Issued: 24 July 2023
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European Commission

JRC MARS Bulletin

Crop monitoring in Europe

July 2023

Yield outlook further reduced

Sunflowers and spring barley most affected

At EU level, the yield forecast for most crops remains at or slightly above the mediocre 5-year average. The forecast for sunflowers suffered the strongest downward revision, to 5% below the 5-year average, mainly due to the worsened yield outlook for Romania (the EU's main sunflower-producing country). The worsened forecast for spring barley, which was already well below the 5-year average, is mainly due to substantial downward revisions for Denmark, Sweden, Finland, and the Baltic Sea countries.

The main reason for the worsened yield expectations are the distinctly drier-than-usual conditions that occurred for more than one month in large parts of western, central and northern Europe, as well as in eastern Romania. In several of these regions, the resulting negative impacts of limited soil-water supply for crops were exacerbated by distinctly warmer-than-usual temperatures and high radiation.

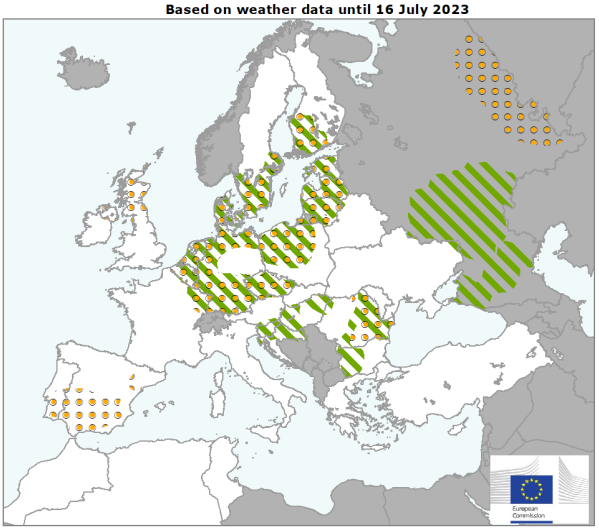
Southern parts of the Iberian Peninsula and northern Italy experienced intense heatwaves, which triggered a risk of heat-induced sterility for flowering summer crops, with potentially irreversible impacts on yields.

Rainfall surplus delayed harvesting, and potentially reduced grain quality in western parts of Bulgaria and Romania, Slovenia, Croatia, and Hungary.

Contents:

Covers the period from 1 June until 16 July

AREAS OF CONCERN - CROP IMPACTS
Based on weather data until 16 July 2023



Winter crops impacted Spring and/or summer crops impacted

Crop	Yield t/ha				
	Avg 5yrs	June Bulletin	MARS 2023 forecasts	%23/5yrs	% Diff June
Total cereals	5.44	5.52	**5.46**	+ 0	– 1
Total wheat	5.58	5.70	**5.59**	+ 0	– 2
Soft wheat	5.79	5.92	**5.80**	+ 0	– 2
Durum wheat	3.50	3.40	**3.39**	– 3	– 0
Total barley	4.89	4.76	**4.74**	– 3	– 0
Spring barley	4.19	3.73	**3.62**	– 14	– 3
Winter barley	5.77	5.91	**5.91**	+ 2	+ 0
Grain maize	7.48	7.61	**7.53**	+ 1	– 1
Rye	3.98	4.24	**4.12**	+ 4	– 3
Triticale	4.22	4.33	**4.29**	+ 2	– 1
Rape and turnip rape	3.10	3.29	**3.20**	+ 3	– 3
Potatoes	34.1	35.5	**34.4**	+ 1	– 3
Sugar beet	72.0	75.9	**73.3**	+ 2	– 3
Sunflower	2.21	2.21	**2.12**	– 5	– 4
Soybeans	2.76	2.89	**2.86**	+ 4	– 1
Green maize	40.7	—	**40.6**	– 0	—

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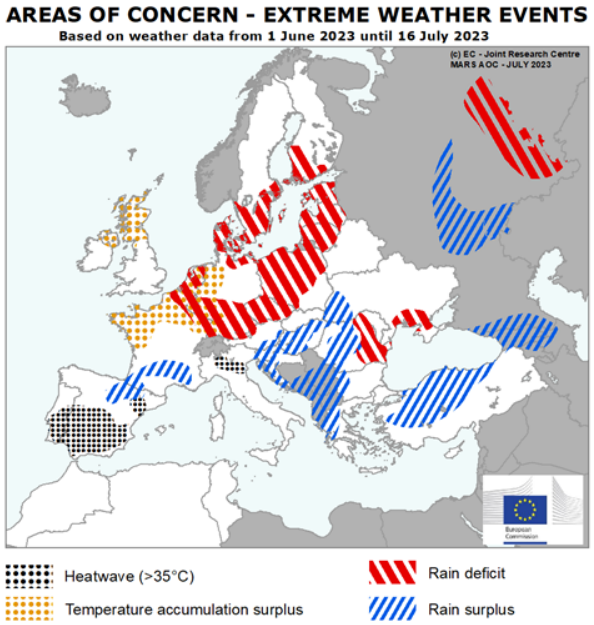
Joint Research Centre

1. Agrometeorological overview

1.1. Areas of concern

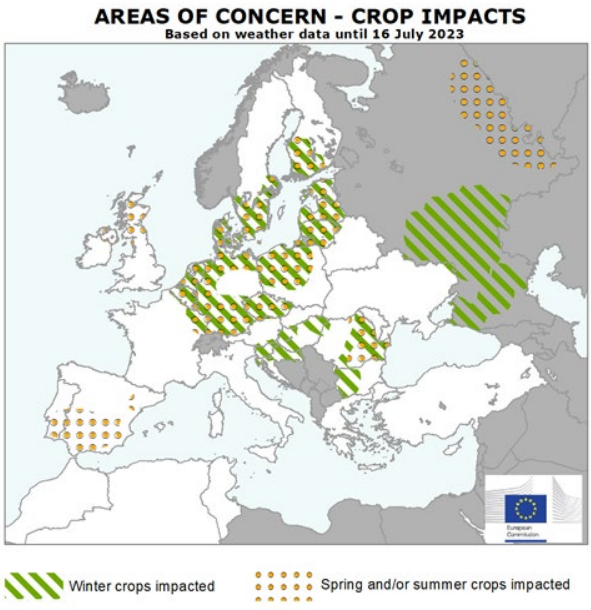


Intense **heatwaves** occurred in southern Portugal and Spain, including the Catalan region of northeastern Spain, as well as in northern Italy. In July, in Spain grain maize is flowering and high temperatures could impair pollination, causing permanent crop damage and reduced yields. While temperatures between 30-40°C are generally favourable for sunflower growth, the dry conditions of April and May, combined with temperatures above 40°C, could be detrimental to yield outcomes. Also in Italy, the increase in maximum temperatures in July triggered a risk of heat-induced sterility for flowering summer crops, which is closely monitored.

Distinctly drier-than-usual conditions were observed in many parts of Europe, including Czechia, Austria, north-eastern France, the Benelux countries, Denmark, southern Sweden and Finland, most of the Baltic Sea countries, Poland, and large parts of Germany, as well as in eastern Romania and southernmost parts of Ukraine. In most of the affected regions in western and northern Europe, the rain deficit is associated with a very dry period from early May until mid- to late-June with negative impacts on flowering and/or grain filling of winter cereals, and on summer crops during vegetative stages. In Austria, Czechia, southern parts of Germany, and most of Poland, as well as in eastern Romania, rainfall was more evenly distributed but well below the LTA throughout the review period, which resulted in negative impacts on winter and spring cereals during grain filling and on summer crops during vegetative stages and partly during flowering (in the case of maize and sunflowers). Central parts of Germany are not marked on the map because of the high precipitation during the storm event in the last dekad of June; for example, in *Nordrhein-Westfahlen* nearly monthly precipitation was recorded within a single day.

Distinctly warmer-than-usual conditions occurred in northern France, the Benelux countries, western Germany, and in northern parts of the United Kingdom. In most of these regions, average and maximum temperatures during the review period were the highest in our records (since 1991). Even though the temperatures were insufficiently high to cause damage to well-watered crops, the combination of high temperatures and high radiation led to very high evaporative demand, thus exacerbating the negative impacts of limited soil-water supply to crops, even in some regions where the rain deficit was not exceptional.

Rainfall surplus delayed harvesting, and potentially reduced grain quality, in western parts of Bulgaria and Romania, Slovenia, Croatia, and Hungary. A distinct rainfall surplus with no negative impacts on crops was also observed in the region of Epirus, Greece, although not a major crop production region. In Italy, above-average rainfall was experienced in the littoral rims of *Lazio*, *Campania*, *Puglia*, *Calabria*, and the Italian islands. Although precipitation here was unevenly distributed and prevailed during the first half of June, potentially it helped to mitigate the negative impacts of high temperatures.



1.2. Meteorological review (1 June –16 July)

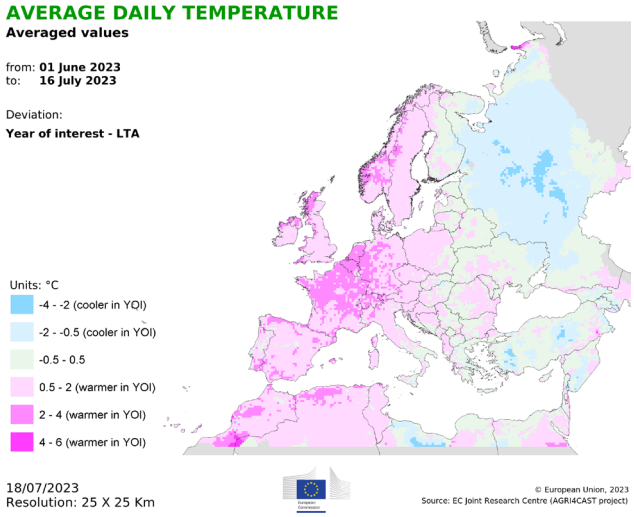
Unusually high temperatures in many parts of western and northern Europe, accompanied by prevailing wet conditions in southern Europe and most of the Balkan Peninsula region.

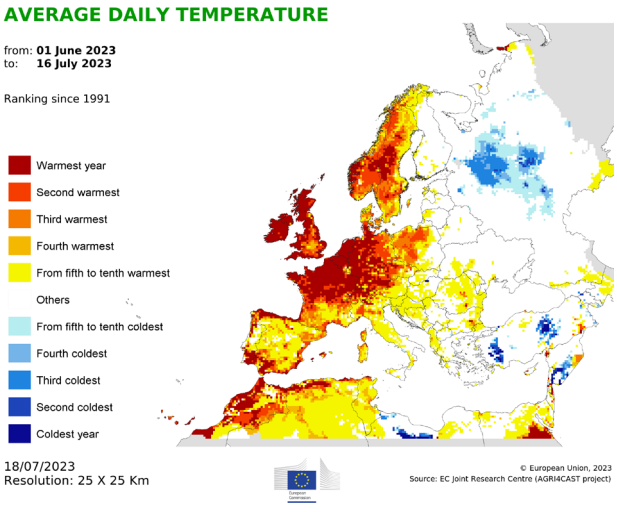
Warmer-than-usual conditions were observed in most of Europe, except European Russia, and Türkiye. More distinct positive temperature anomalies (2 °C to 4 °C above the 1991-2022 long-term average, LTA) were observed in parts of the Iberian Peninsula, in western Europe extending from north-western Italy to Brittany and north-western Germany, in Scotland, Northern Ireland, and parts of Norway. In most of these regions, average daily temperatures rank among the three warmest in our records (since 1991).

Colder-than-usual conditions, mostly with temperature anomalies between 0.5 °C and 2 °C below the LTA, were observed in most of European Russia and parts of Türkiye. Average daily temperatures in the regions with the most distinct negative anomalies rank among the three coldest since 1991.

Wetter-than-usual conditions were observed in most of the Iberian Peninsula, parts of southern Italy, the western Balkan Peninsula, most of Türkiye, and southern European Russia. Rainfall totals exceeding 90 mm were observed in most of the British Isles, northern parts of the Iberian Peninsula, much of France, and in the Alps region, extending into the western Balkan Peninsula, as well as along the southern and eastern coast of the Black Sea, parts of European Russia and eastern Europe, southern Finland, southern Scandinavia, Denmark, and parts of Germany. In these regions, rainfall exceeding the LTA accumulated over 10 and more days above the 5 mm threshold.

Drier-than-usual conditions were observed north of the Alps region, extending to Poland, the Baltic Sea countries, and parts of Scandinavia and northern European Russia. In these regions, as well as along the western and northern coast of the Black Sea, across the Northern European Plain, rainfall accumulated over 1-3 days with rainfall above the 5 mm threshold.



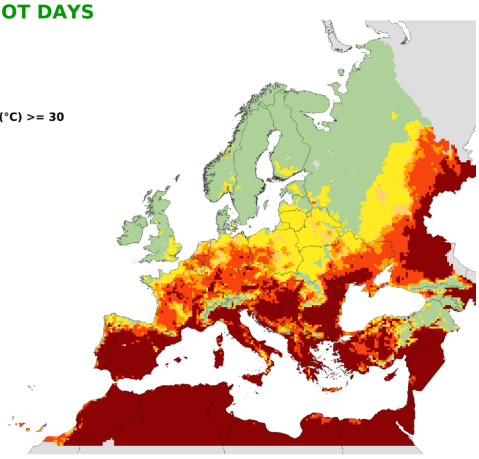


NUMBER OF HOT DAYS

from: **01 June 2023**
to: **16 July 2023**

Period of interest

Maximum temperature (°C) >= 30



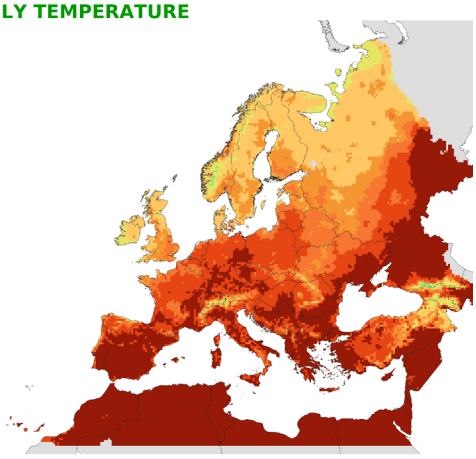
Units: days
- 0
- 1 - 2
- 3 - 3
- 4 - 5
- 6-10
- >= 10

18/07/2023
Resolution: 25 X 25 Km

MAXIMUM DAILY TEMPERATURE

Maximum values

from: **01 June 2023**
to: **16 July 2023**



Units: °C
- > 15 - <= 20
- > 20 - <= 25
- > 25 - <= 28
- > 28 - <= 30
- > 30 - <= 32
- > 32 - <= 35
- >35

21/07/2023
Resolution: 25 X 25 Km

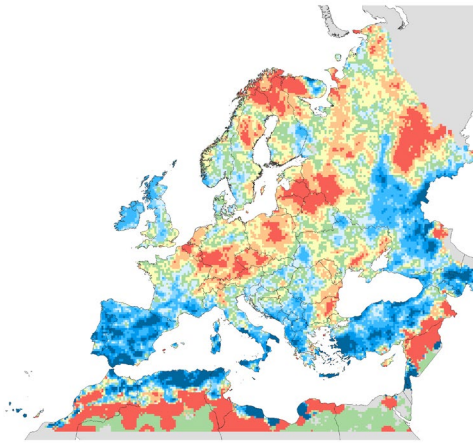
RAINFALL

Cumulative values

from: **01 June 2023**
to: **16 July 2023**

Deviation:

Year of interest - LTA



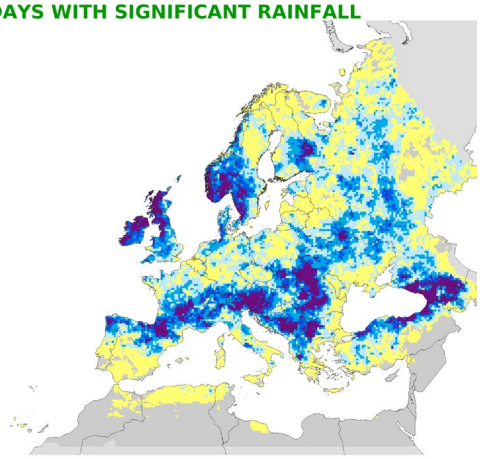
Units: %
- >= -100 - < -50
- >= -50 - < -30
- >= -30 - < -10
- >= -10 - < 10
- >= 10 - < 30
- >= 30 - < 50
- >= 50 - < 100
- >= 100 - < 150
- >= 150

18/07/2023
Resolution: 25 X 25 Km

NUMBER OF DAYS WITH SIGNIFICANT RAINFALL

from: **01 June 2023**
to: **16 July 2023**

Rain (mm) > 5



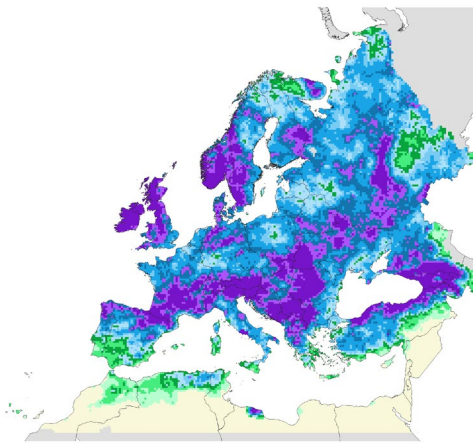
Units: days
- = 0
- 1 - 3
- 4 - 5
- 6 - 7
- 7 - 9
- >= 10

18/07/2023
Resolution: 25 X 25 Km

RAINFALL

Cumulative values

from: **01 June 2023**
to: **16 July 2023**



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

18/07/2023
Resolution: 25 X 25 Km

TEMPERATURE SUM

from: **01 June 2023**
to: **16 July 2023**

Deviation:

Year of interest - LTA

Base temperature: 0 °C
Units: °C
- >= 150
- >= 100 - < 150
- >= 80 - < 100
- >= 50 - < 80
- >= 20 - < 50
- >= -20 - < 20
- >= -50 - < -20
- >= -80 - < -50
- >= -100 - < -80
- >= -150 - < -100
- < -150

18/07/2023
Resolution: 25 X 25 Km

1.3. Weather forecast (20 - 29 July)

Influenced by a hot air mass moving from Africa, parts of southern Europe are forecast to experience unusually high temperatures, while north from the Alps region across the continent, cold air masses are forecast to bring rain showers.

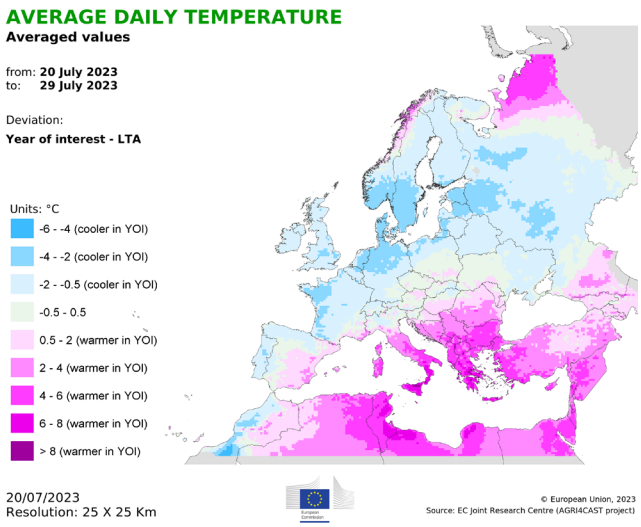
Warmer-than-usual conditions with daily average temperatures exceeding the LTA by 2 °C to 4 °C, are forecast for most of Italy, the Balkan Peninsula, western Türkiye and northernmost European Russia. In some of these regions, daily average temperatures are forecast to exceed the LTA by up to 8 °C. Six or more days with average temperatures above 30 °C are forecast in most of southern Europe, the Balkan Peninsula, most of Türkiye and southern European Russia.

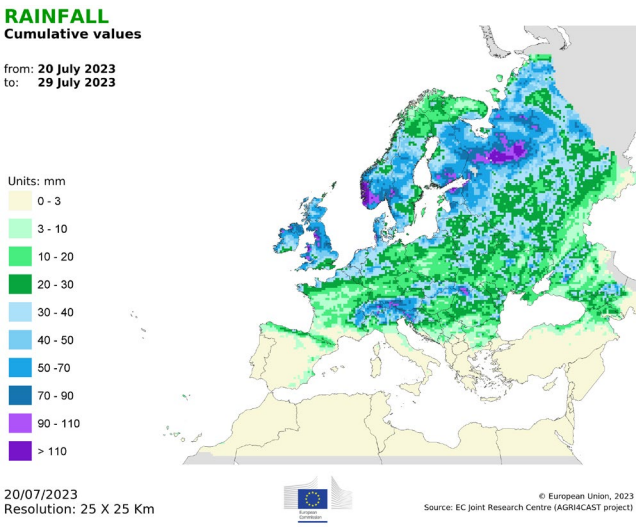
Colder-than-usual conditions with daily average temperatures between -2 °C and -0.5 °C (and locally down to -4 °C) relative to the 1991-2022 long-term average (LTA) are forecast in the western and northern Iberian Peninsula, most of western and northern Europe, including the Baltic countries, eastern Ukraine and parts of European Russia.

Dry conditions (total precipitation less than 3 mm) are forecast for Portugal, most of Spain, southern France, central and southern Italy, the south-western Balkan Peninsula and most of Türkiye.

Wet conditions (total precipitation above 10 mm) are forecast for most of Europe, with regions in the Alps and Carpathian Mountains, as well as the United Kingdom, southern Scandinavia and northern European Russia forecast to receive 50 mm and more rainfall. In the latter regions, 6 or more days with rainfall above 5 mm are forecast. **Very wet conditions** (rainfall above 90 mm) are forecast for parts of Wales and Scotland, southern Norway and Finland, Estonia and parts of northern European Russia.

The long-range weather forecast, from August to October, points to a declining likelihood (from 80-90% and above for August to 60-70% probability for October) of temperatures exceeding the climatological median by up to 2°C in August and September, and between 0.5-1°C in October. The rainfall forecast points to low likelihood (60-70% probability) of rainfall exceeding the climatological median by up to 50 mm only in parts of the Iberian Peninsula and Italy.



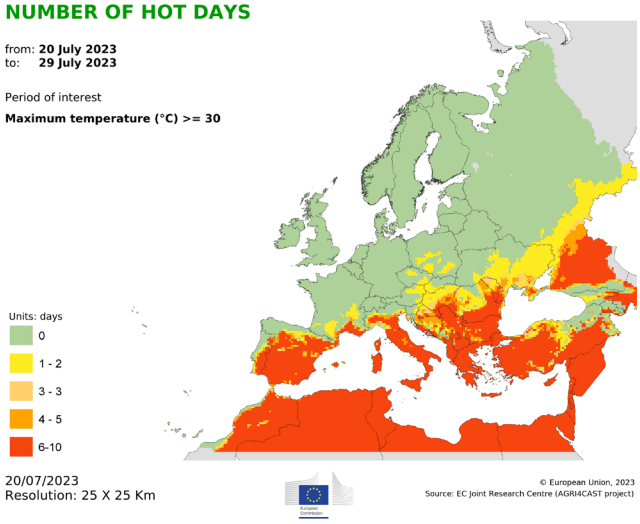


NUMBER OF HOT DAYS

from: **20 July 2023**
to: **29 July 2023**

Period of interest

Maximum temperature (°C) >= 30

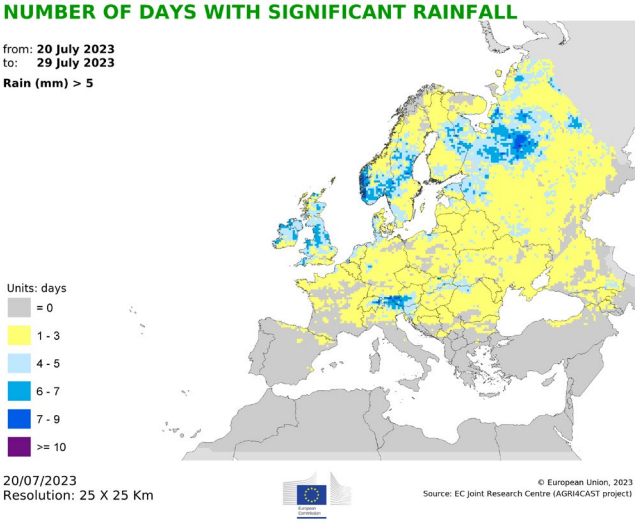


20/07/2023
Resolution: 25 X 25 Km

NUMBER OF DAYS WITH SIGNIFICANT RAINFALL

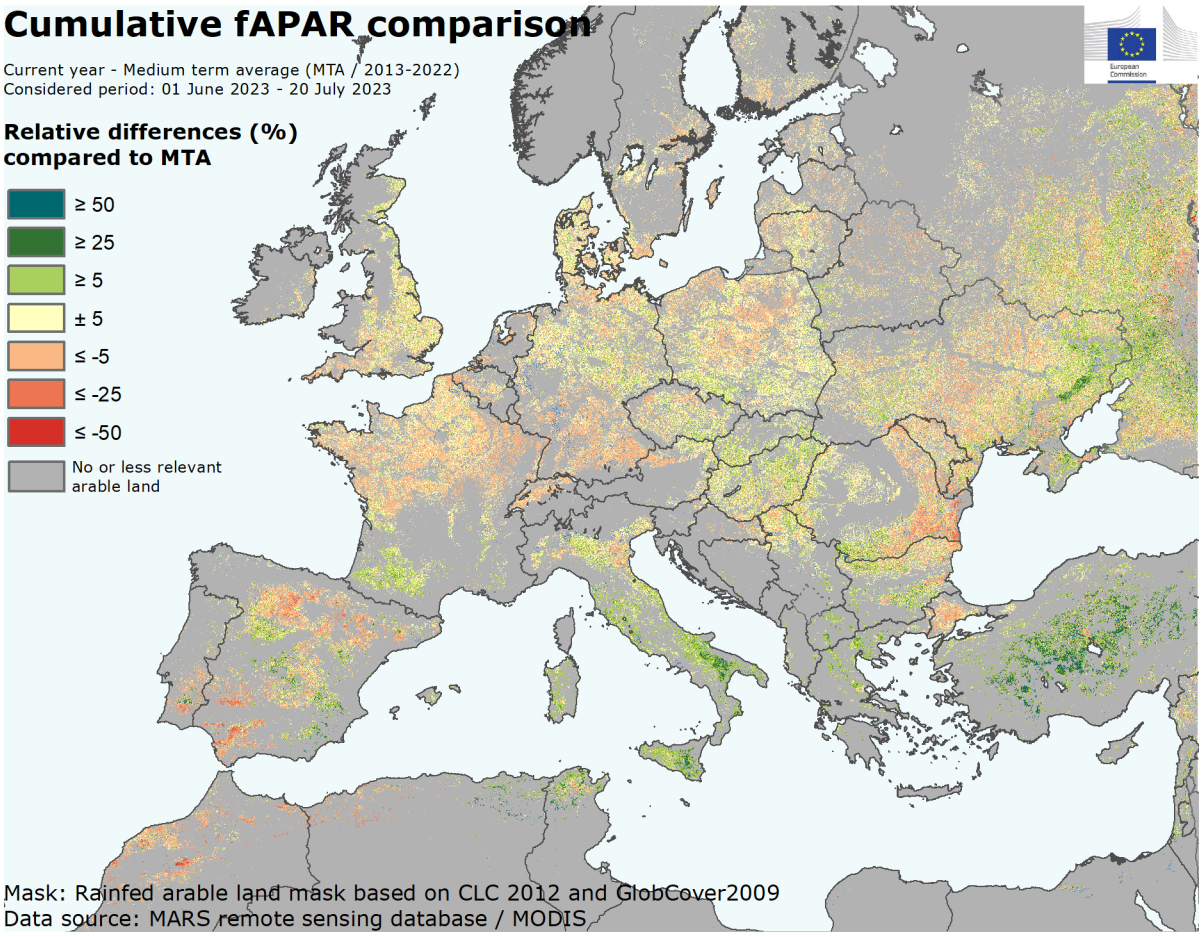
from: **20 July 2023**
to: **29 July 2023**

Rain (mm) > 5



20/07/2023
Resolution: 25 X 25 Km

2. Remote sensing – observed canopy conditions



The map displays the difference between the fraction of absorbed photosynthetically active radiation (fAPAR) cumulated from 1 June to 20 July 2023 and the medium-term average (2013-2022) for the same period. Positive anomalies (in green) reflect above-average canopy density, indicating above-average biomass accumulation or early crop development, while negative anomalies (in red) indicate below-average biomass accumulation or late crop development.

The map displays predominately summer crop conditions in southern Europe, where winter crops are in senescence or already harvested. In northern Europe, winter and spring crop conditions stand out, as summer crops presence in the signal is still marginal. In other regions, the signal represents a mix of winter, spring and summer crops.

Northern-central Spain (e.g. *Castilla y León*, *Castilla la Mancha*) continued experiencing unfavourably hot and dry conditions, after a brief period of relief. Crops in the higher situated areas further south in these regions experienced more effective rainfall and milder temperatures.

Southern and central Italy benefited from abundant rainfall in May and June, resulting in above-average crop growth. Northern Italy presents a more mixed pattern with a moderate slowdown in biomass accumulation in the period 5-12 July due to a heatwave. The overall biomass accumulation can be considered in line with to slightly below the MTA (e.g. *Friuli-Venezia Giulia*).

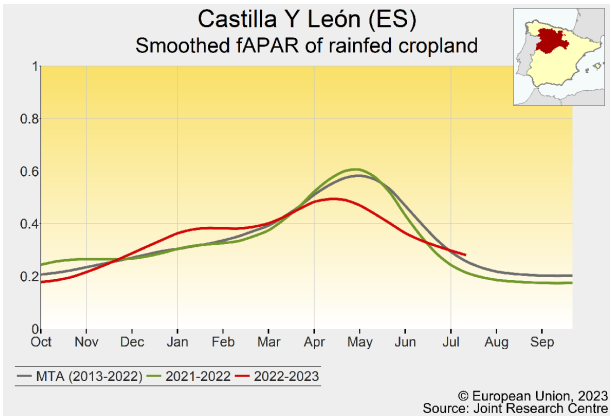
In France, winter and spring crops in the south-west are in good shape due to favourable conditions. However, in north-eastern and western parts of the country, the dry period in May and early June affected the winter crops during grain filling (e.g. *Centre-Val de Loire*). Below-average fAPAR is observed in the peak of vegetation in the Benelux countries, and southern and western Germany due to continued rainfall deficits and hot temperatures (e.g. *Tübingen*). In eastern Germany and most of Poland, the fAPAR is close to the MTA.

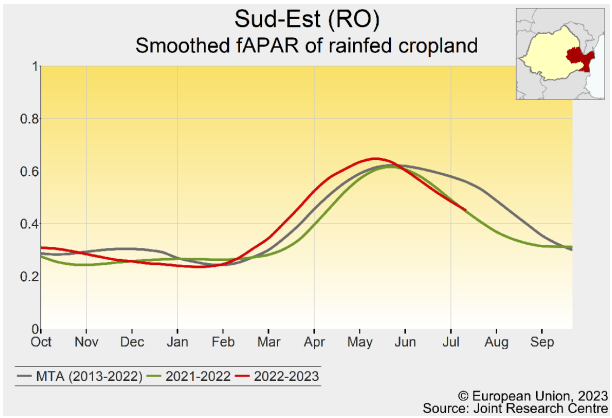
Central Europe, including Slovakia, Hungary, and western Romania, preserved the benefits of a good winter crops season. The advanced and extended season has facilitated biomass accumulation. However, in eastern

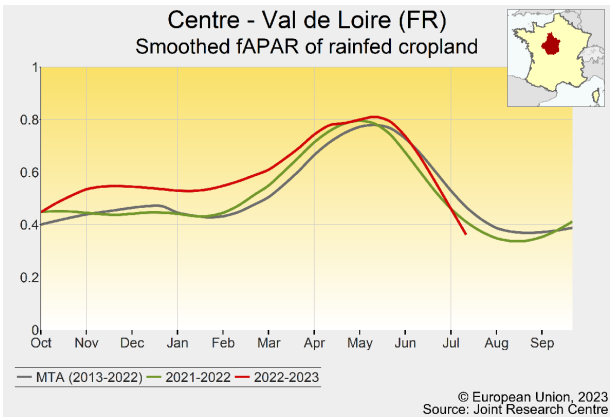
Romania and northern Bulgaria, adverse conditions in May and June have resulted in below-average biomass accumulation during grain filling (e.g. *Sud-Est*).

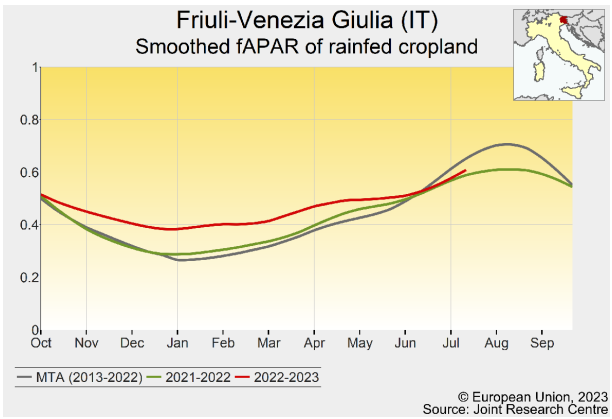
In Denmark, Sweden, Finland and the Baltic Sea countries, winter crops have reached or are about to reach the grain filling stage. The dry and hot conditions that prevailed in this region negatively impacted both winter and spring crops, resulting in lower than usual fAPAR values in e.g. eastern Sweden and western Lithuania.

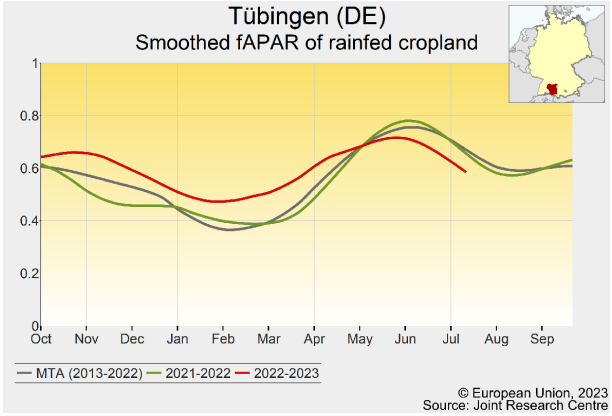
In Türkiye, the positive fAPAR anomalies reflect the prevailing good condition of winter and summer crops (e.g. *Konya*). fAPAR profiles for Ukraine currently present a rapid decline (e.g. *Odes'ka*), which is attributed to the rain deficit in June. The distinctly above-average fAPAR around the conflict line close to *Zaporiz'ka* is attributed to the spontaneous growth of vegetation in abandoned agricultural areas.

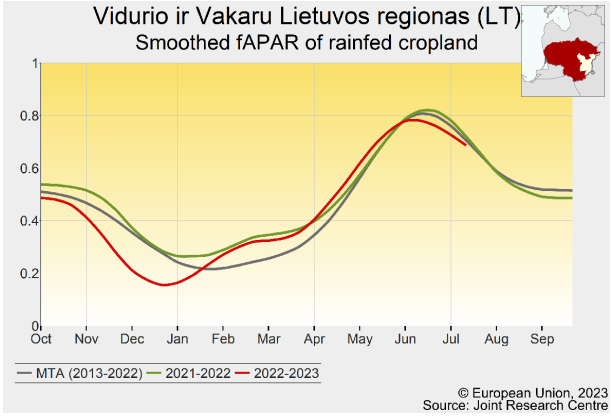


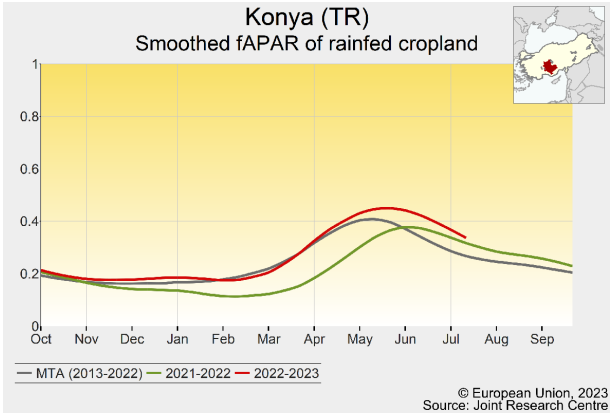


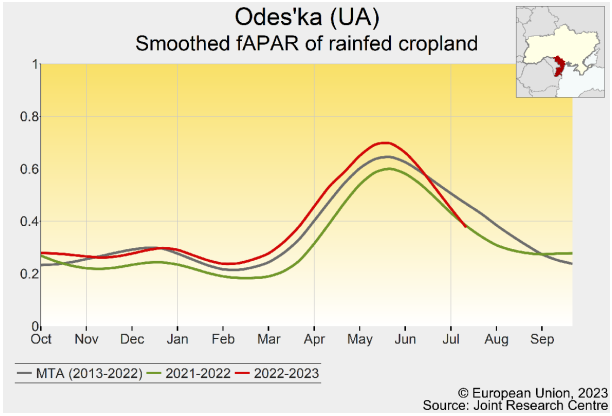








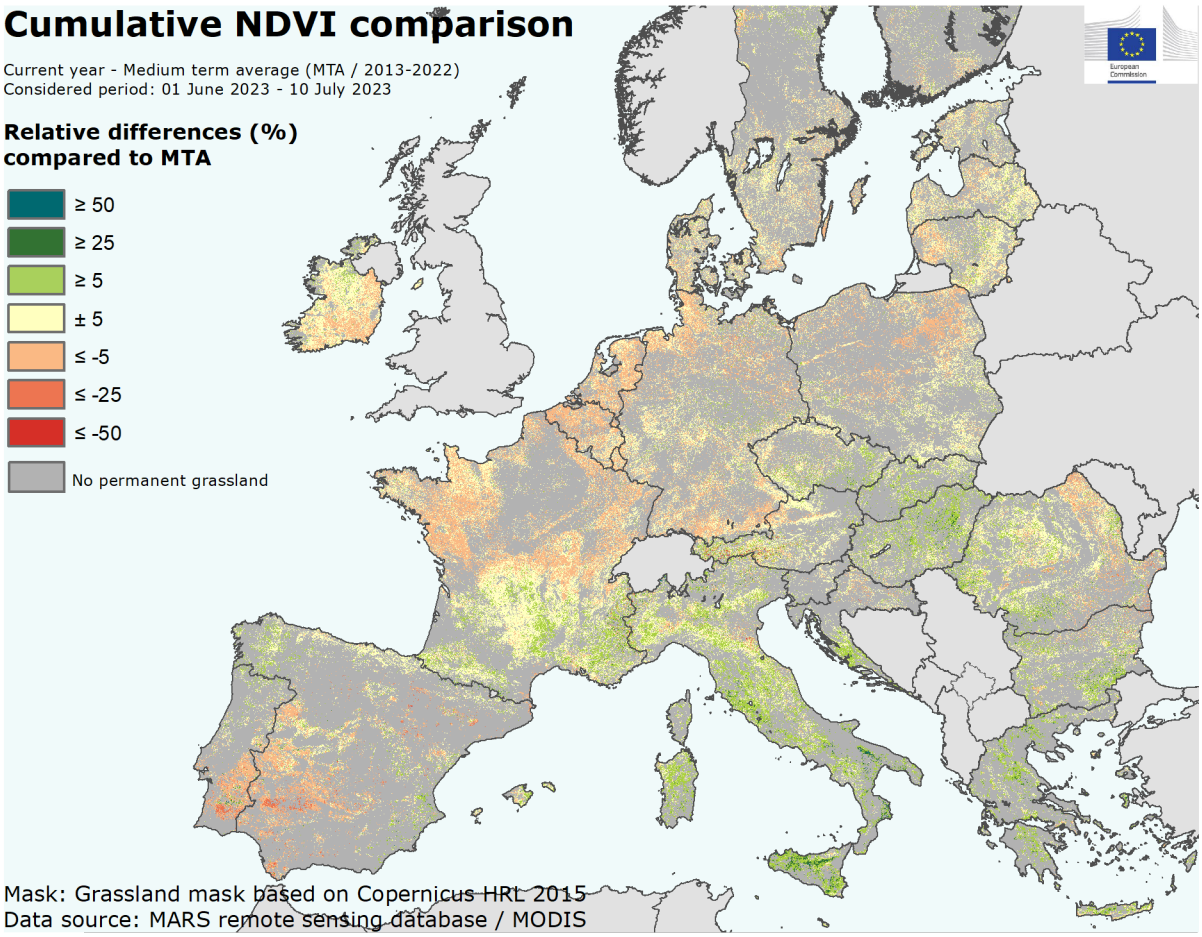

Konya (TR)
Smoothed fAPAR of rainfed cropland
1
0.8
0.6
0.4
0.2
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
MTA (2013-2022)
2021-2022
2022-2023
© European Union, 2023
Source: Joint Research Centre


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

3. Pastures in Europe – regional monitoring

Hot and dry conditions negatively affected grasslands in western and northern Europe

Large parts of western and northern Europe have seen constant above-average temperatures paired with regional rain deficits that have increased water stress for plants. While the rain deficit has been partially alleviated, it is still affecting grasslands with various intensities. Southern European countries have benefitted from regular rainfall, and growing conditions are favourable, aside from the persistent lack of rainfall in the southern Iberian Peninsula.



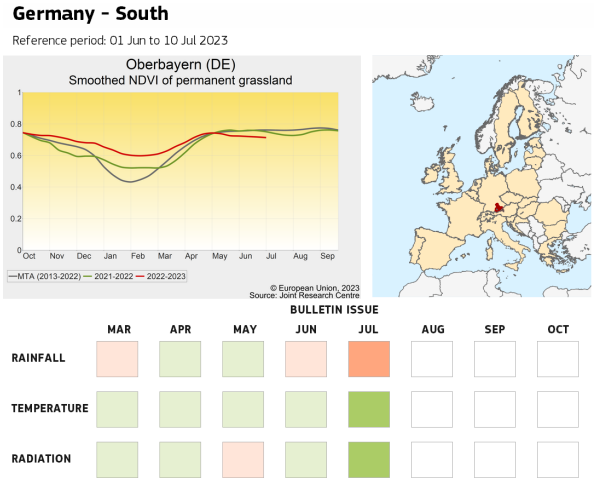
Fair conditions continue to prevail in **France** despite hot temperatures in most of the country. In the southern half of France, the effects of warmer than usual temperatures were mitigated by abundant (locally very heavy) rainfall, while grasslands in the northern half of the country have been more significantly affected by the combined hot and dry conditions. In **Ireland**, the lack of rainfall in May and early June has ended and good conditions are now present for grassland biomass accumulation. In the **Benelux** countries, and bordering areas of **Germany**, unusually warm and dry conditions in May and June negatively affected grassland productivity. Rainfall since the end of June has mitigated the situation, but without fully restoring the condition of grasslands. Biomass accumulation in green maize – which was already behind due to delayed sowing – was also negatively affected. In northern Germany, episodic rainfall events helped to increase grassland productivity after the unusually dry period from May to mid-June, whereas southern Germany witnessed continued rainfall deficit causing stresses in grasslands. Similarly, **Poland** saw below-average precipitation in northern and central regions, which impacted grassland productivity, resulting in below-average NDVI signals compared with 2022 and the MTA. In southern and south-eastern regions the NDVI signal is close to the MTA. Green maize was also negatively impacted by the dry conditions in the northern and central regions.

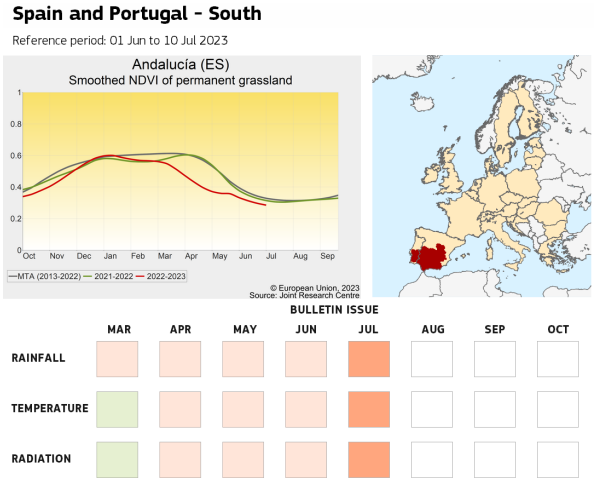
Likewise, continued rain deficit and above-average temperatures in **Denmark** and **Sweden** affected grassland productivity in both countries. Reported yields from the first cut are lower than usual, and regrowth was hampered by the absence of rain. However, as rain resumed since mid-June, the water stress should be alleviated, which is expected to restore the condition of grasslands in the coming weeks. Also, in **Finland** and the **Baltic** countries rainfall resumed after almost one month without significant rainfall, but regionally remained notably below the average.

In **Austria** and **Slovenia,** conditions have been favourable for biomass accumulation, and the NDVI signals suggest average to slightly above-average biomass accumulation. The same is true for **Czechia** despite lower-than-usual rainfall levels. In **Hungary** and **Slovakia** grassland productivity is well above the MTA, most distinctly in the eastern areas of Hungary. In **Romania**, grassland biomass formation is slightly above or in line with the average in western and central regions, thanks to frequent and abundant rains. Dry conditions in the eastern areas resulted in reduced pasture productivity which remains below the MTA. A similar picture can be seen in **Bulgaria** where grassland productivity is above average in the western and southern areas, while the north-eastern parts are experiencing a moderate rainfall deficit.

Favourable conditions for grassland biomass accumulation have prevailed in **Italy**, especially in southern Italy and the isles, which experienced abundant – but not extreme – rainfall events. Except for the flood-impacted Emilia-Romagna region, all Italian regions show above-average grassland productivity. These favourable conditions extend to the coast in **Croatia**, whereas the productivity in the east of the country is around the MTA. Abundant rainfall in **Greece** has slightly slowed down grassland biomass accumulation but it remains above-average.

In northern **Spain** and **Portugal**, the return of rainfall was beneficial for grassland canopies in the north, which have returned to MTA in Castilla y Leon. However, rainfall events were insufficient in the southern parts of both countries for grasslands to recover prior to the onset of the summer season. The expected heat damage in some areas planned for grain maize will increase the area of green maize to be harvested, albeit with low yields (as in the last two years, which were also under severe heat stress).





France

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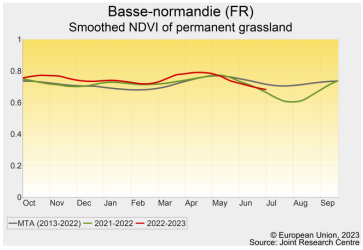

BULLETIN ISSUE

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RAINFALL								
TEMPERATURE								
RADIATION								

Ireland

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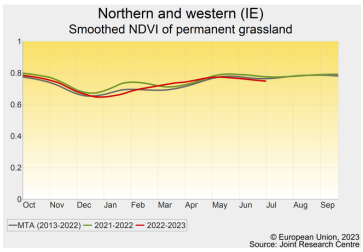

BULLETIN ISSUE

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Italy

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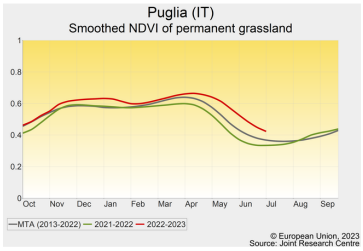

BULLETIN ISSUE

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Poland

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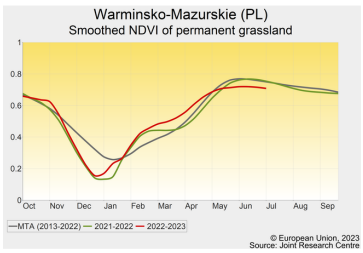

BULLETIN ISSUE

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RAINFALL								
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Romania - East

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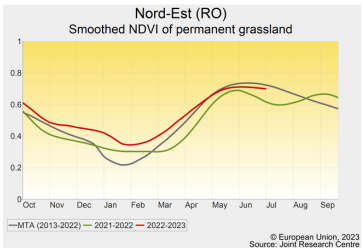

BULLETIN ISSUE

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RAINFALL								
TEMPERATURE								
RADIATION								

Hungary

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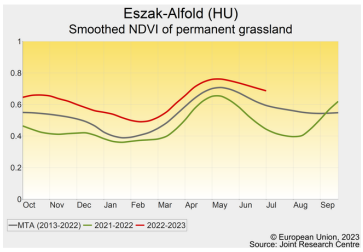

BULLETIN ISSUE

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
RAINFALL								
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4. Country analysis

4.1. European Union

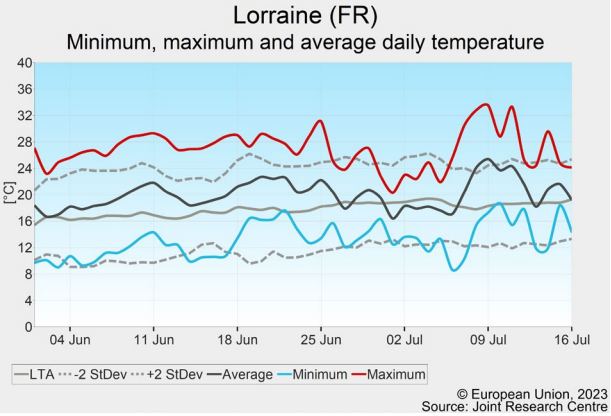
France

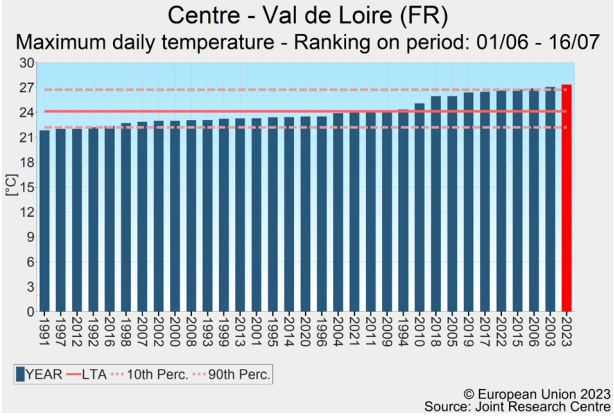
Persistently high temperatures negatively affected summer crops in the north

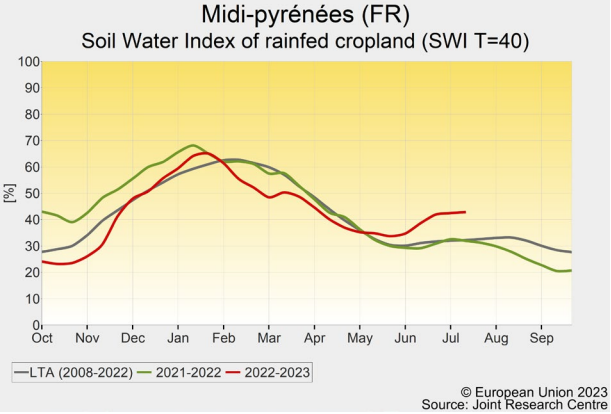
A lingering heatwave in June affected the crops (mostly summer crops) in northern France, where it was accompanied by below-average rainfall. In the south, the yield potential is preserved thanks to numerous rainfall events.

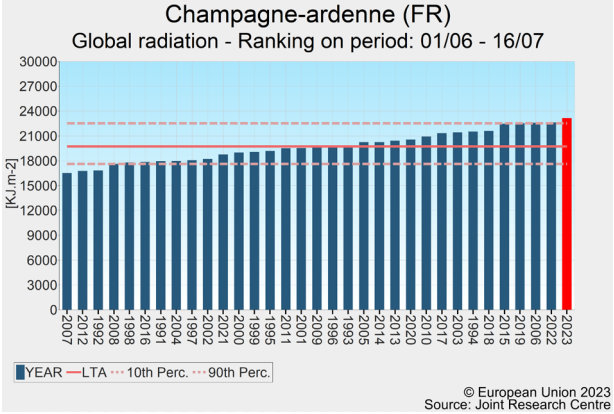
During the review period, temperatures were consistently above the LTA. The average temperature at the national level exceeded the LTA by 2.1 °C. In many regions, the average and maximum temperatures were the highest in our archive for this period. Despite the heat, a significant amount of rainfall occurred in the southern half of the country. In northern regions, while the overall radiation levels were 15-25% above the LTA, precipitation was close to the LTA, except in *Bretagne* (-28% compared with the LTA), *Hauts-de-France* (-33%), and *Grand-Est* (-31%). The heatwave is not expected to have significantly reduced the high yield potential of winter cereals. In the south, where it was accompanied by regular rainfall, its impact was diminished. However, in the north, the high temperatures may have accelerated ripening, resulting in relatively low grain weights, particularly in shallow soils. Harvesting of winter cereals began in northern France and made good progress under relatively dry conditions. In the south, the start of the harvest campaign was disrupted due to numerous and frequent showers. As of mid-July, over 95% of the winter barley, approximately 40% of the soft wheat and spring barley, and nearly all rapeseed had been harvested.

Regarding summer crops, the southern regions showed high biomass accumulation due to ample rainfall. However, in the north, particularly in *Alsace*, the ongoing hot and dry conditions severely affected maize crops entering the flowering stage. As a result, we have revised the yield forecast for summer crops and spring barley slightly downward, while the forecasts for winter crops remain essentially unchanged.









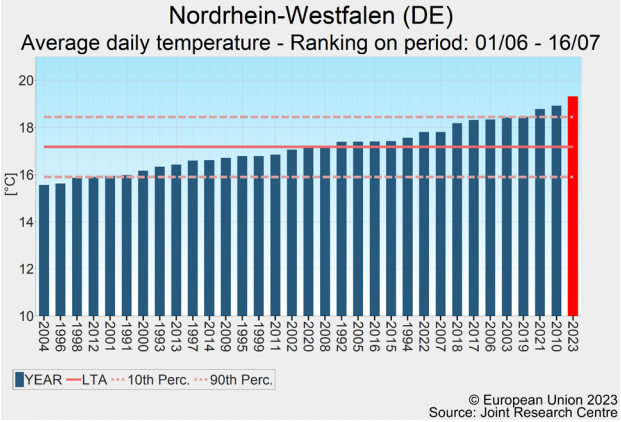
Germany

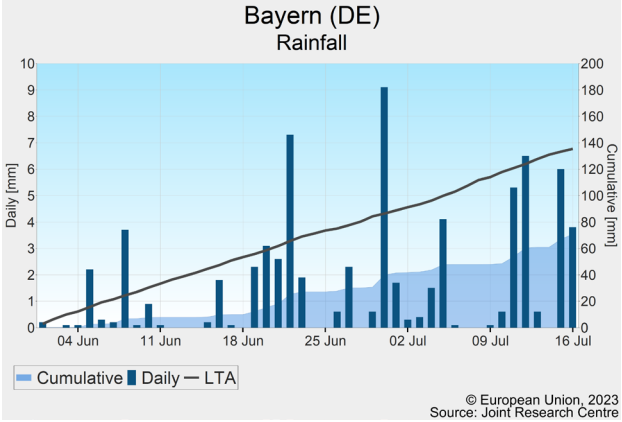
Warm and dry conditions hamper crop development

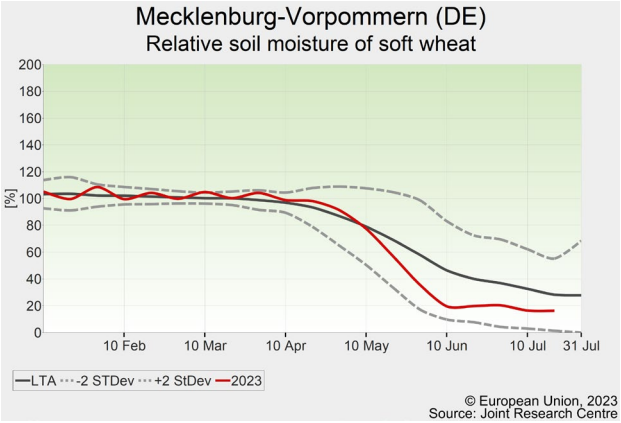
Soil water levels across Germany remain low due to a continued lack of precipitation, especially in the south. Temperature maxima beyond 34 °C were observed in western Germany in early July, putting notable pressure on both summer and winter crops.

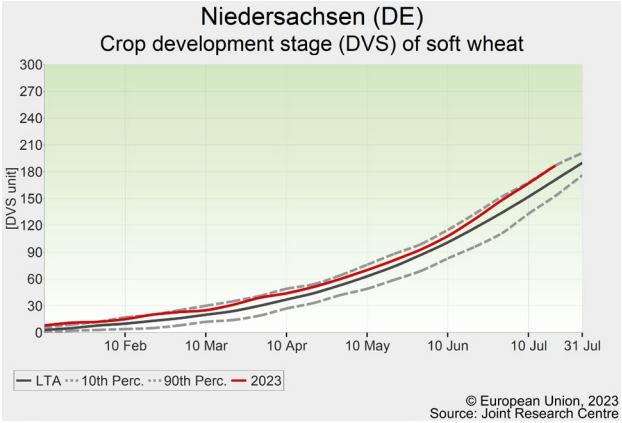
Throughout Germany, temperatures were above average in the reporting period. While temperatures in the eastern parts of the country were only slightly above the LTA, western Germany saw repeatedly above-average mean daily temperatures (3 °C above average) during the whole period. At the same time, notable rainfall deficits of up to 50% were registered in the south and south-west of Germany, in continuation of the precipitation deficit since mid-May. Rainfall totals in most of northern Germany reached average values, but mainly due to heavy rainfall and storms around 20–23 June, causing localised crop damage. However, the soil moisture deficit was not fully alleviated; therefore, soil moisture levels are still below the long-term average throughout the country, enhancing pressure on both summer and winter crops.

The harvest of winter crops, starting with winter barley, began on time, around mid June, and is currently ongoing for most winter crops. Recent hot and dry conditions increased plant stress in winter crops and decreased the period of grain filling, negatively affecting the yield potential. Therefore, our yield estimates for winter crops have been corrected downwards by about 3–4 % since the last report. Even though it is still too early for a definitive evaluation of summer crop yields, the delayed sowing paired with the lack of precipitation and high temperatures led to concerns about crop development and reduced yield expectations. Therefore, the yield forecasts for summer crops were revised down by up to 5 %.









Poland

Dry conditions impact crops in northern and central regions

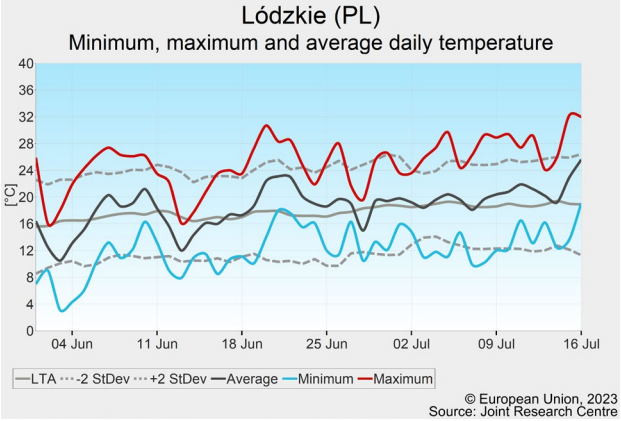
Little rain and increasing summer temperatures deepened soil moisture deficits in north-eastern and central Poland, negatively impacting all crops. In the south-east, however, conditions were rather favourable for summer crop development and grain filling of winter crops.

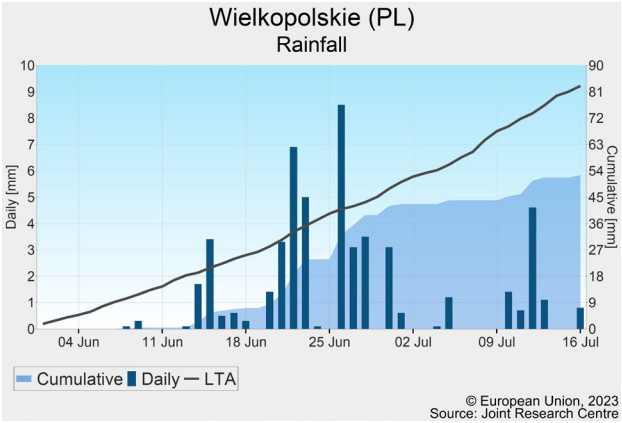
Around-average temperatures during the first two dekads of June were followed by a warmer-than-average period in the third dekad of June, with temperature maxima exceeding 28 °C. The first dekad of July was slightly warmer than average. Precipitation was below LTA in most of the country during the review period; only the third dekad of June was wetter than usual in the west and south. The considerable rainfall deficit of up to 50 mm for the entire review period, following an already dry May, resulted in critically low soil moisture levels. Scattered precipitation events around mid July, mainly in the form of storms, alleviated dry topsoil conditions locally. Global radiation was above average.

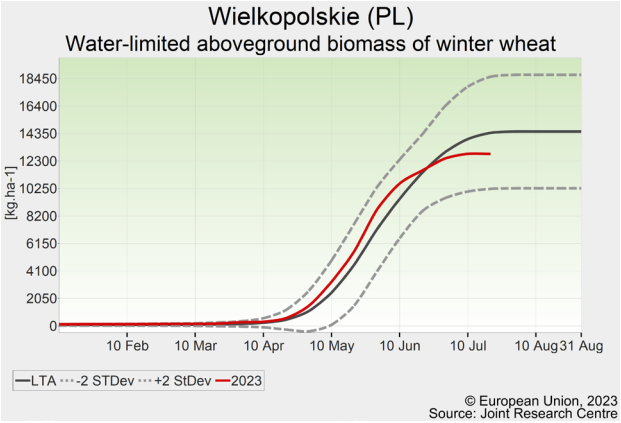
Other than in the south-east, which had sufficient water supply, the dry conditions in most of Poland, combined with above-average temperatures, were suboptimal for the grain filling of winter crops, with yield potentials potentially being compromised during the final stages of grain filling. The harvest of winter wheat and rapeseed is about to begin in southern Poland, while the harvest of winter barley is in full swing, with initially reported satisfactory results.

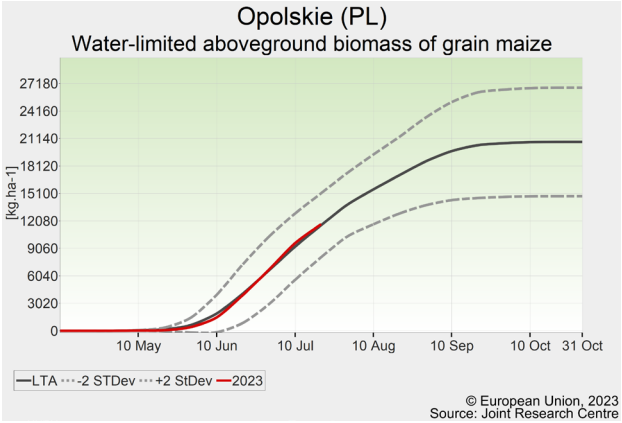
Summer crops benefited from the rain at the end of June and the scattered precipitation in July. After a delayed start as a result of a cold May, the development of summer crops has accelerated and is now close to the seasonal average. In the dry regions of north-western and central Poland, however, conditions were not favourable for maize biomass accumulation and flowering, nor have they been optimal for sugar beet and potato development and growth.

Due to the overall negative impact of the rainfall deficit, we have lowered our yield expectations for winter, spring and summer crops; the outlook is now well below previous record-high years, but still above the 5-year averages.









Romania

Reduced yield potential for summer crops

The yield outlook for winter cereals is close to the historical trend and better than last year. The harvest of winter cereals is being hampered by frequent rainfall. The overall conditions for summer crops are adequate in the west, but have weakened in the east of the country.

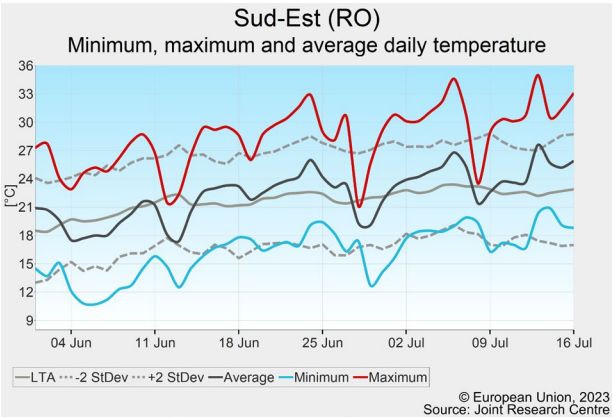
During the first two dekads of June, Romania experienced slightly colder-than-usual thermal conditions. This was followed by a warmer-than-usual period until the end of our review period (with short breaks), and which is forecast to continue for the next 10 days. The number of hot days (Tmax >30 °C) exceeded the long-term average by 5 to 12 days for this period, with the highest anomalies in the south-eastern areas. Temperatures locally reached 35-39 °C on the hottest days.

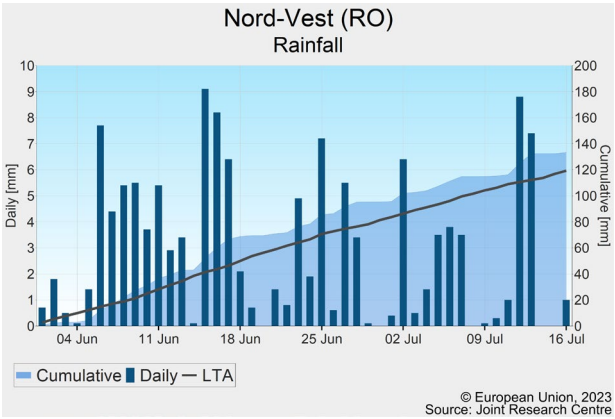
Precipitation was frequent, intense and abundant in western and central Romania. Meanwhile in the eastern regions the drier-than-usual weather that started in early May, continued during the period under review. The cumulated rainfall deficit since 1 May has reached 20-50% (25-95 mm) in these regions.

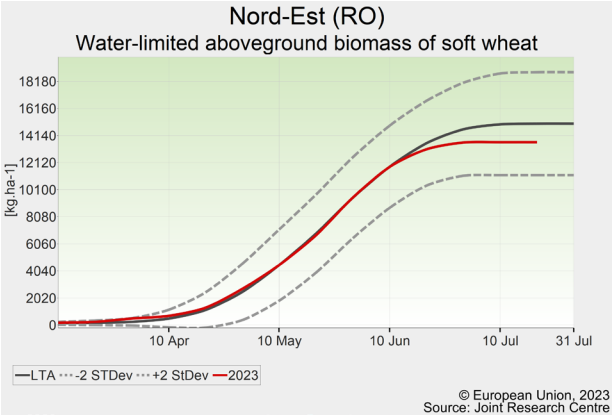
Limited water supply and high temperatures adversely affected the winter crops during the grain-filling period in the eastern regions. Meanwhile, the overly wet conditions in the western side of Romania led to increased pest pressure and lodging (stem bending) of winter cereals, negatively affecting grain quality and increasing the harvest losses. Considering these overall unfavourable conditions, our yield forecast for winter crops was revised downwards.

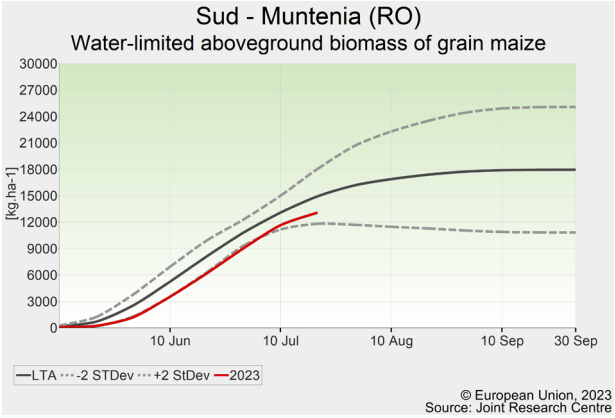
Heavy rains replenished the soil moisture levels under summer crops in the western regions and consequently facilitated the leaf area expansion and biomass accumulation during the vegetative stage of these crops. In contrast, in the important grain production regions of eastern Romania, the water supply for summer crops is limited, with negative effects on crop growth.

On balance, the yield outlook for grain maize and sunflower became more pessimistic and our yield forecasts were reduced to below the 5-year average.









Spain and Portugal

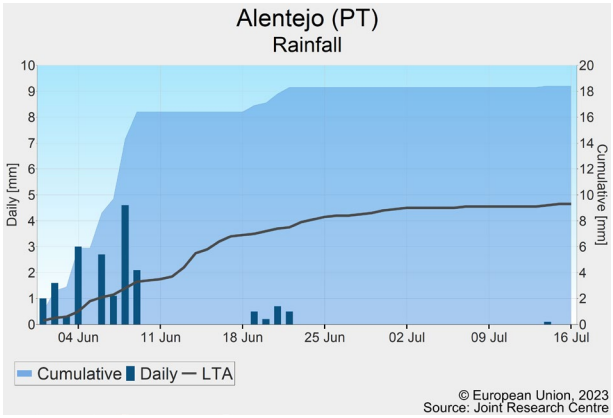
Start of a dry and hot summer along the lines of last year

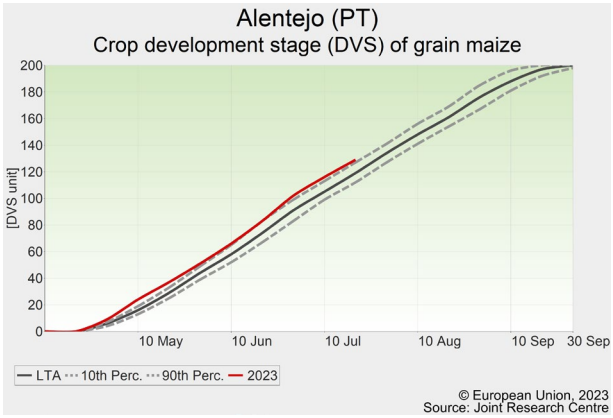
The last dekad of June saw the end of harvesting of winter and spring crops, with very low yields, as expected. The outlook for summer crops remains below average. Current and expected very high temperatures in central Spain are jeopardising the flowering of maize and sunflowers.

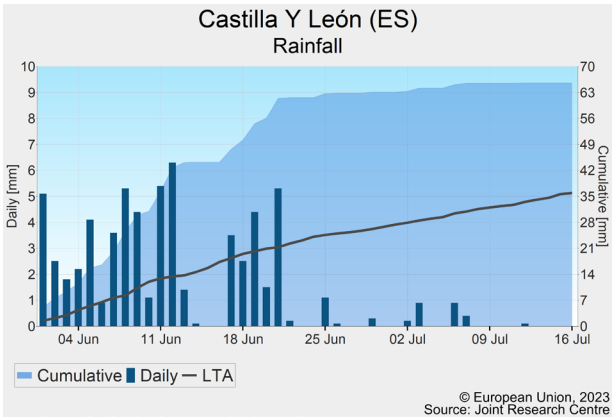
For the period under review, rainfall, temperature and radiation have been at the LTA or above. Rainfall returned in the last dekad of May and remained relatively abundant during the first dekad of June in the south, and the first two dekads of June in the northern provinces but has since stopped. Water levels in reservoirs in Spain have very marginally benefited from the rain and are now at the (still very low) level of 2022[1]. In Portugal, water levels are close to half capacity in *Alentejo* and well below capacity in *Algarve*[2].

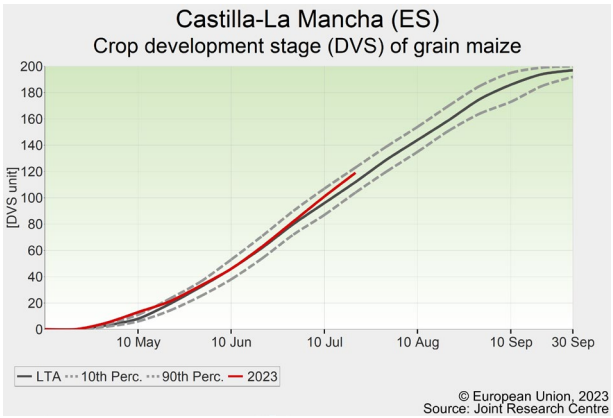
The harvesting of winter and spring crops is now completed. Field reports confirm the very low yield expectations expressed in previous editions of the Bulletin. Summer crops are approaching flowering and are slightly advanced in development. The very high temperatures (43 °C in central Spain) are to be carefully monitored, as they can cause damage to inflorescences, especially in grain maize and sunflower.

The yield forecasts for summer crops are on par with the June bulletin, below the 5-year average, and below last year's level.









[1] www.embalses.net, 18 June 2023
[2] https://sir.dgadr.gov.pt/reservas, 18 June 2023

Hungary

Abundant rainfall benefitted summer crops, but caused harm to winter crops

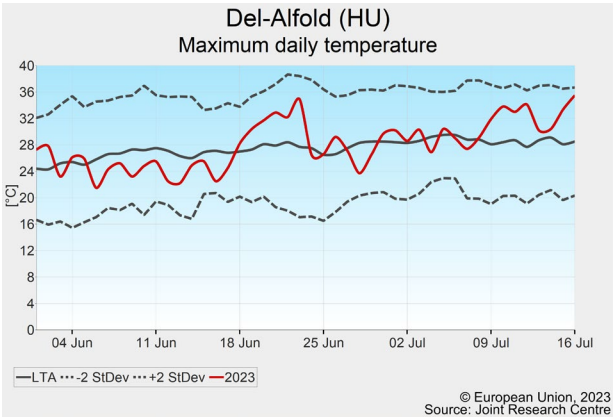
Intense rainfall reduced yield expectations and grain quality of winter crops and made the harvest campaign difficult; our yield forecast was revised downwards accordingly. Summer crops have benefited from adequate water supply so far, but the heatwave of mid July puts the fertilisation of the flowers at risk.

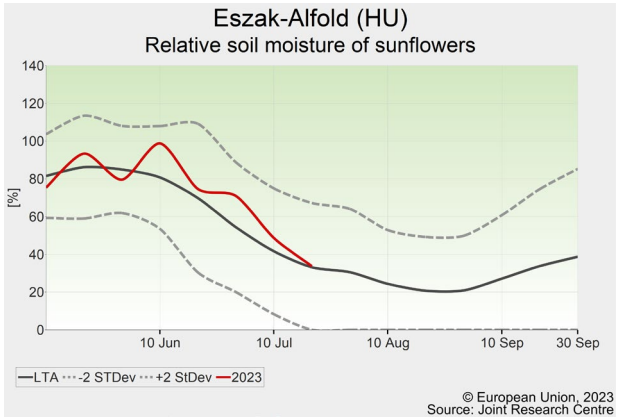
While the first half of June was colder than usual, heatwaves occurred between 18 and 25 June and in mid July across Hungary. The number of hot days (*T*max > 30 °C) exceeded 10 days nearly everywhere, reaching 20 days in the warmest regions of the south-east.

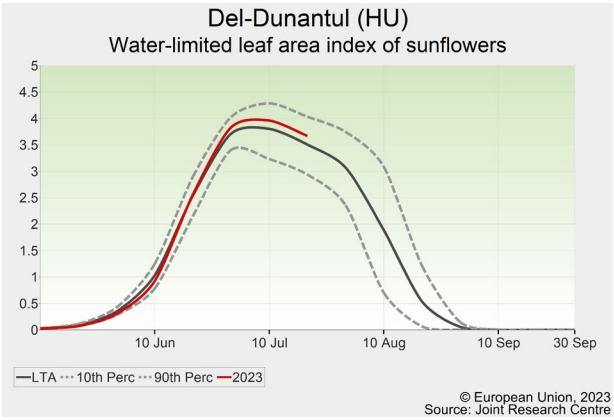
Following a wet May, rainy weather continued in the first dekad of June. Precipitation decreased considerably in the second dekad, but became excessive again during the third. Since then, western Hungary has continued to receive abundant rainfall, while the eastern regions have experienced more moderate levels of precipitation. Typically, the total precipitation for the review period ranges between 90 mm and 160 mm, with up to 50 % more rainfall than LTA in the south-west and up to 80 % more in the north-east, while some south-eastern areas were drier than average.

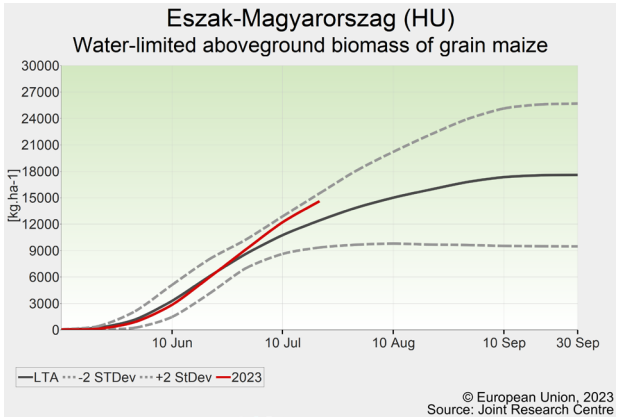
The June heatwave adversely affected the winter cereal grain-filling period. The subsequent rainstorms and hail damaged the winter crop stands in several places, leading to harvest losses, and increased the chance of fungal infections. Furthermore, the frequent rains are likely to have impacted the grain quality.

Regarding summer crops, the development is slightly delayed for sunflowers and maize. The leaf area index and biomass accumulation are above average in the east and at average in the west of Hungary. So far, the water supply of summer crops has been very favourable, ensuring adequate conditions for the flowering period. However, the mid-July heatwave has reduced soil moisture back to average. The heat may have also hampered fertilisation during the flowering stage. The yield forecast of winter crops was revised downwards, while the outlook for summer crops moderately improved.









Italy

Favourable growth conditions but potential heat stress in summer crops

Despite the uneven distribution of rainfall in space and time, the weather in June was favourable overall for summer crops. A rise in maximum temperatures in July triggered a risk of heat-induced sterility for flowering summer crops such as maize, which is being closely monitored.

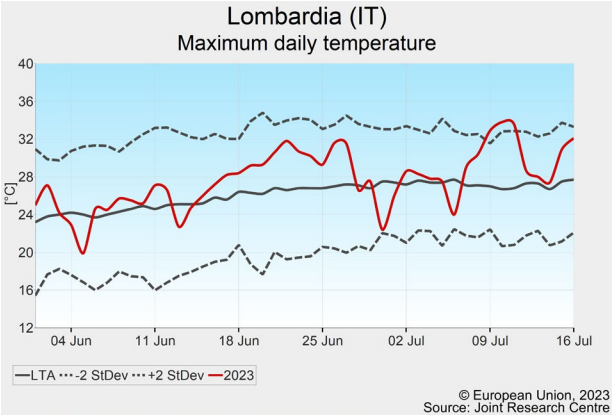
Looking at the review period as a whole, average daily temperatures in Italy were 1-2 °C above the LTA and cumulated active temperatures (Tbase = 10 °C), slightly exceeded the LTA (by 5-15%). However, a recent heatwave pushed maximum temperatures beyond 32-33 °C from 7 to 12 July, thus raising a concern of potential heat-induced sterility for maize (green and grain) and rice during flowering. This occurred particularly in the northern and central regions of *Piemonte*, *Lombardia, Veneto* and *Emilia-Romagna*, and subsequent potential impacts on production are being closely monitored.

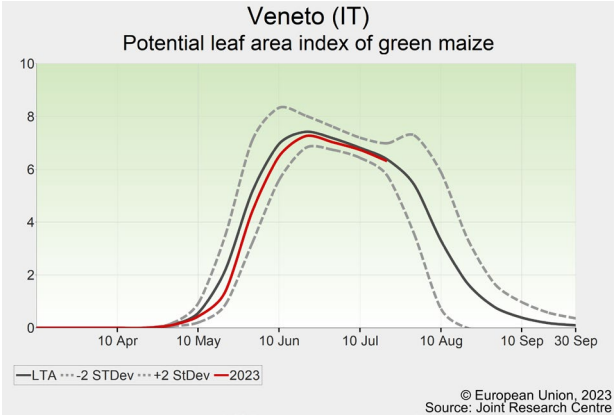
Rainfall was moderately below average in *Lombardia* and eastern *Emilia-Romagna* and above average in the rest of the country, with the highest deviations from the mean towards the littoral rims of *Lazio*, *Campania*, *Puglia*, *Calabria* and the Italian islands. In these regions precipitation was particularly abundant during the first half of June.

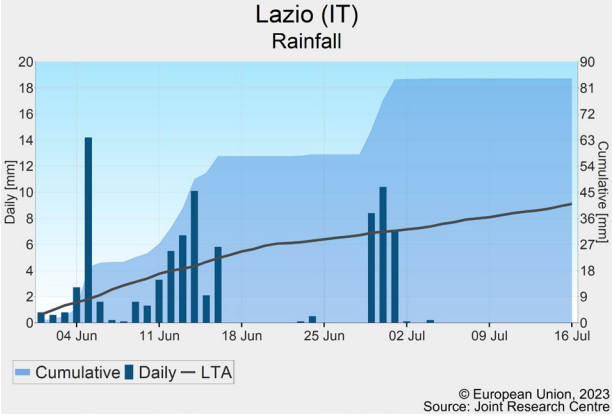
The interpretation of crop growth simulations and remote sensing indicators confirms that biomass accumulation in summer crops has been average to above average, as it benefited from the favourable rains in June, right before flowering.

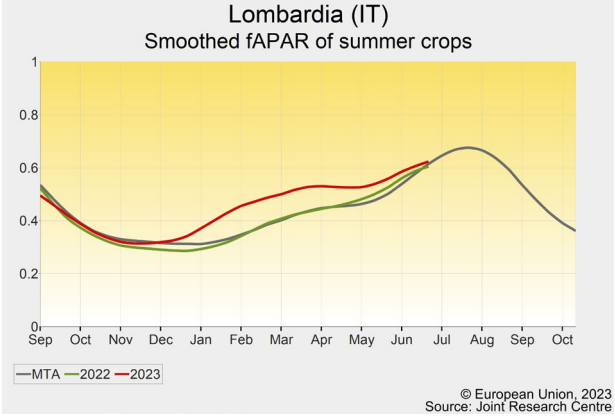
The winter cereals season ended with below-average expectations. Soft wheat and barley were hampered in May by heavy flood events in *Emilia Romagna* (among the main cereal producing region), while durum wheat in *Sicilia* and *Puglia* were hit by strong windstorms and heavy rains in June, which caused crop lodging.

The coming weeks will be important for determining the exposure of summer crops to heat stress and the possible impact on final yields. Our current yield forecasts for summer crops are assuming no impact from heat stress and range from 1% to 2% above the last 5-year average.









Czechia, Austria and Slovakia

Dry conditions reduced yield potentials in the north and west

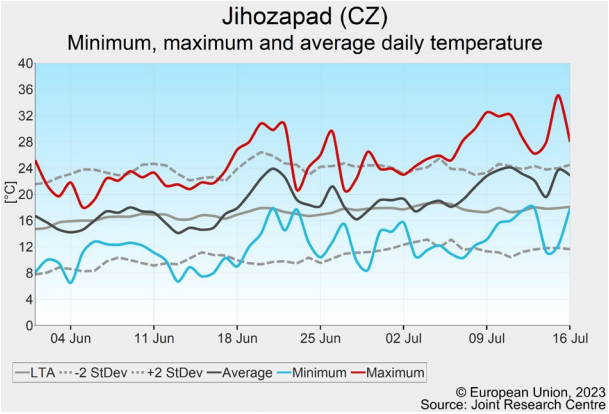
Soil moisture deficits and higher-than-average temperatures impaired grain-filling of winter crops in Czechia and northern Austria (Oberösterreich), as well as the flowering of grain maize. In south-eastern Austria and Slovakia, conditions were generally adequate for grain-filling of winter crops, confirming the good yield potential of summer crops.

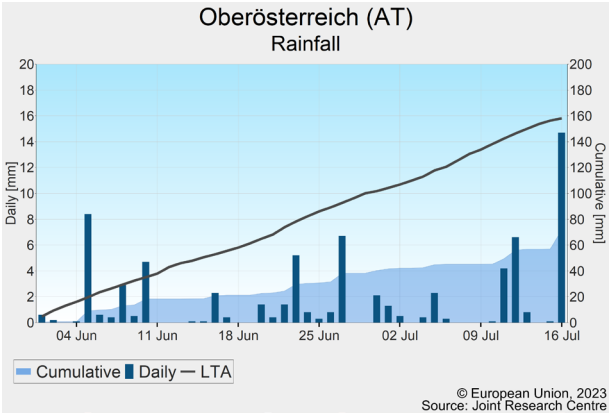
Around-average temperatures during the first two dekads of June were followed by a warmer-than-average third dekad, when a short heat spell raised temperature maxima above 30 °C. Since 6 July, warmer-than-average temperatures (+2-4 °C above LTA) have prevailed again, with daily maxima reaching 34 °C. Significant rainfall deficits, below 50% of the LTA in Czechia and the *Oberösterreich* region, in conjunction with high temperatures, dried out soils to critical levels. In Slovakia and southern Austria (*Kärnten*, *Steiermark*, *Burgenland*), around-average rainfall totals provided generally adequate soil moisture conditions.

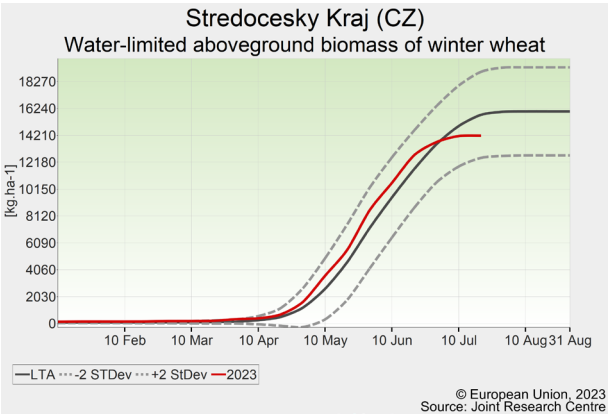
In Czechia and northern Austria, dry conditions combined with above-average temperatures were sub-optimal for grain-filling of winter crops and reduced yield potentials. In the *Niederösterreich* region and in Slovakia, our model indicates above-average biomass and storage organ accumulation for winter wheat, and soil moisture conditions were generally favourable for the final stages of grain-filling. Harvest operations of winter crops started at the end of June and are currently in full swing under favourable conditions.

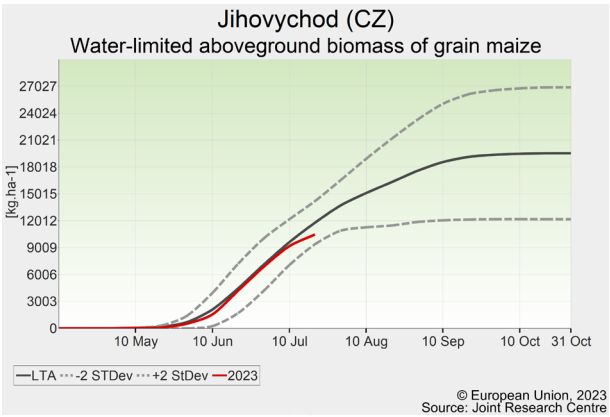
The dry spell in Czechia and northern Austria coincided with the flowering of grain maize and could have impaired yield potentials. In addition, our crop model results indicate that biomass accumulation for grain maize has been impacted and is now below average in this region. In south-eastern Austria and Slovakia, by contrast, summer crop biomass accumulation is estimated as around or above seasonal levels.

We slightly reduced our yield outlook for most crops in Czechia as well as for grain maize in Austria, while the yield forecast for grain maize, winter wheat and rapeseed in Slovakia has been revised upwards.









Bulgaria

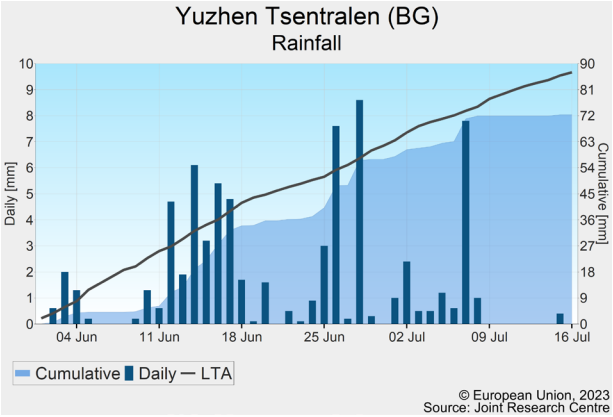
Improved yield expectations for winter crops

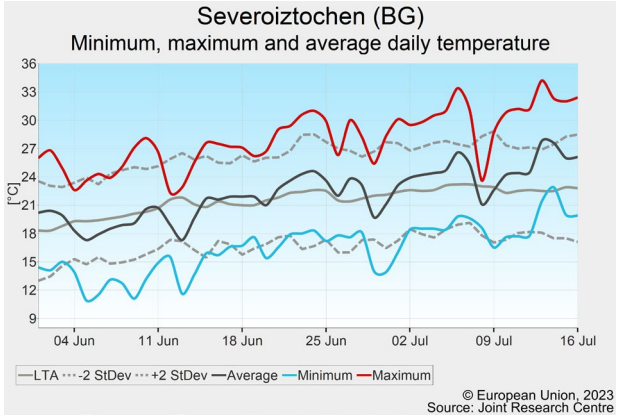
Abundant and intensive rainfall in June supported the yield formation in winter crops, but at the expense of reduced grain quality. The yield forecasts for grain maize and sunflowers, which benefited from moderate warm weather and abundant rainfall are at the level of the historical trend, above the 5-year average.

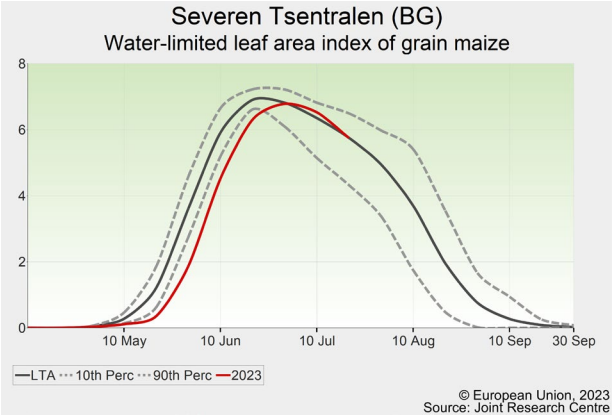
During the review period, daily temperatures fluctuated around the LTA, resulting in no significant anomaly for the period as a whole. However, after 20 June above-average temperatures predominated, with maximum temperatures exceeding 30 °C. The second dekad of July presented extremely high temperatures, reaching up to 35-40 °C on the hottest days. Rainfall distribution was uneven. Very intensive and abundant precipitation occurred in western Bulgaria (mostly in the first two dekads of June), whereas the central and – most distinctly – the eastern regions experienced a considerable rainfall deficit. July, so far, has been mostly dry in all parts of the country.

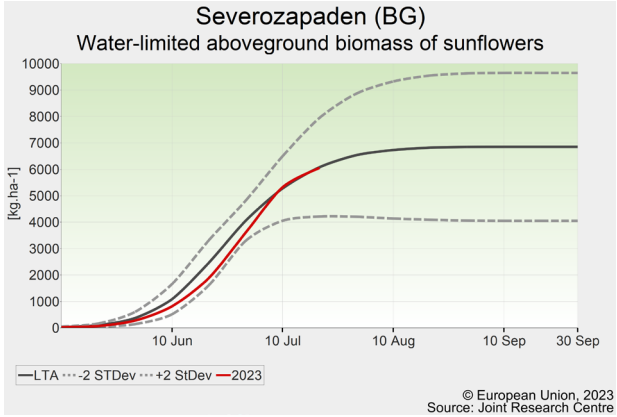
Water supply for winter crops during the late grain-filling stage was mostly adequate, except in some eastern areas. The start and progress of the harvest campaign have presented delays, especially in the wet western regions. Our model simulations indicate above-average biomass accumulation in winter cereals. Therefore our yield forecasts were revised upwards, to above-average level. However, there are considerable differences among the regions in yields and grain quality, due to high pest pressure and possible fungal infections.

Crop development of maize and sunflower is near seasonal. Water supply for summer crops has generally been adequate since mid-May, but soil moisture contents dropped to near-average or below-average levels in mid-July. Our model simulations show close-to-average biomass accumulation for maize and sunflowers, and satellite imagery indicates that the crops are in good condition. However, the yield formation of summer crops will be mostly determined by the water supply and thermal conditions during flowering and early grain filling, in the coming weeks. The yield forecast of summer crops is set close to the historical trend.









Denmark and Sweden

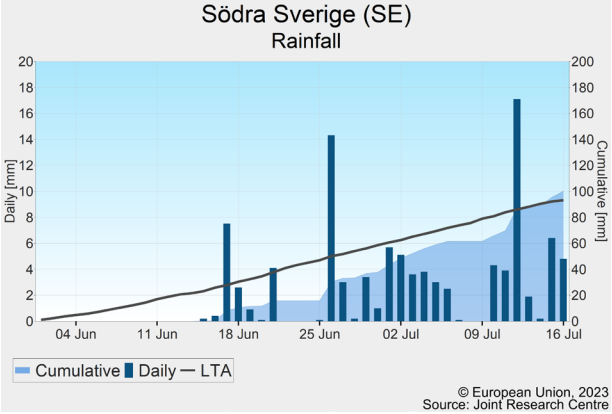
Yield outlook revised further downwards after prolonged dry conditions

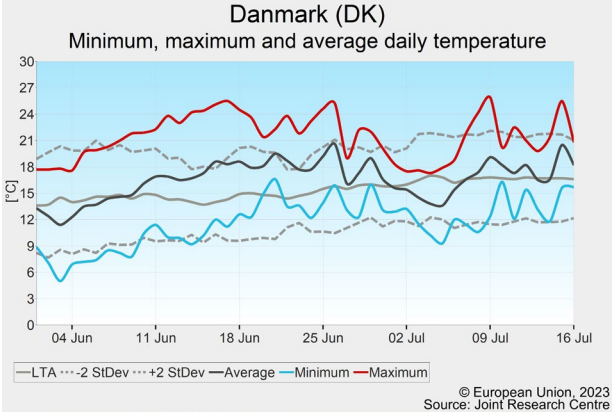
Despite a return to normal conditions in early July, the dry and warm weather from May to mid June negatively impacted spring crops and, to a lesser extent, winter crops.

The dry conditions that began in early May in Denmark and southern Sweden continued until mid June. Soil moisture levels improved due to the resuming rain thereafter but remain below average, and rainfall totals are now close to average in Denmark and southern Sweden, but below the LTA in eastern Sweden. Temperatures were well above the LTA, especially during the second half of June, further enlarging the moisture deficit through increased evapotranspiration. Temperatures returned to close to average from early July. Both countries reported a positive radiation anomaly.

According to our models, the grain-filling stage has been reached for soft wheat in Denmark and southern Sweden, and is about to be reached for spring barley in both countries. MODIS-reported NDVI values appear to be below the median threshold, which can be linked to the water-limited conditions in both countries.

As a consequence of the prolonged dry weather from May until mid June, which affected cereals during their flowering stage, yield forecasts have been further revised down for winter and spring crops. The return to usual seasonal conditions in July allowed our previous estimations for summer crops to be maintained at trend level.





Estonia, Latvia, Lithuania, Finland

Drought compromised winter and spring crop yields

After a prolonged dry and warm period that affected crops during flowering, rainfall resumed but totals remain below average.

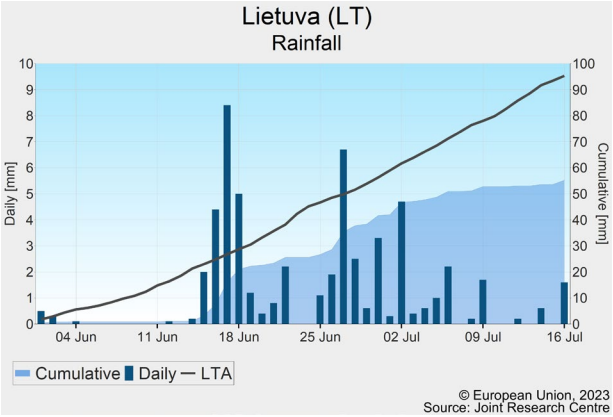
In Estonia and Finland, rainfall was scarce until the last week of June, followed by a wetter period including significant (> 5 mm) rainfall events (3 days in Finland, 2 days in Estonia). In Latvia and Lithuania, regular rainfall has been reported since mid June, with only 1 day of significant precipitation in Latvia and 3 in Lithuania. Cumulative rainfall was slightly below the seasonal average for Finland, and well below the seasonal averages for Estonia, Latvia and Lithuania, by 30 %, 40 % and 58 %, respectively. Soil moisture levels, following the dry period that started in May, remain largely below average.

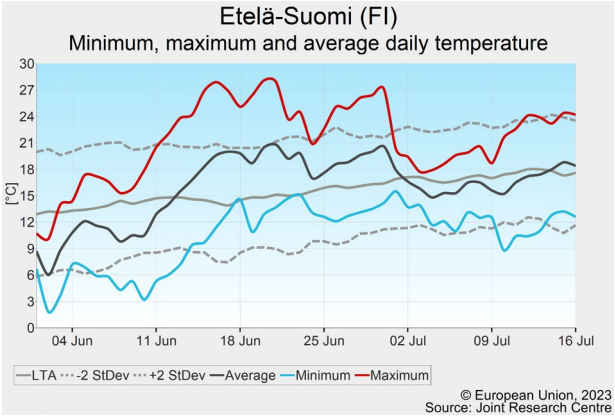
In the four countries, the first 2 weeks of June were colder than usual, while the second half of June was warmer than the LTA by approximately 3 °C. In July, temperatures dropped to slightly below average. The cumulative temperatures (base 0 °C) for the review period are close to the LTA.

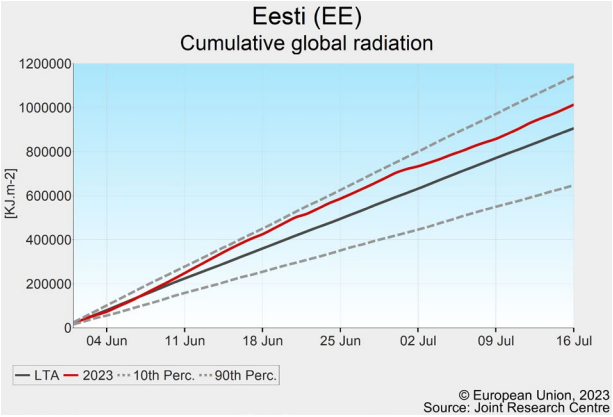
A positive radiation anomaly was recorded for all four countries. It was most pronounced in Estonia, where cumulative values are approximately 10 % above the LTA. According to our models, soft wheat reached the grain-filling stage in Estonia, Lithuania and Finland, and partially reached the ripening stage in Latvia, approximately 10 days earlier than usual. Similarly, spring barley reached the grain-filling stage in all four countries 1 week earlier than usual.

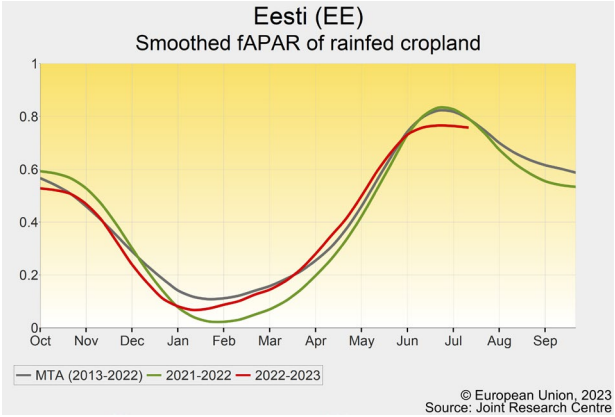
Remote sensing data indicate that fAPAR remained below the MTA for Estonia and Finland, while in Latvia and Lithuania values were close to average for the last dekad for which values were available.

The prolonged dry and warm period increased the evaporative demand and reduced soil moisture levels, and accelerated crop development. As a result, yield expectations have been further lowered for both winter and spring crops.









Greece

Abundant rainfall affected wheat harvest; summer crops faring well

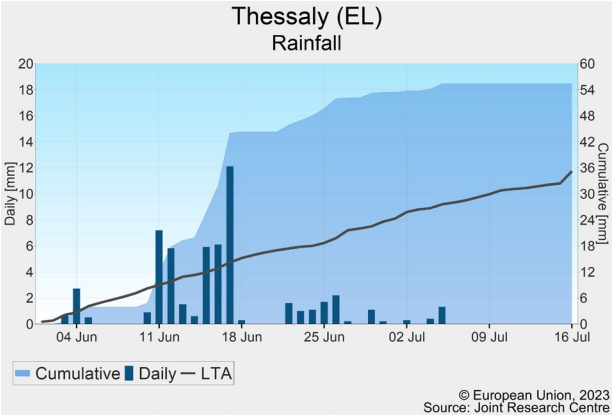
The country saw an excess of rainfall in mid-June, which hampered the harvest of wheat and led to a temporary delay in summer crop development. Water supply for summer crops is favourable.

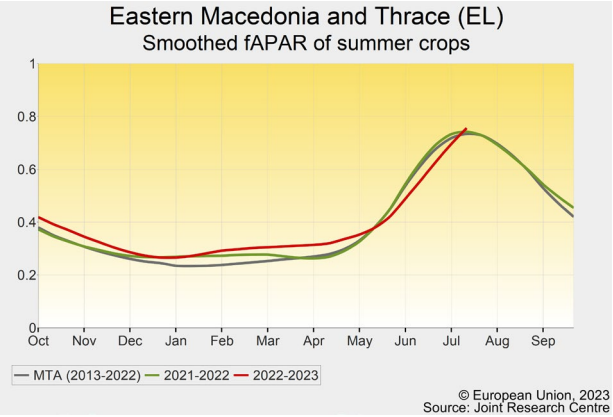
In June, temperatures in Greece started around or slightly below the LTA and increased gradually to around the LTA by the end of June. A heat wave in mid-July has been pushing maximum temperatures well beyond 35 °C across the country, often reaching 40 °C. Rainfall was plentiful and well-distributed from 1 June to the beginning of July, resulting in an overall excess of rainfall compared to the LTA, up to +50% in western Greece.

Most of the regions producing the highest amounts of summer crops have experienced significantly more rainfall than the long-term average for the period under review, namely Thessaly, Central Macedonia and Western Greece.

The harvest of all winter crops was completed by the end of June. While the wheat harvest has been adversely affected by rainfall, no impacts have been noted for barley harvested slightly earlier.

The overall abundant rainfall in June most likely caused a 10 day delay in the vegetative growth of summer crops, as highlighted by our remote sensing indicators. The delay will likely be caught up soon by the rising temperatures of July. Beyond the delay, water supply for summer crops has been very beneficial so far, crops overall have benefitted from positive weather conditions and the absence of abiotic (e.g. heat) or biotic (e.g. pests) stress pressure so that our yield forecasts for summer crops confirm the outlook of June and remain 2.5% (potato) to 5.5% (sunflower) above the last 5-year-average.





Ireland

Fair conditions during grain filling of cereals

Temperatures and rainfall remained above average in the country, and cereals are about to reach maturity.

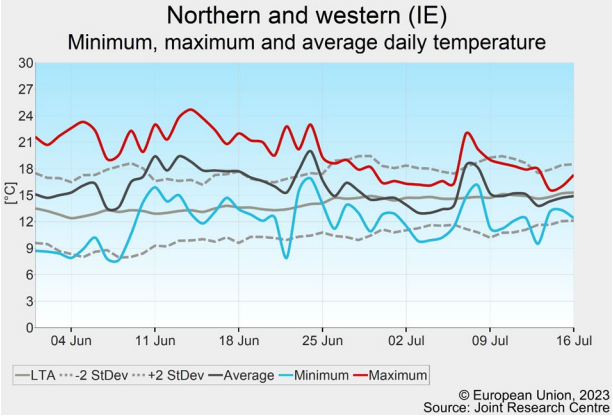
No rainfall was recorded during the first week of June, while almost daily precipitation events were reported over the rest of the review period. Total rainfall was above average by approximately 60 % at the country level.

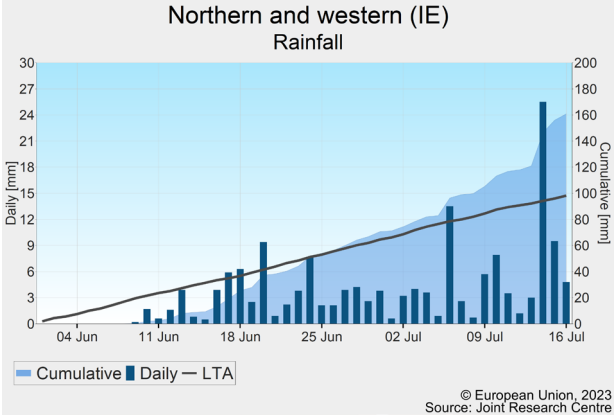
Temperatures of 2–4 °C warmer than usual prevailed until the end of June, while temperatures in July returned to normal. Cumulative temperatures (base 0 °C) show a 10 % positive anomaly compared with seasonal averages. These conditions could favour the spread of diseases such as potato blight, as reported by the Irish meteorological service ([3]). Radiation is above the LTA by approximately 5 %.

According to our models, soft wheat and spring barley are ripening and about to reach maturity, both approximately 1 week earlier than usual.

MODIS-derived fAPAR values remained close to the MTA at the country scale, yet the registered values are slightly above the MTA in northern and western Ireland.

No major negative impacts on crop yield are expected, as rain resumed on time. Our previous yield forecasts are maintained.





([3]) https://www.met.ie/forecasts/blight-forecast.

Belgium, Luxembourg and the Netherlands

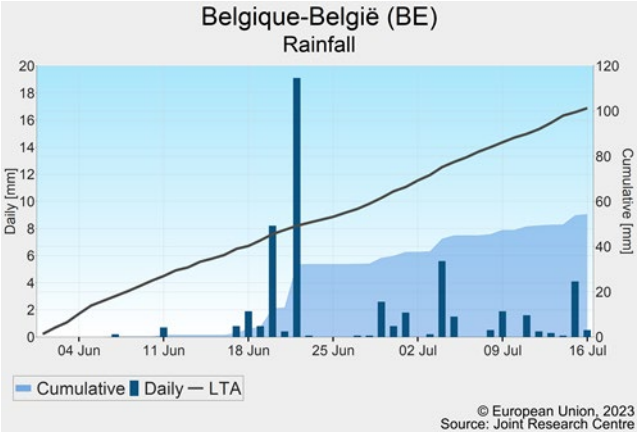
Yield forecasts revised downwards

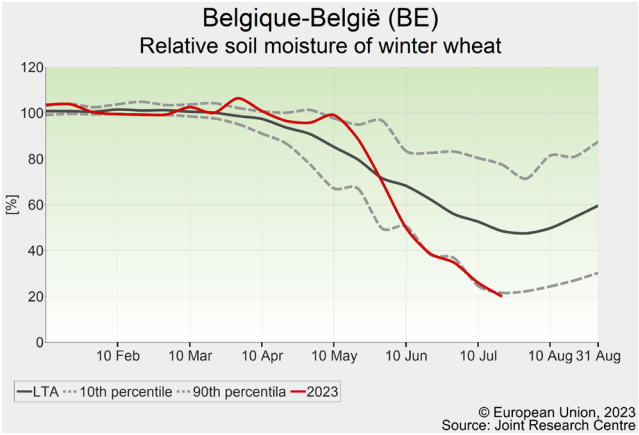
The exceptionally dry period, which started mid May, continued until 20 June. However, rainfall since then remained insufficent to raise soil moisture contents above non-limiting levels. Yield forecasts were revised downwards for all crops.

The period of very dry and sunny conditions, which affected the region since mid-May, ended 20 June. Since then, rainfall has been closer to the LTA, while high temperatures continued to prevail. In all three countries, this was the sunniest and warmest 1 June to 16 July period in our archive (since 1991). The number of hot days (with Tmax > 30°C) ranged from 1 in the coastal regions to 9 (against an LTA of 2 to 3) in southern parts of the Netherlands. With few exceptions, minimum temperatures remained below 20°C throughout the review period.

As a consequence of the prevailing warm, sunny and dry conditions, soil moisture levels under rainfed crops rapidly depleted. The rainfall since 20 June, and cooler temperatures during the first week of July brought some relief, but soil water contents have remained very low. Restrictions to water withdrawal from surface waters are now imposed in most regions; in some regions groundwater withdrawal is also restricted.

The season for winter cereals has practically finished. Harvesting of winter barley is well underway and soft wheat is in the ripening phase. Initial reports suggest high yields of well-watered winter crops, but otherwise, the yield potential was negatively affected by decreased photosynthesis and accelerated ripening induced by water stress and high temperatures. Summer crops (principally green maize, potatoes and sugar beet in the Benelux countries) are mostly still in a relatively early stage of development. The yield forecasts for all crops were revised downwards. The yield forecasts are now close to the mediocre 5-year average for winter crops; and slightly below this level for summer crops, which have faced difficulties since the start to the season.





Slovenia and Croatia

Yield reductions for winter crops; improved outlook for summer crops

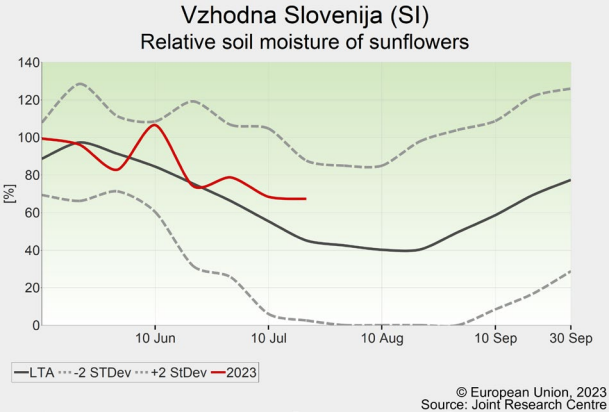
Substantial precipitation in May and June increased pest pressure, compromised grain quality, and reduced the yield potential of winter crops. Short heat waves occurred in major agricultural areas, but with no significant impact on crops. Soil moisture remained favourable, sustaining an adequate yield formation of summer crops.

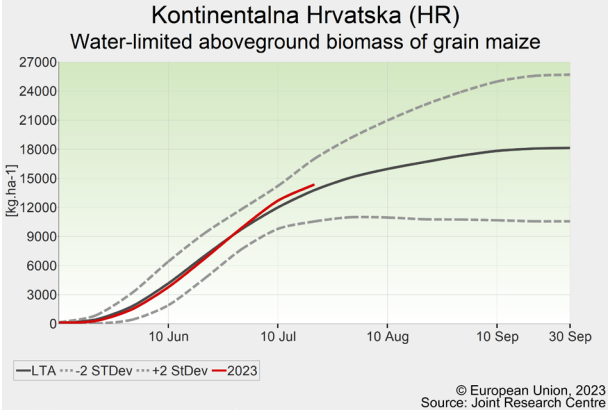
During our review period (1 June-16 July), daily temperatures fluctuated around the LTA except for three moderate heat waves (between 19 and 23 June, around 10 July, and after 15 July) when daily maximum temperatures exceeded 30 °C in the agricultural regions of both countries, reaching up to 36 °C on the hottest days. Fortunately, these heat waves were short, with only minor adverse effects on crops.

After the abundant rainfall in May, the weather remained rainy in the first half of June. Since mid-June, precipitation has decreased to near-normal levels in both countries. Rainfall totals over the entire review period have been above average for Slovenia and coastal Croatia (*Jadranska Hvratska*), around average or slightly below for eastern Croatia (*Kontinentalna Hrvatska*).

The wet conditions favoured the spreading of crop diseases and fungal infections, reducing yield quality and quantity of winter cereals. Additionally, the rainy and cold weather during flowering in May might have had a negative effect on grain formation, resulting in a low grain-straw ratio. Therefore, we reduced our expected yields of winter crops for Croatia and Slovenia. The harvesting campaign has started at a normal pace; overly wet conditions may have delayed the progress of harvest locally.

Higher temperatures accelerated the formerly delayed vegetative development of summer crops, which is now slightly advanced. Soil moisture contents are around average in Croatia and highly beneficial in Slovenia for the flowering of maize; only the currently high temperatures are unfavourable for pollination. Biomass accumulation of grain maize is above average, near normal for sunflower. The yield forecast for summer crops has been revised upwards.





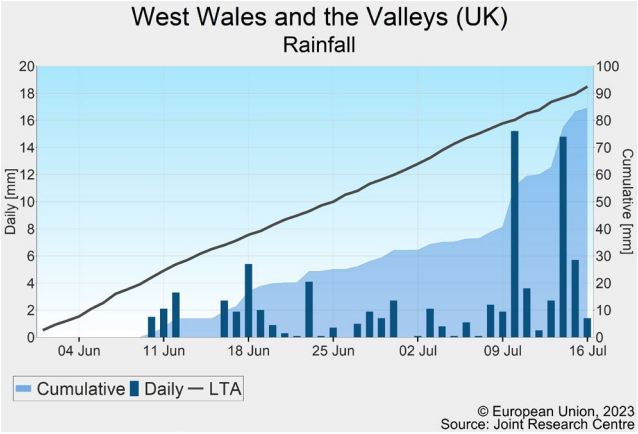
4.2. United Kingdom

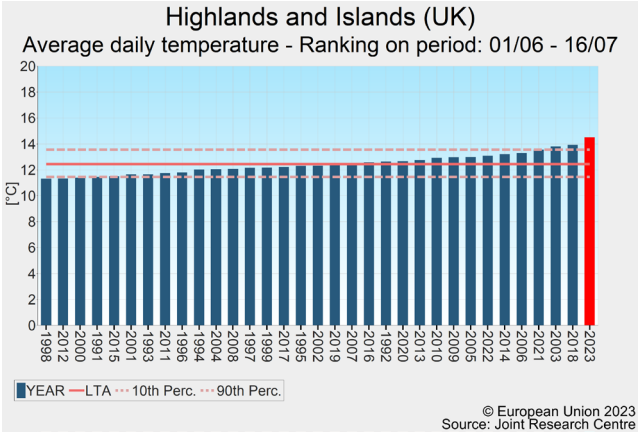
Very warm June negatively impacted yield expectations for winter and spring cereals

The country experienced unusually warm temperatures in June. A rainfall deficit persisted in the south-east and Wales. Winter cereals are reaching harvest, with the heatwave having impacted the yield outlook. In Scotland, spring barley reached flowering under persistent water stress.

During the second and third dekads of June, temperatures were considerably and continuously higher than usual. The entire country experienced the warmest June of the past 30 years. Maximum temperatures reached unprecedented levels, often +6 °C warmer than usual, arriving at 30 °C in the south-east. Southern Wales and the south-west, but also eastern UK, have been facing a shortage of rainfall since mid-May that was recovered in mid-July only thanks to intense rainfall. Solar radiation has generally exceeded seasonal levels.

The dry and warm conditions resulted in accelerated leaf-aging and negative effects on the grain-filling of winter cereals that are approaching harvest. Crop development has been progressing faster than normal, and the harvest of winter barley started in England and Wales already at the beginning of July, two weeks earlier than usual. In eastern Scotland, where spring barley is mainly cultivated, crops have reached flowering under persistent water stress. As a result, our yield forecasts for winter cereals and spring barley were slightly reduced, but remain still above the five-year average.





4.3. Black Sea Area

Ukraine

Mixed conditions for summer crops

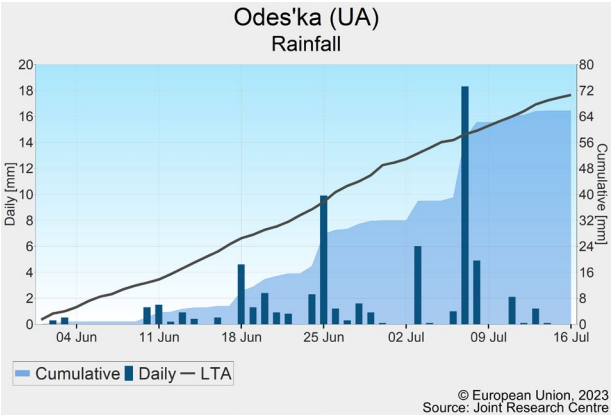
Harvesting of winter crops started in the second half of June, with the first reported yields higher than the previous season. Rainfall created favourable conditions for summer crops in the central and northern oblasts, but is urgently needed in the south.

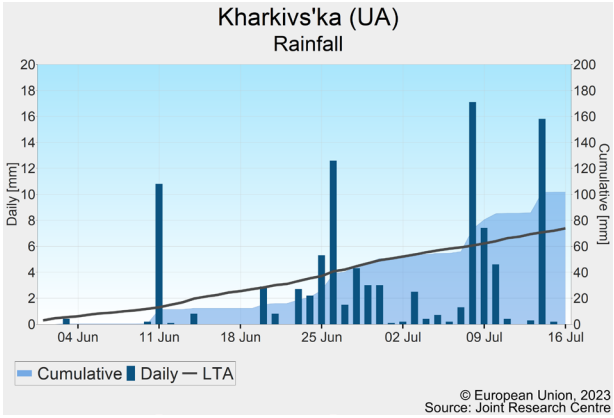
Seasonal or slightly drier-than-usual conditions prevailed in most parts of Ukraine during the period under review. Rainfall was 30–50 % above the LTA in the easternmost (*Kharkivs'ka*) and westernmost (e.g. *Lvivs'ka*) oblasts, and 50–80 % above the LTA in the northern oblasts (e.g. *Sums'ka*). Drier-than-usual conditions prevailed in parts of the southern oblasts (e.g. *Mykolayivs'ka*, *Khersons'ka*).

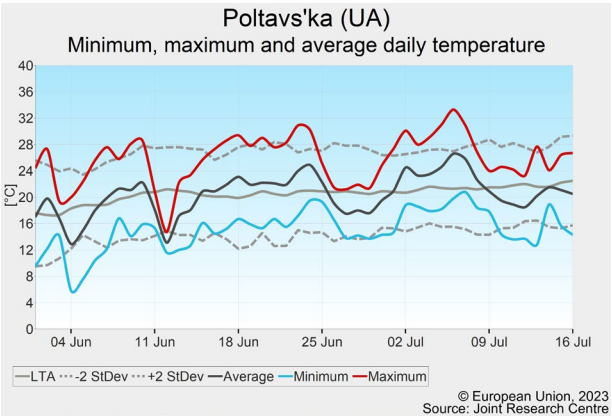
Near-seasonal thermal conditions prevailed in most parts, with daily maxima rarely exceeding 30 °C. Above-average (1–2 °C above the LTA) temperatures were observed in some western oblasts (*Vinnyts'ka, Ternopils'ka*) while a negative thermal anomaly (1–2°C below the LTA) was recorded in the east, along the border with Russia.

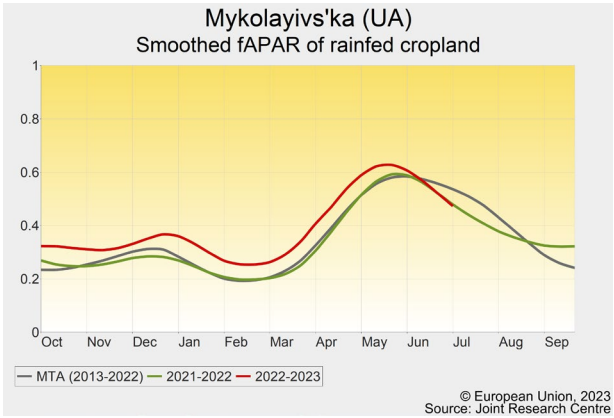
These conditions allowed winter crops to pass the grain-filling stage without any hydric or thermal stress. According to the Ukrainian Ministry of Agrarian Policy and Food ([4]), harvesting is currently ongoing in all government-controlled oblasts. However, abundant rainfall from 6 to 9 July in most regions hampered progress and had a localised negative effect on grain quality. The currently reported yields are higher than at this point during the previous season, which is in line with our forecast.

The rainfall surplus in the eastern and northern oblasts improved conditions for summer crops, which are currently entering the flowering stage. More rainfall is needed in the south, where remote sensing images suggest reduced biomass accumulation, which could already have negatively affected the yield potential.









([4]) https://minagro.gov.ua/news/ukrayinski-agrariyi-namolotili-majzhe-59-mln-tonn-novogo-vrozhayu

Türkiye

Continued favourable conditions sustain a positive yield outlook

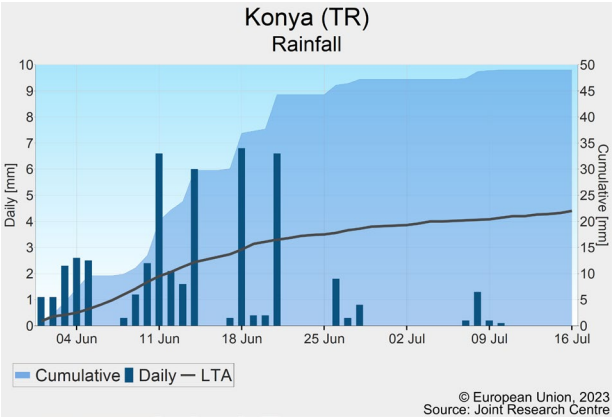
Wetter-than-usual conditions combined with near-seasonal temperatures have been favourable for the grain-filling of winter cereals and the development of summer crops, underpinning a positive yield outlook.

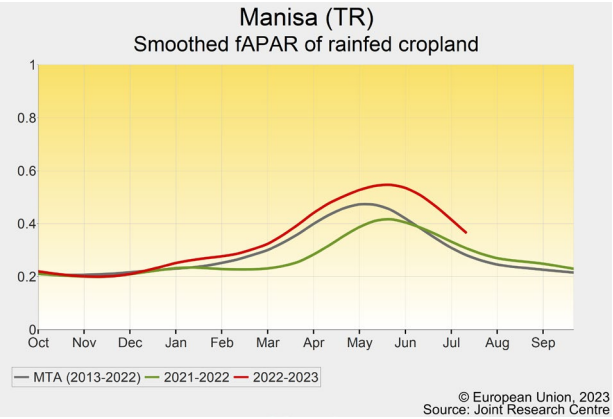
Wetter-than-usual conditions continued in most parts of Türkiye. Rainfall was frequent and abundant during the first two dekads of June, resulting in a rainfall surplus (locally +100 % of the LTA) in the central and western regions for the entire review period. A rain deficit of 50% to 80% compared with the LTA was observed only in the south-east, along the border with Syria.

Near- or slightly below-average temperatures have prevailed since the beginning of the summer. Distinctly colder-than-average conditions (2–4 °C below the LTA) were registered only locally in the west (e.g. Manisa) and in central Anatolia (e.g. Kayseri).

Favourable soil moisture levels due to June rainfall resulted in good growing conditions, and the increased water reserves for irrigation provide positive perspectives for summer crop development in the coming weeks. The absence of any thermal stress during the grain-formation phase further improved the yield potential of winter crops. Harvesting of wheat and barley is ongoing under dry and favourable conditions.

Our remote sensing analysis shows an above-average biomass accumulation in most of the producing regions. Consequently, our yield forecasts for both winter and summer crops were revised upwards and are currently above the 5-year average. New record-high yields could be achieved at regional level.





4.4. European Russia and Belarus

European Russia

Wet conditions raised concerns about grain quality

Wetter-than-usual conditions in southern and central regions maintained soil moisture at favourable levels, but caused delays to the harvesting of winter cereals and raised concerns about grain quality.

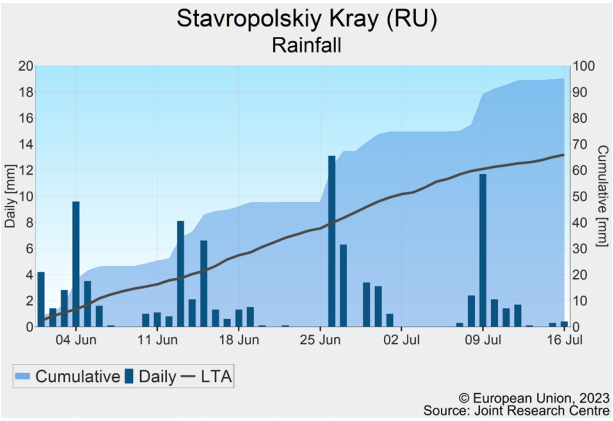
Wetter-than-usual conditions prevailed in the central and southern parts of European Russia during the period under review. Rainfall was 50% to 80% above the LTA in the eastern half of the Central okrug (e.g. *Voronezhskaya*), and in the south-western oblasts (e.g. *Stavropolskiy*). Drier-than-usual conditions, with rainfall 50% to 80% below the LTA, were observed in most parts of the Volga okrug.

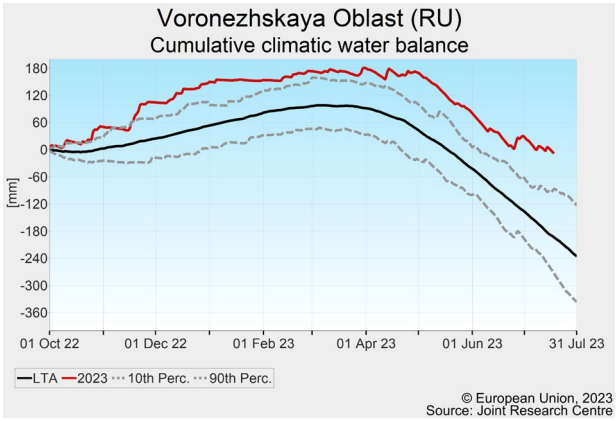
Temperatures were 1to 2 °C below the LTA in the Central okrug and most of the Volga okrug, and at seasonal levels in the Southern okrug and the North Caucasian okrug. Above-average temperatures were observed only in the easternmost oblasts of the Volga okrug (e.g. *Saratovskaya*), where daily maxima exceeded 30 °C for a few days during the first half of July.

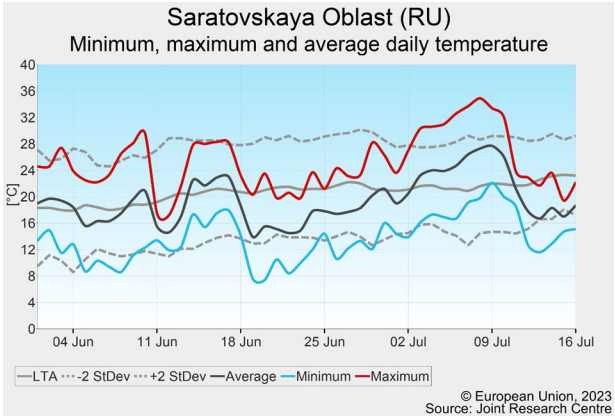
These conditions were favourable for winter and spring cereals in central and south-western Russia, since they profited from favourable soil moisture and thermal conditions during the flowering and grain filling stages. Above-average yields are still expected, but the rainfall surplus is expected to have deteriorated grain quality. In this part of Russia, harvesting of winter cereals started in the second half of June and is currently ongoing under fair conditions.

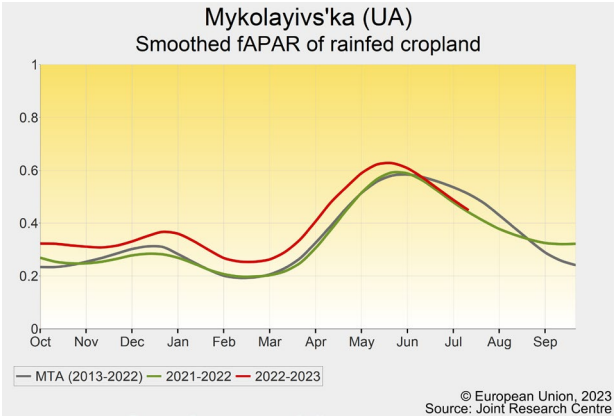
In the Volga okrug, the rainfall deficit and/or warmer-than-usual temperatures are expected to have further negatively affected the yield potential of spring and (to a lesser extent) winter cereals.

Except for the Volga okrug, where the yield outlook has slightly worsened, the overall yield outlook for wheat and barley in European Russia remains essentially the same as the forecast issued in the June edition of the Bulletin on Russia in the global outlook series[5]. The yield outlook for grain maize improved, as it is mostly grown in the regions that experienced wetter-than-usual conditions.









[5] https://publications.jrc.ec.europa.eu/repository/handle/JRC133235

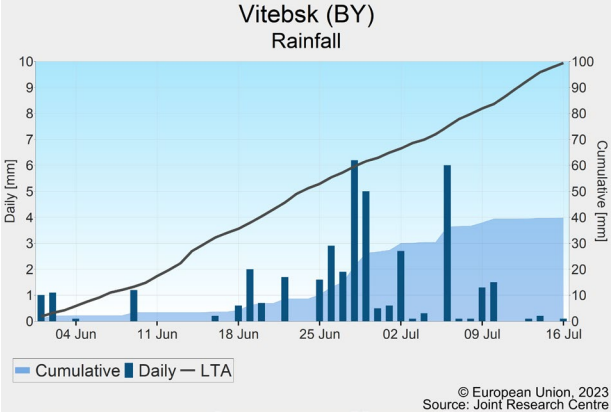
Belarus

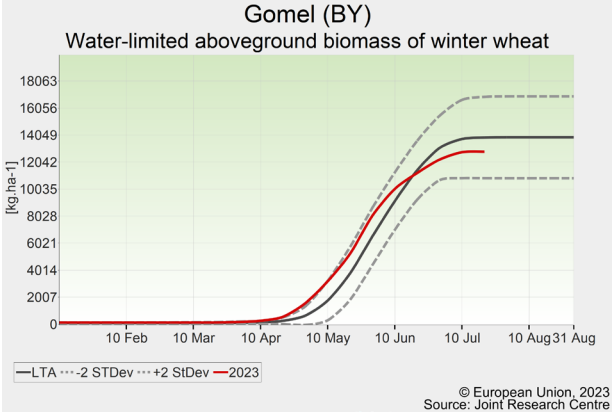
Reduced outlook due to rain deficit

Dry conditions during the first half of June compromised the grain-filling of winter crops and the vegetative development of maize. Conditions were especially unfavourable in the centre and north-east where the impact on crops is most visible.

After a cooler first half of June, temperatures rose above average, and – following a brief cooling at the end of June – fluctuated around the LTA until the end of the review period. High maximum temperatures (>30 °C) were observed for few days during the second dekad of June and in mid-July. Rainfall totals were below average in most of the country, with the lowest values in the *Minsk* and *Vitebsk* regions (below 40% and 60% of the LTA, respectively). Only in the south-east (*Gomel*) and south-west (*Brest*) was seasonal rainfall registered.

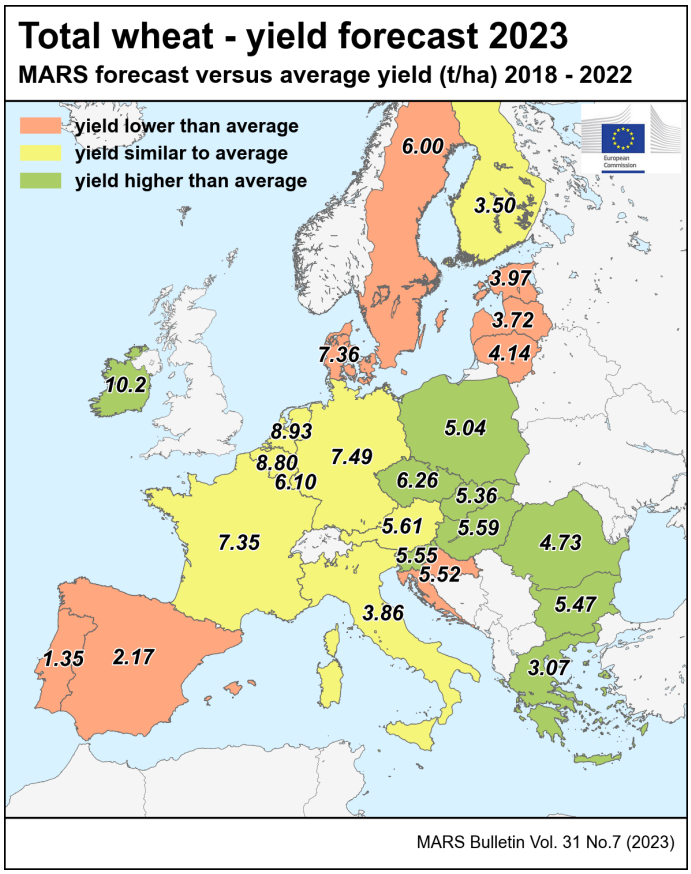
Our crop model results indicate a wheat biomass accumulation and storage organ weights below seasonal averages in most of the country, except for *Grodno* and *Brest* regions. Rain deficits in June, in conjunction with increasing summer temperatures, resulted in continued soil moisture depletion during the grain filling of winter crops, and were not optimal for the vegetative growth of maize. Rainfall during the second half of June brought relief for crops, but soil moisture levels remain low in the centre and north-east, further exacerbated by little July precipitation. So far, grain maize development has been following seasonal averages and is now at the flowering phase. Model simulations indicate around seasonal average biomass accumulation of grain maize in most of the country, and slightly above-average values in the west (*Grodno*, *Brest*). We reduced our yield outlook for wheat and barley, still remaining above the 5-year average, and kept constant the yield expectations for maize, slightly above average, but strongly conditioned on adequate rain during the coming weeks.



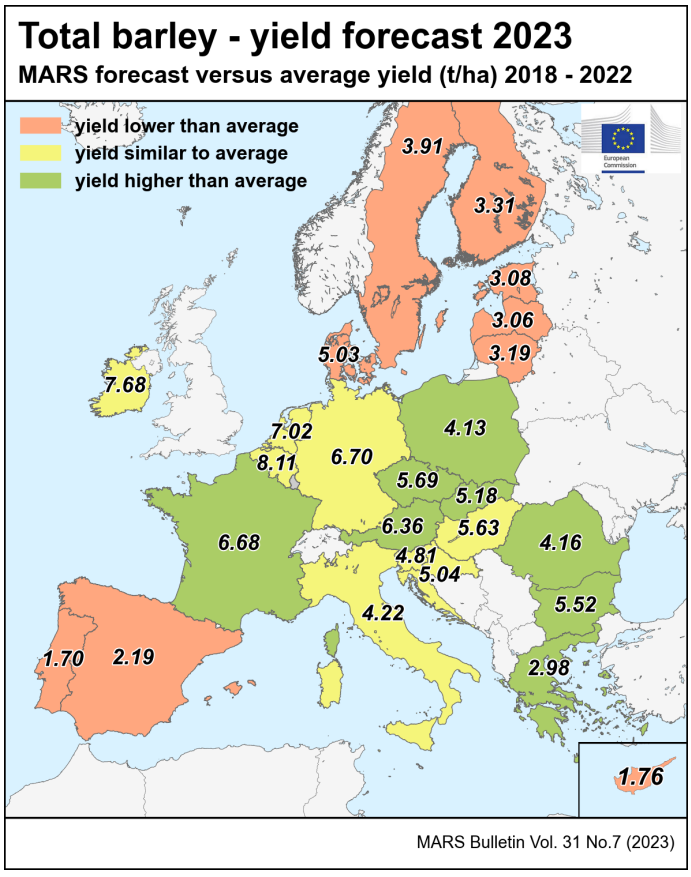


5. Crop yield forecast

Country	Total wheat (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	5.58	5.56	**5.59**	+ 0	+ 1
AT	5.52	5.73	**5.61**	+ 2	– 2
BE	8.69	8.91	**8.80**	+ 1	– 1
BG	4.99	5.17	**5.47**	+ 10	+ 6
CY	—	—	**—**	—	—
CZ	5.93	6.07	**6.26**	+ 6	+ 3
DE	7.35	7.58	**7.49**	+ 2	– 1
DK	7.80	8.47	**7.36**	– 6	– 13
EE	4.38	4.72	**3.97**	– 9	– 16
EL	2.93	2.72	**3.07**	+ 5	+ 13
ES	3.52	2.79	**2.17**	– 38	– 22
FI	3.56	3.80	**3.50**	– 2	– 8
FR	7.12	7.08	**7.35**	+ 3	+ 4
HR	5.87	5.95	**5.52**	– 6	– 7
HU	5.23	4.40	**5.59**	+ 7	+ 27
IE	9.79	10.7	**10.2**	+ 4	– 5
IT	3.83	3.63	**3.86**	+ 1	+ 6
LT	4.54	4.74	**4.14**	– 9	– 13
LU	6.04	6.21	**6.10**	+ 1	– 2
LV	4.59	4.72	**3.72**	– 19	– 21
MT	—	—	**—**	—	—
NL	8.95	9.47	**8.93**	– 0	– 6
PL	4.84	5.34	**5.04**	+ 4	– 6
PT	2.36	1.82	**1.35**	– 43	– 26
RO	4.30	4.18	**4.73**	+ 10	+ 13
SE	6.53	6.99	**6.00**	– 8	– 14
SI	5.22	4.90	**5.55**	+ 6	+ 13
SK	5.06	4.69	**5.36**	+ 6	+ 14



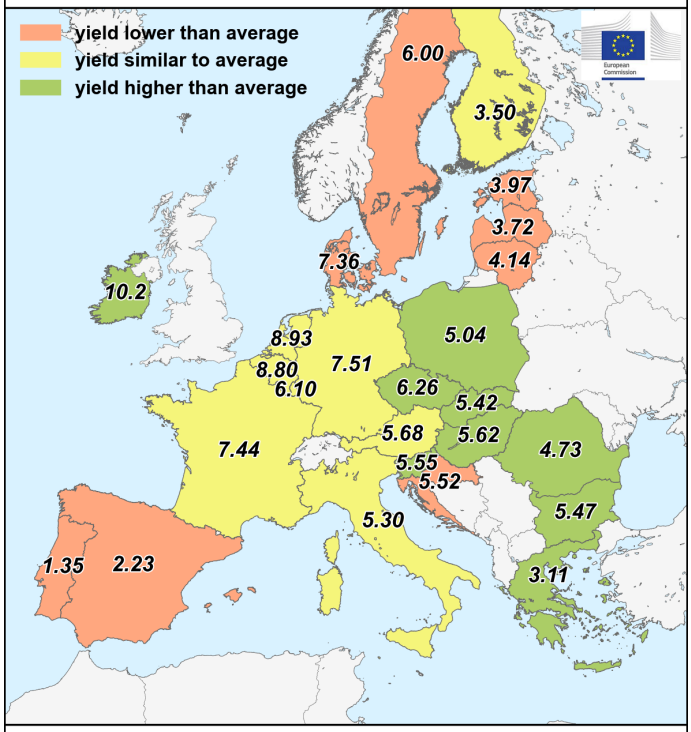
Country	Total barley (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	4.89	5.03	**4.74**	– 3	– 6
AT	5.92	6.19	**6.36**	+ 7	+ 3
BE	8.14	8.32	**8.11**	– 0	– 3
BG	4.76	4.97	**5.52**	+ 16	+ 11
CY	1.84	2.26	**1.76**	– 4	– 22
CZ	5.35	5.61	**5.69**	+ 6	+ 1
DE	6.56	7.08	**6.70**	+ 2	– 5
DK	5.83	6.79	**5.03**	– 14	– 26
EE	3.67	4.20	**3.08**	– 16	– 27
EL	2.82	2.44	**2.98**	+ 6	+ 22
ES	3.33	2.77	**2.19**	– 34	– 21
FI	3.51	3.82	**3.31**	– 6	– 14
FR	6.27	6.12	**6.68**	+ 7	+ 9
HR	5.04	5.10	**5.04**	+ 0	– 1
HU	5.41	4.80	**5.63**	+ 4	+ 17
IE	7.89	8.32	**7.68**	– 3	– 8
IT	4.13	4.20	**4.22**	+ 2	+ 1
LT	3.48	3.92	**3.19**	– 8	– 19
LU	—	—	**—**	—	—
LV	3.22	3.67	**3.06**	– 5	– 17
MT	—	—	**—**	—	—
NL	7.05	7.77	**7.02**	– 1	– 10
PL	3.83	4.43	**4.13**	+ 8	– 7
PT	2.97	2.47	**1.70**	– 43	– 31
RO	3.97	4.25	**4.16**	+ 5	– 2
SE	4.51	5.50	**3.91**	– 13	– 29
SI	5.00	4.99	**4.81**	– 4	– 4
SK	4.73	4.72	**5.18**	+ 10	+ 10



Country	Soft wheat (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	5.79	5.79	**5.80**	+ 0	+ 0
AT	5.58	5.78	**5.68**	+ 2	– 2
BE	8.69	8.91	**8.80**	+ 1	– 1
BG	4.99	5.17	**5.47**	+ 10	+ 6
CY	—	—	—	—	—
CZ	5.93	6.07	**6.26**	+ 6	+ 3
DE	7.37	7.61	**7.51**	+ 2	– 1
DK	7.80	8.47	**7.36**	– 6	– 13
EE	4.38	4.72	**3.97**	– 9	– 16
EL	2.98	3.01	**3.11**	+ 4	+ 3
ES	3.62	2.87	**2.23**	– 38	– 22
FI	3.56	3.80	**3.50**	– 2	– 8
FR	7.22	7.18	**7.44**	+ 3	+ 4
HR	5.87	5.95	**5.52**	– 6	– 7
HU	5.26	4.43	**5.62**	+ 7	+ 27
IE	9.79	10.7	**10.2**	+ 4	– 5
IT	5.36	5.12	**5.30**	– 1	+ 3
LT	4.54	4.74	**4.14**	– 9	– 13
LU	6.04	6.21	**6.10**	+ 1	– 2
LV	4.59	4.72	**3.72**	– 19	– 21
MT	—	—	—	—	—
NL	8.95	9.47	**8.93**	– 0	– 6
PL	4.84	5.34	**5.04**	+ 4	– 6
PT	2.36	1.82	**1.35**	– 43	– 26
RO	4.30	4.18	**4.73**	+ 10	+ 13
SE	6.53	6.99	**6.00**	– 8	– 14
SI	5.22	4.90	**5.55**	+ 6	+ 13
SK	5.07	4.65	**5.42**	+ 7	+ 17

Soft wheat - yield forecast 2023

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



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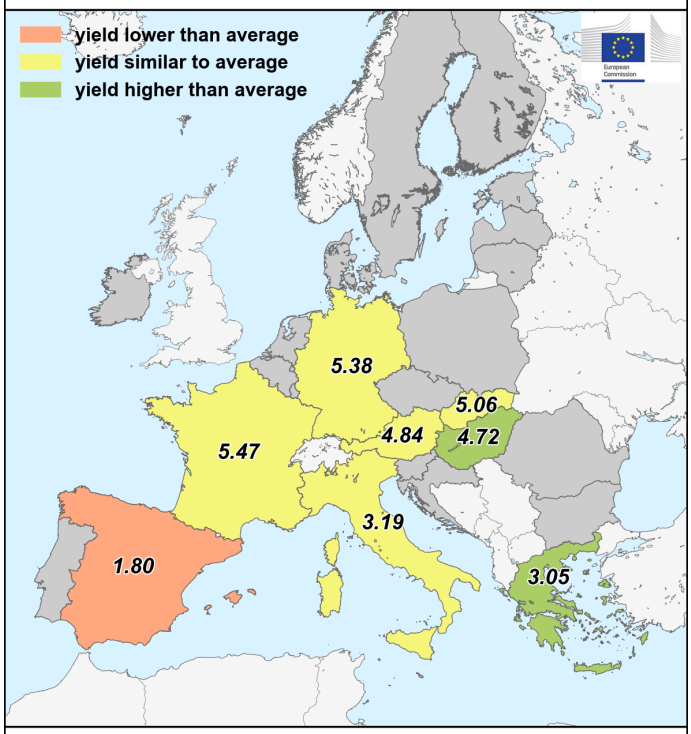
Country	Durum wheat (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	3.50	3.26	**3.39**	– 3	+ 4
AT	4.68	5.09	**4.84**	+ 3	– 5
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	—	—	—	—	—
DE	5.18	5.35	**5.38**	+ 4	+ 0
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	2.91	2.59	**3.05**	+ 5	+ 18
ES	2.92	2.26	**1.80**	– 38	– 21
FI	—	—	—	—	—
FR	5.42	5.30	**5.47**	+ 1	+ 3
HR	—	—	—	—	—
HU	4.53	3.72	**4.72**	+ 4	+ 27
IE	—	—	—	—	—
IT	3.18	2.98	**3.19**	+ 0	+ 7
LT	—	—	—	—	—
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	—	—	—	—	—
PT	—	—	—	—	—
RO	—	—	—	—	—
SE	—	—	—	—	—
SI	—	—	—	—	—
SK	5.00	4.90	**5.06**	+ 1	+ 3

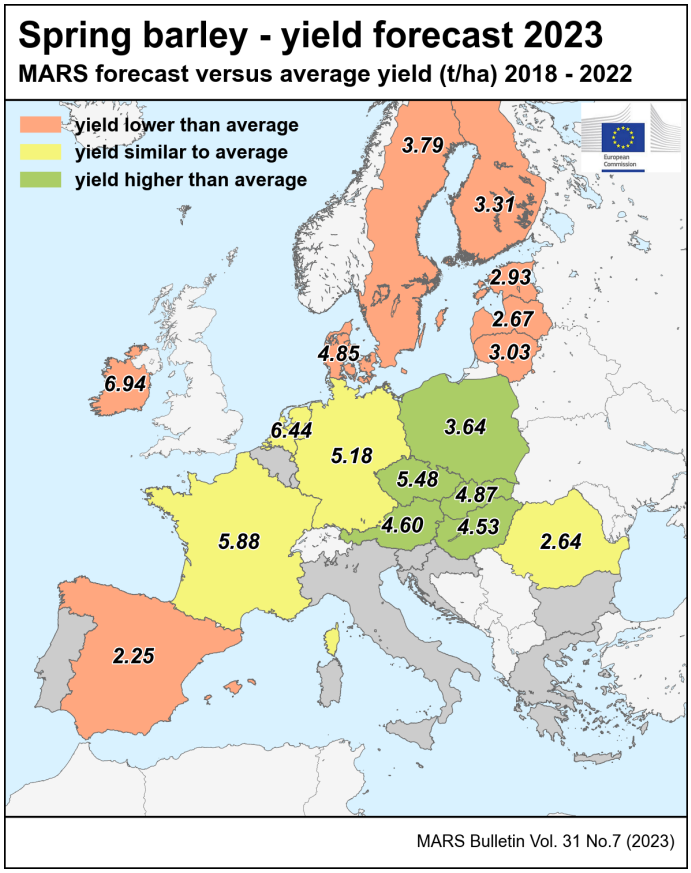
Durum wheat - yield forecast 2023

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

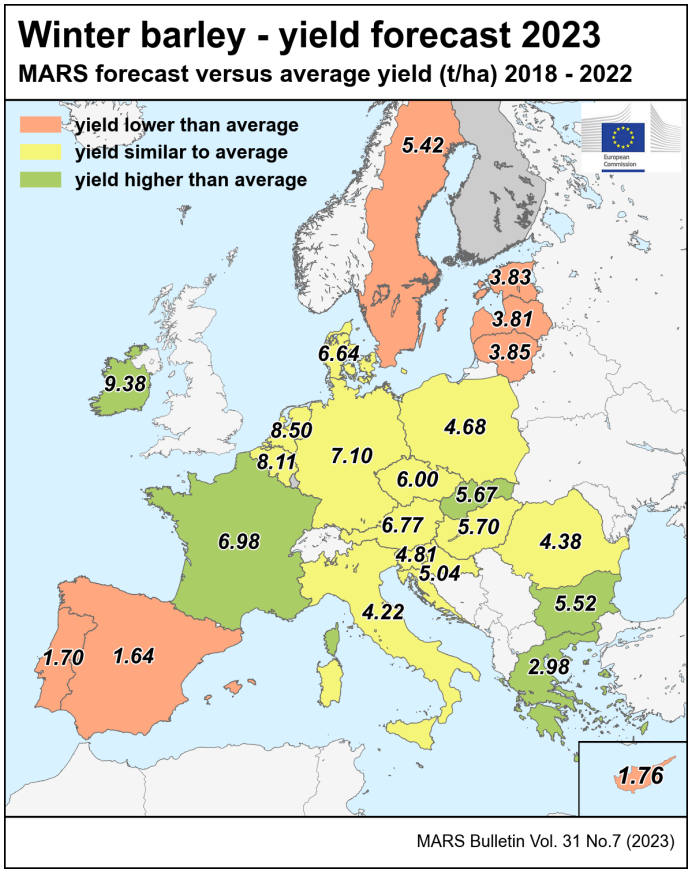


MARS Bulletin Vol. 31 No.7 (2023)

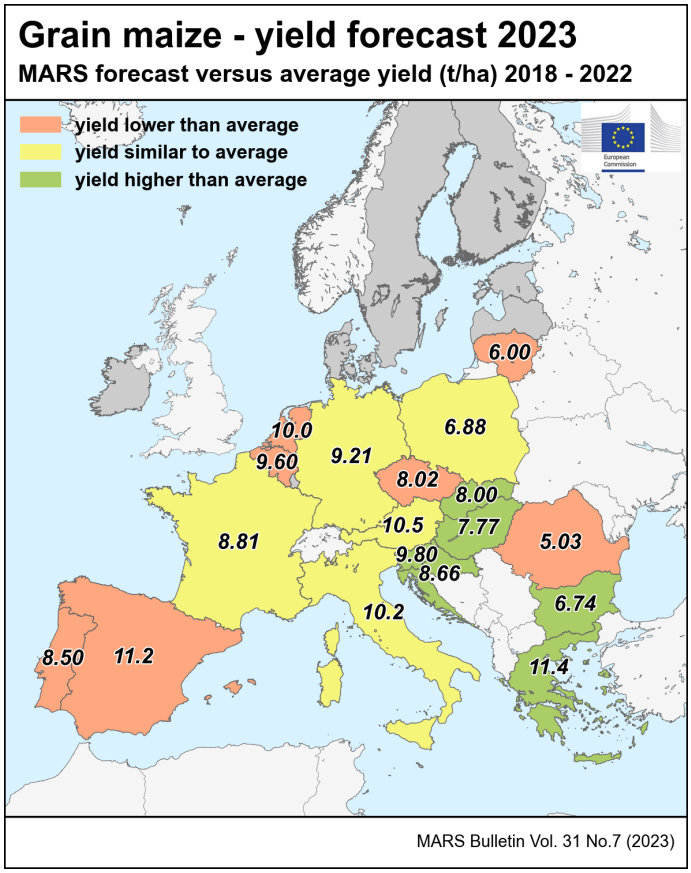
Country	Spring barley (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	4.19	4.21	**3.62**	– 14	– 14
AT	4.17	4.38	**4.60**	+ 10	+ 5
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	5.11	5.31	**5.48**	+ 7	+ 3
DE	5.19	5.32	**5.18**	– 0	– 3
DK	5.71	6.74	**4.85**	– 15	– 28
EE	3.43	3.99	**2.93**	– 14	– 27
EL	—	—	—	—	—
ES	3.38	2.81	**2.25**	– 34	– 20
FI	3.51	3.82	**3.31**	– 6	– 14
FR	5.83	5.16	**5.88**	+ 1	+ 14
HR	—	—	—	—	—
HU	4.13	4.30	**4.53**	+ 10	+ 5
IE	7.28	8.10	**6.94**	– 5	– 14
IT	—	—	—	—	—
LT	3.37	3.81	**3.03**	– 10	– 21
LU	—	—	—	—	—
LV	2.99	3.24	**2.67**	– 11	– 18
MT	—	—	—	—	—
NL	6.64	7.40	**6.44**	– 3	– 13
PL	3.44	3.95	**3.64**	+ 6	– 8
PT	—	—	—	—	—
RO	2.61	2.83	**2.64**	+ 1	– 7
SE	4.41	5.44	**3.79**	– 14	– 30
SI	—	—	—	—	—
SK	4.41	4.26	**4.87**	+ 10	+ 14



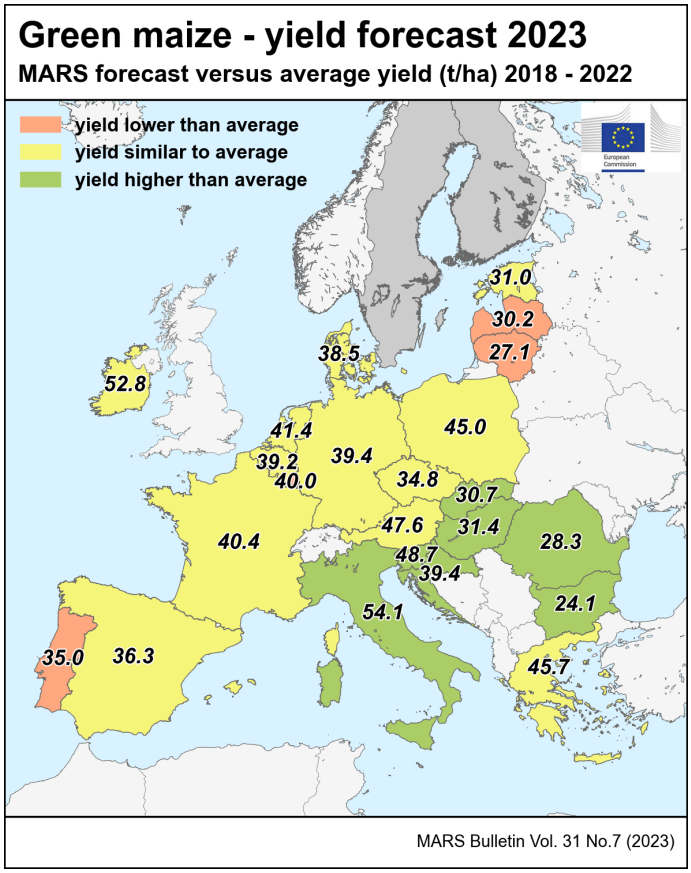
Country	Winter barley (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	5.77	5.92	**5.91**	+ 2	– 0
AT	6.54	6.66	**6.77**	+ 4	+ 2
BE	8.14	8.32	**8.11**	– 0	– 3
BG	4.76	4.97	**5.52**	+ 16	+ 11
CY	1.84	2.26	**1.76**	– 4	– 22
CZ	5.83	6.13	**6.00**	+ 3	– 2
DE	6.96	7.62	**7.10**	+ 2	– 7
DK	6.63	7.22	**6.64**	+ 0	– 8
EE	4.89	4.68	**3.83**	– 22	– 18
EL	2.82	2.44	**2.98**	+ 6	+ 22
ES	2.86	2.41	**1.64**	– 43	– 32
FI	—	—	—	—	—
FR	6.48	6.55	**6.98**	+ 8	+ 7
HR	5.04	5.10	**5.04**	+ 0	– 1
HU	5.54	4.84	**5.70**	+ 3	+ 18
IE	8.98	8.68	**9.38**	+ 4	+ 8
IT	4.13	4.20	**4.22**	+ 2	+ 1
LT	4.19	4.26	**3.85**	– 8	– 10
LU	—	—	—	—	—
LV	4.81	4.85	**3.81**	– 21	– 21
MT	—	—	—	—	—
NL	8.17	8.69	**8.50**	+ 4	– 2
PL	4.65	4.95	**4.68**	+ 1	– 5
PT	2.97	2.47	**1.70**	– 43	– 31
RO	4.27	4.43	**4.38**	+ 3	– 1
SE	5.90	6.17	**5.42**	– 8	– 12
SI	5.00	4.99	**4.81**	– 4	– 4
SK	5.30	5.32	**5.67**	+ 7	+ 7



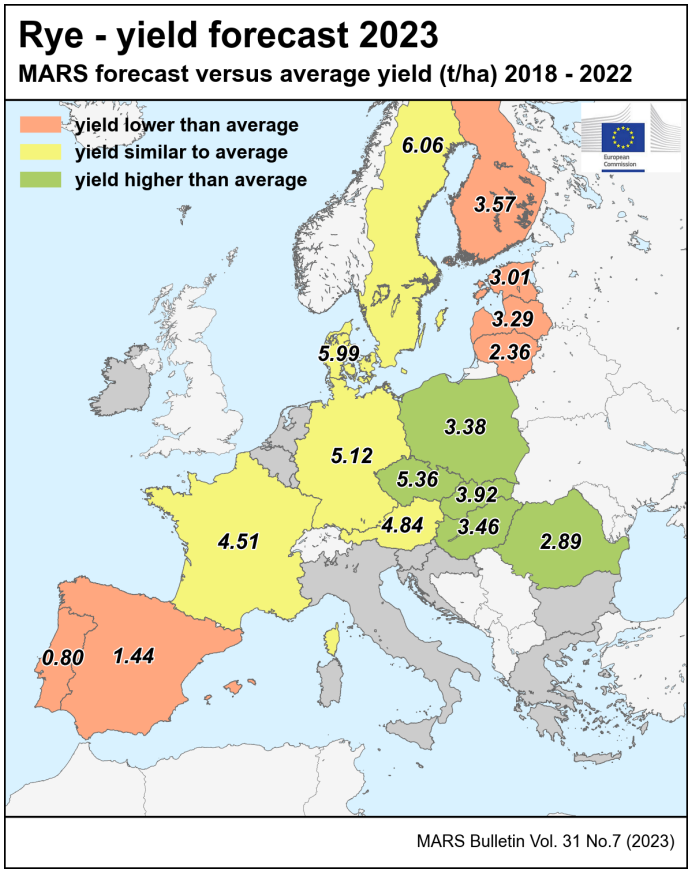
Country	Grain maize (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	7.48	5.90	**7.53**	+ 1	+ 28
AT	10.6	9.82	**10.5**	– 1	+ 7
BE	10.0	9.27	**9.60**	– 4	+ 4
BG	6.08	4.80	**6.74**	+ 11	+ 41
CY	—	—	—	—	—
CZ	8.35	7.95	**8.02**	– 4	+ 1
DE	9.06	8.40	**9.21**	+ 2	+ 10
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	10.8	9.75	**11.4**	+ 5	+ 17
ES	12.1	11.7	**11.2**	– 7	– 4
FI	—	—	—	—	—
FR	8.61	7.54	**8.81**	+ 2	+ 17
HR	8.06	6.11	**8.66**	+ 8	+ 42
HU	7.04	3.42	**7.77**	+ 10	+ 127
IE	—	—	—	—	—
IT	10.0	8.31	**10.2**	+ 2	+ 23
LT	6.40	5.31	**6.00**	– 6	+ 13
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	10.5	10.8	**10.0**	– 5	– 8
PL	6.79	6.98	**6.88**	+ 1	– 1
PT	9.43	9.44	**8.50**	– 10	– 10
RO	5.39	3.01	**5.03**	– 7	+ 67
SE	—	—	—	—	—
SI	9.09	6.68	**9.80**	+ 8	+ 47
SK	7.37	4.47	**8.00**	+ 9	+ 79



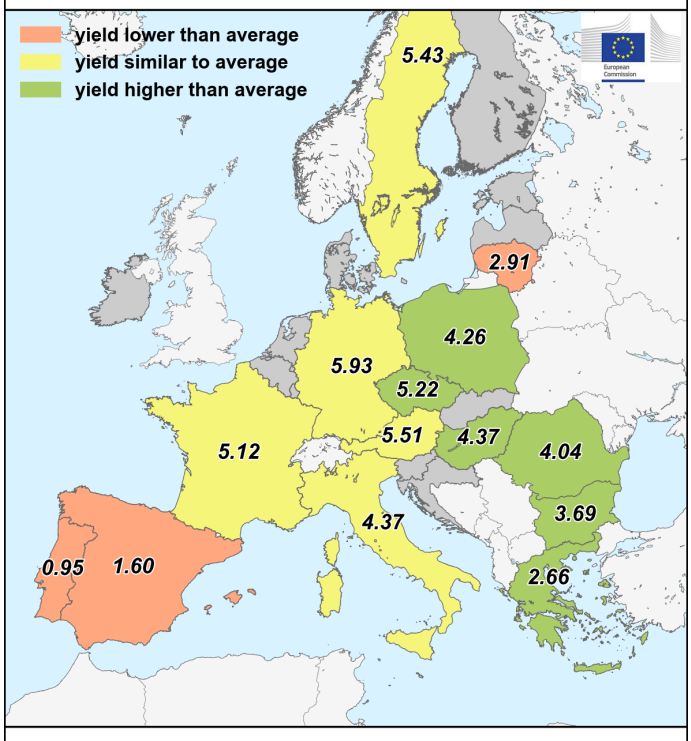
Country	Green maize (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU*	40.7	38.0	**40.6**	– 0	+ 7
AT	47.0	47.0	**47.6**	+ 1	+ 1
BE	39.4	38.7	**39.2**	– 0	+ 1
BG	22.2	24.1	**24.1**	+ 9	– 0
CY	—	—	—	—	—
CZ	35.8	36.0	**34.8**	– 3	– 3
DE	40.1	36.1	**39.4**	– 2	+ 9
DK	38.5	39.7	**38.5**	– 0	– 3
EE	31.9	30.7	**31.0**	– 3	+ 1
EL	44.7	47.0	**45.7**	+ 2	– 3
ES	36.4	34.5	**36.3**	– 0	+ 5
FI	—	—	—	—	—
FR	39.9	35.6	**40.4**	+ 1	+ 13
HR	36.4	26.7	**39.4**	+ 8	+ 48
HU	27.7	17.6	**31.4**	+ 14	+ 79
IE	52.0	52.8	**52.8**	+ 1	+ 0
IT	51.8	47.8	**54.1**	+ 5	+ 13
LT	28.4	26.6	**27.1**	– 4	+ 2
LU	44.5	41.2	**40.0**	– 10	– 3
LV	32.1	30.5	**30.2**	– 6	– 1
MT	—	—	—	—	—
NL	42.5	42.7	**41.4**	– 3	– 3
PL	45.2	47.7	**45.0**	– 0	– 6
PT	42.1	43.2	**35.0**	– 17	– 19
RO	25.8	20.2	**28.3**	+ 10	+ 40
SE	—	—	—	—	—
SI	43.8	31.8	**48.7**	+ 11	+ 53
SK	29.4	22.3	**30.7**	+ 5	+ 38



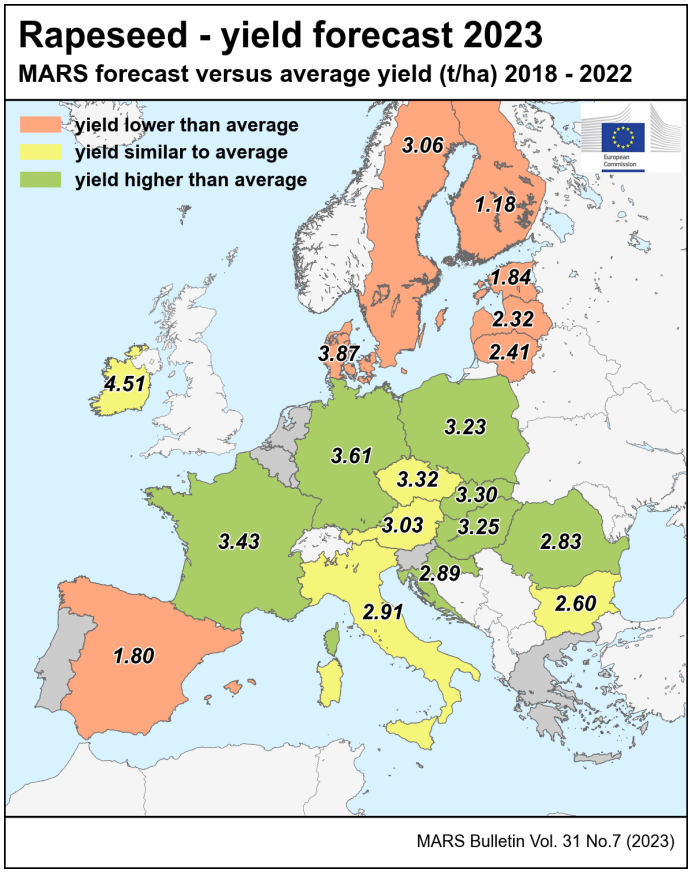
Country	Rye (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	3.98	4.29	**4.12**	+ 4	– 4
AT	4.72	4.87	**4.84**	+ 3	– 1
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	5.14	5.31	**5.36**	+ 4	+ 1
DE	5.16	5.32	**5.12**	– 1	– 4
DK	6.06	6.42	**5.99**	– 1	– 7
EE	3.75	3.85	**3.01**	– 20	– 22
EL	—	—	—	—	—
ES	2.42	1.87	**1.44**	– 41	– 23
FI	3.84	3.38	**3.57**	– 7	+ 6
FR	4.34	3.84	**4.51**	+ 4	+ 17
HR	—	—	—	—	—
HU	3.29	3.01	**3.46**	+ 5	+ 15
IE	—	—	—	—	—
IT	—	—	—	—	—
LT	2.56	2.41	**2.36**	– 8	– 2
LU	—	—	—	—	—
LV	4.05	3.66	**3.29**	– 19	– 10
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	3.07	3.58	**3.38**	+ 10	– 6
PT	1.11	1.03	**0.80**	– 28	– 22
RO	2.72	2.58	**2.89**	+ 6	+ 12
SE	5.99	6.22	**6.06**	+ 1	– 3
SI	—	—	—	—	—
SK	3.60	3.84	**3.92**	+ 9	+ 2



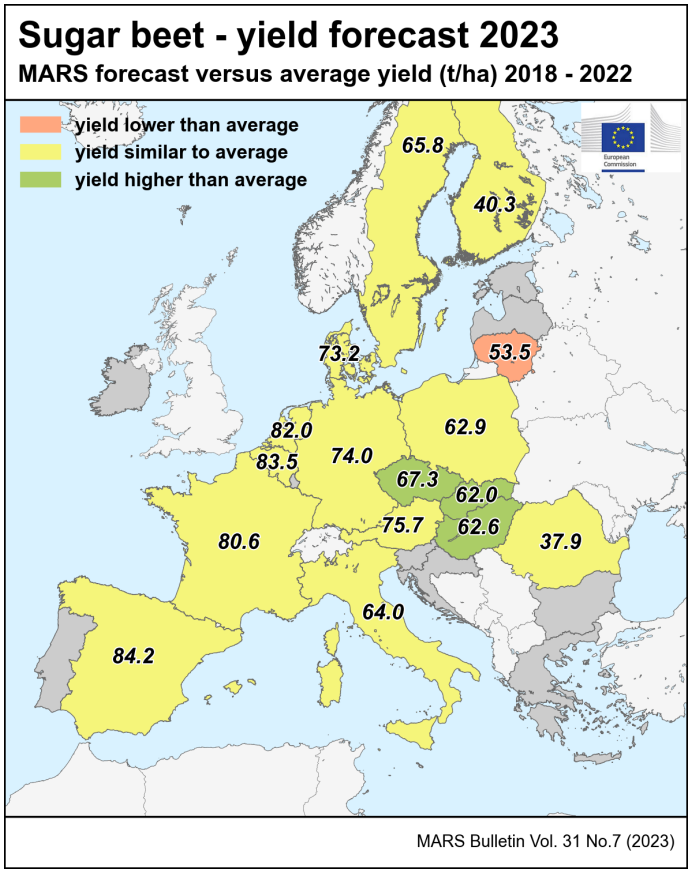
Country	Triticale (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	4.22	4.42	**4.29**	+ 2	– 3
AT	5.44	5.62	**5.51**	+ 1	– 2
BE	—	—	—	—	—
BG	2.96	3.00	**3.69**	+ 24	+ 23
CY	—	—	—	—	—
CZ	4.88	5.12	**5.22**	+ 7	+ 2
DE	5.85	5.95	**5.93**	+ 1	– 0
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	2.53	2.79	**2.66**	+ 5	– 5
ES	2.64	2.18	**1.60**	– 40	– 27
FI	—	—	—	—	—
FR	5.00	4.79	**5.12**	+ 2	+ 7
HR	—	—	—	—	—
HU	3.98	3.43	**4.37**	+ 10	+ 28
IE	—	—	—	—	—
IT	4.42	4.31	**4.37**	– 1	+ 1
LT	3.25	3.24	**2.91**	– 11	– 10
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	3.98	4.51	**4.26**	+ 7	– 6
PT	1.54	1.25	**0.95**	– 38	– 24
RO	3.86	3.80	**4.04**	+ 5	+ 6
SE	5.55	5.68	**5.43**	– 2	– 5
SI	—	—	—	—	—
SK	—	—	—	—	—



Country	Rape and turnip rape (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	3.10	3.33	**3.20**	+ 3	– 4
AT	3.06	3.21	**3.03**	– 1	– 5
BE	—	—	**—**	—	—
BG	2.57	2.29	**2.60**	+ 1	+ 13
CY	—	—	**—**	—	—
CZ	3.25	3.39	**3.32**	+ 2	– 2
DE	3.47	3.95	**3.61**	+ 4	– 8
DK	4.08	4.49	**3.87**	– 5	– 14
EE	2.47	2.53	**1.84**	– 26	– 28
EL	—	—	**—**	—	—
ES	2.35	2.16	**1.80**	– 23	– 17
FI	1.31	1.37	**1.18**	– 10	– 14
FR	3.24	3.68	**3.43**	+ 6	– 7
HR	2.72	2.59	**2.89**	+ 6	+ 12
HU	2.88	2.50	**3.25**	+ 13	+ 30
IE	4.44	4.92	**4.51**	+ 2	– 8
IT	2.84	2.85	**2.91**	+ 3	+ 2
LT	2.80	2.57	**2.41**	– 14	– 6
LU	—	—	**—**	—	—
LV	2.62	2.21	**2.32**	– 12	+ 5
MT	—	—	**—**	—	—
NL	—	—	**—**	—	—
PL	3.05	3.38	**3.23**	+ 6	– 4
PT	—	—	**—**	—	—
RO	2.56	2.62	**2.83**	+ 10	+ 8
SE	3.20	3.35	**3.06**	– 4	– 9
SI	—	—	**—**	—	—
SK	3.03	3.12	**3.30**	+ 9	+ 6



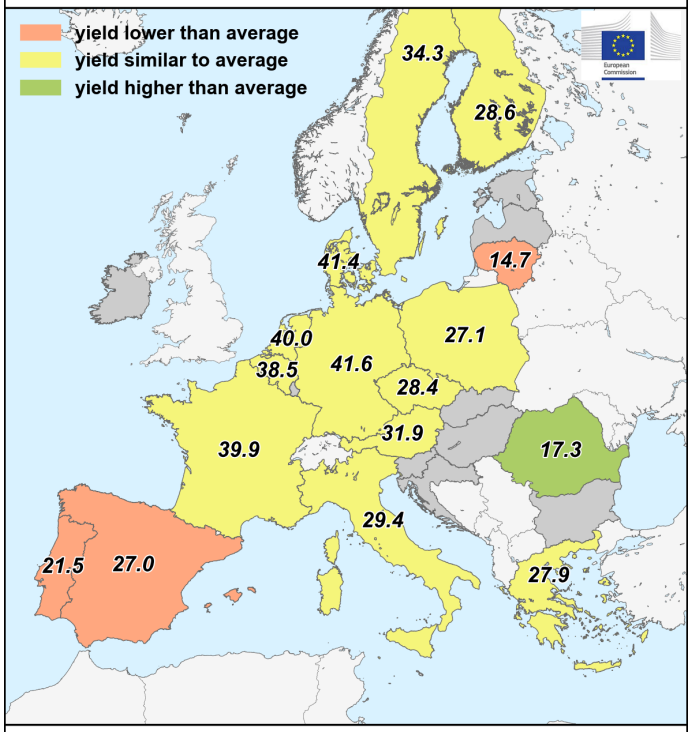
Country	Sugar beet (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	72.0	N/A	**73.3**	+ 2	N/A
AT	75.9	79.7	**75.7**	– 0	– 5
BE	85.3	89.3	**83.5**	– 2	– 7
BG	—	—	**—**	—	—
CY	—	—	**—**	—	—
CZ	63.5	69.6	**67.3**	+ 6	– 3
DE	72.5	71.2	**74.0**	+ 2	+ 4
DK	73.6	72.3	**73.2**	– 0	+ 1
EE	—	—	**—**	—	—
EL	—	—	**—**	—	—
ES	85.8	84.1	**84.2**	– 2	+ 0
FI	40.1	43.1	**40.3**	+ 1	– 7
FR	78.6	78.6	**80.6**	+ 3	+ 3
HR	—	—	**—**	—	—
HU	57.4	47.2	**62.6**	+ 9	+ 33
IE	—	—	**—**	—	—
IT	63.1	N/A	**64.0**	+ 1	N/A
LT	63.2	62.5	**53.5**	– 15	– 15
LU	—	—	**—**	—	—
LV	—	—	**—**	—	—
MT	—	—	**—**	—	—
NL	82.4	88.8	**82.0**	– 1	– 8
PL	60.6	63.8	**62.9**	+ 4	– 2
PT	—	—	**—**	—	—
RO	37.5	31.8	**37.9**	+ 1	+ 19
SE	66.5	64.7	**65.8**	– 1	+ 2
SI	—	—	**—**	—	—
SK	59.4	56.3	**62.0**	+ 4	+ 10



Country	Potatoes (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	34.1	35.3	**34.4**	+ 1	– 3
AT	32.7	32.0	**31.9**	– 2	– 0
BE	39.1	38.6	**38.5**	– 2	– 0
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	28.3	30.2	**28.4**	+ 0	– 6
DE	40.3	40.1	**41.6**	+ 3	+ 4
DK	41.7	44.2	**41.4**	– 1	– 6
EE	—	—	—	—	—
EL	27.3	26.5	**27.9**	+ 2	+ 6
ES	31.7	30.5	**27.0**	– 15	– 11
FI	28.6	28.1	**28.6**	+ 0	+ 2
FR	40.4	38.0	**39.9**	– 1	+ 5
HR	—	—	—	—	—
HU	—	—	—	—	—
IE	—	—	—	—	—
IT	29.2	28.3	**29.4**	+ 1	+ 4
LT	15.6	14.9	**14.7**	– 5	– 1
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	41.2	42.6	**40.0**	– 3	– 6
PL	27.8	30.8	**27.1**	– 2	– 12
PT	23.1	24.0	**21.5**	– 7	– 10
RO	16.2	15.9	**17.3**	+ 7	+ 9
SE	34.7	36.3	**34.3**	– 1	– 6
SI	—	—	—	—	—
SK	—	—	—	—	—

Potatoes - yield forecast 2023

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



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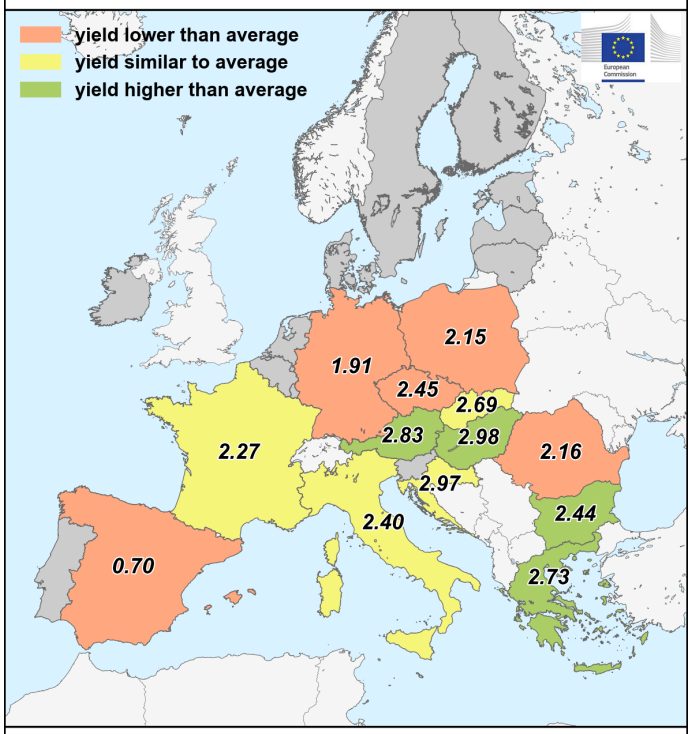
Country	Sunflower (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	2.21	1.87	**2.12**	– 5	+ 13
AT	2.70	2.32	**2.83**	+ 5	+ 22
BE	—	—	—	—	—
BG	2.32	2.31	**2.44**	+ 5	+ 6
CY	—	—	—	—	—
CZ	2.60	2.65	**2.45**	– 6	– 8
DE	2.07	1.88	**1.91**	– 8	+ 1
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	2.59	2.67	**2.73**	+ 5	+ 2
ES	1.17	0.90	**0.70**	– 40	– 22
FI	—	—	—	—	—
FR	2.25	2.07	**2.27**	+ 1	+ 10
HR	3.02	2.99	**2.97**	– 2	– 1
HU	2.64	1.84	**2.98**	+ 13	+ 62
IE	—	—	—	—	—
IT	2.42	2.39	**2.40**	– 1	+ 1
LT	—	—	—	—	—
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	2.27	2.40	**2.15**	– 6	– 11
PT	—	—	—	—	—
RO	2.43	1.92	**2.16**	– 11	+ 12
SE	—	—	—	—	—
SI	—	—	—	—	—
SK	2.62	2.33	**2.69**	+ 3	+ 15

Sunflower - yield forecast 2023

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

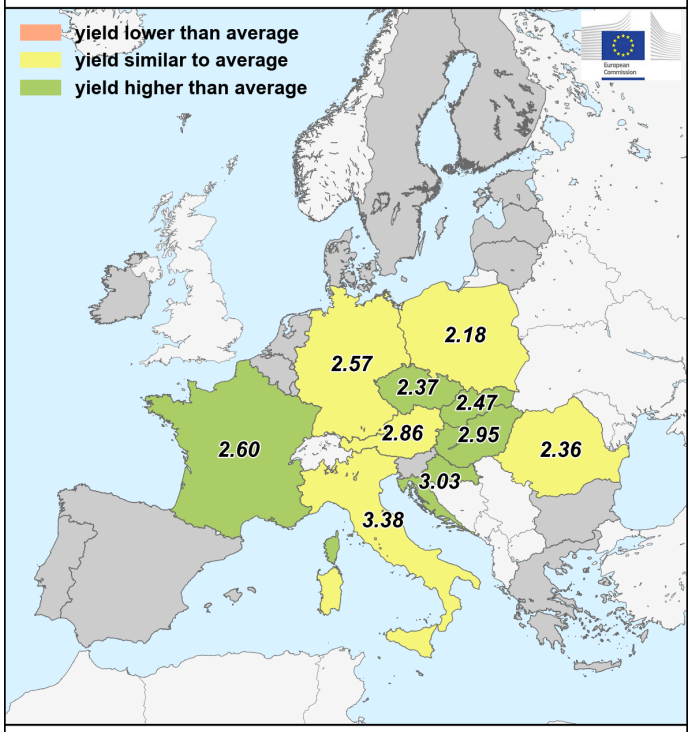


MARS Bulletin Vol. 31 No.7 (2023)

Country	Soybeans (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
EU	2.76	2.24	**2.86**	+ 4	+ 28
AT	2.88	2.62	**2.86**	– 1	+ 9
BE	—	—	—	—	—
BG	—	—	—	—	—
CY	—	—	—	—	—
CZ	2.26	2.30	**2.37**	+ 5	+ 3
DE	2.67	2.34	**2.57**	– 4	+ 10
DK	—	—	—	—	—
EE	—	—	—	—	—
EL	—	—	—	—	—
ES	—	—	—	—	—
FI	—	—	—	—	—
FR	2.43	2.05	**2.60**	+ 7	+ 27
HR	2.83	2.16	**3.03**	+ 7	+ 40
HU	2.58	1.85	**2.95**	+ 14	+ 59
IE	—	—	—	—	—
IT	3.30	2.64	**3.38**	+ 2	+ 28
LT	—	—	—	—	—
LU	—	—	—	—	—
LV	—	—	—	—	—
MT	—	—	—	—	—
NL	—	—	—	—	—
PL	2.17	2.36	**2.18**	+ 0	– 8
PT	—	—	—	—	—
RO	2.33	1.80	**2.36**	+ 1	+ 31
SE	—	—	—	—	—
SI	—	—	—	—	—
SK	2.22	1.45	**2.47**	+ 11	+ 71

Soybeans - yield forecast 2023

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



MARS Bulletin Vol. 31 No.7 (2023)

Country	Wheat (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
BY	3.42	3.48	**3.47**	+ 2	– 0
TR	2.83	2.99	**3.06**	+ 8	+ 2
UA	4.07	4.12	**4.58**	+ 13	+ 11
UK	8.10	8.60	**8.38**	+ 4	– 3

Country	Barley (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
BY	2.76	2.75	**3.03**	+ 10	+ 10
TR	2.48	2.63	**2.72**	+ 9	+ 3
UA	3.38	3.47	**3.59**	+ 6	+ 4
UK	6.25	6.67	**6.50**	+ 4	– 3

Country	Grain maize (t/ha)				
	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
BY	5.61	5.57	**5.78**	+ 3	+ 4
TR	9.32	9.33	**9.69**	+ 4	+ 4
UA	6.99	6.69	**7.15**	+ 2	+ 7
UK	—	—	—	—	—

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

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

Sources: 2018-2022 data come from DG Agriculture and Rural Development short-term-outlook data (dated June 2023, received on 10.07.2023), Eurostat Eurobase (last update: 07.07.2023), ELSTAT, Statistics Netherlands (CBS) and EES (last update: 15.11.2017).

Non-EU 2018-2022 data come from USDA, Turkish Statistical Institute (TurkStat), Eurostat Eurobase (last update: 07.07.2023), Ministry for Development of Economy, Trade and Agriculture of Ukraine, Department for Environment, Food & Rural Affairs of UK (DEFRA), FAO and PSD-online.

2023 yields come from MARS Crop Yield Forecasting System (output up to 15.07.2023).

EU aggregate after 12.2020 is reported.

N/A = Data not available.

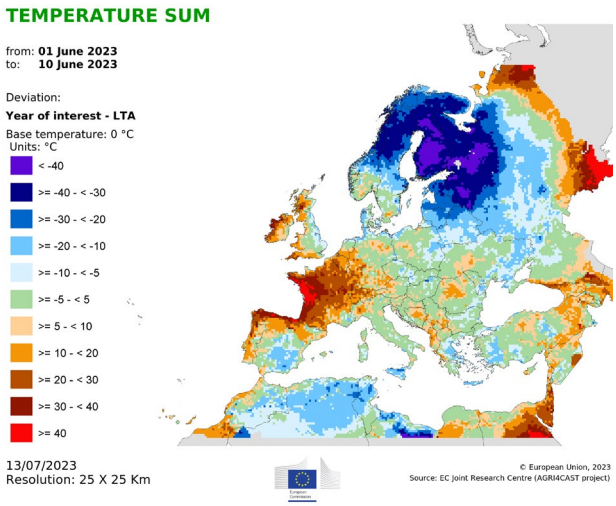
The column header '%23/5yrs' stands for the 2023 change with respect to the 5-year average(%). Similarly, '%23/22' stands for the 2023 change with respect to 2022(%).

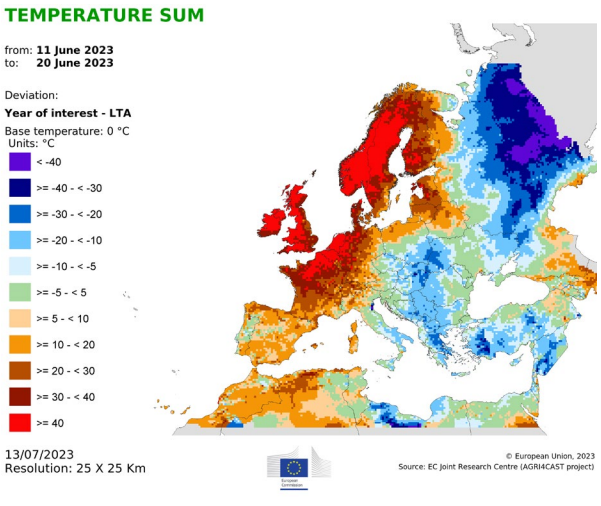
* The EU figures do not include green maize forecasts for Sweden since recent data on yields were not consistent.

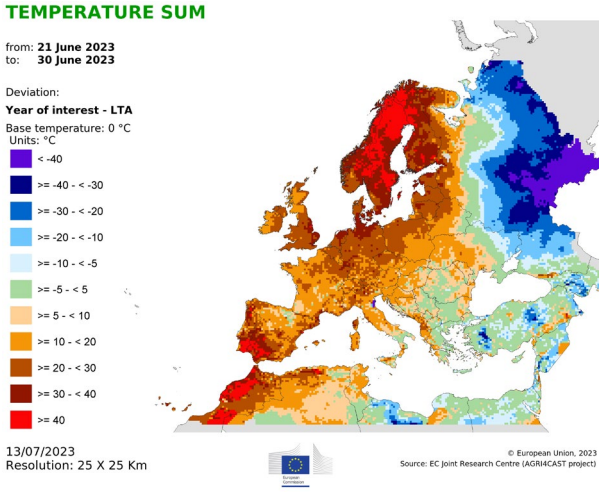
Cop name	Eurostat Crop name	Eurostat Crop Code	Official Eurostat Crop definition*
Total wheat	Wheat and spelt	C1100	Common wheat (*Triticum aestivum* L. emend. Fiori et Paol.), spelt (*Triticum spelta* L), einkorn wheat (*Triticum monococcum* L.) and durum wheat (*Triticum durum* Desf.).
Total barley	Barley	C1300	Barley (*Hordeum vulgare* L.).
Soft wheat	Common wheat and spelt	C1110	Common wheat (*Triticum aestivum* L. emend. Fiori et Paol.), spelt (*Triticum spelta* L) and einkorn wheat (*Triticum monococcum* L.).
Durum what	Durum wheat	C1120	*Triticum durum* Desf.
Spring barley	Spring barley	C1320	Barley (*Hordeum vulgare* L.) sown in the spring.
Winter barley	Winter barley	C1310	Barley (*Hordeum vulgare* L.) sown before or during winter.
Grain maize	Grain maize and corn-cob-mix	C1500	Maize (*Zea mays* L.) harvested for grain, as seed or as corn-cob-mix.
Green maize	Green maize	G3000	All forms of maize (*Zea mays* L.) grown mainly for silage (whole cob, parts of or whole plant) and not harvested for grain.
Rye	Rye and winter cereal mixtures (maslin)	C1200	Rye (*Secale cereale* L.) sown any time, mixtures of rye and other cereals and other cereal mixtures sown before or during the winter (maslin).
Triticale	Triticale	C1600	Triticale (x *Triticosecale* Wittmack).
Rape and turnip rape	Rape and turnip rape seeds	I1110	Rape (*Brassica napus* L.) and turnip rape (*Brassica rapa* L. var. oleifera (Lam.)) grown for the production of oil, harvested as dry grains.
Sugar beet	Sugar beet (excluding seed)	R2000	Sugar beet (*Beta vulgaris* L.) intended for the sugar industry, alcohol production or renewable energy production.
Potatoes	Potatoes (including seed potatoes)	R1000	Potatoes (*Solanum tuberosum* L.).
Sunflower	Sunflower seed	I1120	Sunflower (*Helianthus annuus* L.) harvested as dry grains.
Soybeans	Soya	I1130	Soya (*Glycine max* L. Merril) harvested as dry grains.
Rice	Rice	C2000	Rice (*Oryza sativa*, L.).
* *Source:*	Eurostat - Annual crop statistics (Handbook 2020 Edition)		

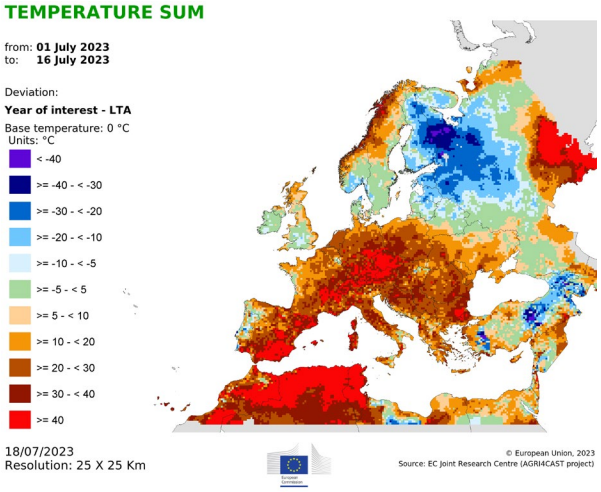
6. Atlas

Temperature regime

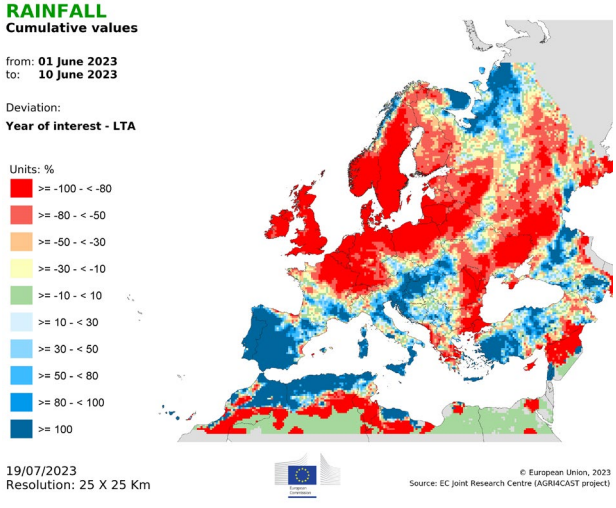


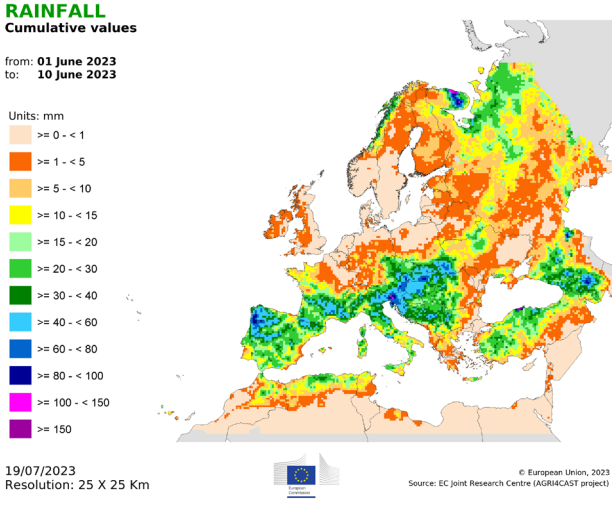






Precipitation



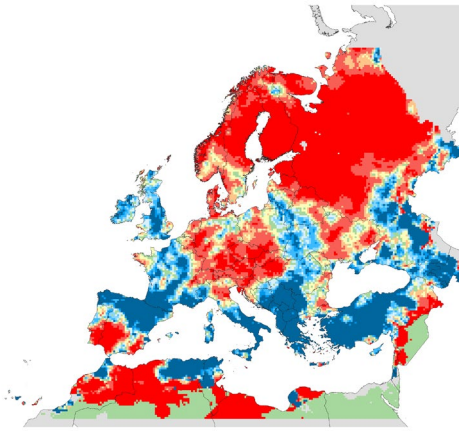


RAINFALL
Cumulative values

from: **11 June 2023**
to: **20 June 2023**

Deviation:
Year of interest - LTA

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

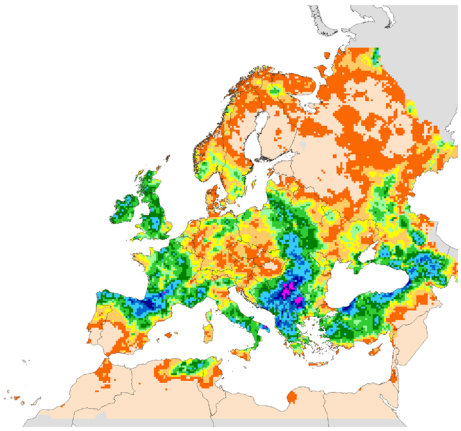


19/07/2023
Resolution: 25 X 25 Km

RAINFALL
Cumulative values

from: **11 June 2023**
to: **20 June 2023**

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



19/07/2023
Resolution: 25 X 25 Km

RAINFALL
Cumulative values

from: **21 June 2023**
to: **30 June 2023**

Deviation:
Year of interest - LTA

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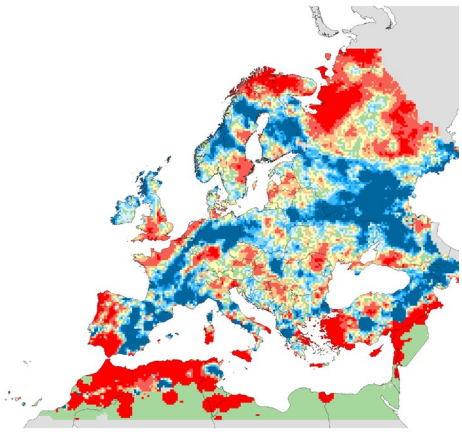
- >= -50 - < -30
- >= -30 - < -10
- >= -10 - < 10
- >= 10 - < 30
- >= 30 - < 50
- >= 50 - < 80
- >= 80 - < 100
- >= 100

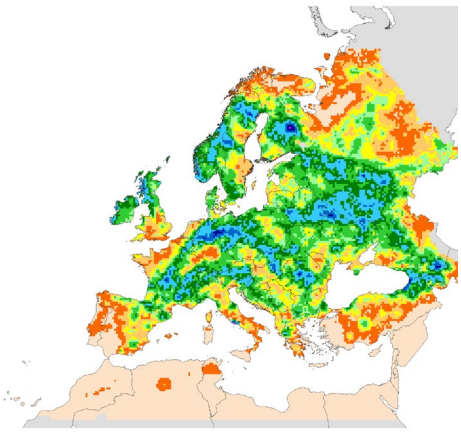


19/07/2023
Resolution: 25 X 25 Km

RAINFALL
Cumulative values

from: **21 June 2023**
to: **30 June 2023**

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



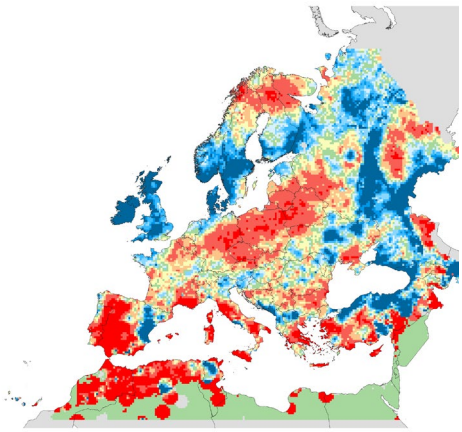
19/07/2023
Resolution: 25 X 25 Km

RAINFALL
Cumulative values

from: **01 July 2023**
to: **16 July 2023**

Deviation:
Year of interest - LTA

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

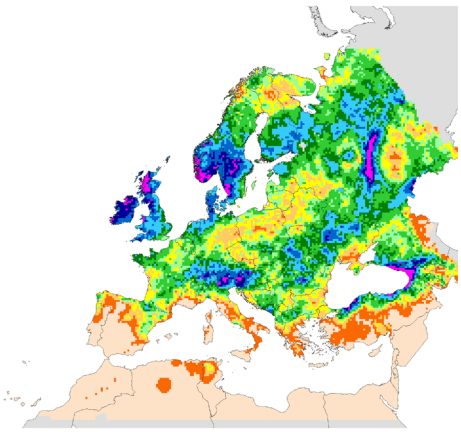


19/07/2023
Resolution: 25 X 25 Km

RAINFALL
Cumulative values

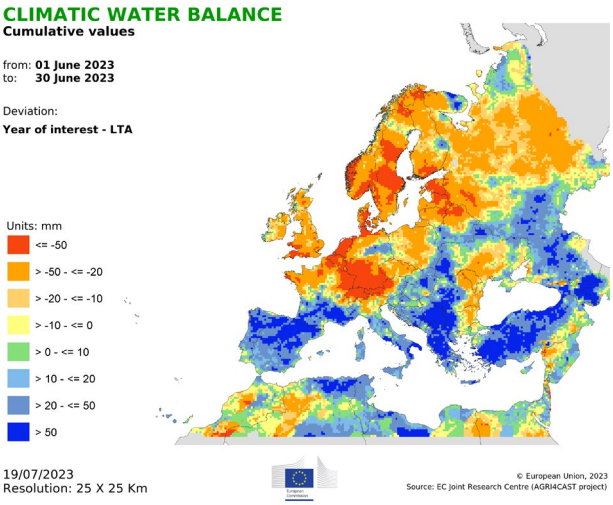
from: **01 July 2023**
to: **16 July 2023**

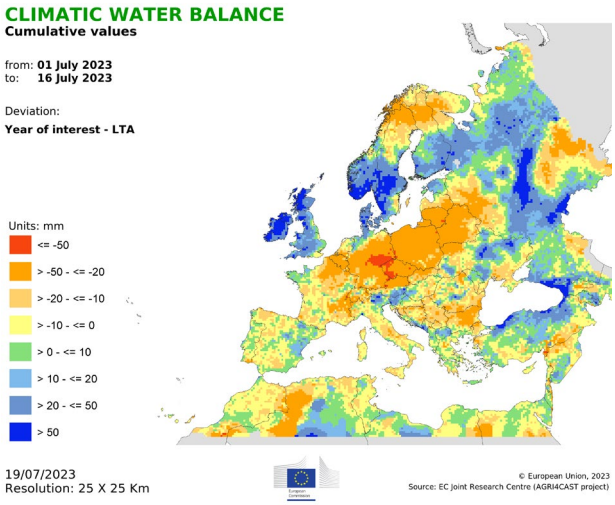
Units: mm
- >= 0 - < 1
- >= 1 - < 5
- >= 5 - < 10
- >= 10 - < 15
- >= 15 - < 20
- >= 20 - < 30
- >= 30 - < 40
- >= 40 - < 60
- >= 60 - < 80
- >= 80 - < 100
- >= 100 - < 150
- >= 150



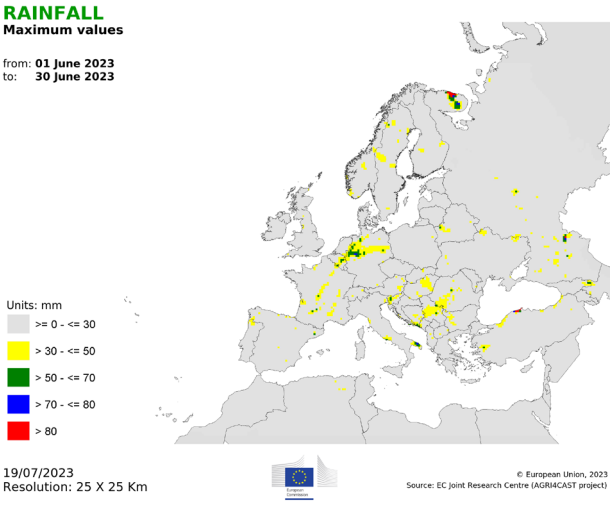
19/07/2023
Resolution: 25 X 25 Km

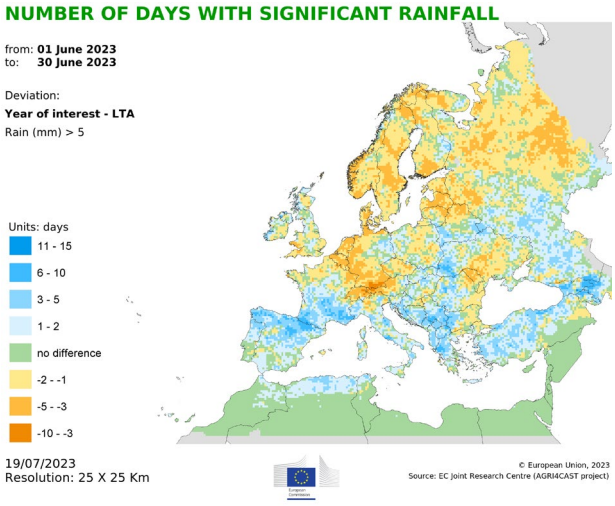
Climatic water balance

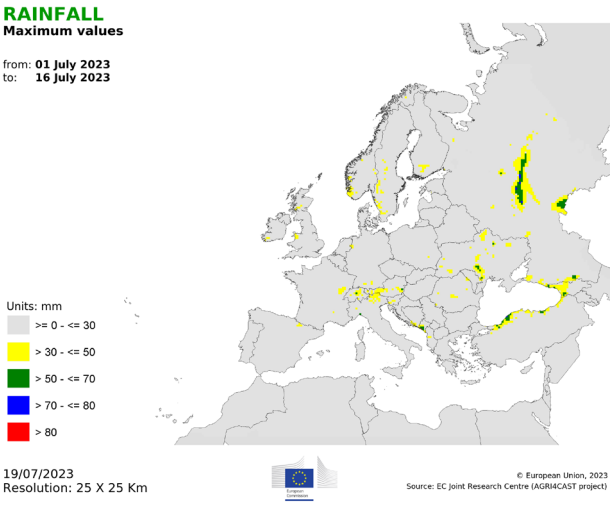


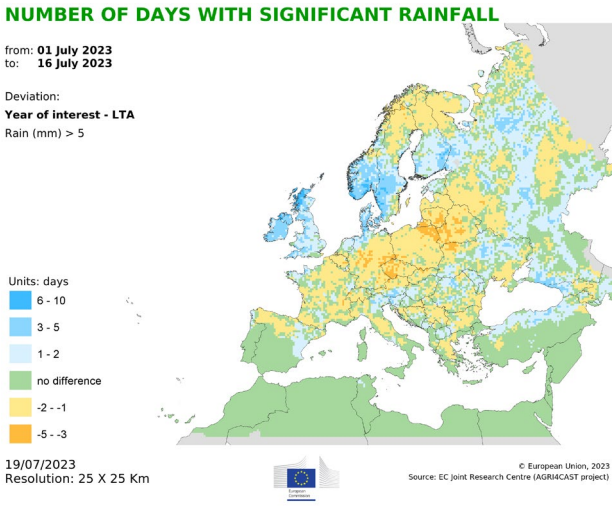


Weather events





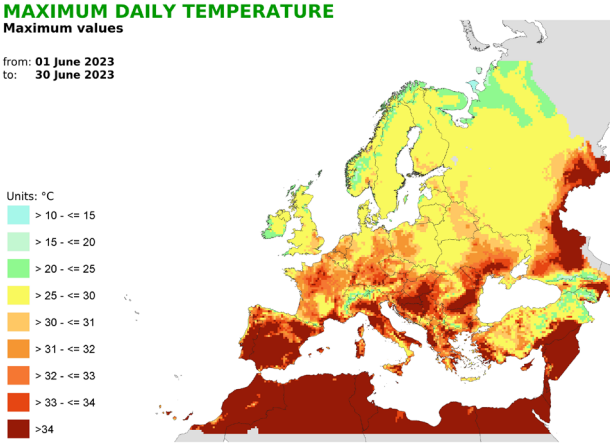




MAXIMUM DAILY TEMPERATURE

Maximum values

from: **01 June 2023**
to: **30 June 2023**



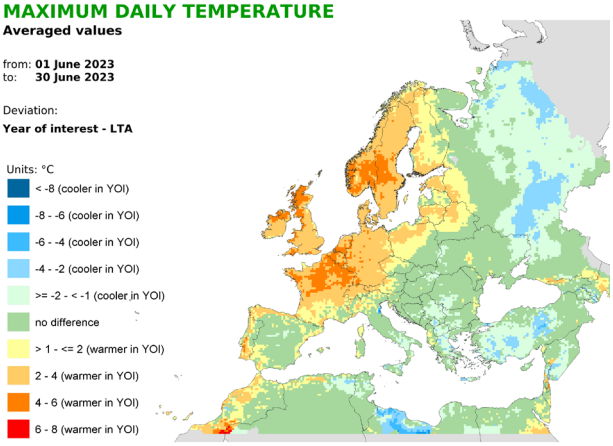
17/07/2023
Resolution: 25 X 25 Km

MAXIMUM DAILY TEMPERATURE

Averaged values

from: **01 June 2023**
to: **30 June 2023**

Deviation:
Year of interest - LTA

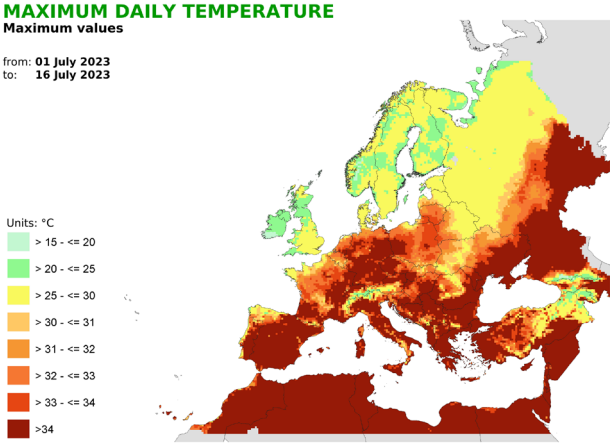


13/07/2023
Resolution: 25 X 25 Km

MAXIMUM DAILY TEMPERATURE

Maximum values

from: **01 July 2023**
to: **16 July 2023**



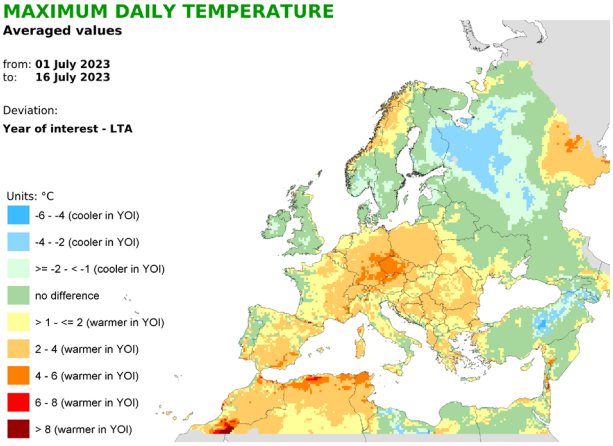
17/07/2023
Resolution: 25 X 25 Km

MAXIMUM DAILY TEMPERATURE

Averaged values

from: **01 July 2023**
to: **16 July 2023**

Deviation:
Year of interest - LTA

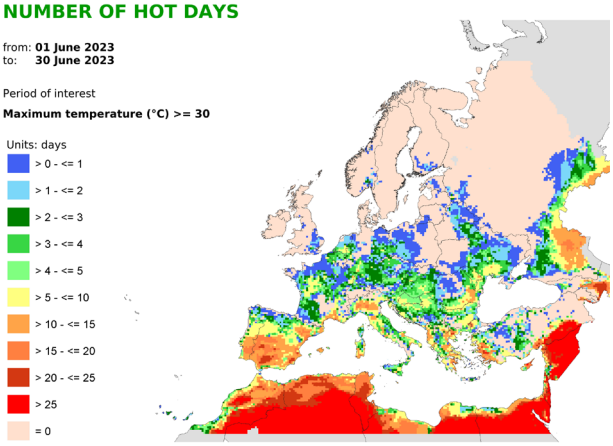


18/07/2023
Resolution: 25 X 25 Km

NUMBER OF HOT DAYS

from: **01 June 2023**
to: **30 June 2023**

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

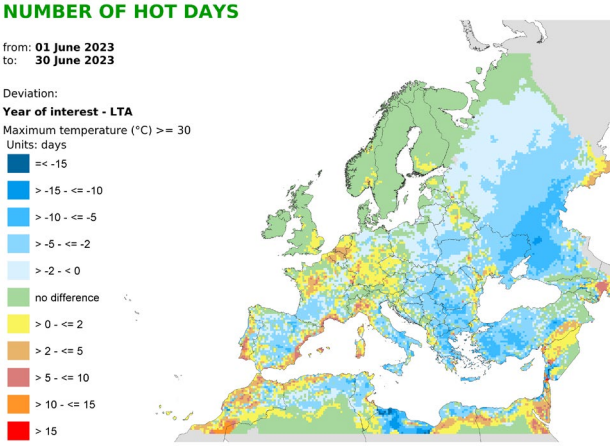


13/07/2023
Resolution: 25 X 25 Km

NUMBER OF HOT DAYS

from: **01 June 2023**
to: **30 June 2023**

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

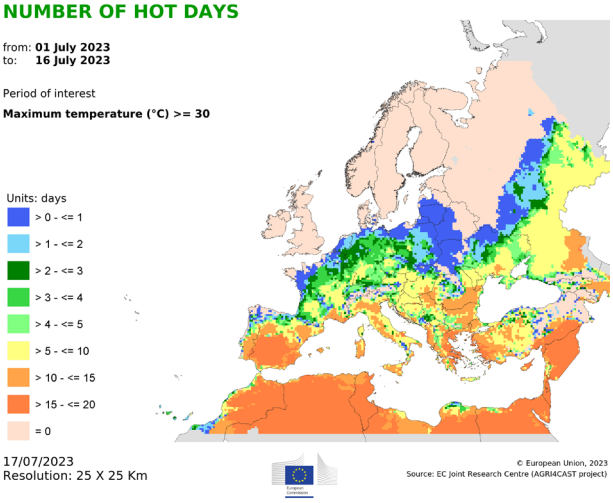


13/07/2023
Resolution: 25 X 25 Km

NUMBER OF HOT DAYS

from: **01 July 2023**
to: **16 July 2023**

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

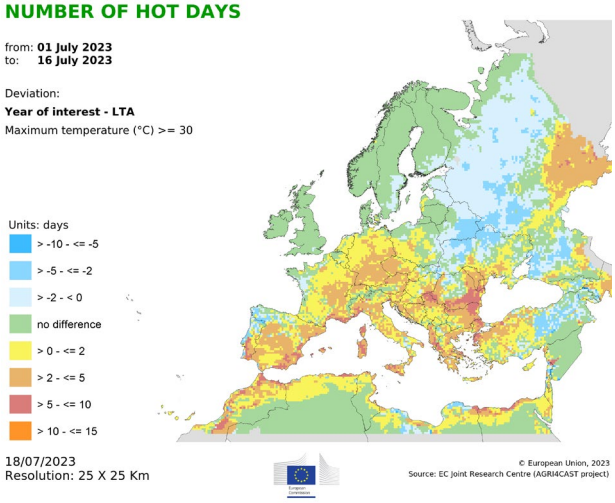


17/07/2023
Resolution: 25 X 25 Km

NUMBER OF HOT DAYS

from: **01 July 2023**
to: **16 July 2023**

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

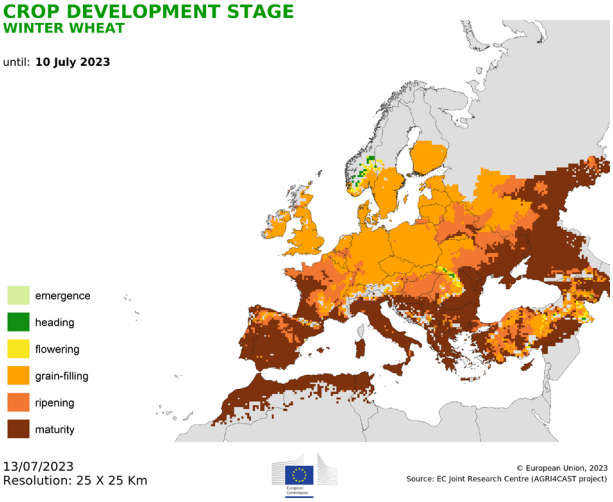


18/07/2023
Resolution: 25 X 25 Km

Crop development stages and precocity

CROP DEVELOPMENT STAGE
WINTER WHEAT

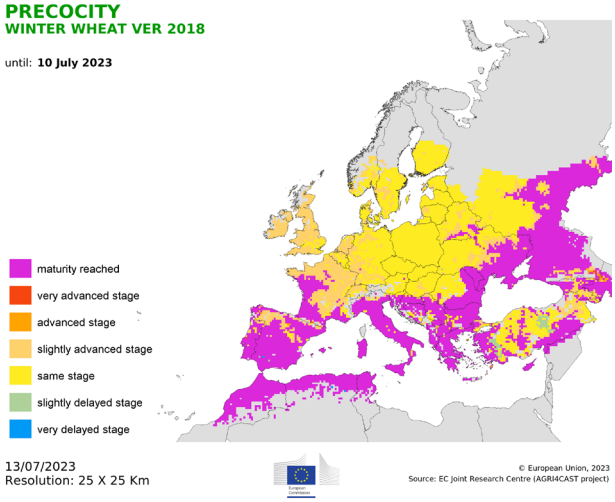
until: **10 July 2023**



13/07/2023
Resolution: 25 X 25 Km

PRECOCITY
WINTER WHEAT VER 2018

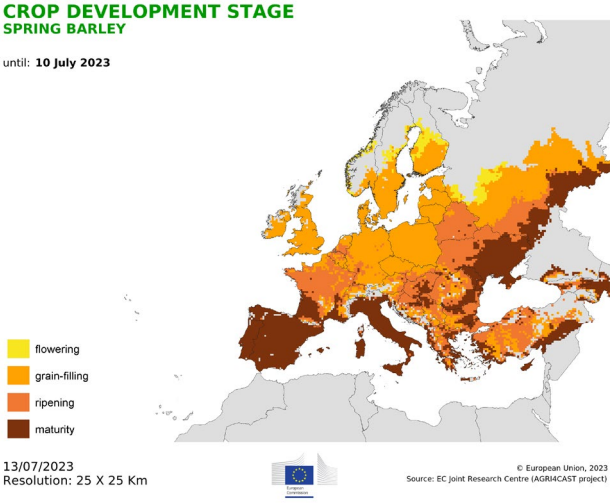
until: **10 July 2023**



13/07/2023
Resolution: 25 X 25 Km

CROP DEVELOPMENT STAGE
SPRING BARLEY

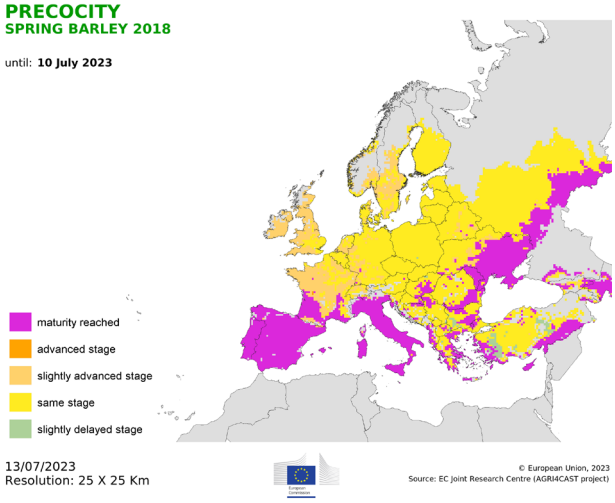
until: **10 July 2023**



13/07/2023
Resolution: 25 X 25 Km

PRECOCITY
SPRING BARLEY 2018

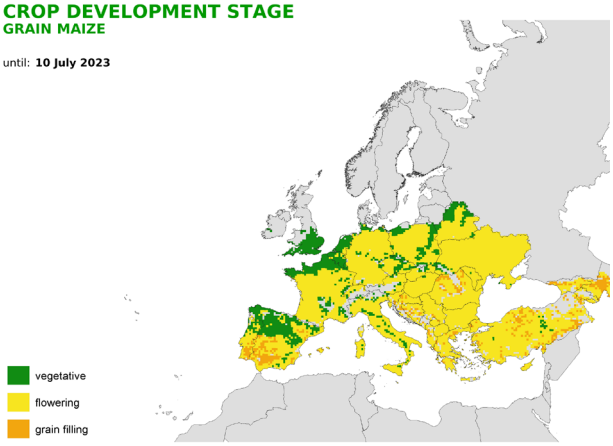
until: **10 July 2023**



13/07/2023
Resolution: 25 X 25 Km

CROP DEVELOPMENT STAGE
GRAIN MAIZE

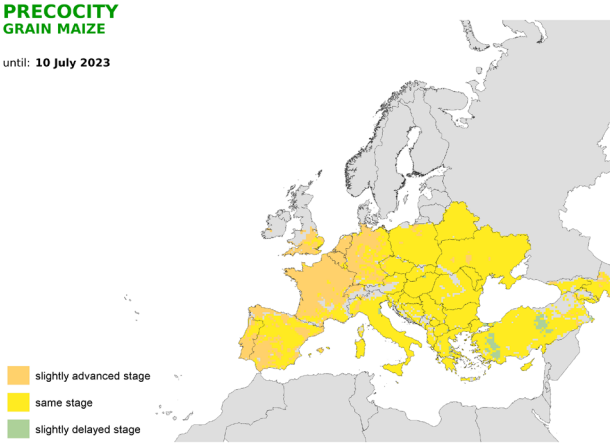
until: **10 July 2023**



13/07/2023
Resolution: 25 X 25 Km

PRECOCITY
GRAIN MAIZE

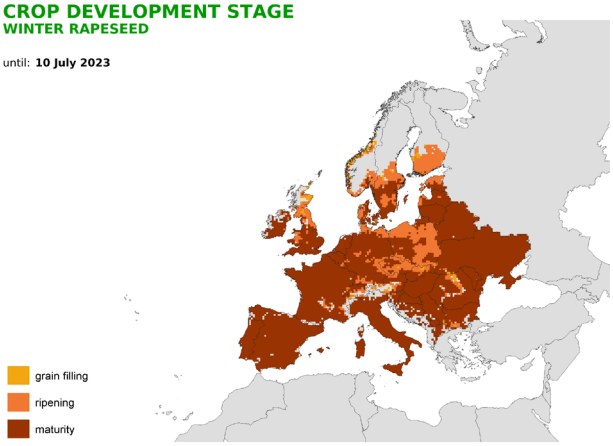
until: **10 July 2023**



13/07/2023
Resolution: 25 X 25 Km

CROP DEVELOPMENT STAGE
WINTER RAPESEED

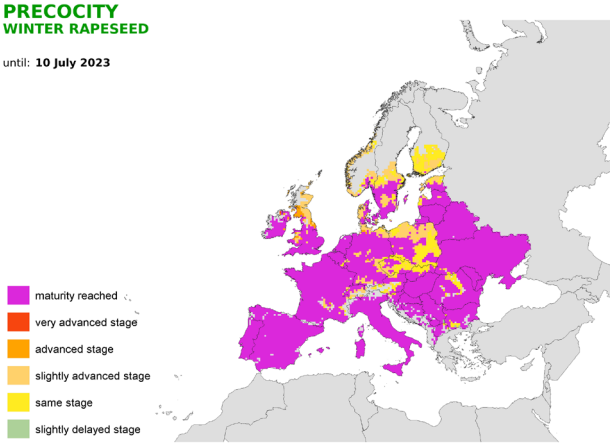
until: **10 July 2023**



18/07/2023
Resolution: 25 X 25 Km

PRECOCITY
WINTER RAPESEED

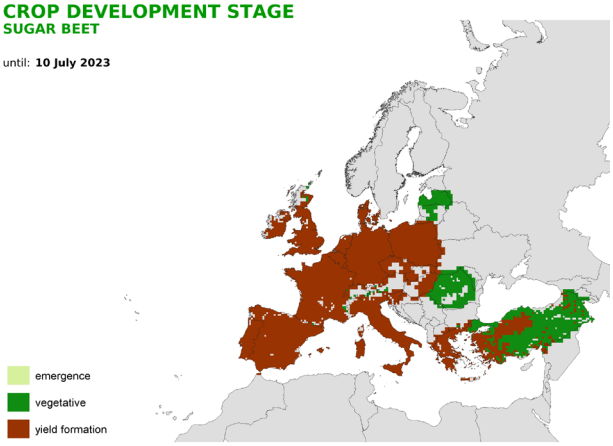
until: **10 July 2023**



13/07/2023
Resolution: 25 X 25 Km

CROP DEVELOPMENT STAGE
SUGAR BEET

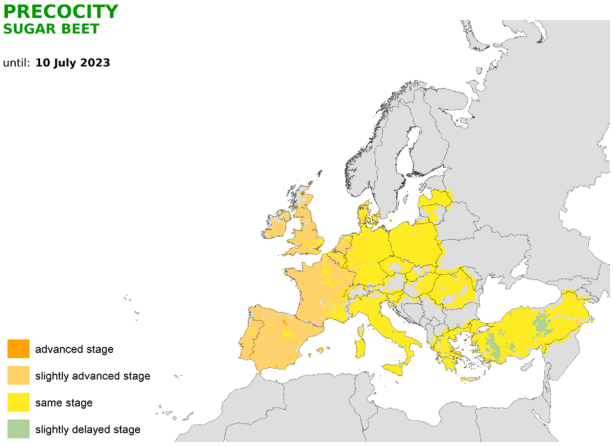
until: **10 July 2023**



13/07/2023
Resolution: 25 X 25 Km

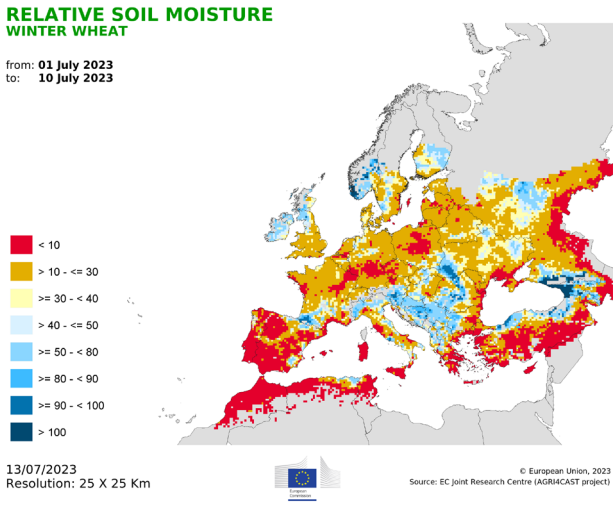
PRECOCITY
SUGAR BEET

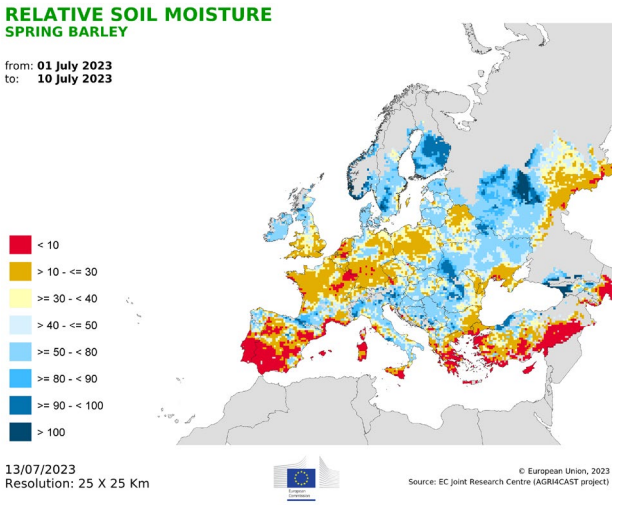
until: **10 July 2023**

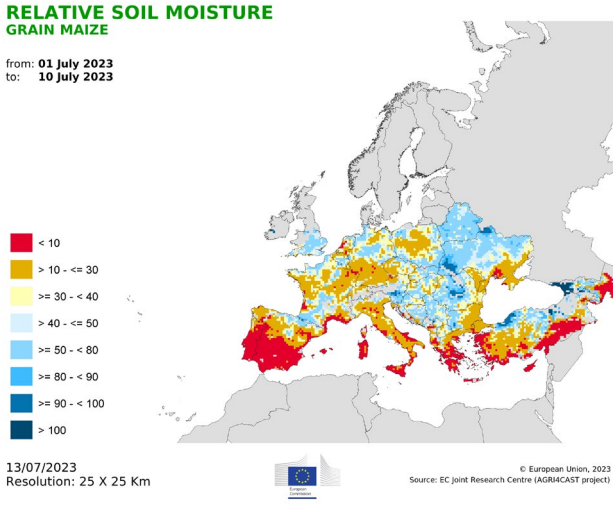


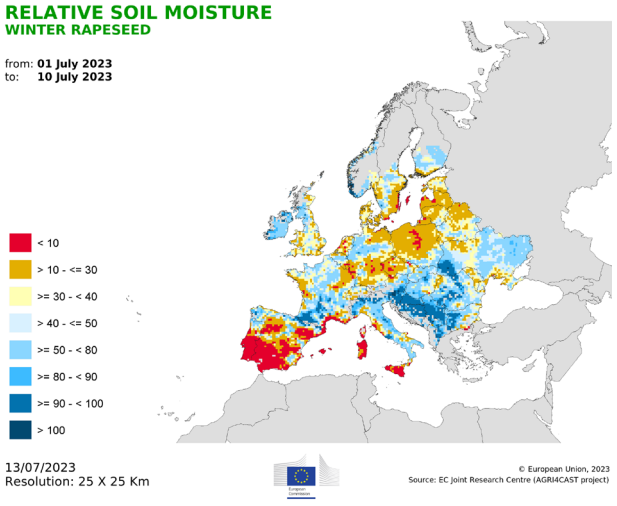
13/07/2023
Resolution: 25 X 25 Km

Relative soil moisture

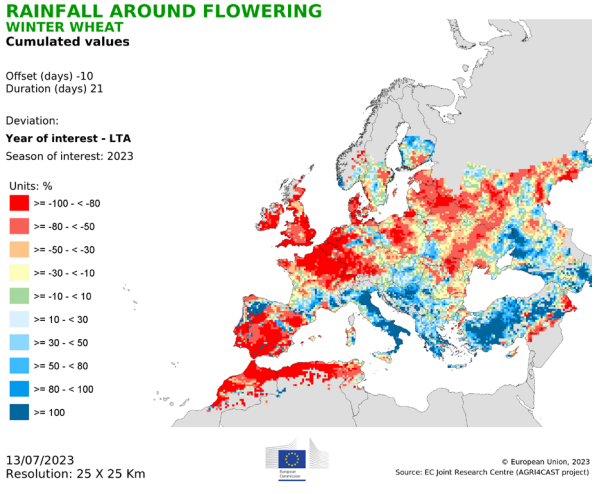


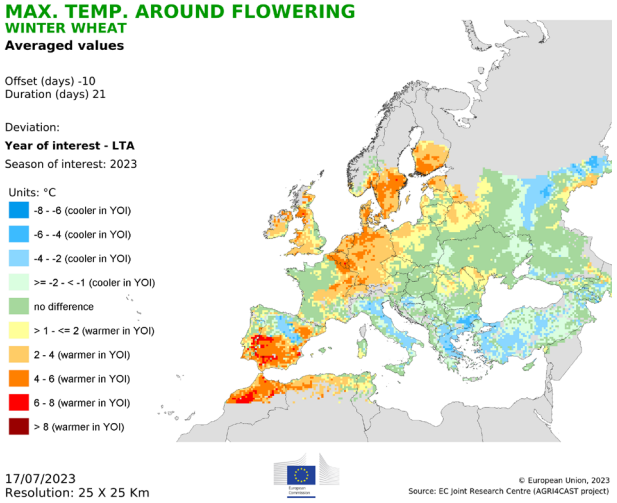






Precipitation and temperatures anomalies around flowering



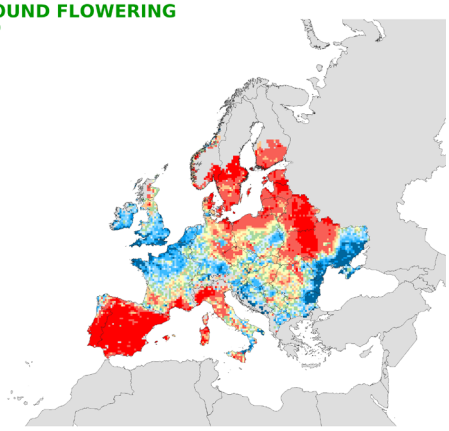


RAINFALL AROUND FLOWERING
WINTER RAPESEED
Cumulated values

Offset (days) -10
Duration (days) 21

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

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



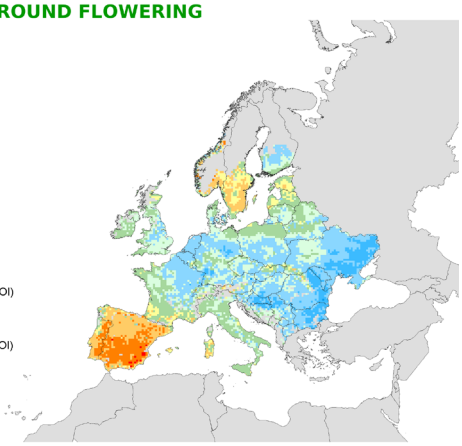
13/07/2023
Resolution: 25 X 25 Km

MAX. TEMP. AROUND FLOWERING
WINTER RAPESEED
Averaged values

Offset (days) -10
Duration (days) 21

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

Units: °C
- -8 - -6 (cooler in YOI)
- -6 - -4 (cooler in YOI)
- -4 - -2 (cooler in YOI)
- >= -2 - < -1 (cooler in YOI)
- no difference
- > 1 - <= 2 (warmer in YOI)
- 2 - 4 (warmer in YOI)
- 4 - 6 (warmer in YOI)
- 6 - 8 (warmer in YOI)



17/07/2023
Resolution: 25 X 25 Km

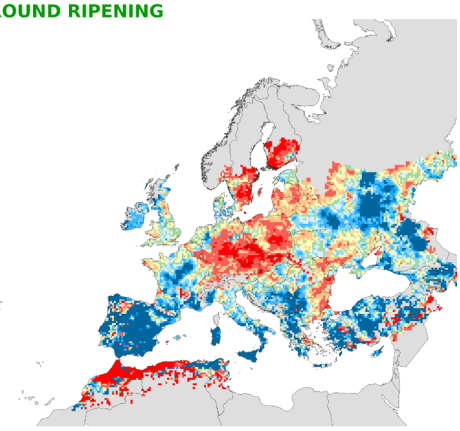
Precipitation and temperatures anomalies around ripening

RAINFALL AROUND RIPENING
WINTER WHEAT
Cumulated values

Offset (days) -10
Duration (days) 21

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

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



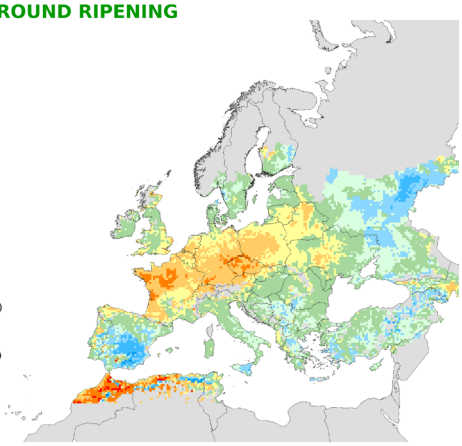
13/07/2023
Resolution: 25 X 25 Km

MAX. TEMP. AROUND RIPENING
WINTER WHEAT
Averaged values

Offset (days) -10
Duration (days) 21

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

Units: °C
- < -8 (cooler in YOI)
- -8 - -6 (cooler in YOI)
- -6 - -4 (cooler in YOI)
- -4 - -2 (cooler in YOI)
- >= -2 - < -1 (cooler in YOI)
- no difference
- > 1 - <= 2 (warmer in YOI)
- 2 - 4 (warmer in YOI)
- 4 - 6 (warmer in YOI)
- 6 - 8 (warmer in YOI)



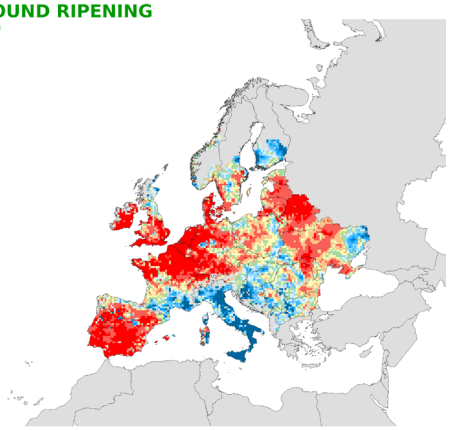
17/07/2023
Resolution: 25 X 25 Km

RAINFALL AROUND RIPENING
WINTER RAPESEED
Cumulated values

Offset (days) -10
Duration (days) 21

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

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



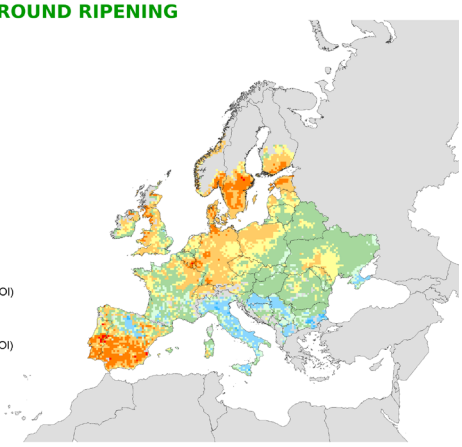
13/07/2023
Resolution: 25 X 25 Km

MAX. TEMP. AROUND RIPENING
WINTER RAPESEED
Averaged values

Offset (days) -10
Duration (days) 21

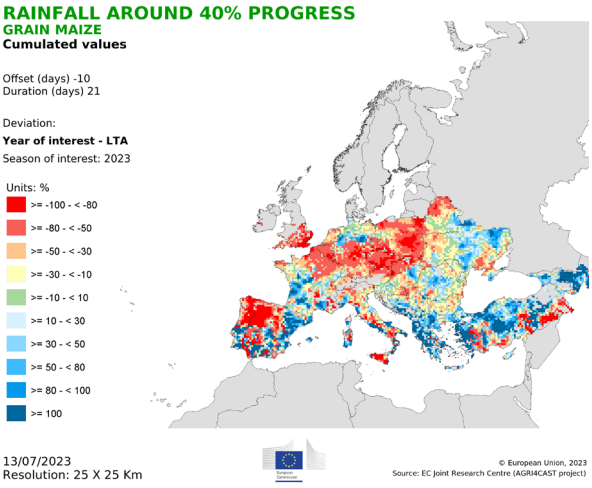
Deviation:
Year of interest - LTA
Season of interest: 2023

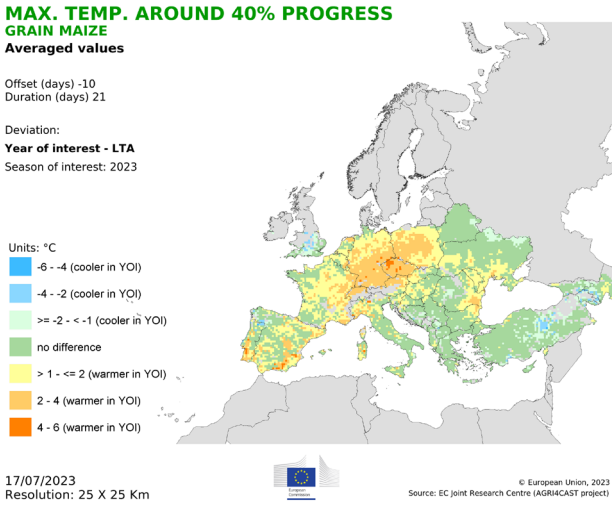
Units: °C
- -6 - -4 (cooler in YOI)
- -4 - -2 (cooler in YOI)
- >= -2 - < -1 (cooler in YOI)
- no difference
- > 1 - <= 2 (warmer in YOI)
- 2 - 4 (warmer in YOI)
- 4 - 6 (warmer in YOI)
- 6 - 8 (warmer in YOI)

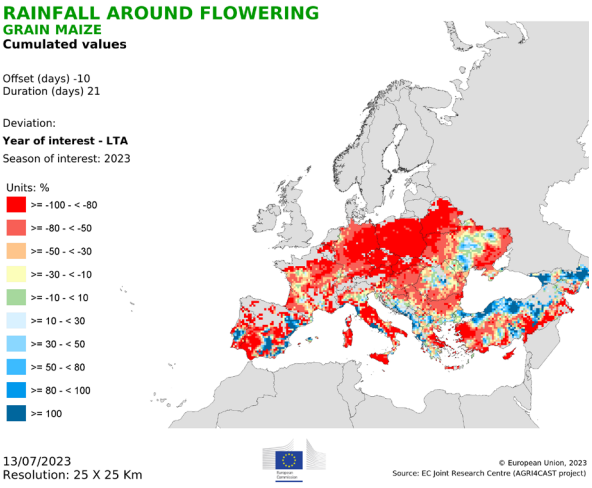


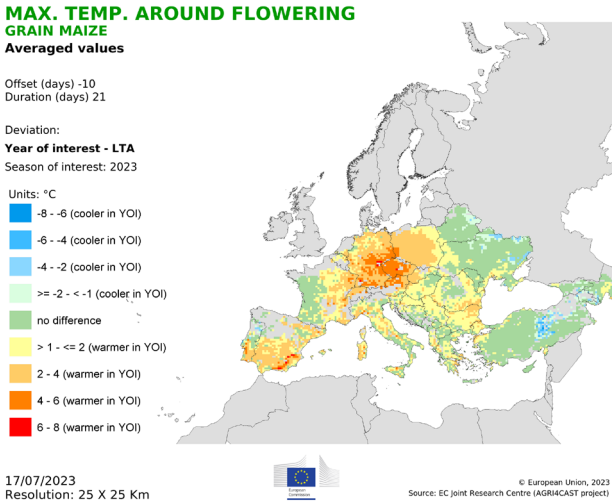
17/07/2023
Resolution: 25 X 25 Km

Maize: precipitation and temperature anomalies on crop development









JRC MARS Bulletins 2023

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

Mission statement

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

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Analysis and reports

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Technical note

The long-term average (LTA) used within this Bulletin as a reference is calculated on the basis of weather data from 1991-2022.

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