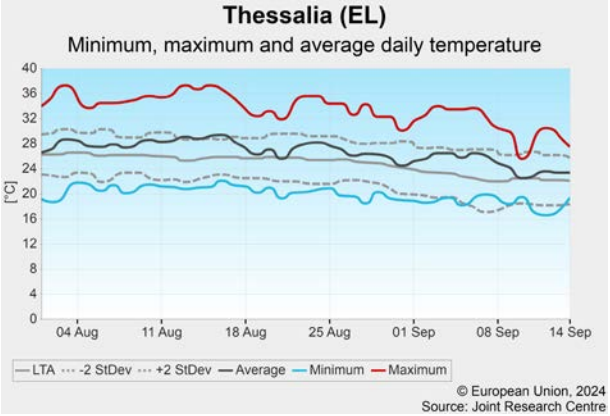
Throughout the review period, prolonged hot and dry conditions led to a deterioration in summer crop conditions across the main Greek agricultural regions.

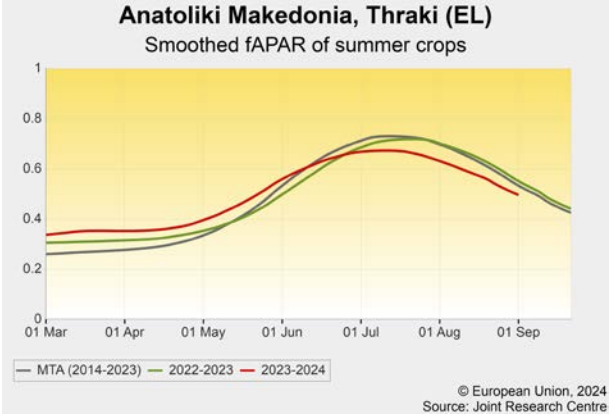
The major crop-producing regions of Greece, including *Kentriki Makedonia*, *Anatoliki Makedonia* and *Thraki*, *Thessalia*, and *Dytiki Makedonia*, experienced anomalous heatwaves in August that significantly raised average and maximum daily temperatures and hampered crop development during the end of flowering and ripening.

The hot weather increased the evaporative demand, also depleting the water reserves available for irrigation. The situation was particularly severe in areas poorly served by major rivers and in those already facing declining water tables, such as *Thessalia* and the easternmost parts of *Anatoliki Makedonia* and *Thraki*.

Intensive precipitation (> 5 mm in a day) around 20 August and 10 September partly replenished irrigation reservoirs and raised rainfall totals up to the LTA in *Kentriki Makedonia*, *Dytiki Makedonia* and *Thessalia*, but did not provide a long-lasting soil water supply to crops, as the persistent record-high temperatures throughout the summer had already irreversibly affected summer crops.

Satellite-derived biomass indicators revealed below-average biomass accumulation during both the vegetative and reproductive phases of summer crops in July and August. Currently, crops are approaching the harvesting phase. As a result, our yield projections for potatoes and grain maize have been lowered to 12 % below the 5-year average, while the forecast for sunflowers remains unchanged at 15 % below the 5-year average.





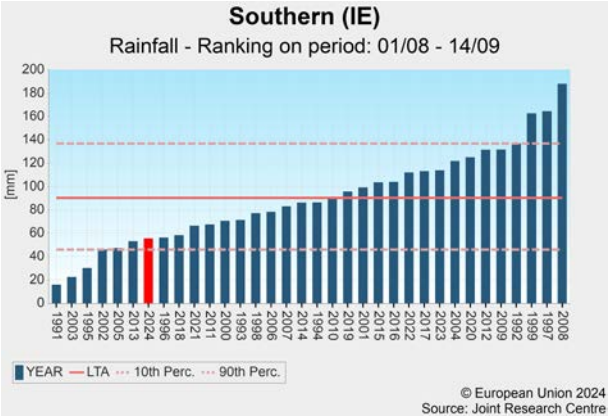
Ireland

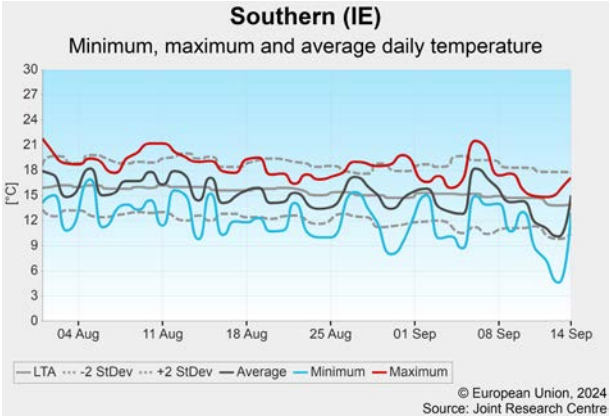
End of season in sight with moderate yield expectations

The harvest of winter and spring crops progressed well thanks to adequately dry soils. Autumn rapeseed sowing started on time and is about to be finished in most of the country. Spring barley yields are expected to be only slightly below the 5-year average.

Drier-than-usual conditions prevailed in Ireland during the review period, except in the north and west. Most of the precipitation occurred during the third week of August, while no significant rainfall has been reported for September so far. Rainfall totals were close to 50 mm in the *Southern* and *Eastern and Midland* regions, approximately 40 % below normal. Temperatures were close to the LTA throughout August and alternated above and below it in September, resulting in cumulative temperatures close to normal. In addition to the rainfall deficit, radiation remained slightly below the LTA.

The harvest of winter and spring crops progressed well, thanks to the dry conditions that have occurred since late August, and should be completed in the coming weeks. Considerable variability in spring barley yields is expected considering the extended sowing period in springtime. Autumn rapeseed sowing has started on time and should rapidly be completed; rain will be necessary to sustain good establishment. Our yield forecasts remain unchanged, below the 5-year average for spring barley and rapeseed.





Belgium, Luxembourg and the Netherlands

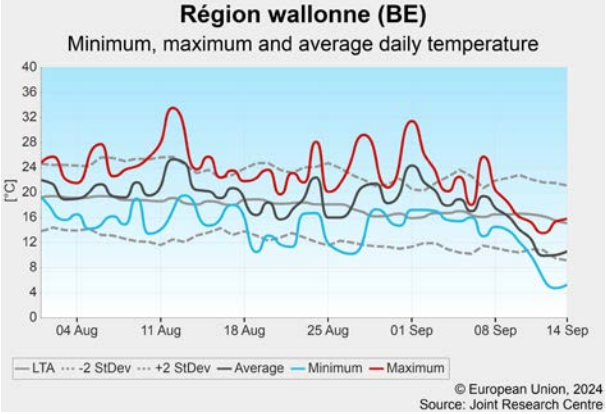
Favourable weather insufficient to improve expectations for summer crops

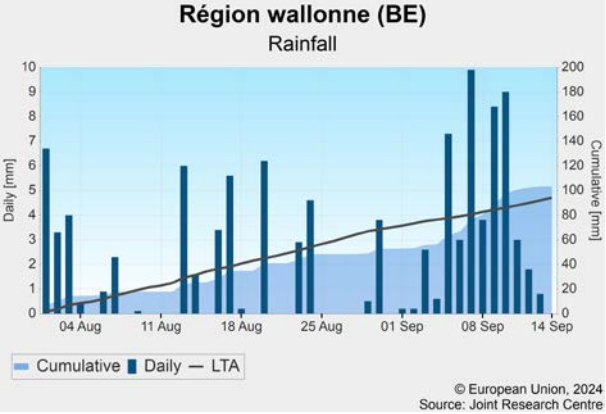
Yield forecasts for potatoes, sugar beet and green maize are maintained below the 5-year average.

Rainfall during the review period was close to the LTA in most regions. The frequency of rain events was high during the last 10 days of the review period, especially in *Wallonne*. Temperatures exceed the LTA during most of the review period, but dropped to well-below average in the second week of September. Sunshine levels were slightly above the LTA.

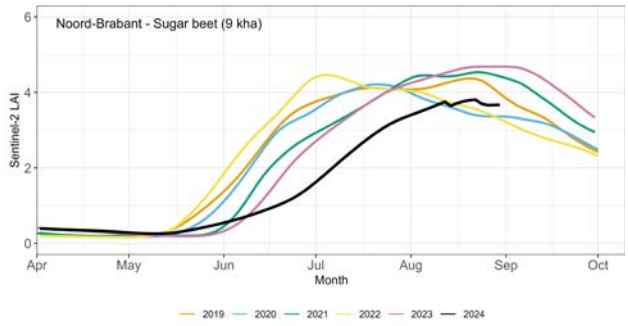
Overall, these weather conditions favoured the growth and development of summer crops. However, this was insufficient to recover the accumulation of biomass needed to attain high yields (see text box below). Therefore, our yield forecasts for summer crops were essentially maintained, below the 5-year average.

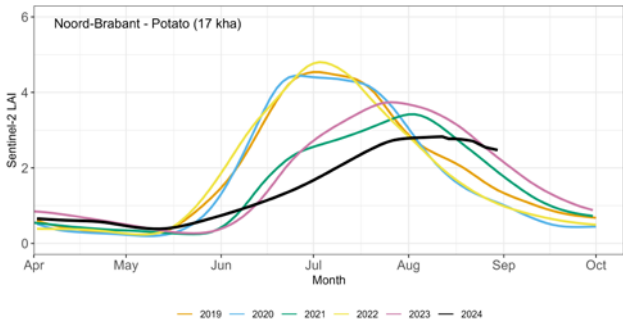
A detailed overview of weather and crop conditions in Belgium can be found in the September edition of the agrometeorological Bulletin of BCGMS[6]





The Netherlands is one of very few EU countries that makes parcel-level GSA* data publicly available during the season, providing information of the parcel geometry and main cultivated crops. These data, combined with high-resolution remote-sensing analysis (Sentinel 2 Copernicus) allow for crop-specific monitoring of important indicators at regional level. The examples below show the course of the leaf area index (LAI) of sugar beet and potato crops, aggregated at province level, for the years from 2019 to 2024. The results clearly reflect the negative effects of this year's late sowing and overly wet conditions during spring and the beginning of summer. This was particularly the case in southern provinces, such as *Noord Brabant* and *Limburg*. Later in summer, conditions improved and canopy development accelerated. However, this has been insufficient to offset the reduced light interception (and thus photosynthesis and biomass accumulation) during the initial phases of development.





*GSA (geo-spatial application) is a system that allows EU farmers to visually indicate the areas for which they apply for aid in the framework of the EU Common Agricultural Policy.

[6] https://bcgms.be/fr/bulletins/

Slovenia and Croatia

Yield forecast for summer crops below 5-year average

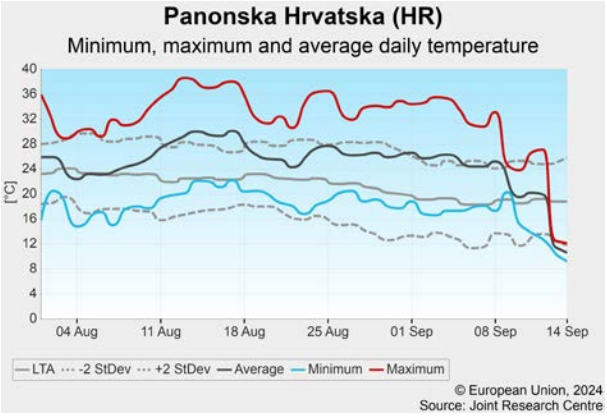
The summer continued to be exceptionally warm during the review period, with no widespread rainfall until the second week of September. This had a negative impact on summer crop development, particularly in Croatia, with yield forecasts falling significantly below the 5-year average.

Exceptionally warm temperatures persisted in Slovenia and Croatia during this review period. Maximum temperatures reached 34–36 °C in Slovenia and *Jadranska Hrvatska*, while peaking at 39 °C in eastern Croatia, thus considerably shortening the crop cycle in the main agricultural regions of both countries.

The situation in eastern *Panonska Hrvatska* was particularly concerning. High temperatures and an increasing soil water deficit in July and August negatively affected summer crop yields and forced the maize harvest to start in early August, 3 weeks earlier than normal. The sunflower harvest in Croatia started in mid August, and the maize harvest in Slovenia started in the first days of September, also earlier than usual.

Following a dry August, precipitation returned in September. In the second week of September, particularly in *Zahodna Slovenija* and northern *Jadranska Hrvatska*, very intense rainfall events were recorded, with over 200 mm accumulated and up to 90 mm occurring in a single day. The rainfall caused structural damage and flooding, but these regions are of little importance for annual crops. In *Vzhodna Slovenija*, where around 100 mm was recorded in 1 week, the rainfall delayed the harvest and may have increased pest pressure locally. Eastern Croatia experienced around 50–60 mm of rainfall that week, too late to positively affect summer crops but benefiting the sowing of rapeseed, which had been delayed due to lack of soil moisture.

Considering the unfavourable conditions during summer, our yield forecasts for summer crops have been revised downwards to significantly below the 5-year average in Croatia and slightly below average in Slovenia.



5.2. United Kingdom

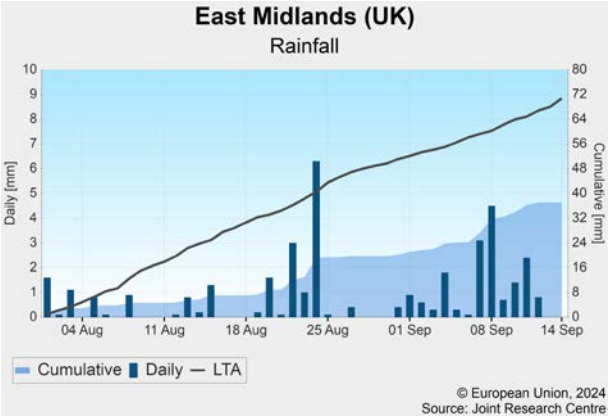
Spring barley shows good prospects; harvest in the north delayed due to intermittent rain

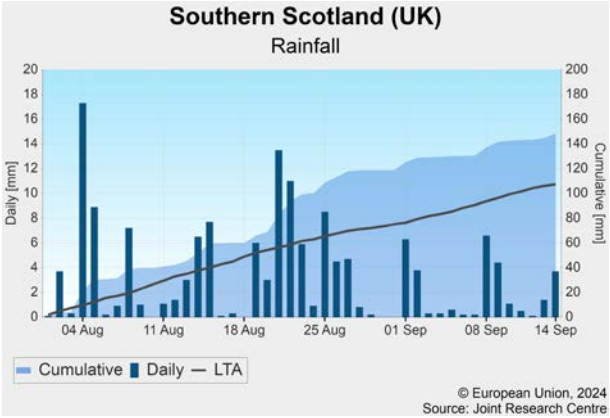
Fair weather conditions were beneficial to spring crops in most of the country. The harvest is in progress, but has slowed down in Scotland and Northern Ireland due to intermittent rainfall.

During the review period, temperatures were in line with the LTA in most of the UK, except for the south-east, where they were up to 6 °C higher. Conversely, the precipitation level was half the LTA in the south-east, but significantly higher in southern Scotland, and in line with the LTA elsewhere. Overall, warm temperatures and moderate rainfall prevailed in the UK during the review period. These conditions allowed mature crops to dry and reach the required moisture content for harvest, and enabled spring crops to ripen and soils to dry so that machinery could enter the fields for harvest with minimum impact on the soil structure.

Despite these fair weather conditions, the harvest overall is a little later than usual. While the winter crop harvest was about to end in the first week of September and the spring barley harvest is under way, intermittent rainfall has delayed the harvest of both winter crops and spring barley in Scotland and Northern Ireland.

The promising prospects for spring crops, reported in our previous bulletin, are now being realised. Our yield forecast for spring barley remains almost 5 % above the 5-year average, while it remains 5–7 % below the 5-year average for winter crops.





5.3. Black Sea Area

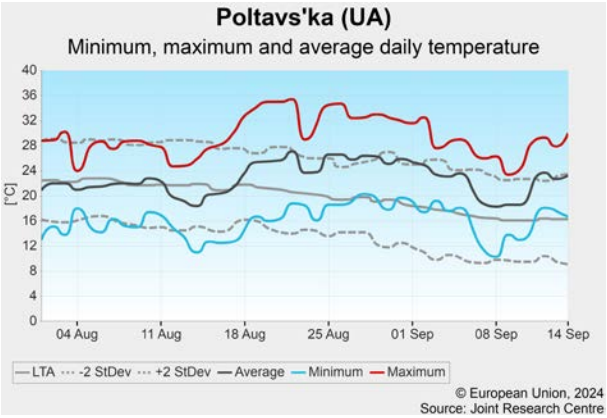
Ukraine

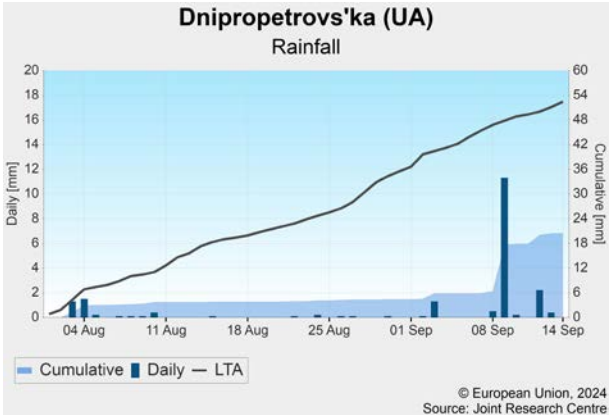
Severe drought further affected summer crops yield outlook

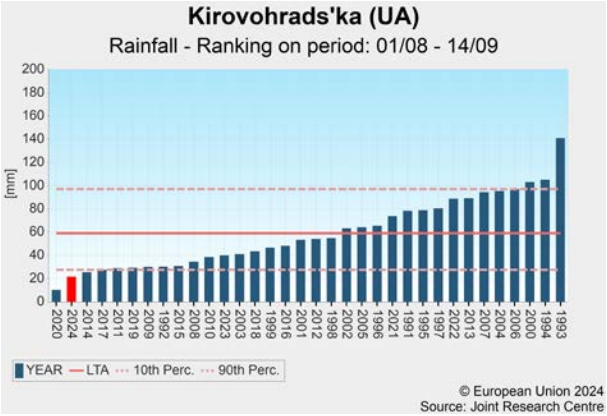
The eastern half of Ukraine experienced severe drought conditions during the review period, further impacting the yield outlook for summer crops.

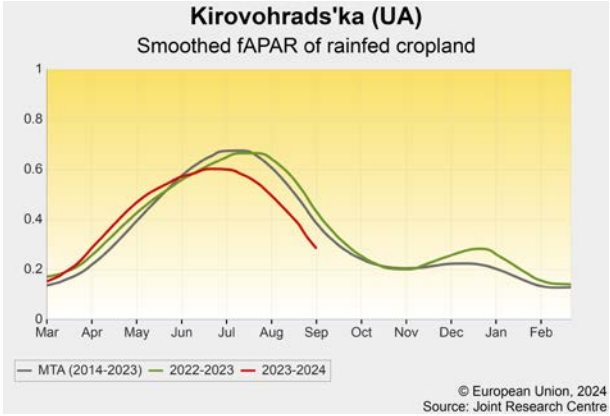
Following the very dry conditions in July in the eastern half of the Ukraine, drought conditions prevailed during the review period, with rainfall 50-100% below the LTA in most regions. However, some areas in the west, centre, north and south experienced only slightly drier-than-usual conditions, with rainfall up to 50% below the LTA. Temperatures were on average 1-2°C above the LTA in most regions. While in the east, temperatures were 0.5-1°C above the LTA, parts of *Vinnyts'ka*, *Khmel'nyts'ka*, and *Chernivets'ka* experienced a more pronounced warming of 2-3°C above the LTA.

The prevailing weather conditions were favourable for crops in western and central regions, eastern areas strongly suffered from the rainfall deficit. Grain maize and sunflowers were most severely impacted by the dry conditions in eastern and south-eastern regions. Soybean, which is mainly cultivated in western regions, was less affected by the drought. The harvest of summer crops commenced early in drought-affected areas. Following the analysis of the JRC MARS Global outlook Ukraine Bulletin of September 2024 [7], all yield forecasts for summer crops were revised downward. The rapeseed sowing campaign is completed in the west but it's running behind schedule in the eastern areas, primarily due to hard and dry topsoils.









[7] https://publications.jrc.ec.europa.eu/repository/handle/JRC136678

Türkiye

A warm summer with fair prospects for summer crops

The summer crop season was average with limited negative events, which retained crop yield potential around the average.

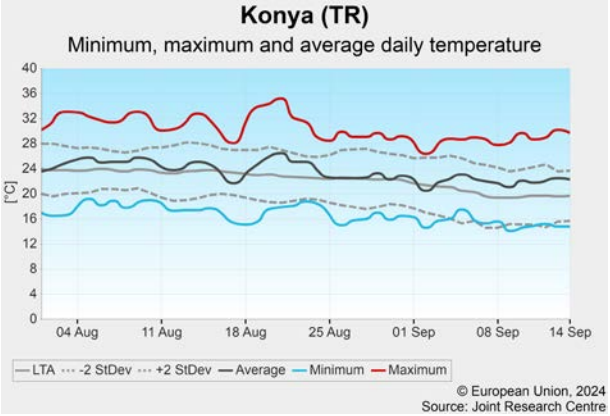
In Türkiye, August was as dry and warm as usual in summer. At the end of the month, some limited unusual precipitation occurred, notably in the north. In September, weather turned dry again, while temperatures remained high, with maximum temperatures above 30° C.

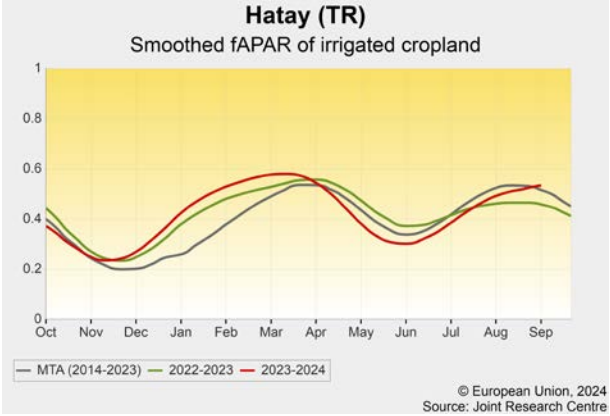
In the Anatolian regions, weather in August was around average except for the period between 18 and 23 August, when a heatwave raised maximum temperatures well above 35° C. Since then, temperatures have returned to normal and a few days with unusual, light precipitation have occurred. September started out dry and hot again with maximum temperatures around 30° C. The summer crop season was proceeding favourably until the heatwave in mid August, when the storage organs of crops suffered from heat stress where irrigation was limited or absent.

In the Mediterranean regions (e.g. *Hatay*, *Adana*), summer crops are progressing under favourable conditions, with high temperatures but enough water for irrigation. In *Adana*, the second and most productive crop cycle, which started in April, is almost finished, while in *Hatay* the second cycle of maize is reaching the flowering stage after being sown in late June.

In the south-east, summer crops are in similar condition as those in the Mediterranean regions. The second crop cycle, mostly maize, is still in the vegetative phase in the main growing provinces (*Şanlıurfa*, *Mardin*), and canopy development is in line with or above the average.

Our crop yield forecasts for summer crops have slightly increased but are still close to the average values.





5.4. European Russia and Belarus

European Russia

Decreased grain maize yield outlook

After a cold start, significantly warmer- and drier-than-usual weather conditions occurred after 21 August. Severe rainfall deficit hit the southern and western grain maize cultivation areas, while abundant rainfall hampered the harvest of spring cereals in the Volga and Central okrugs.

The first two dekads of August were 1°C to 3°C colder than usual in the main crop-producing regions. During this period, the Central okrug and the Volga okrug received abundant rainfall in the range of 40-140 mm. In contrast western regions along the Ukrainian border and southern Russia experienced very low (1-20 mm) precipitation.

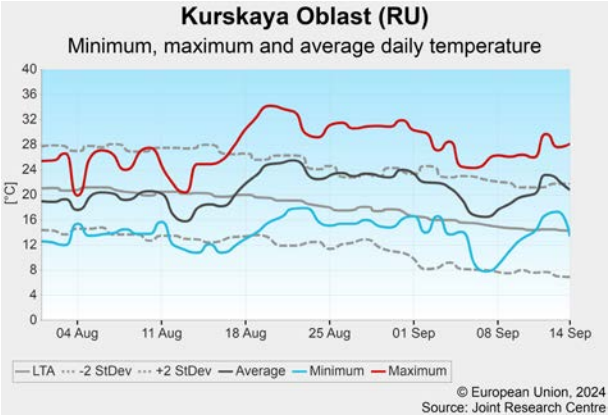
After 21 August, no or hardly any precipitation was recorded, and temperatures exceeded the LTA by 1-6°C, except in the south-eastern part of the Volga okrug, where temperatures remained close to the LTA.

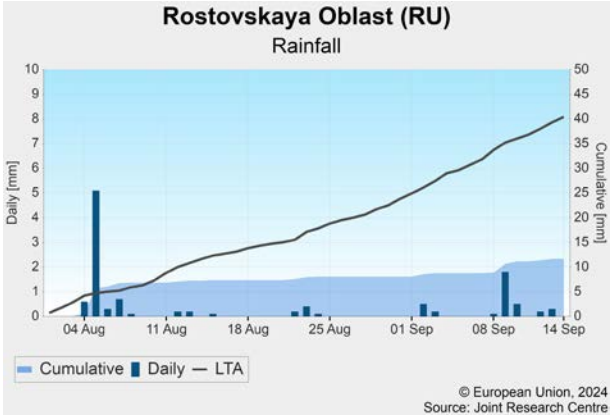
Harvesting of spring cereals was hampered by the frequent rainfall events until 21 August and some losses and grain quality decrease due to the overly wet conditions are probable. The overall yield outlook for spring cereals in European Russia remains near the 5-year average.

In the south and in the west, persistent dry conditions, and the exceptionally hot conditions after 21 August resulted in quick leaf area decay of summer crops, with negative impacts on yield formation. The situation is more promising in the Volga okrug, where summer crops experienced fair water supply. The harvest of grain maize started quite early this year in the south due to highly accelerated crop phenology. Overall yield expectations for grain maize are low, below the 5-year average.

Sowing of winter cereals has started in late August and has progressed well so far. However, soils are very dry and much more rain is needed for adequate germination and initial development.

A more detailed analysis, with quantitative yield and production forecasts, will be provided in the JRC MARS bulletin global outlook on Russia, which will be published 30 September 2024.





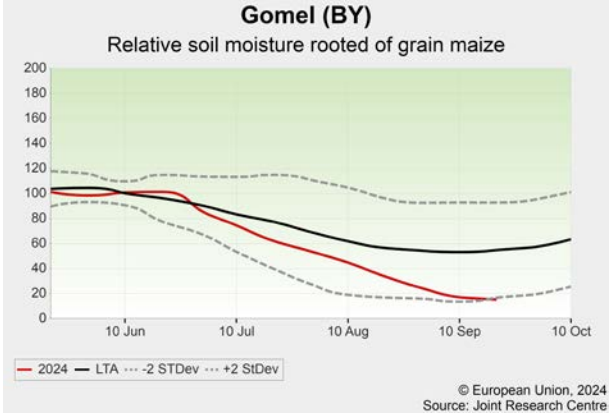
Belarus

Fair maize yield expectations confirmed

Warm conditions were beneficial for grain maize development, especially in the west. Drought conditions are limited to the south-east and they are not expected to swing the overall positive outlook.

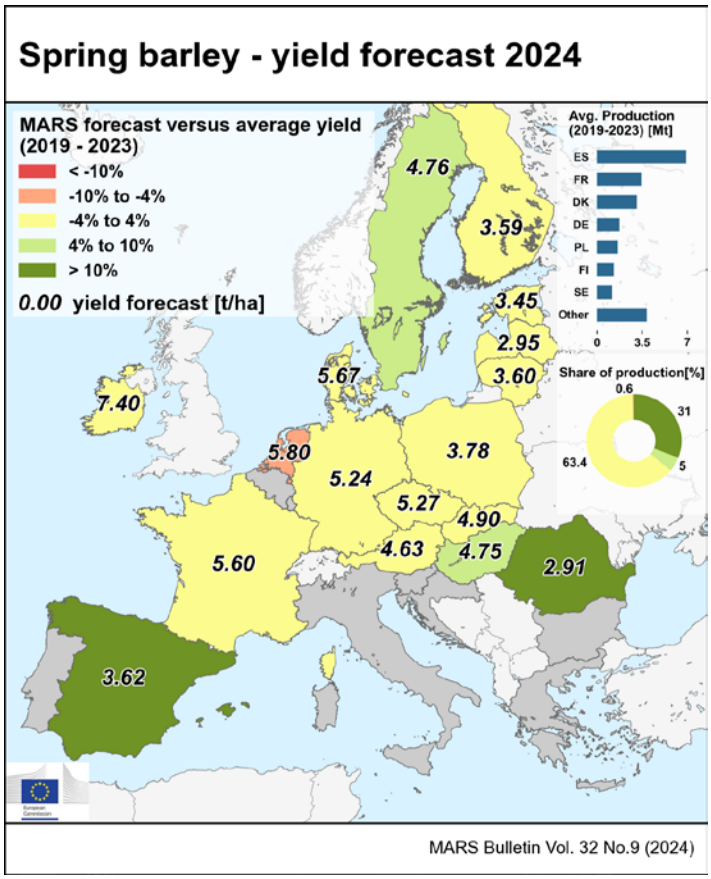
The first dekad of August was characterised by slightly cooler-than-average conditions in all regions. Since then, temperatures have been increasing, and average daily temperatures up to 6 °C above the LTA were observed in south-eastern regions during the first dekad of September. More than 10 days were characterized by maximum temperature above 30 *C in *Gomel* and south-eastern *Brest.* However, the temperature gradient was sharp across the country as in *Vitebsk* maximum temperature never reached 30°C during the review period. Rainfall during the review period was 30% to 50% below the LTA in the west and 50% to 100% below the LTA in the east. The wettest period was around the 20 August when up to 30 mm fell in most parts of *Vitebsk, Minsk, Grodno* and *Brest*. By contrast, the beginning of September was mostly dry in all regions.

The persistent warm temperatures during the review period (without reaching critically hot levels) benefited the grain filling and ripening of grain maize, whose development is advanced compared with an average season. Most regions still benefit from the wet conditions of the previous months, except *Gomel and Mogilev,* where drought is rapidly depleting the topsoil moisture reserves. According to our model, the biomass accumulation of maize is around or above the average in all regions except *Gomel*. With maize harvest approaching, the weather forecasts indicate overall favourably dry conditions. The yield outlook for grain maize remains above the 5-year average.

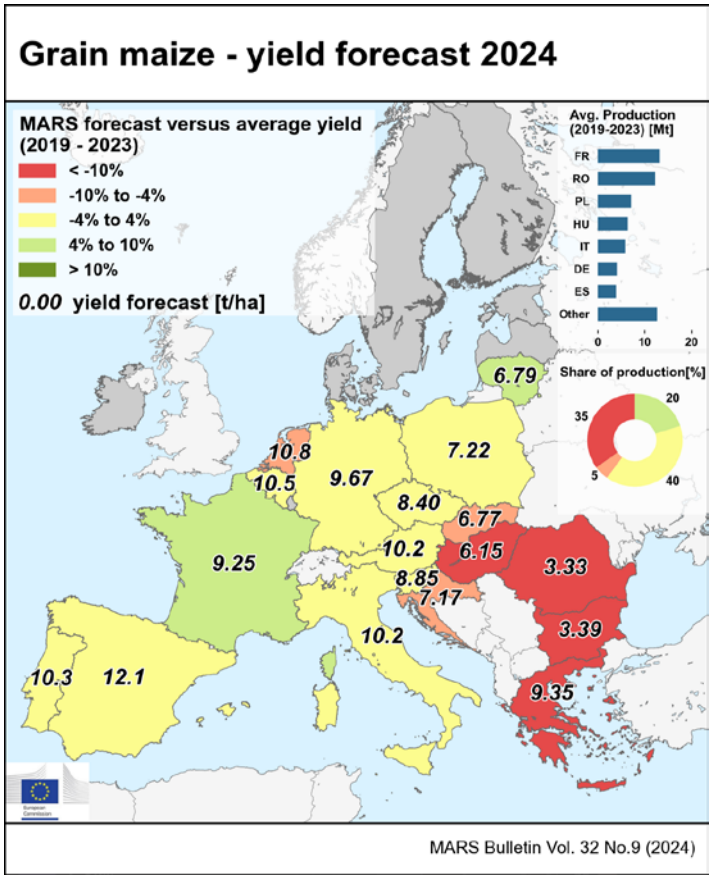


6. Crop yield forecast

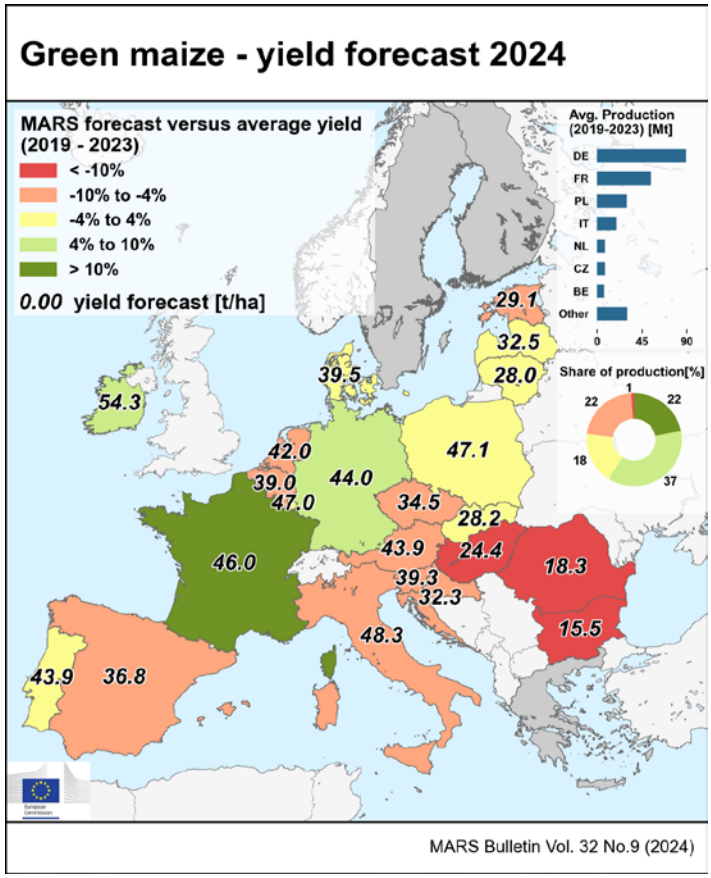
Country	Spring barley (t/ha)					
	Avg 5yrs	2023	MARS 2024 forecasts	%24/5yrs	%24/23	% Diff September/ August
EU	4.08	3.18	**4.40**	+ 8	+ 38	– 1
AT	4.49	4.75	**4.63**	+ 3	– 3	+ 0
BE	—	—	—	—	—	—
BG	—	—	—	—	—	—
CY	—	—	—	—	—	—
CZ	5.12	4.94	**5.27**	+ 3	+ 7	+ 0
DE	5.10	4.41	**5.24**	+ 3	+ 19	+ 0
DK	5.84	4.37	**5.67**	– 3	+ 30	– 6
EE	3.55	2.59	**3.45**	– 3	+ 33	+ 0
EL	—	—	—	—	—	—
ES	3.02	1.67	**3.62**	+ 20	+ 117	+ 0
FI	3.48	3.13	**3.59**	+ 3	+ 15	+ 0
FR	5.75	5.78	**5.60**	– 3	– 3	+ 0
HR	—	—	—	—	—	—
HU	4.51	4.40	**4.75**	+ 5	+ 8	+ 0
IE	7.44	6.38	**7.40**	– 0	+ 16	+ 0
IT	—	—	—	—	—	—
LT	3.60	3.40	**3.60**	– 0	+ 6	+ 0
LU	—	—	—	—	—	—
LV	3.04	2.42	**2.95**	– 3	+ 22	+ 0
MT	—	—	—	—	—	—
NL	6.26	4.82	**5.80**	– 7	+ 20	+ 0
PL	3.65	3.79	**3.78**	+ 3	– 0	+ 0
PT	—	—	—	—	—	—
RO	2.55	3.25	**2.91**	+ 14	– 10	+ 0
SE	4.56	3.15	**4.76**	+ 4	+ 51	+ 0
SI	—	—	—	—	—	—
SK	4.79	5.10	**4.90**	+ 2	– 4	+ 0



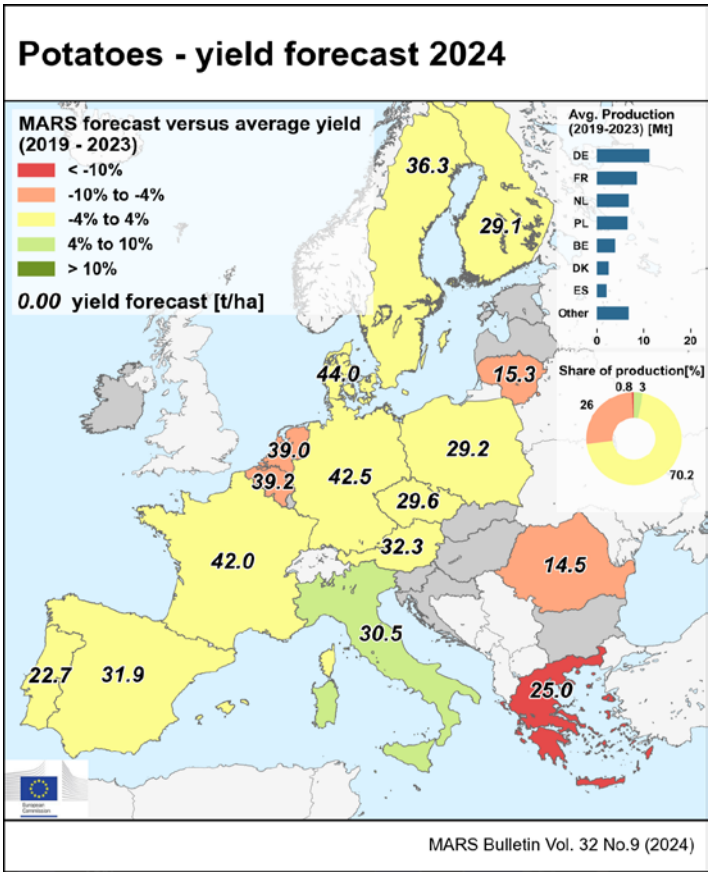
Country	Grain maize (t/ha)					
	Avg 5yrs	2023	MARS 2024 forecasts	%24/5yrs	%24/23	% Diff September/ August
EU	7.35	7.51	**6.84**	– 7	– 9	– 3
AT	10.5	9.93	**10.2**	– 4	+ 2	+ 0
BE	10.8	12.1	**10.5**	– 3	– 13	+ 0
BG	5.50	4.48	**3.39**	– 38	– 24	– 27
CY	—	—	—	—	—	—
CZ	8.75	7.88	**8.40**	– 4	+ 7	+ 0
DE	9.36	9.65	**9.67**	+ 3	+ 0	– 0
DK	—	—	—	—	—	—
EE	—	—	—	—	—	—
EL	10.6	9.50	**9.35**	– 12	– 2	– 2
ES	12.0	11.7	**12.1**	+ 1	+ 4	+ 1
FI	—	—	—	—	—	—
FR	8.77	9.83	**9.25**	+ 6	– 6	+ 6
HR	7.76	7.42	**7.17**	– 8	– 3	– 8
HU	6.93	8.17	**6.15**	– 11	– 25	– 5
IE	—	—	—	—	—	—
IT	10.1	10.7	**10.2**	+ 1	– 4	– 1
LT	6.51	8.24	**6.79**	+ 4	– 18	– 2
LU	—	—	—	—	—	—
LV	—	—	—	—	—	—
MT	—	—	—	—	—	—
NL	11.3	12.8	**10.8**	– 4	– 15	+ 0
PL	7.05	7.29	**7.22**	+ 2	– 1	– 0
PT	9.90	10.7	**10.3**	+ 4	– 4	+ 1
RO	4.89	4.70	**3.33**	– 32	– 29	– 13
SE	—	—	—	—	—	—
SI	8.96	8.79	**8.85**	– 1	+ 1	+ 0
SK	7.17	7.57	**6.77**	– 6	– 11	– 15



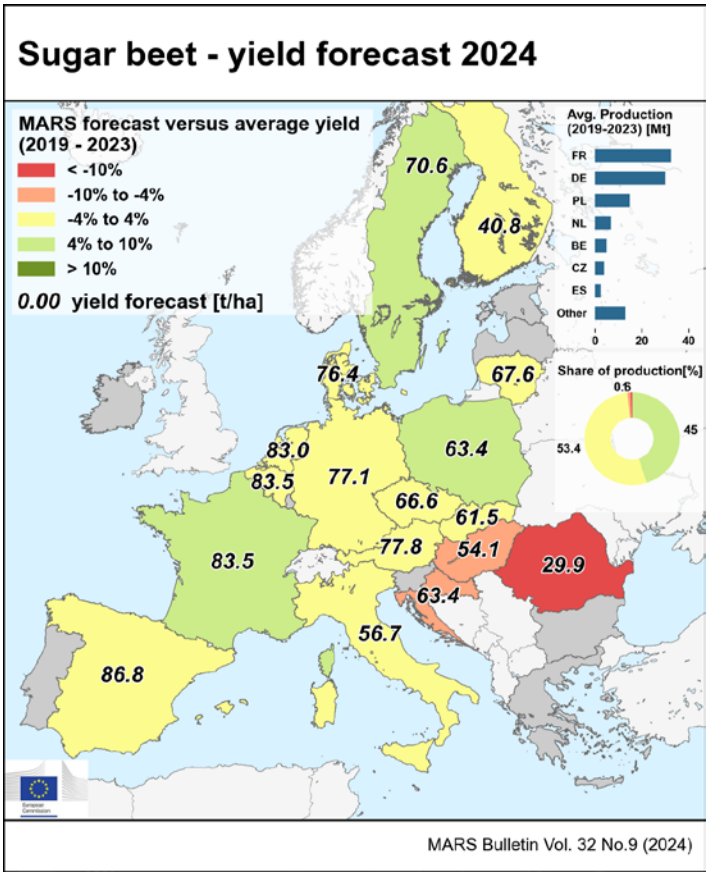
Country	Green maize (t/ha)					
	Avg 5yrs	2023	MARS 2024 forecasts	%24/5yrs	%24/23	% Diff September/ August
EU*	41.7	43.2	**43.2**	+ 4	+ 0	+ 1
AT	46.2	42.0	**43.9**	– 5	+ 4	– 5
BE	40.9	41.1	**39.0**	– 5	– 5	+ 0
BG	20.9	18.9	**15.5**	– 26	– 18	– 23
CY	—	—	—	—	—	—
CZ	36.3	32.3	**34.5**	– 5	+ 7	+ 0
DE	41.5	42.1	**44.0**	+ 6	+ 4	– 1
DK	38.9	37.0	**39.5**	+ 2	+ 7	+ 0
EE	31.6	30.2	**29.1**	– 8	– 4	– 2
EL	—	—	—	—	—	—
ES	38.4	47.3	**36.8**	– 4	– 22	+ 0
FI	—	—	—	—	—	—
FR	40.9	46.0	**46.0**	+ 13	+ 0	+ 9
HR	35.4	34.9	**32.3**	– 9	– 7	– 9
HU	27.8	31.1	**24.4**	– 12	– 22	– 7
IE	51.7	54.6	**54.3**	+ 5	– 1	+ 0
IT	52.2	54.1	**48.3**	– 8	– 11	– 5
LT	28.2	27.9	**28.0**	– 1	+ 1	+ 0
LU	46.2	50.9	**47.0**	+ 2	– 8	+ 0
LV	31.4	27.3	**32.5**	+ 4	+ 19	+ 4
MT	—	—	—	—	—	—
NL	44.0	45.7	**42.0**	– 5	– 8	+ 0
PL	46.0	46.7	**47.1**	+ 2	+ 1	+ 0
PT	44.4	45.1	**43.9**	– 1	– 3	+ 1
RO	24.0	21.4	**18.3**	– 24	– 14	– 14
SE	—	—	—	—	—	—
SI	42.2	39.9	**39.3**	– 7	– 1	– 4
SK	29.1	31.5	**28.2**	– 3	– 10	– 8



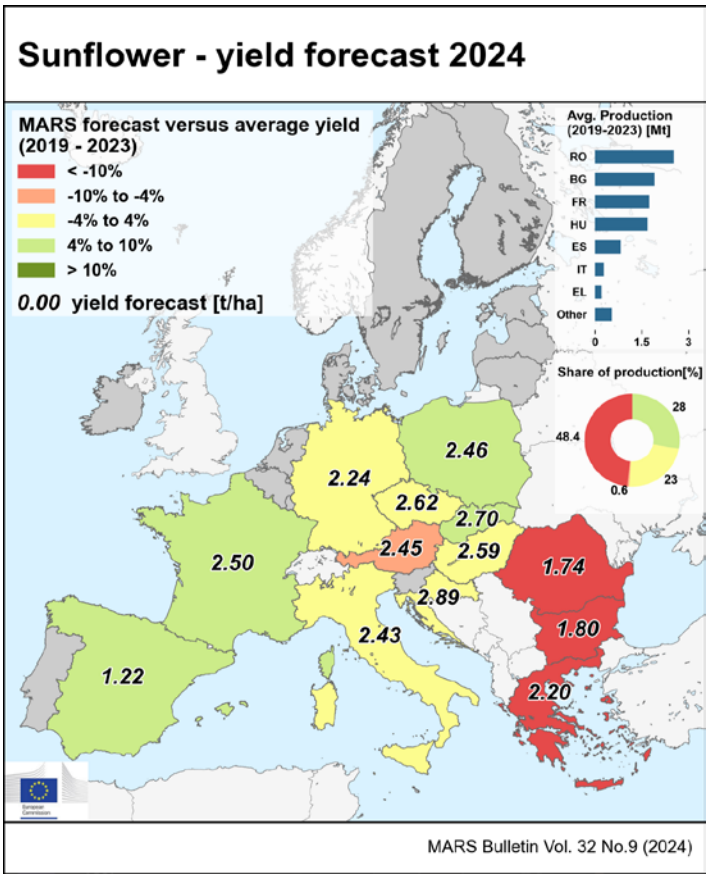
Country	Potatoes (t/ha)					
	Avg 5yrs	2023	MARS 2024 forecasts	%24/5yrs	%24/23	% Diff September/ August
EU	35.4	36.8	**35.8**	+ 1	– 3	+ 2
AT	32.7	28.8	**32.3**	– 1	+ 12	+ 0
BE	41.4	43.5	**39.2**	– 5	– 10	+ 1
BG	—	—	—	—	—	—
CY	—	—	—	—	—	—
CZ	28.7	27.4	**29.6**	+ 3	+ 8	+ 0
DE	41.9	43.9	**42.5**	+ 1	– 3	+ 3
DK	43.7	45.1	**44.0**	+ 1	– 2	+ 0
EE	—	—	—	—	—	—
EL	28.6	27.7	**25.0**	– 12	– 10	– 3
ES	32.3	32.0	**31.9**	– 1	– 0	+ 0
FI	28.9	30.2	**29.1**	+ 0	– 4	+ 1
FR	41.0	42.2	**42.0**	+ 3	– 0	+ 7
HR	—	—	—	—	—	—
HU	—	—	—	—	—	—
IE	—	—	—	—	—	—
IT	29.0	27.8	**30.5**	+ 5	+ 10	+ 0
LT	16.1	18.1	**15.3**	– 5	– 16	– 4
LU	—	—	—	—	—	—
LV	—	—	—	—	—	—
MT	—	—	—	—	—	—
NL	42.2	41.8	**39.0**	– 8	– 7	– 1
PL	28.8	29.6	**29.2**	+ 1	– 2	+ 0
PT	23.6	24.2	**22.7**	– 4	– 6	– 5
RO	15.6	14.1	**14.5**	– 7	+ 3	– 2
SE	35.8	35.6	**36.3**	+ 1	+ 2	+ 1
SI	—	—	—	—	—	—
SK	—	—	—	—	—	—



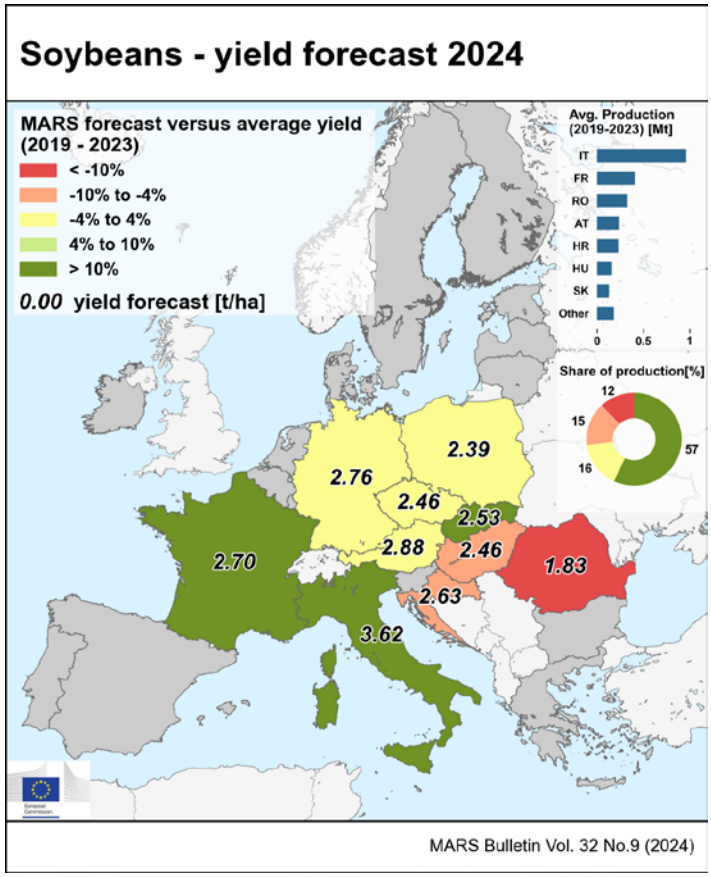
Country	Sugar beet (t/ha)					
	Avg 5yrs	2023	MARS 2024 forecasts	%24/5yrs	%24/23	% Diff September/ August
EU	73.1	N/A	**74.7**	+ 2	N/A	+ 2
AT	77.1	75.0	**77.8**	+ 1	+ 4	+ 0
BE	86.2	87.0	**83.5**	– 3	– 4	+ 0
BG	—	—	—	—	—	—
CY	—	—	—	—	—	—
CZ	65.2	65.2	**66.6**	+ 2	+ 2	+ 0
DE	75.9	79.7	**77.1**	+ 2	– 3	+ 3
DK	76.4	74.8	**76.4**	– 0	+ 2	+ 0
EE	—	—	—	—	—	—
EL	—	—	—	—	—	—
ES	85.3	81.5	**86.8**	+ 2	+ 7	+ 1
FI	40.5	38.5	**40.8**	+ 1	+ 6	+ 0
FR	78.8	83.4	**83.5**	+ 6	+ 0	+ 4
HR	66.6	62.4	**63.4**	– 5	+ 2	– 4
HU	56.8	58.0	**54.1**	– 5	– 7	– 6
IE	—	—	—	—	—	—
IT	58.2	N/A	**56.7**	– 3	N/A	– 9
LT	66.5	72.2	**67.6**	+ 2	– 6	+ 0
LU	—	—	—	—	—	—
LV	—	—	—	—	—	—
MT	—	—	—	—	—	—
NL	84.3	85.3	**83.0**	– 2	– 3	– 1
PL	60.8	61.3	**63.4**	+ 4	+ 4	+ 1
PT	—	—	—	—	—	—
RO	36.6	33.1	**29.9**	– 18	– 10	– 13
SE	67.7	60.4	**70.6**	+ 4	+ 17	+ 2
SI	—	—	—	—	—	—
SK	60.2	63.6	**61.5**	+ 2	– 3	+ 0



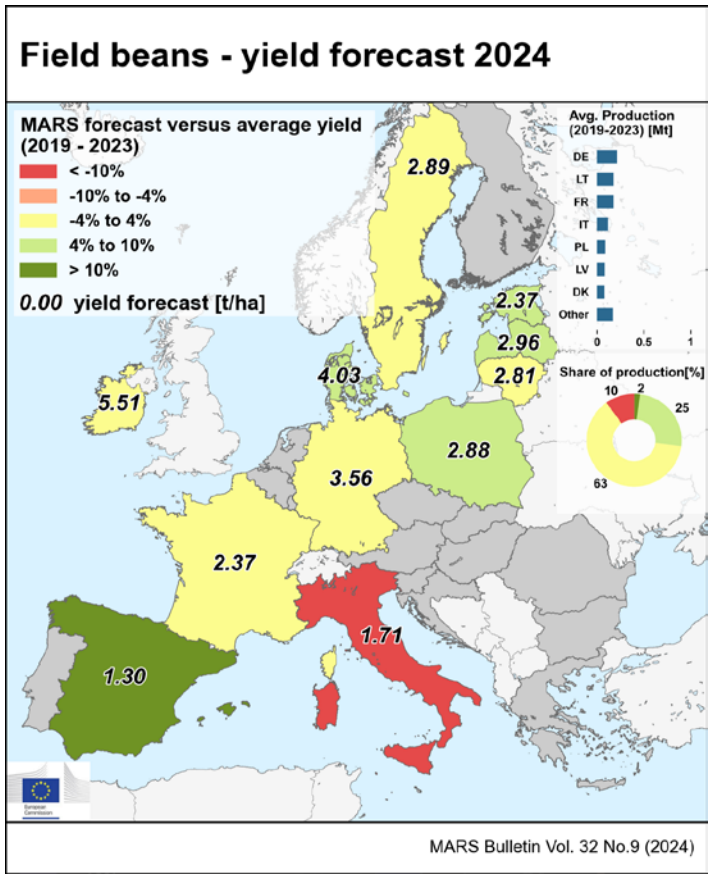
Country	Sunflower (t/ha)					
	Avg 5yrs	2023	MARS 2024 forecasts	%24/5yrs	%24/23	% Diff September/ August
EU	2.15	2.10	**1.98**	– 8	– 6	– 3
AT	2.68	2.69	**2.45**	– 9	– 9	+ 0
BE	—	—	—	—	—	—
BG	2.24	2.03	**1.80**	– 20	– 11	– 15
CY	—	—	—	—	—	—
CZ	2.63	2.49	**2.62**	– 0	+ 5	+ 0
DE	2.20	2.47	**2.24**	+ 2	– 9	+ 3
DK	—	—	—	—	—	—
EE	—	—	—	—	—	—
EL	2.52	2.42	**2.20**	– 13	– 9	+ 0
ES	1.13	1.12	**1.22**	+ 8	+ 8	+ 1
FI	—	—	—	—	—	—
FR	2.30	2.50	**2.50**	+ 8	– 0	+ 11
HR	2.93	2.64	**2.89**	– 1	+ 9	– 5
HU	2.64	2.90	**2.59**	– 2	– 11	– 4
IE	—	—	—	—	—	—
IT	2.44	2.49	**2.43**	– 0	– 2	+ 0
LT	—	—	—	—	—	—
LU	—	—	—	—	—	—
LV	—	—	—	—	—	—
MT	—	—	—	—	—	—
NL	—	—	—	—	—	—
PL	2.35	2.36	**2.46**	+ 5	+ 4	+ 1
PT	—	—	—	—	—	—
RO	2.21	1.86	**1.74**	– 21	– 6	– 6
SE	—	—	—	—	—	—
SI	—	—	—	—	—	—
SK	2.58	2.78	**2.70**	+ 5	– 3	– 5



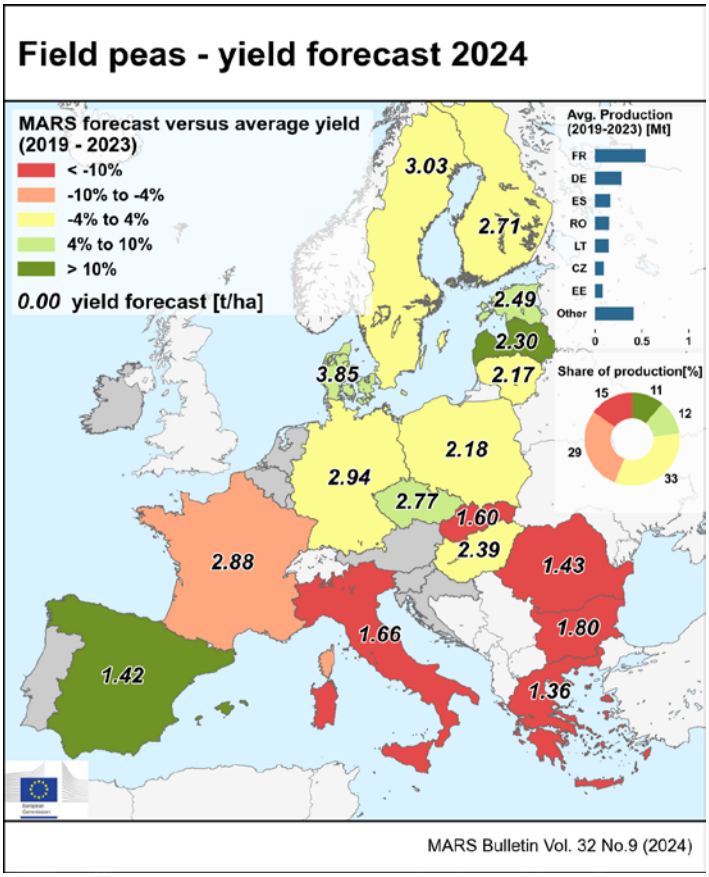
Country	Soybeans (t/ha)					
	Avg 5yrs	2023	MARS 2024 forecasts	%24/5yrs	%24/23	% Diff September/ August
EU	2.73	2.85	**2.81**	+ 3	– 2	+ 2
AT	2.95	3.06	**2.88**	– 2	– 6	– 4
BE	—	—	—	—	—	—
BG	—	—	—	—	—	—
CY	—	—	—	—	—	—
CZ	2.38	2.39	**2.46**	+ 3	+ 3	+ 0
DE	2.75	2.88	**2.76**	+ 0	– 4	+ 2
DK	—	—	—	—	—	—
EE	—	—	—	—	—	—
EL	—	—	—	—	—	—
ES	—	—	—	—	—	—
FI	—	—	—	—	—	—
FR	2.41	2.44	**2.70**	+ 12	+ 11	+ 9
HR	2.76	2.86	**2.63**	– 5	– 8	– 6
HU	2.65	3.04	**2.46**	– 7	– 19	– 2
IE	—	—	—	—	—	—
IT	3.28	3.39	**3.62**	+ 10	+ 7	+ 7
LT	—	—	—	—	—	—
LU	—	—	—	—	—	—
LV	—	—	—	—	—	—
MT	—	—	—	—	—	—
NL	—	—	—	—	—	—
PL	2.31	2.58	**2.39**	+ 3	– 7	+ 0
PT	—	—	—	—	—	—
RO	2.19	2.14	**1.83**	– 17	– 15	– 7
SE	—	—	—	—	—	—
SI	—	—	—	—	—	—
SK	2.27	2.59	**2.53**	+ 11	– 2	+ 0



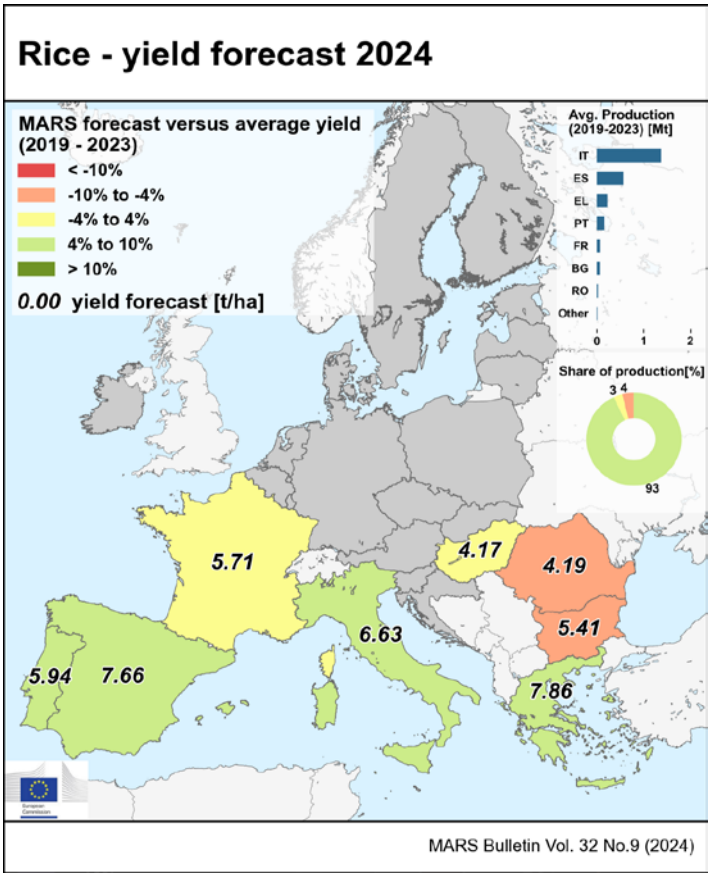
Country	Field beans (t/ha)					
	Avg 5yrs	2023	MARS 2024 forecasts	%24/5yrs	%24/23	% Diff September/ August
EU	2.72	2.53	**2.81**	+ 3	+ 11	– 0
AT	—	—	—	—	—	—
BE	—	—	—	—	—	—
BG	—	—	—	—	—	—
CY	—	—	—	—	—	—
CZ	—	—	—	—	—	—
DE	3.55	2.88	**3.56**	+ 0	+ 24	+ 0
DK	3.83	3.27	**4.03**	+ 5	+ 23	+ 0
EE	2.25	2.32	**2.37**	+ 5	+ 2	+ 0
EL	—	—	—	—	—	—
ES	1.12	1.00	**1.30**	+ 16	+ 31	– 2
FI	—	—	—	—	—	—
FR	2.41	2.66	**2.37**	– 2	– 11	+ 0
HR	—	—	—	—	—	—
HU	—	—	—	—	—	—
IE	5.33	5.00	**5.51**	+ 3	+ 10	+ 0
IT	1.93	1.98	**1.71**	– 11	– 14	+ 0
LT	2.72	2.37	**2.81**	+ 3	+ 18	+ 0
LU	—	—	—	—	—	—
LV	2.83	2.30	**2.96**	+ 5	+ 29	+ 0
MT	—	—	—	—	—	—
NL	—	—	—	—	—	—
PL	2.74	2.61	**2.88**	+ 5	+ 10	+ 0
PT	—	—	—	—	—	—
RO	—	—	—	—	—	—
SE	2.94	2.42	**2.89**	– 2	+ 19	+ 0
SI	—	—	—	—	—	—
SK	—	—	—	—	—	—



Country	Field peas (t/ha)					
	Avg 5yrs	2023	MARS 2024 forecasts	%24/5yrs	%24/23	% Diff September/ August
EU	2.34	2.00	**2.21**	– 5	+ 11	– 1
AT	—	—	—	—	—	—
BE	—	—	—	—	—	—
BG	2.09	2.25	**1.80**	– 14	– 20	+ 0
CY	—	—	—	—	—	—
CZ	2.55	2.25	**2.77**	+ 9	+ 23	+ 0
DE	2.95	2.25	**2.94**	– 0	+ 31	+ 0
DK	3.67	2.88	**3.85**	+ 5	+ 34	+ 0
EE	2.28	2.20	**2.49**	+ 9	+ 13	+ 0
EL	1.55	1.60	**1.36**	– 13	– 15	– 3
ES	1.18	0.67	**1.42**	+ 20	+ 111	+ 0
FI	2.64	2.54	**2.71**	+ 3	+ 7	+ 0
FR	3.16	3.21	**2.88**	– 9	– 10	+ 0
HR	—	—	—	—	—	—
HU	2.38	2.34	**2.39**	+ 1	+ 2	+ 0
IE	—	—	—	—	—	—
IT	2.82	2.65	**1.66**	– 41	– 38	+ 0
LT	2.14	2.10	**2.17**	+ 1	+ 3	+ 0
LU	—	—	—	—	—	—
LV	2.05	1.84	**2.30**	+ 12	+ 25	+ 0
MT	—	—	—	—	—	—
NL	—	—	—	—	—	—
PL	2.12	2.12	**2.18**	+ 3	+ 3	+ 0
PT	—	—	—	—	—	—
RO	1.73	1.67	**1.43**	– 17	– 14	– 3
SE	2.95	2.06	**3.03**	+ 3	+ 47	+ 0
SI	—	—	—	—	—	—
SK	2.47	2.08	**1.60**	– 35	– 23	– 38



Country	Rice (t/ha)					
	Avg 5yrs	2023	MARS 2024 forecasts	%24/5yrs	%24/23	% Diff September/ August
EU	6.38	6.26	**6.78**	+6	+8	—
AT	—	—	—	—	—	—
BE	—	—	—	—	—	—
BG	5.78	6.20	**5.41**	– 6	– 13	—
CY	—	—	—	—	—	—
CZ	—	—	—	—	—	—
DE	—	—	—	—	—	—
DK	—	—	—	—	—	—
EE	—	—	—	—	—	—
EL	7.26	5.25	**7.86**	+ 8	+ 50	—
ES	7.08	5.94	**7.66**	+ 8	+ 29	—
FI	—	—	—	—	—	—
FR	5.52	5.77	**5.71**	+ 3	– 1	—
HR	—	—	—	—	—	—
HU	4.02	4.22	**4.17**	+ 4	– 1	—
IE	—	—	—	—	—	—
IT	6.24	6.58	**6.63**	+ 6	+ 1	—
LT	—	—	—	—	—	—
LU	—	—	—	—	—	—
LV	—	—	—	—	—	—
MT	—	—	—	—	—	—
NL	—	—	—	—	—	—
PL	—	—	—	—	—	—
PT	5.69	5.98	**5.94**	+ 4	– 1	—
RO	4.50	5.22	**4.19**	– 7	– 20	—
SE	—	—	—	—	—	—
SI	—	—	—	—	—	—
SK	—	—	—	—	—	—



Country	Wheat (t/ha)					
	Avg 5yrs	2023	MARS 2024 forecasts	%24/5yrs	%24/23	% Diff September/ August
BY	3.54	3.38	**3.80**	+ 7	+ 12	+ 0
TR	2.93	3.22	**2.97**	+ 2	– 8	+ 0
UA	4.20	4.53	**4.11**	– 2	– 9	+ 0
UK	8.17	8.10	**7.70**	– 6	– 5	+ 0

Country	Barley (t/ha)					
	Avg 5yrs	2023	MARS 2024 forecasts	%24/5yrs	%24/23	% Diff September/ August
BY	2.88	2.75	**3.00**	+ 4	+ 9	+ 0
TR	2.52	2.78	**3.00**	+ 19	+ 8	+ 0
UA	3.46	3.64	**3.63**	+ 5	– 0	+ 2
UK	6.31	6.10	**6.19**	– 2	+ 2	+ 0

Country	Grain maize (t/ha)					
	Avg 5yrs	2023	MARS 2024 forecasts	%24/5yrs	%24/23	% Diff September/ August
BY	5.43	5.56	**5.63**	+ 4	+ 1	+ 0
TR	9.29	9.40	**9.68**	+ 4	+ 3	+ 13
UA	6.90	7.73	**6.26**	– 9	– 19	– 6
UK	—	—	**—**	—	—	—

Country	Soybean (t/ha)					
	Avg 5yrs	2023	MARS 2024 forecasts	%24/5yrs	%24/23	% Diff September/ August
BY	—	—	**—**	—	—	—
TR	4.22	4.21	**4.54**	+ 8	+ 8	+ 0
UA	2.38	2.61	**2.38**	+ 0	– 9	– 2
UK	—	—	**—**	—	—	—

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

Sources: 2019-2024 data come from DG Agriculture and Rural Development short-term-outlook data (dated August 2024, received on 06.09.2024), Eurostat Eurobase (last update: 06.09.2024), ELSTAT, Statistics Netherlands (CBS), DESTATIS and EES (last update: 15.11.2017).

Non-EU 2019-2023 data come from USDA, Turkish Statistical Institute (TurkStat), Eurostat Eurobase (last update: 06.09.2024), Ministry for Development of Economy, Trade and Agriculture of Ukraine, Department for Environment, Food & Rural Affairs of UK (DEFRA), FAO and PSD-online.

2024 yields come from MARS Crop Yield Forecasting System (output up to 20.09.2024).

EU aggregate after 1.2.2020 is reported.

The column header '%24/5yrs' stands for the 2024 change with respect to the 5-year average(%). Similarly, '%24/23' stands for the 2024 change with respect to 2023(%).

N/A = Data not available.

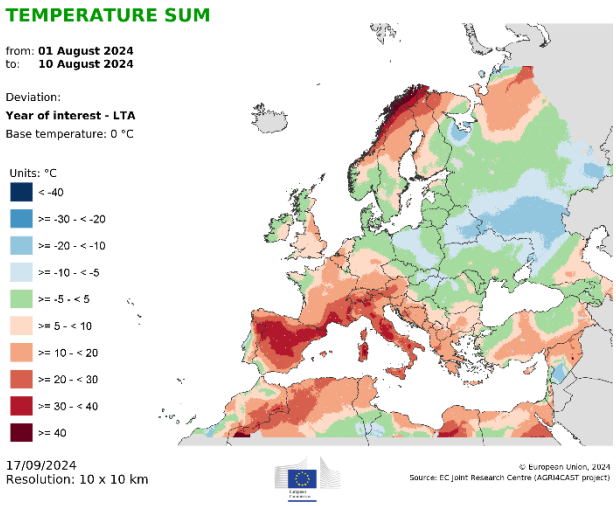
* The EU figures do not include green maize forecasts for Sweden since recent data on yields were not consistent.

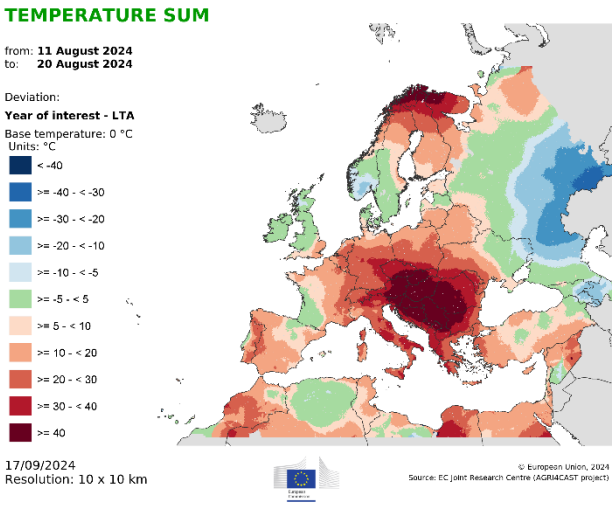
Cop name	Eurostat Crop name	Eurostat Crop Code	Official Eurostat Crop definition*
Total wheat	Wheat and spelt	C1100	Common wheat (*Triticum aestivum* L. emend. Fiori et Paol.), spelt (*Triticum spelta* L.), einkorn wheat (*Triticum monococcum* L.) and durum wheat (*Triticum durum* Desf.).
Total barley	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.
Field beans	Broad and field beans	P1200	All varieties of broad and field beans (Faba vulgaris (Moench) syn. Vicia faba L. (partim)) harvested dry for grain, including seed.
Field peas	Field peas	P1100	All varieties of field peas (Pisum sativum L. convar. sativum or Pisum sativum L. convar. arvense L. or convar. speciosum) harvested dry for grain, including seed.
Rice	Rice	C2000	Rice (*Oryza sativa*, L.).

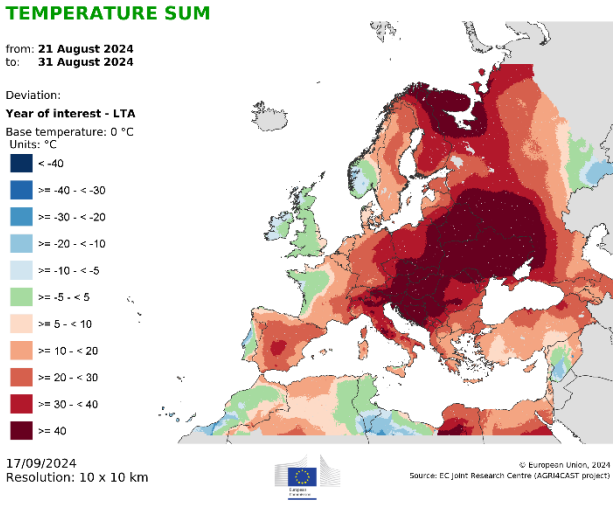
** Source:* Eurostat - Annual crop statistics (Handbook 2020 Edition)

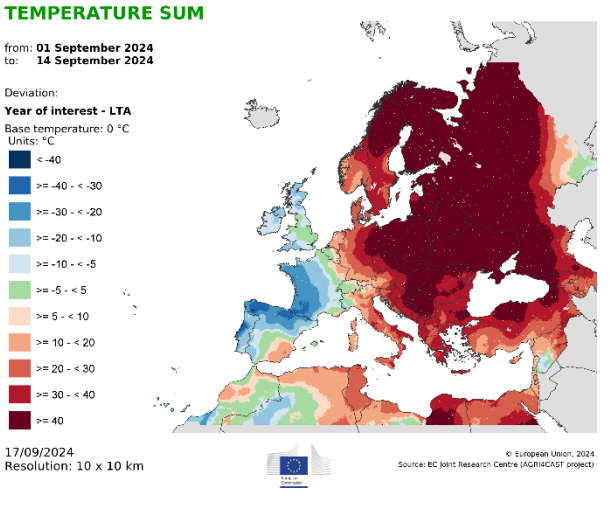
7. Atlas

Temperature regime

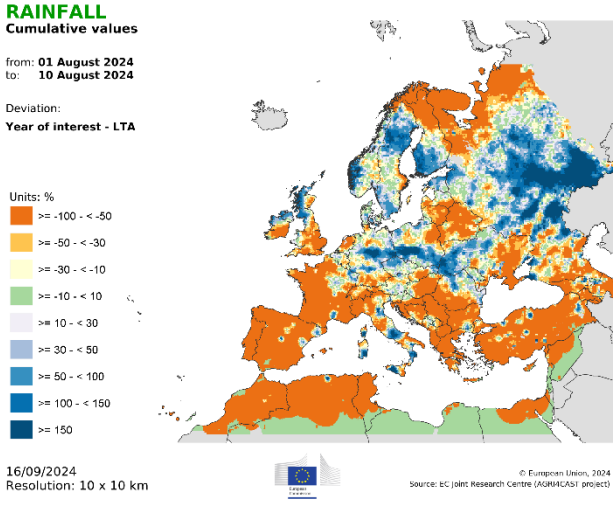


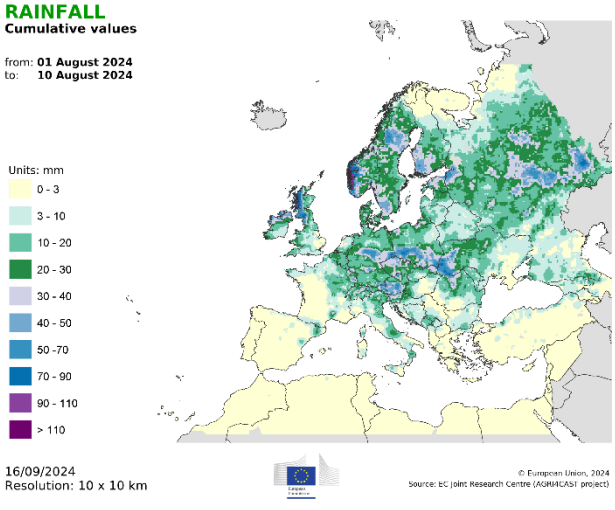






Precipitation



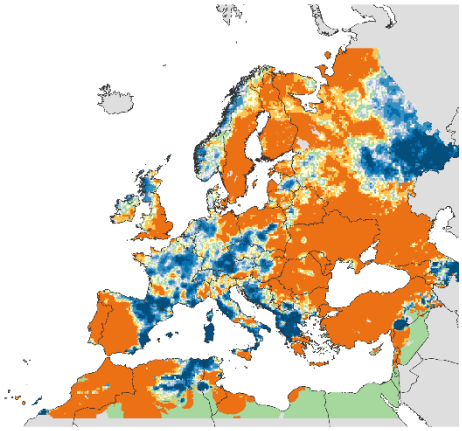


RAINFALL
Cumulative values

from: **11 August 2024**
to: **20 August 2024**

Deviation:
Year of interest - LTA

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

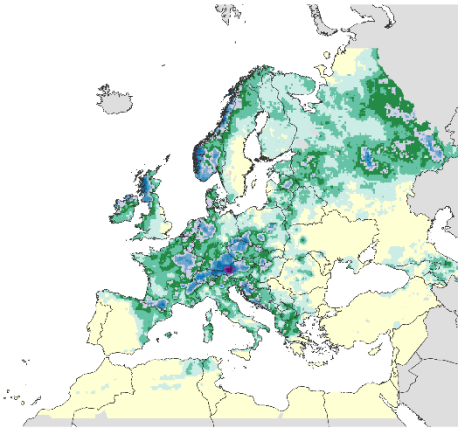


16/09/2024
Resolution: 10 x 10 km

RAINFALL
Cumulative values

from: **11 August 2024**
to: **20 August 2024**

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



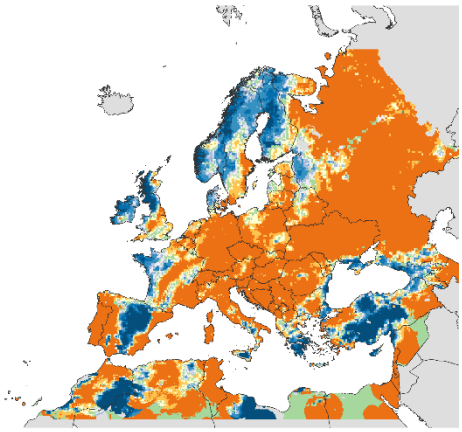
16/09/2024
Resolution: 10 x 10 km

RAINFALL
Cumulative values

from: **21 August 2024**
to: **31 August 2024**

Deviation:
Year of interest - LTA

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

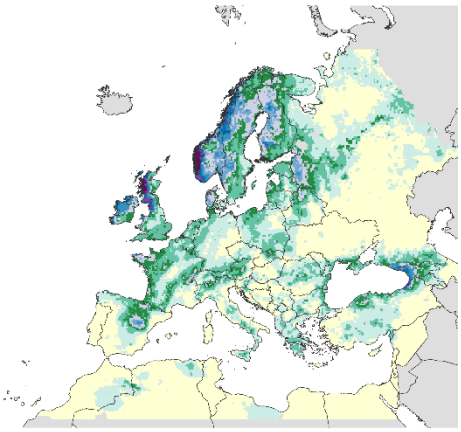


16/09/2024
Resolution: 10 x 10 km

RAINFALL
Cumulative values

from: **21 August 2024**
to: **31 August 2024**

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



16/09/2024
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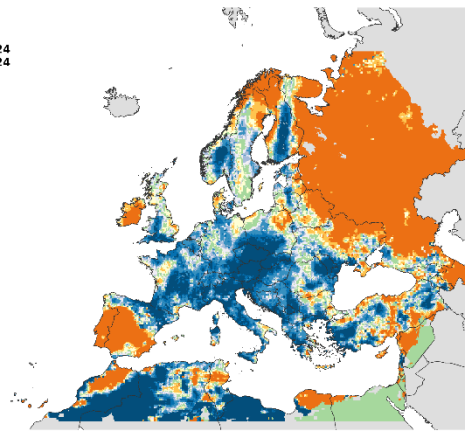
RAINFALL
Cumulative values

from: **01 September 2024**
to: **14 September 2024**

Deviation:
Year of interest - LTA

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

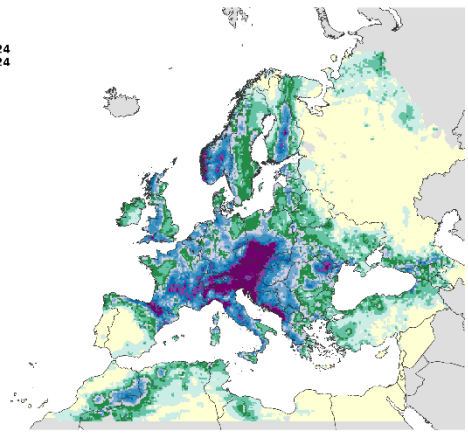


16/09/2024
Resolution: 10 x 10 km

RAINFALL
Cumulative values

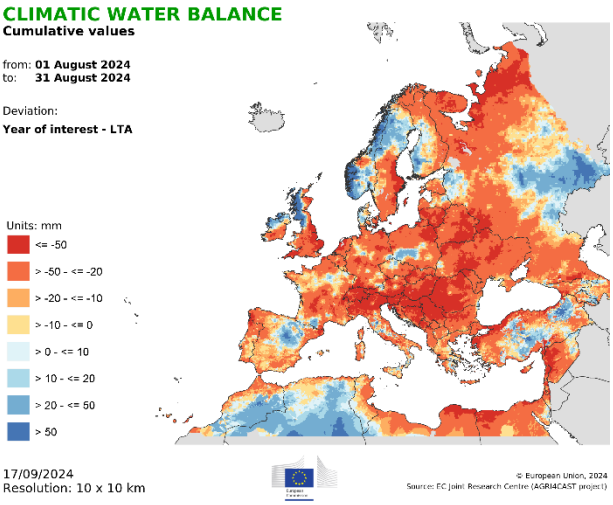
from: **01 September 2024**
to: **14 September 2024**

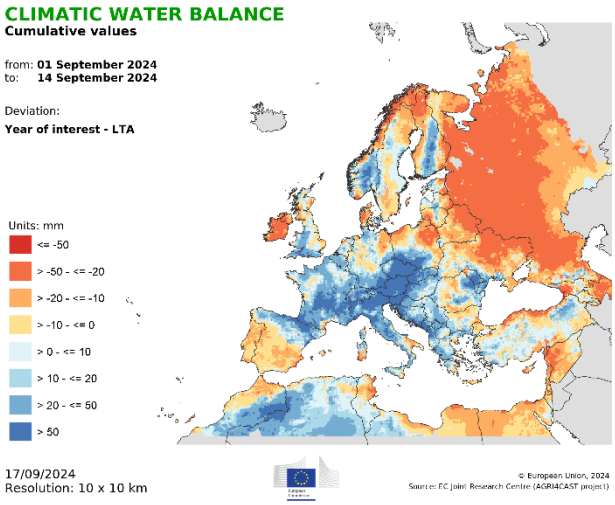
Units: mm
- 0 - 3
- 3 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 -70
- 70 - 90
- 90 - 110
- > 110



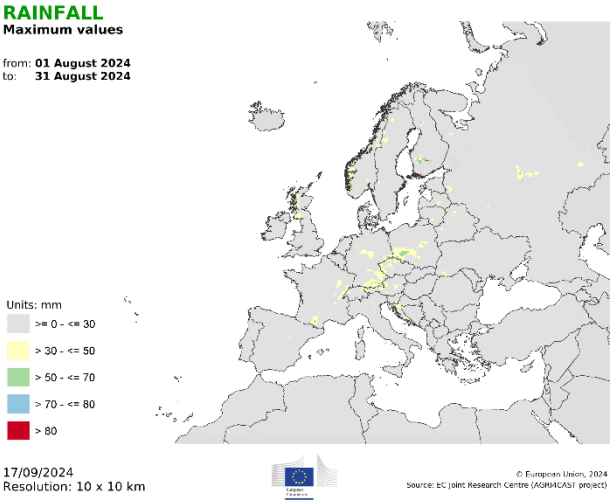
16/09/2024
Resolution: 10 x 10 km

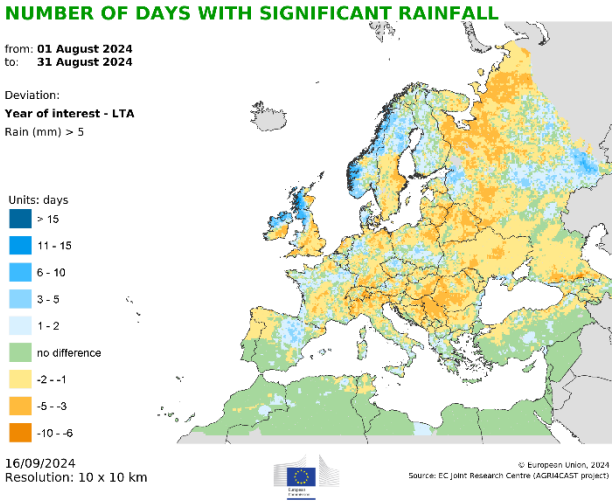
Climatic water balance

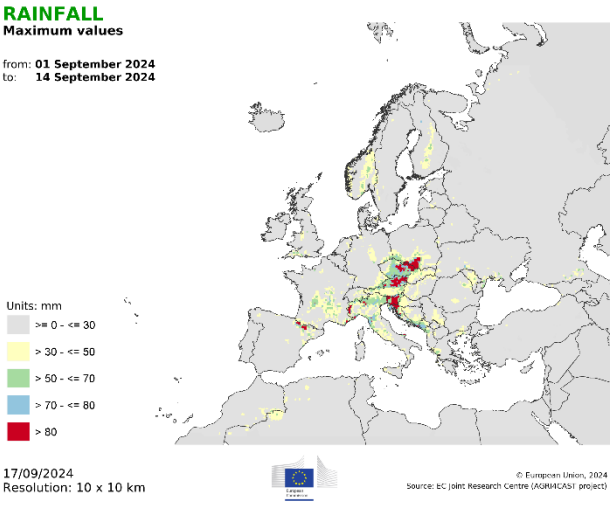


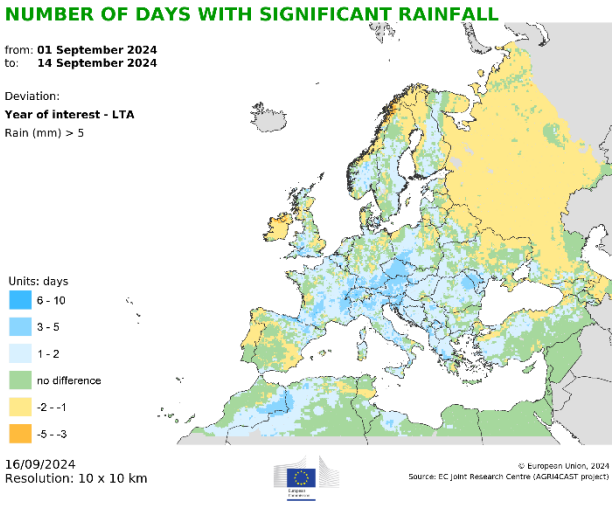


Weather events





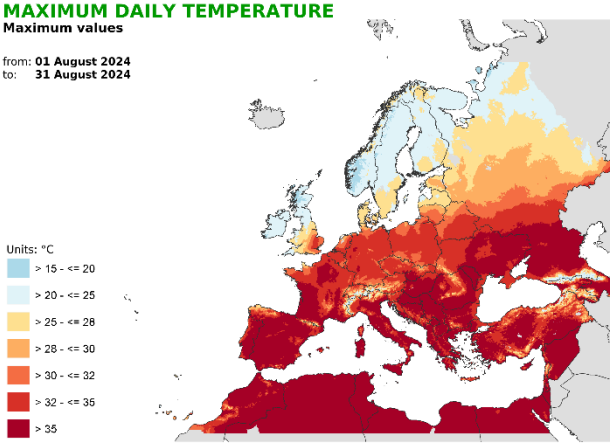




MAXIMUM DAILY TEMPERATURE

Maximum values

from: **01 August 2024**
to: **31 August 2024**



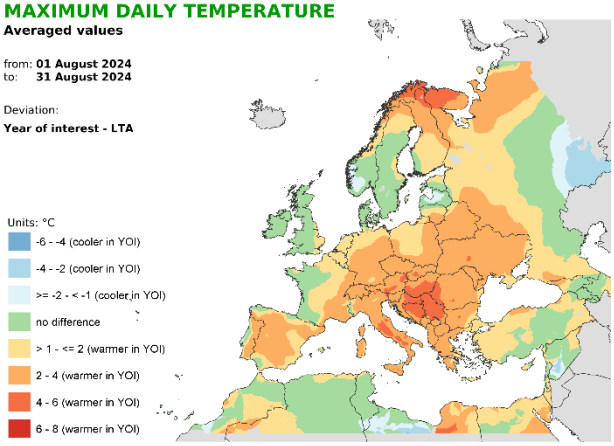
17/09/2024
Resolution: 10 x 10 km

MAXIMUM DAILY TEMPERATURE

Averaged values

from: **01 August 2024**
to: **31 August 2024**

Deviation:
Year of interest - LTA

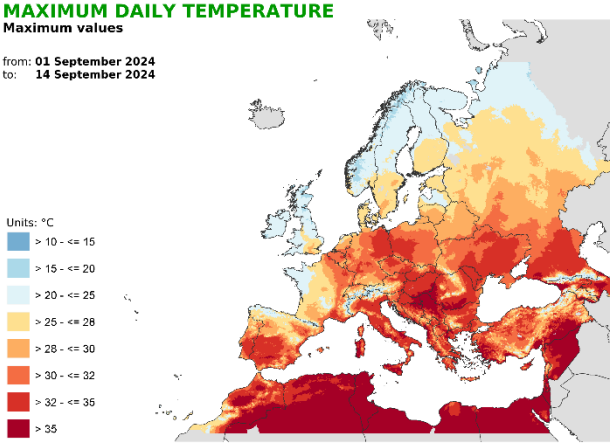


17/09/2024
Resolution: 10 x 10 km

MAXIMUM DAILY TEMPERATURE

Maximum values

from: **01 September 2024**
to: **14 September 2024**



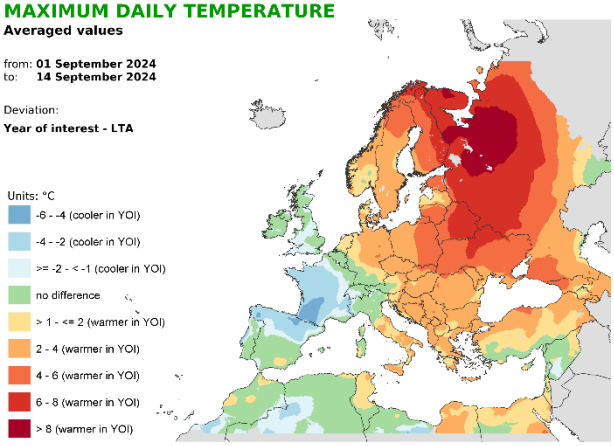
17/09/2024
Resolution: 10 x 10 km

MAXIMUM DAILY TEMPERATURE

Averaged values

from: **01 September 2024**
to: **14 September 2024**

Deviation:
Year of interest - LTA

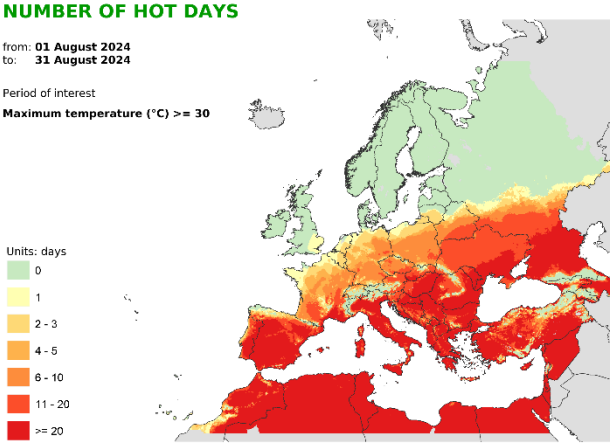


17/09/2024
Resolution: 10 x 10 km

NUMBER OF HOT DAYS

from: **01 August 2024**
to: **31 August 2024**

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

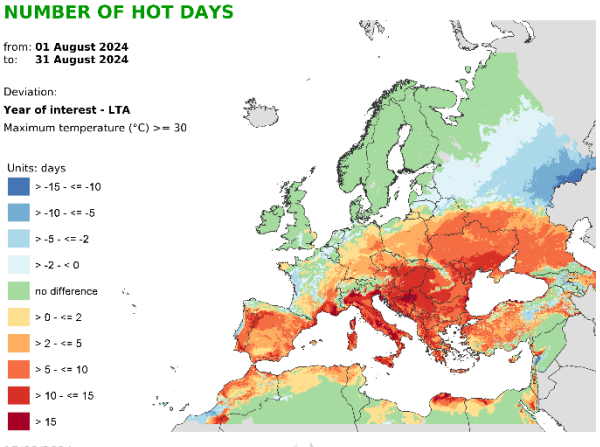


23/09/2024
Resolution: 10 x 10 km

NUMBER OF HOT DAYS

from: **01 August 2024**
to: **31 August 2024**

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

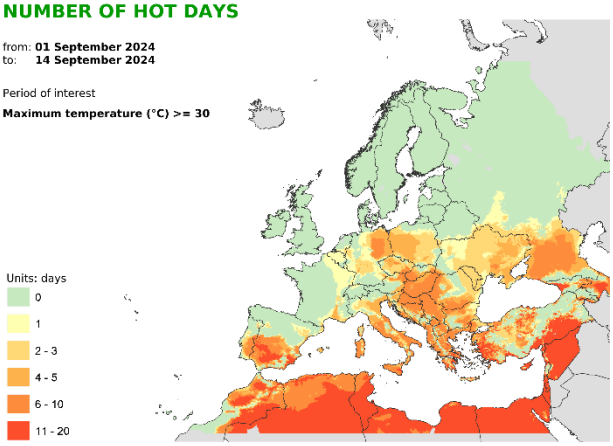


17/09/2024
Resolution: 10 x 10 km

NUMBER OF HOT DAYS

from: **01 September 2024**
to: **14 September 2024**

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

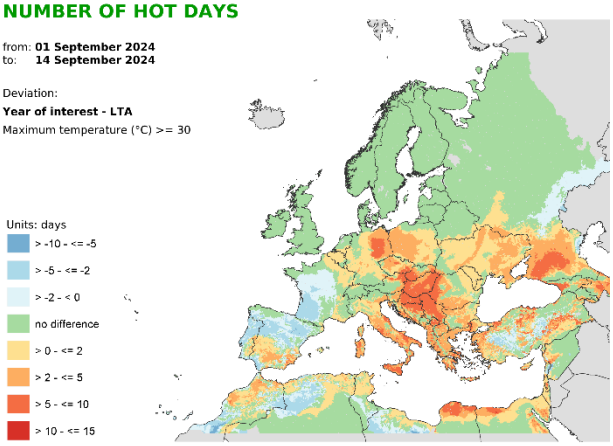


23/09/2024
Resolution: 10 x 10 km

NUMBER OF HOT DAYS

from: **01 September 2024**
to: **14 September 2024**

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

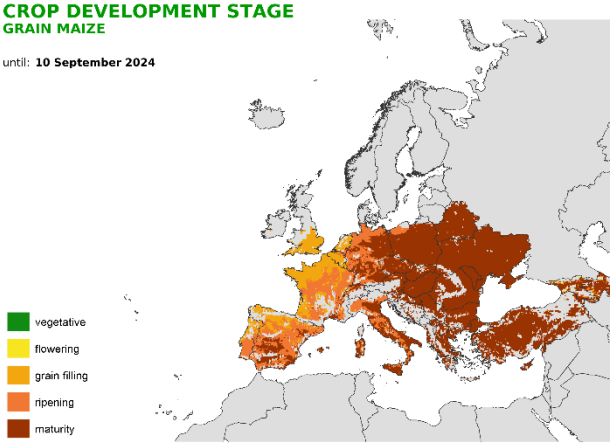


17/09/2024
Resolution: 10 x 10 km

Crop development stages and precocity

CROP DEVELOPMENT STAGE
GRAIN MAIZE

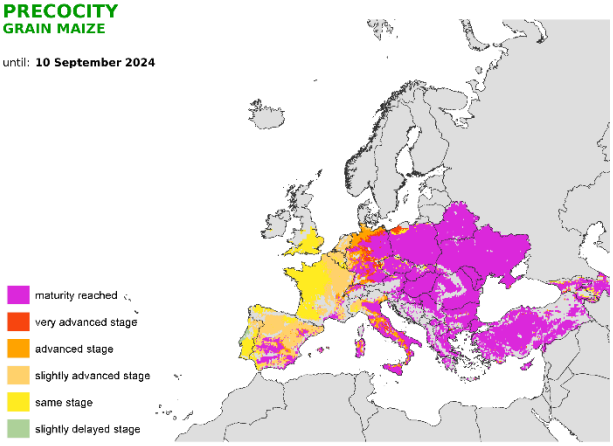
until: **10 September 2024**



16/09/2024
Resolution: 10 x 10 km

PRECOCITY
GRAIN MAIZE

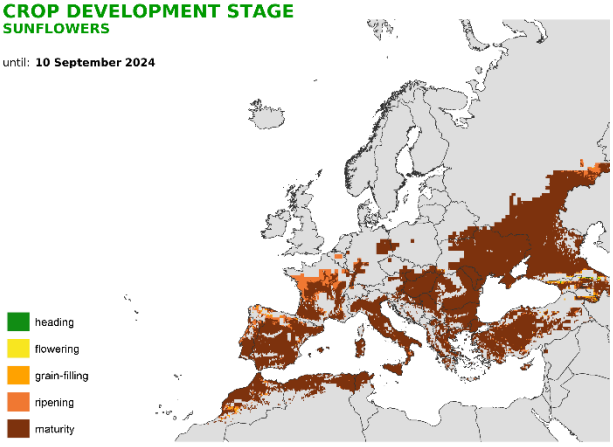
until: **10 September 2024**



16/09/2024
Resolution: 10 x 10 km

CROP DEVELOPMENT STAGE
SUNFLOWERS

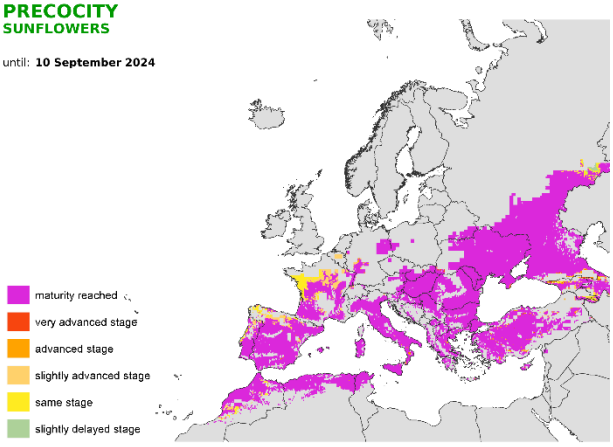
until: **10 September 2024**



16/09/2024
Resolution: 10 x 10 km

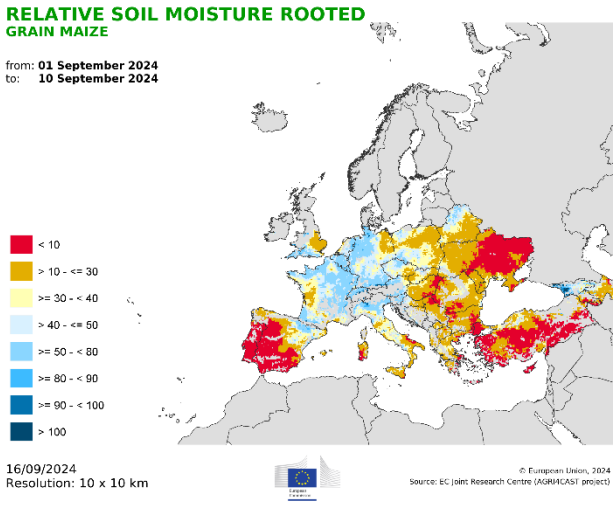
PRECOCITY
SUNFLOWERS

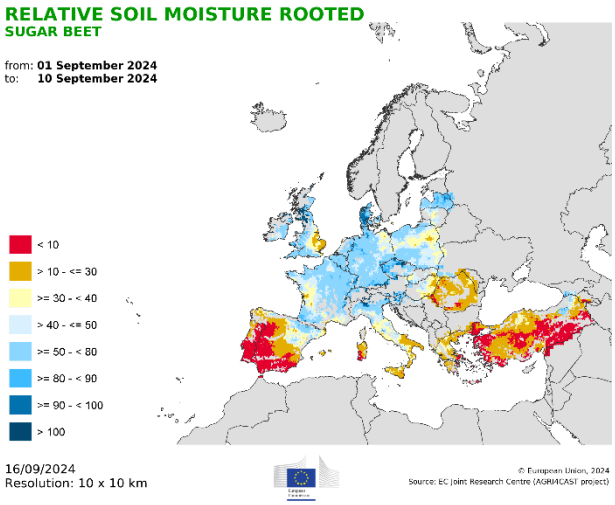
until: **10 September 2024**



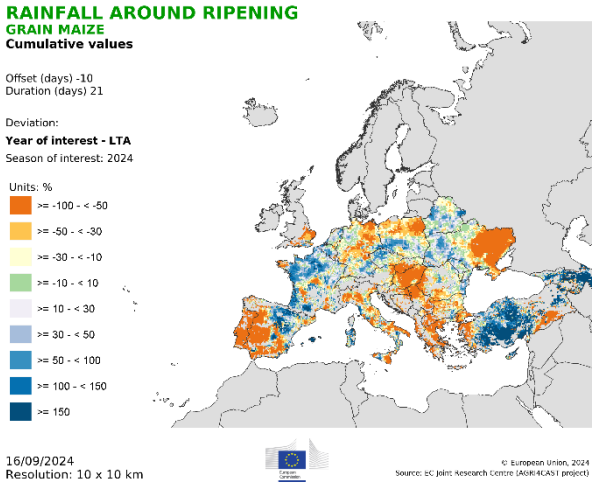
16/09/2024
Resolution: 10 x 10 km

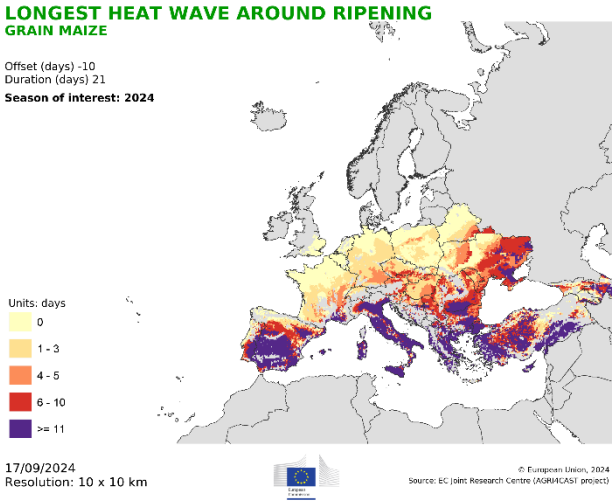
Relative soil moisture

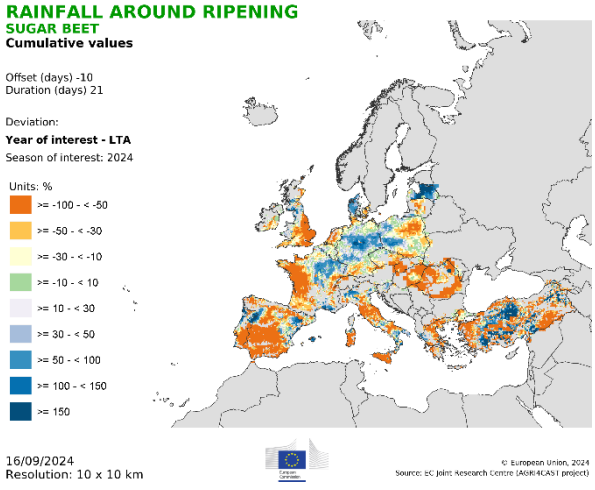


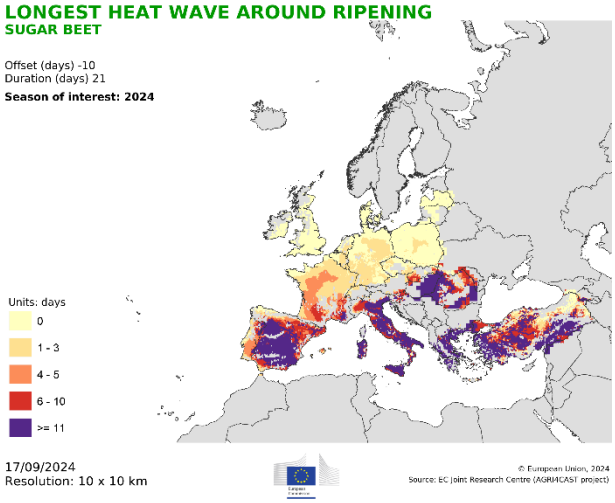


Rainfall and longest heat wave around ripening

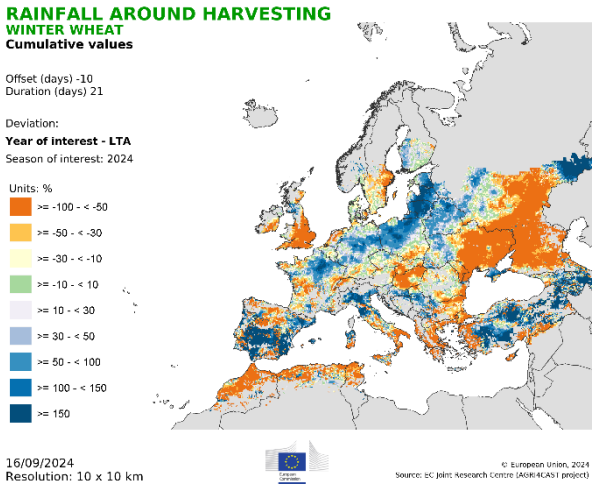


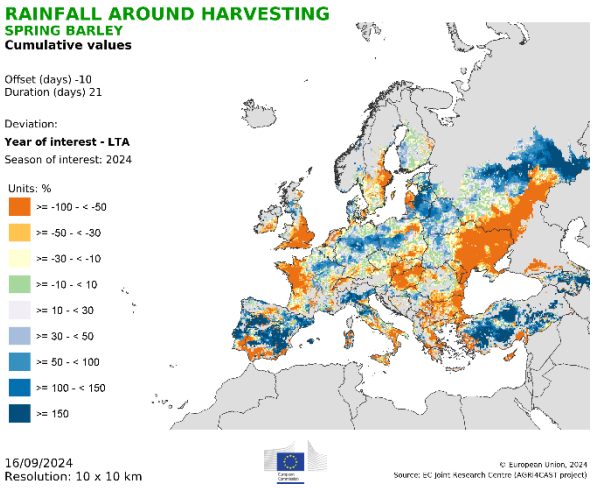






Precipitation around harvesting





JRC MARS Bulletin 2024

Date	Publication	Reference
22 Jan	Agromet analysis	Vol. 32 No 1
26 Feb	Agromet analysis	Vol. 32 No 2
25 Mar	Agromet analysis, yield forecast	Vol. 32 No 3
22 Apr	Agromet analysis, remote sensing, pasture analysis, sowing conditions, yield forecast	Vol. 32 No 4
27 May	Agromet analysis, remote sensing, pasture analysis, sowing update, yield forecast	Vol. 32 No 5
24 Jun	Agromet analysis, remote sensing, pasture analysis, rice analysis, yield forecast	Vol. 32 No 6
22 Jul	Agromet analysis, remote sensing, pasture analysis, harvesting conditions, yield forecast	Vol. 32 No 7
26 Aug	Agromet analysis, remote sensing, pasture update, harvesting update, yield forecast	Vol. 32 No 8
23 Sep	Agromet analysis, remote sensing, pasture analysis, rice analysis, harvesting update, yield forecast	Vol. 32 No 9
28 Oct	Agromet analysis, pasture update, sowing conditions, harvesting update, yield forecast	Vol. 32 No 10
25 Nov	Agromet analysis, sowing update, harvesting update	Vol. 32 No 11
16 Dec	Agromet analysis	Vol. 32 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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Analysis and reports

Biavetti, I., Bussay, A., Cerrani, I., Claverie, M., De Palma, P., Fumagalli, D., Henin, R., Luque Reyes, J., Manfron, G., Morel, J., Nisini, L., Ozalp, O., Panarello, L., Rossi, M., Seguini, L., Tarnavsky, E., Todoroff, P., van den Berg, M., Zucchini, A.

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Data production

AGRI4CAST (Food Security Unit JRC D5), MARSOP6 Consortium

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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 1991-2023.

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