Issued: 22 May 2023
JRC MARS Bulletin Vol. 31 No 5

European Commission

# JRC MARS Bulletin

# Crop monitoring in Europe

*May 2023*

## Weather conditions marked by contrasts

### Overall fair yield outlook maintained, except in Iberian Peninsula

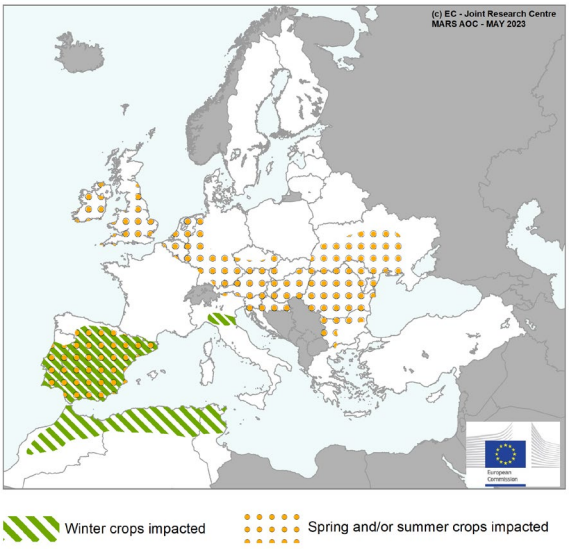
*The weather observed during this review period was marked by contrasting patterns of drier- and wetter- than-usual conditions across Europe, which affected crops in many areas.*

Continued and intensified drought conditions in the Iberian Peninsula further worsened the outlook for crops in Spain and Portugal. In both countries, the yield forecast for all main crops have dropped to well below last year's poor level. Details on the drought in the Maghreb region can be found in the JRC MARS bulletin on North Africa.

A distinct rainfall surplus and/or colder than usual conditions caused delays to the sowing of summer crops and impaired other field operations in a large belt extending from Ireland to Bulgaria and Ukraine. An important positive aspect of the rainfall surplus is that, from a crop-water supply perspective, soil moisture and ground water levels in most of the areas affected are currently at a very favourable level for this time of year.

While north-western Italy is recovering from the drought reported in April, extreme rainfall events in the north-east caused locally severe loss of production of wheat and barley and substantial damage to permanent crops.

**AREAS OF CONCERN - CROP IMPACTS**




**Contents:**



Covers the period from 1 April until 14 May

| Crop | Yield t/ha | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | April Bulletin | MARS 2023 forecasts | %23/5yrs | % Diff April |
| **Total cereals** | 5.44 | 5.59 | **5.60** | + 3 | + 0 |
| **Total wheat** | 5.59 | 5.74 | **5.79** | + 4 | + 1 |
| *Soft wheat* | 5.81 | 5.96 | **6.01** | + 4 | + 1 |
| *Durum wheat* | 3.50 | 3.54 | **3.48** | - 0 | - 2 |
| **Total barley** | 4.90 | 4.92 | **4.89** | - 0 | - 1 |
| *Spring barley* | 4.19 | 4.04 | **3.90** | - 7 | - 3 |
| *Winter barley* | 5.77 | 5.93 | **6.00** | + 4 | + 1 |
| **Grain maize** | 7.48 | 7.67 | **7.64** | + 2 | - 0 |
| **Rye** | 3.98 | 4.30 | **4.26** | + 7 | - 1 |
| **Triticale** | 4.22 | 4.39 | **4.32** | + 2 | - 2 |
| **Rape and turnip rape** | 3.10 | 3.31 | **3.34** | + 8 | + 1 |
| **Potato** | 34.1 | 36.0 | **36.4** | + 7 | + 1 |
| **Sugar beet** | 72.6 | 77.5 | **76.7** | + 6 | - 1 |
| **Sunflower** | 2.21 | 2.29 | **2.22** | + 0 | - 3 |
| **Soybean** | 2.76 | 2.84 | **2.85** | + 3 | + 0 |

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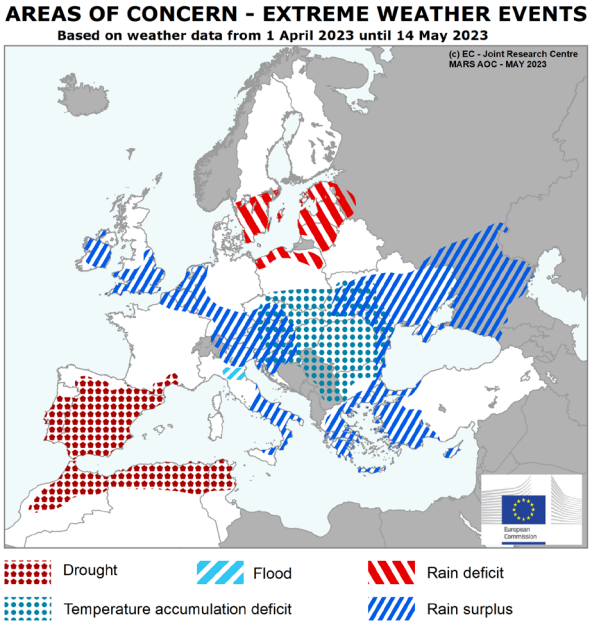
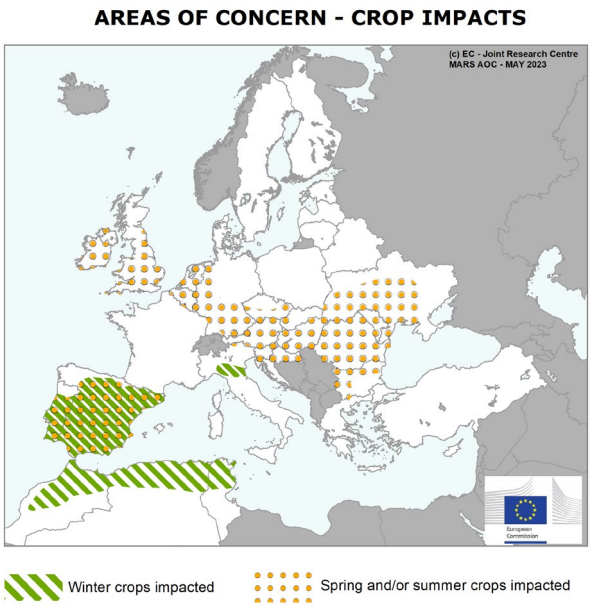
Joint Research Centre

# 1. Agrometeorological overview

## 1.1. Areas of concern




The map above reflects the most distinct weather events (in terms of duration and/or severity) that occurred or continued after the reporting period of the April Bulletin (17 April).

The weather observed during the current review period is characterised by contrasting patterns of drier- and wetter-than-average conditions across Europe, which negatively affected crops in many areas.

Prolonged and intensified **drought** conditions in the Iberian Peninsula and the Maghreb region severely affected winter crop yield potentials. Yield forecasts for summer crops in Spain and Portugal (not assessed in the Maghreb), have also been revised downward, noting that actual impacts of the drought might be reflected more in areas sown and harvested than in the yields. Drought extends into the *Languedoc* region of France, but without direct impacts on arable crops, as it is sparsely cultivated. Further details on the Maghreb region, are available in the May edition of the JRC MARS bulletin on North Africa[1], in the Global outlook series.

While north-western Italy is recovering from the drought reported in April, **much wetter-than-usual conditions**, with rainfall totals 80-100% above the LTA were observed in the north-east (*Veneto*, *Emilia-Romagna*) and south (*Puglia, Campania*). In *Emilia-Romagna*, extreme rainfall events (170-220 mm in 48 hours) in early May and rivers bursting their banks caused locally severe loss of production of wheat and barley and substantial damage to permanent crops (>1.200 ha[2]).

**Rainfall surplus** in Ireland and the United Kingdom delayed the sowing of spring barley (continuing into early May), as well as of potatoes and maize, particularly in north-east Ireland. Similarly, in Belgium, the Netherlands, western Germany, and northern France, continued above-average rainfall (although not as high as in March) hampered sowing and other field operations. In north-eastern Austria, southern Germany, south-eastern Czechia, and Ukraine, considerably above-average rainfall during April delayed sowing of summer crops and impaired other field operations; which, in these regions was accompanied by the lowest radiation levels in our records (since 1991) and colder-than-usual conditions already unfavourable for emergence and development of summer crops. The radiation deficit (not indicated on the map) will have contributed to prolonged wetness and increased pest and disease pressure. In western Hungary, Croatia, and Slovenia, above-average rainfall in the first half of April and again since the start of May caused

[1] https://publications.jrc.ec.europa.eu/repository/handle/JRC133197
2 https://rapidmapping.emergency.copernicus.eu/EMSR659

rainfall surplus locally, triggering some floods. Wetter-than-usual conditions (>120 mm in the north and often >50% relative to the LTA across the country) occurred in Greece and above-average rainfall was observed in the north and close to LTA rainfall in the south in Cyprus, but without relevant concerns for crops. An important positive aspect of the rainfall surplus is that, from a crop-water supply perspective, soil moisture and ground water levels in most of the areas affected are currently at a very favourable level for this time of year.

**Rainfall deficit** was observed in northern Poland, but crops are in generally good condition, as topsoil moisture deficits deteriorating in early May were alleviated by recent rains. Similarly, in the Baltic Sea countries and southern Sweden, the rainfall deficit did not impact on crops as soil moisture contents were high at the end of the previous reporting period.

**Temperature accumulation deficit** was observed in Hungary, Romania, Bulgaria, and western Ukraine, where colder-than-average conditions caused some delay to the emergence and early development of summer crops.

# 1.2. Meteorological review (1 April –14 May 2023)

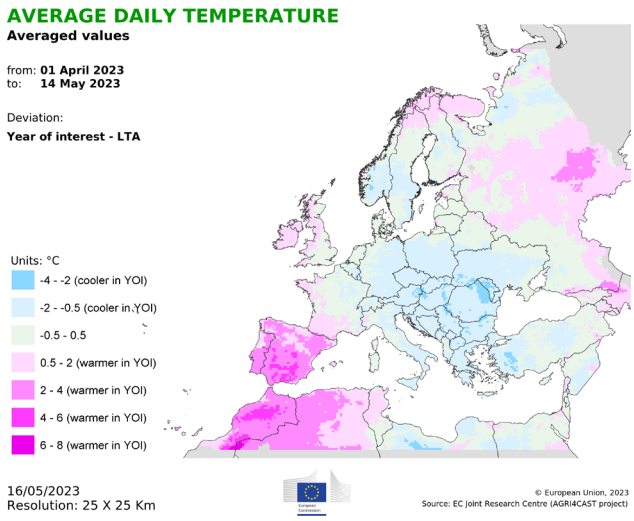
*Drought conditions intensified in the Iberian Peninsula and the Maghreb region, while wetter-than-usual conditions were observed in many parts of Europe.*

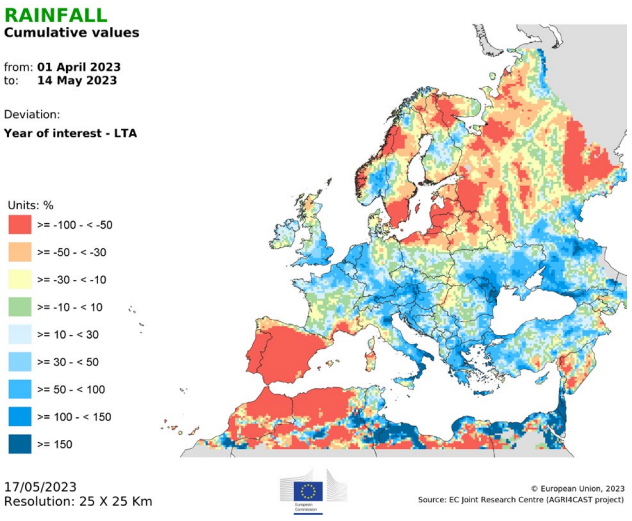
**Much warmer-than-usual conditions** with daily mean temperatures between 2°C and 4°C (in some regions up to 6°C) above the 1991-2022 long-term average (LTA) were observed in most of the Iberian Peninsula, the Maghreb region, and some parts of European Russia. Less distinct positive anomalies (average daily temperatures exceeding the LTA by 0.5°C to 2°C) were observed in Ireland, the western United Kingdom, southern and western France, and in parts of north-western Italy and eastern Türkiye, as well as in northern Scandinavia and most of European Russia. The number of hot days (average daily temperature above 30°C) in the southern Iberian Peninsula exceeded 6 days. In some parts of southern Spain more than 10, and up to 20 hot days were observed, which represents up to 20 days above the LTA.

**Slightly colder-than-usual conditions** with daily mean temperature anomalies between 0.5°C and 2°C below the LTA were observed in central Europe, Italy, the Balkan Peninsula, Belarus, and Ukraine, as well as in southern Scandinavia and parts of northern European Russia and western and central Türkiye. Average daily temperatures from 2°C to 4°C below the LTA were observed in parts of western Türkiye and the Balkan Peninsula. Minimum daily temperatures up to 10°C below the LTA were observed in northern Spain and parts of central Europe during a cold spell in the first half of April.

**Drier-than-usual conditions** with precipitation anomalies of -50% or more (with respect to the LTA) were observed in almost the entire Iberian Peninsula and the Maghreb region, as well as in southern France, north-western Italy, and in parts of Scandinavia, the Baltic countries, and northern European Russia. In these areas, up to 2 days with rainfall above the 5 mm threshold were observed.

**Wetter-than-usual conditions** (50% or more with respect to the LTA) were observed in large parts of central and south-eastern Europe, Italy, western Türkiye, Moldova, Ukraine, and southern European Russia, as well as in parts of the Benelux countries, northern France, southern United Kingdom, and parts of Scandinavia. In many of these regions, rainfall exceeding the LTA accumulated over 10 and more days above the 5 mm threshold.



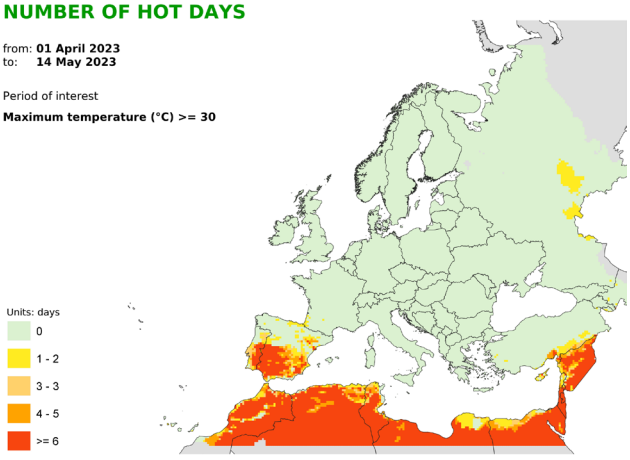



## NUMBER OF HOT DAYS

from: **01 April 2023**
to: **14 May 2023**

Period of interest

**Maximum temperature (°C) >= 30**



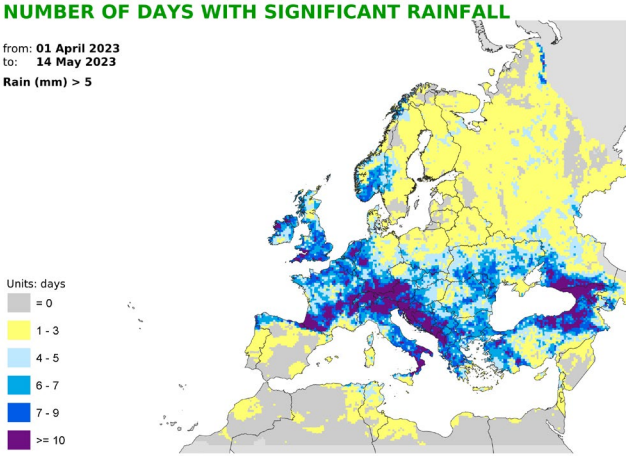

16/05/2023
Resolution: 25 X 25 Km



## NUMBER OF DAYS WITH SIGNIFICANT RAINFALL

from: **01 April 2023**
to: **14 May 2023**

**Rain (mm) > 5**




17/05/2023
Resolution: 25 X 25 Km

# 1.3. Weather forecast (18 - 27 May)

*In many parts of Europe, the forecast period will be characterised by average to cooler-than-usual thermal conditions accompanied by wet spells, replenishing much-needed soil moisture in part of the western Mediterranean region, but potentially causing damage in some areas.*

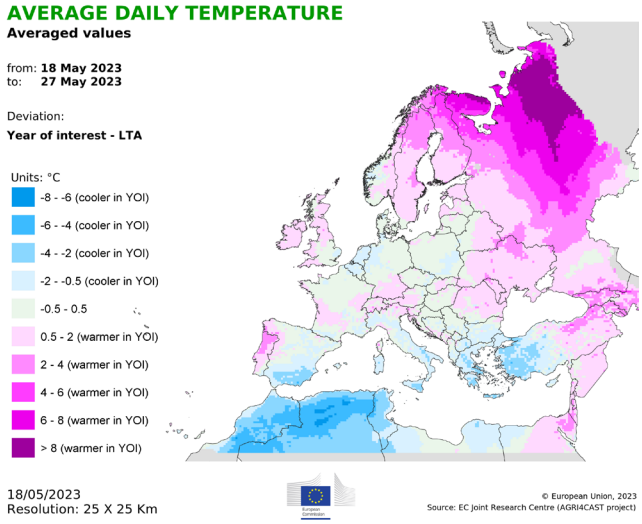
**Colder-than-usual conditions** with daily average temperatures between -2°C and -0.5°C relative to the 1991-2022 long-term average (LTA) are forecast for most of Spain, southern France, Belgium, the Netherlands, and north-western Germany, as well as for most of Italy, south-eastern Poland, most of the Balkan region, and western Türkiye. More substantial negative anomalies are forecast for southern Spain, southern Italy, parts of Greece, and western Türkiye, and, most distinctly, for the Maghreb region.

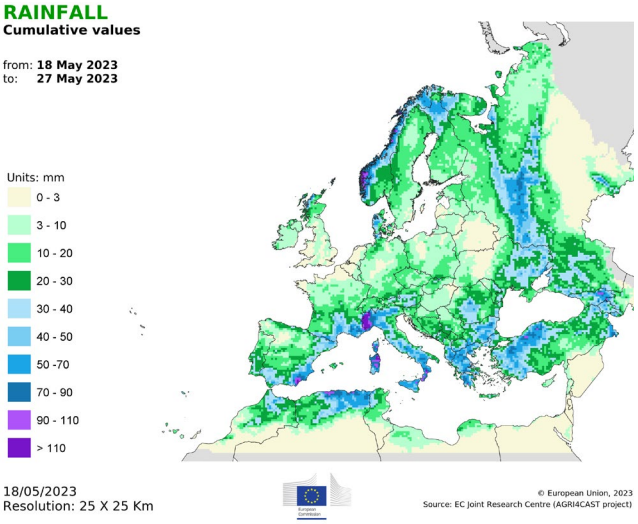
**Warmer-than-usual conditions**, with daily average temperatures exceeding the LTA by 2°C to 4°C, are forecast for northern Portugal, eastern Türkiye, parts of northern Ukraine, northern Scandinavia, and parts of European Russia. More substantial positive anomalies are forecast for northern European Russia. Maximum daily temperatures above 30°C are forecast for parts of the Iberian Peninsula and most of the Maghreb region, as well as in parts of eastern and southern European Russia.

**Dry conditions** (total precipitation less than 3 mm) are forecast in small areas in north-western Spain, parts of the United Kingdom, along the northern coast of France, Belgium, and the Netherlands, parts of central Germany, Poland, most of Belarus and parts of western Ukraine, easternmost Hungary, and eastern European Russia.

**Wet conditions,** with total precipitation exceeding 50 mm are forecast in southern Spain, and in parts of southern France, Italy, Greece, Bulgaria, western Türkiye, as well as in central European Russia, small areas in eastern Ukraine, and along the western Scandinavian coast. In most of these regions, 4 or more days with rainfall above 5 mm are forecast. In parts of southern Spain, north-western Italy, and Sardinia, rainfall is forecast to exceed 90 mm.

**The long-range weather forecast** particularly for June and July, but also for August, points to highly likely warmer-than-usual conditions in most of Europe (60% and more probability that temperatures will exceed the 24-year median). This will be accompanied by likely wetter-than-usual conditions (60% to 70% probability that rainfall will exceed the 24-year median) in many parts of southern and central Europe and the Balkan region, particularly in August.

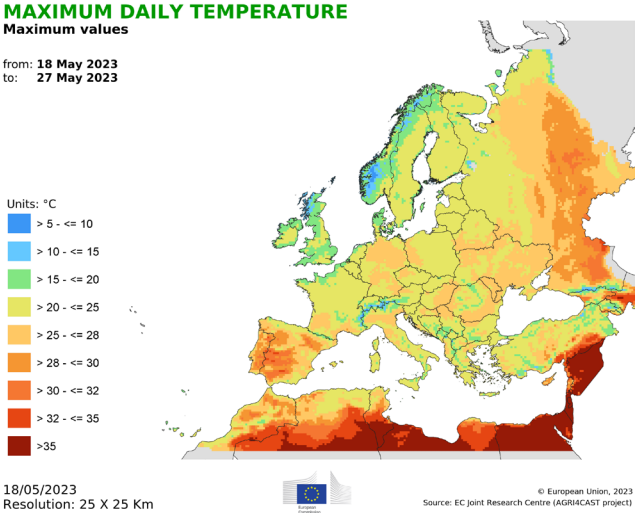


## MAXIMUM DAILY TEMPERATURE

**Maximum values**

from: **18 May 2023**
to: **27 May 2023**



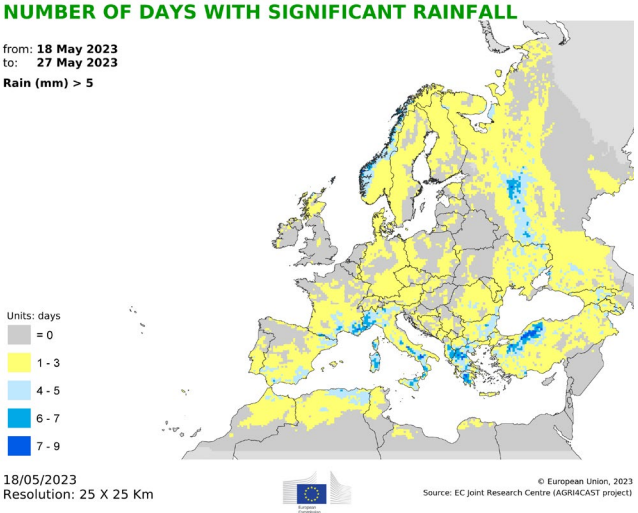

18/05/2023
Resolution: 25 X 25 Km



## NUMBER OF DAYS WITH SIGNIFICANT RAINFALL

from: **18 May 2023**
to: **27 May 2023**

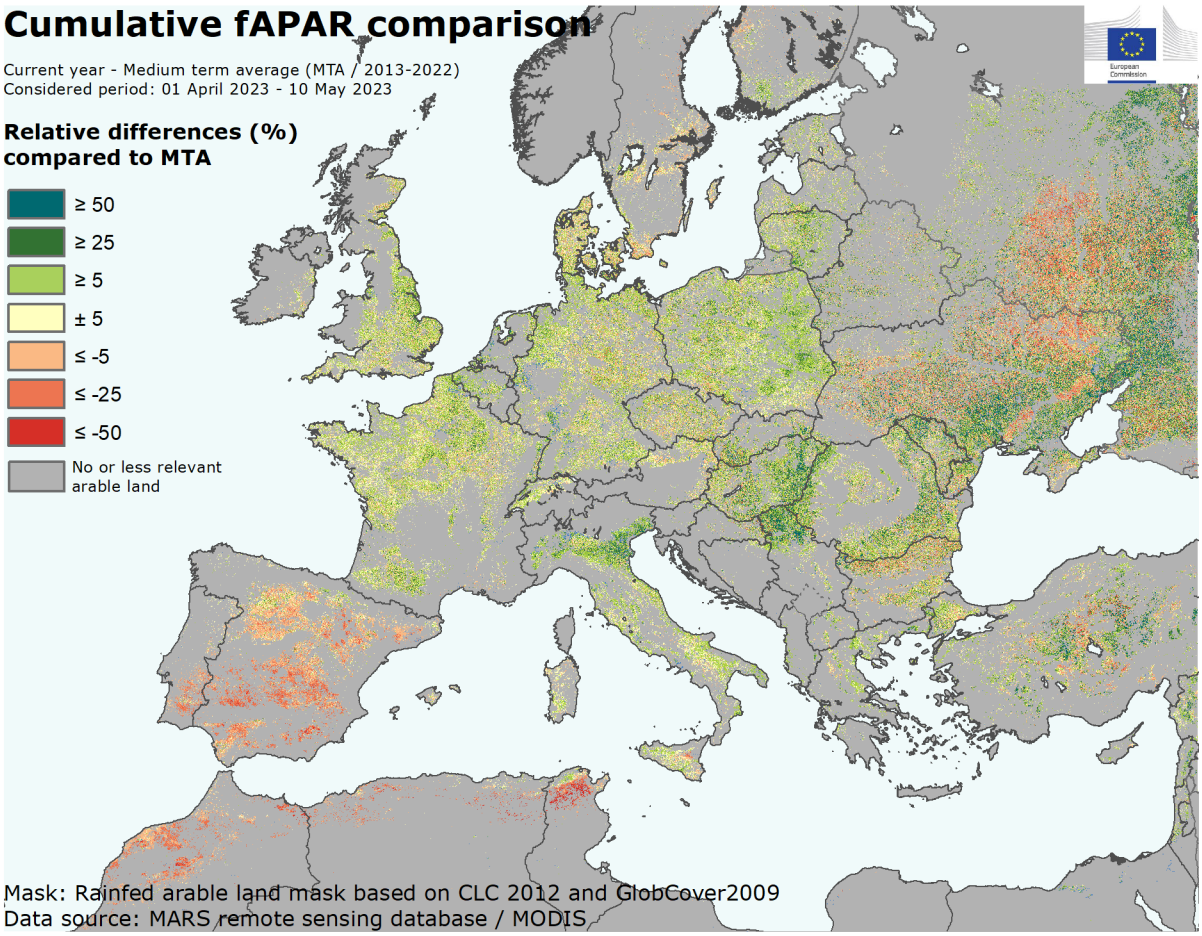
**Rain (mm) > 5**




18/05/2023
Resolution: 25 X 25 Km

# 2. Remote sensing – observed canopy conditions

## Fair to good conditions except for Iberian Peninsula and Maghreb




*The map displays the relative differences (in percentages) between the cumulated Fraction of Absorbed Photosynthetically Active Radiation (fAPAR) from 1 April to 10 May April 2023 and the medium-term average (MTA, 2013-2022) for the same period. Positive anomalies (in green) reflect above-average biomass or early crop development while negative anomalies (in red) reflect below-average biomass or late crop development.*

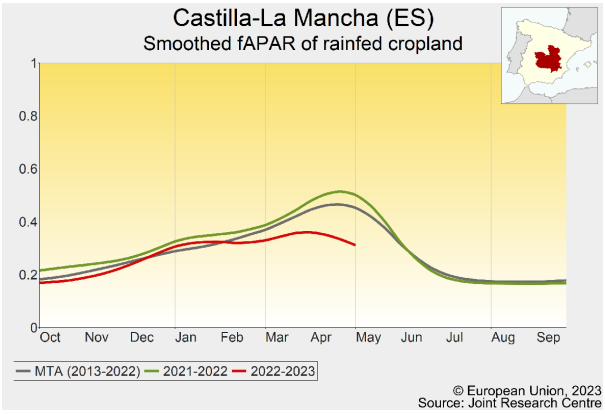
The map above predominantly shows winter crop conditions, as the summer crop season has just begun and has a minimal contribution to fAPAR values. Favourable weather conditions continue to result in predominantly positive anomalies in most regions, except for the Iberian Peninsula and the Maghreb.

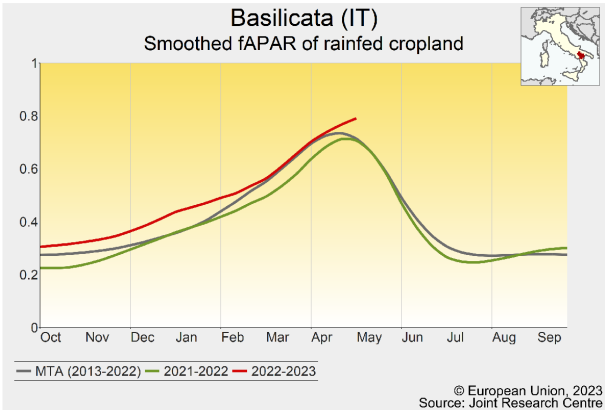
The **Iberian Peninsula** is experiencing a persistent and severe fAPAR negative anomaly due to an exceptional drought, which is adversely affecting winter and spring crops throughout the entire country except for the provinces of *Euskadi* and *Navarra*. **Italy**, on the other hand, shows positive anomalies, indicating an advanced season and sufficient rainfall since March. In northern Italy, despite the scarce winter precipitation, positive fAPAR anomalies also characterised the situation in **Bulgaria**, fAPAR is developing around the MTA, while **eastern Romania** is experiencing positive anomalies due to an advanced season.

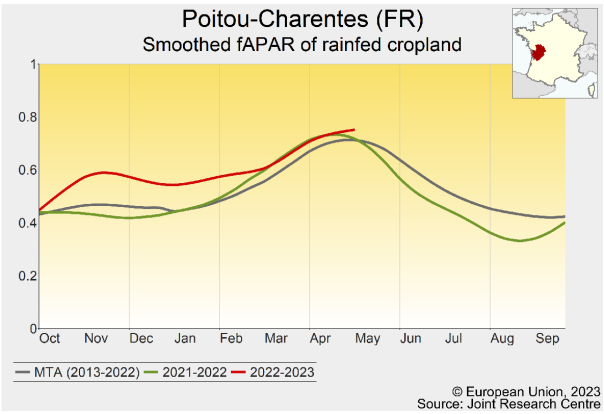
In a significant part of Europe, including **France**, **Benelux**, **Germany**, **Austria**, the **Czech Republic**, and **Poland**, fAPAR values are higher than average, indicating advanced phenology and well-watered conditions since the end of winter. Higher-than-average values during the winter period are partially attributed to a slight shift in the distribution towards more winter and fewer summer crops, which may affect our remote sensing analysis relying on the stability of crop distribution from year to year.

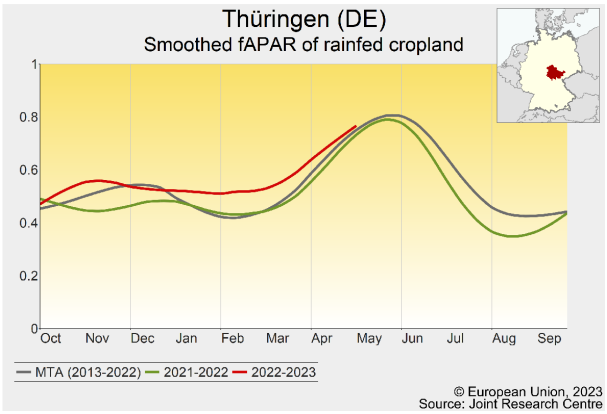
In **Slovakia**, **Hungary**, and **western Romania**, the ongoing favourable weather conditions are resulting in excellent biomass conditions, depicted by multiple dark green areas on the map.

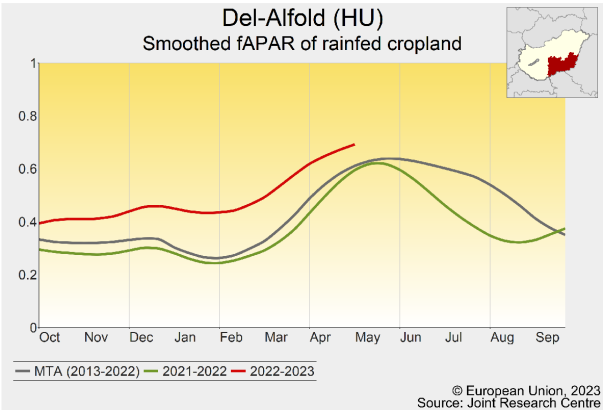
Average conditions are observed in western and northern parts of **Ukraine**. The crop conditions in the southern oblasts are excellent; however, a 30-50 km buffer zone along the conflict line displays negative anomalies, indicating uncultivated and devastated areas. As in the north of France, the **United Kingdom** is showing positive anomalies due to favourable weather conditions. In the **Maghreb** regions, a negative season, characterised by dry conditions, is coming to an end, with particularly strong impacts in **Tunisia**. In Türkiye, the fair-weather conditions yielded a close-to-average fAPAR.

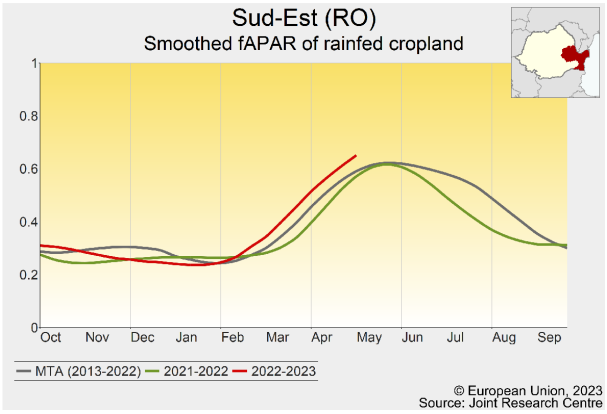


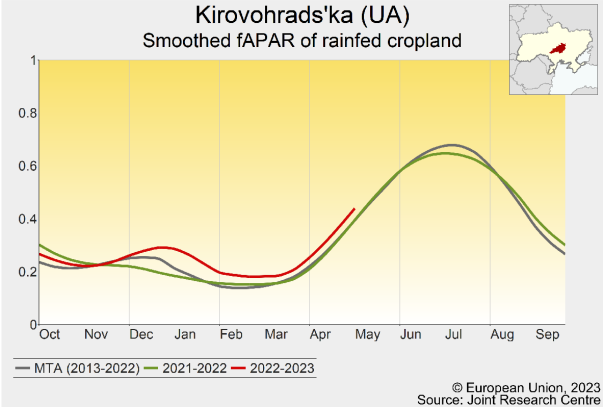



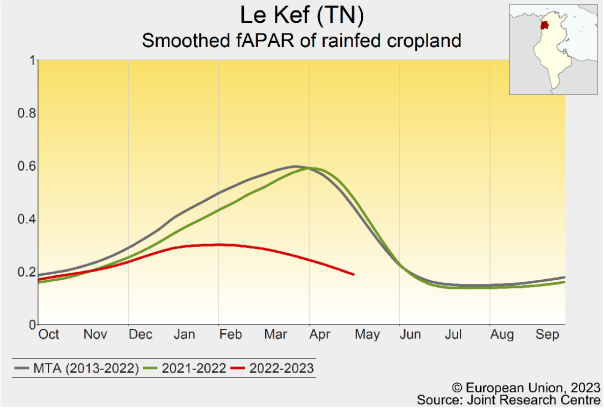




Kirovohrads'ka (UA)
Smoothed fAPAR of rainfed cropland
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
MTA (2013-2022) 2021-2022 2022-2023
© European Union, 2023
Source: Joint Research Centre

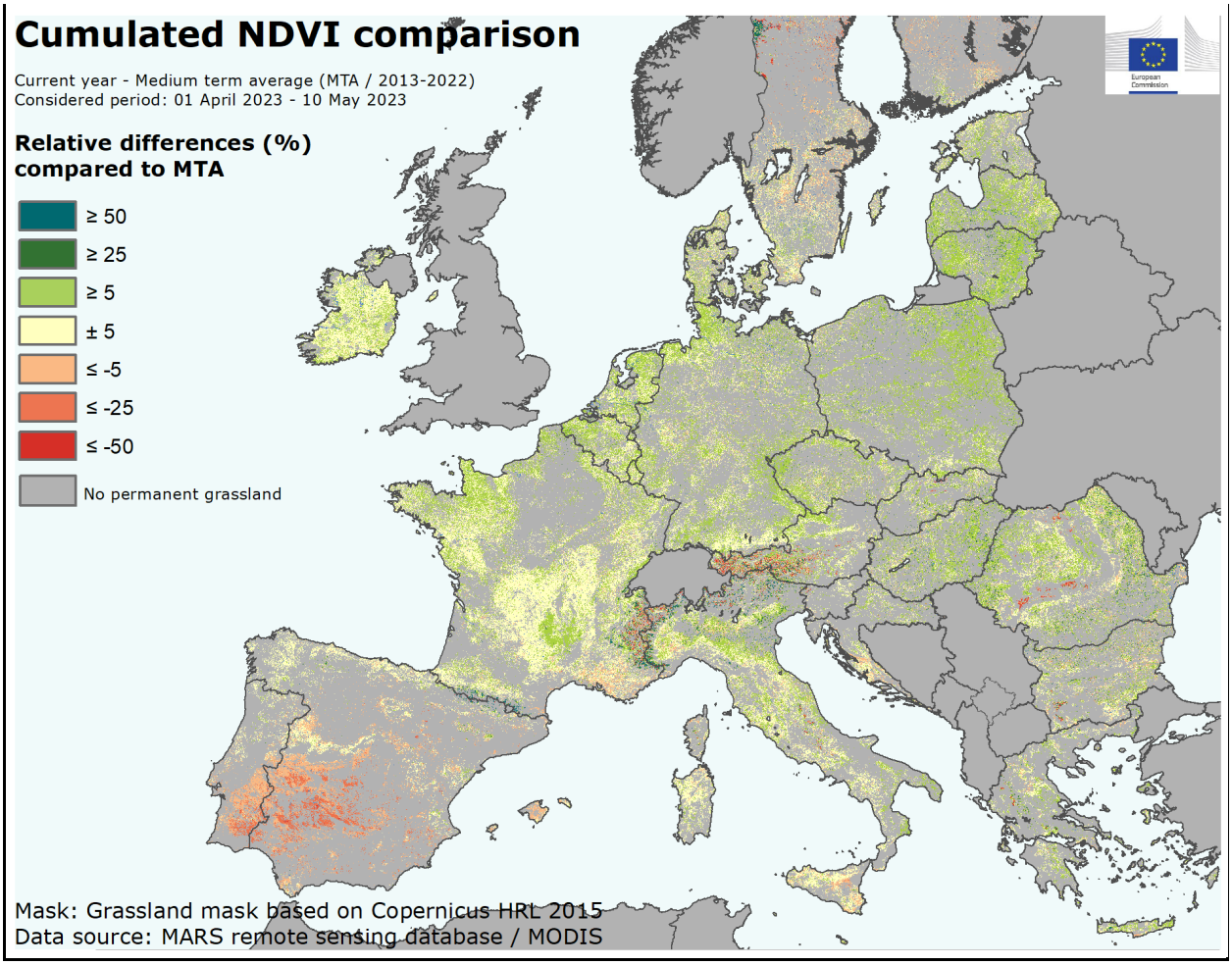

Le Kef (TN)
Smoothed fAPAR of rainfed cropland
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
MTA (2013-2022) 2021-2022 2022-2023
© European Union, 2023
Source: Joint Research Centre

# 3. Grasslands and fodder – regional monitoring

## Grasslands in good condition in most region

*Grasslands benefitted from favourable conditions in most parts of Europe. Exceptions are negative impacts due to drought in some southern regions, most distinctly in the Iberian Peninsula. Wet conditions delayed or complicated field access for cattle and field maintenance in some regions in western and central Europe.*

The map below displays the differences between the normalised difference vegetation index (NDVI) cumulated from 1 April to 10 May 2023, and the medium-term average (MTA, 2013-2022) for the same period. Positive anomalies (in green) reflect above-average surface greenness, while negative anomalies (in red) reflect below-average surface greenness. At this stage of the year the status of fodder crops cannot be assessed yet.




In **Spain** and **Portugal**, the persistent dry conditions have created canopy conditions that already resemble those in summer. Temperatures, radiation and precipitation have hit record levels with low rainfall being the biggest concern. Press reports indicate that farmers are harvesting winter cereals for fodder and releasing livestock in the cereal fields that were not possible to harvest mechanically. The situation is more nuanced in southern **France** (Rhône Valley and Mediterranean regions), where lack of rainfall and dry soils are limiting growth.

**Italy** shows moderately above-average biomass accumulation. The rainfall deficit continuously monitored in the northern regions has started to fade thanks to more frequent and abundant rainfall events since mid-April. In northern **Germany** some difficulties were reported in accessing and working on wet fields. Conditions in **Poland, Czechia** and **Slovakia** can be considered similar to northern Germany even though the recent rainfall events were less frequent. In southern **Germany** and **Austria,**

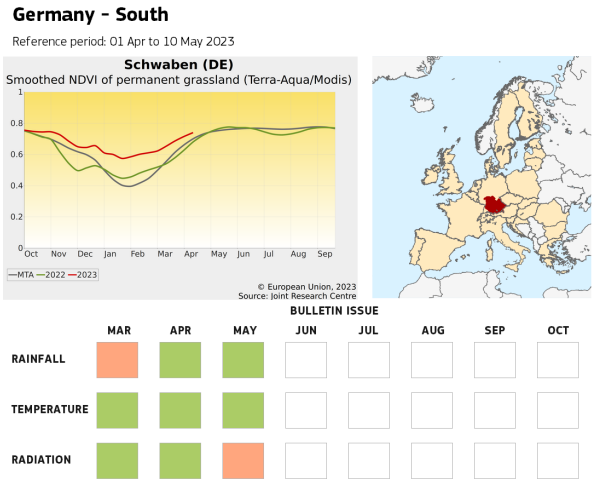
wet field-related difficulties have recently intensified due to more frequent rainfall and a lack of radiation. Nevertheless, conditions for growth are favourable overall, and first harvests were reported at the end of April.

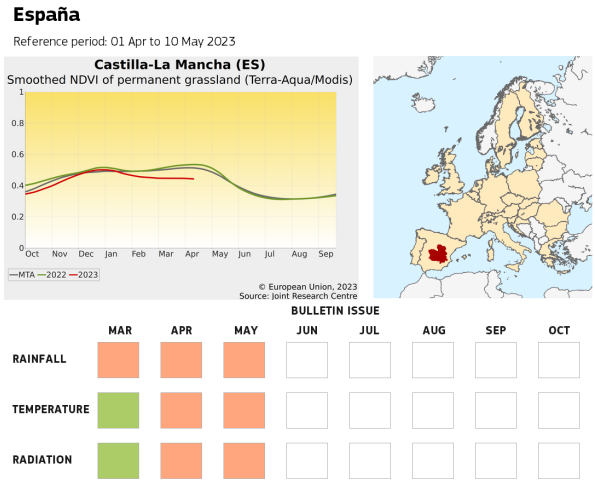
Similar situations occurred in northern **France**, **Belgium** and the **Netherlands** where frequent rainfall in March and April locally delayed access to fields for grazing and to work in them. First cuts were reported in late April, and early reports from national institutes indicate good levels of productivity.

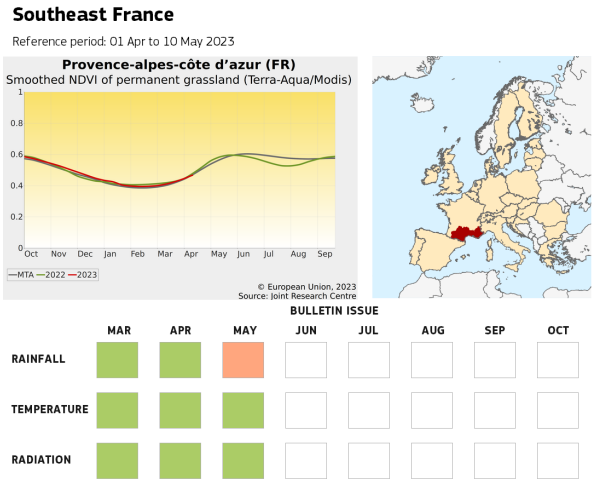
In **Hungary** favourable soil moisture and thermal conditions led to above-average biomass formation, especially in the eastern half of the country. In central and southern **Romania** precipitation rates were close to average and did not affect biomass development. In the eastern part of the country precipitation was above average and improved water supply, thus leading to productivity being moderately above average. In **Bulgaria**, below-average temperatures delayed phenological development, but biomass accumulation is above average.

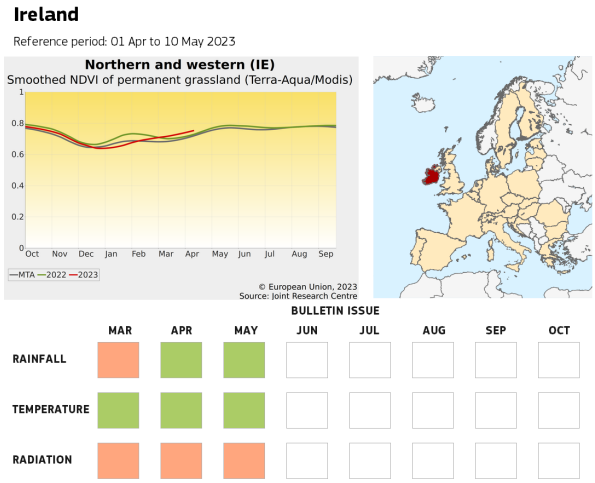
In **Denmark** conditions are close to average with above-average radiation but slightly below-average rainfall leading to good conditions for biomass accumulation. Similarly, below-average rainfall has been observed in **Finland** and **Latvia** but without impacting growth on grasslands.

In **Ireland**, close to average rainfall and temperature conditions favoured good growth, but a radiation deficiency is observed in the north; biomass accumulation is expected to be close to or slightly above normal. A rainfall deficit was reported in **Sweden** and **Estonia** but it is not expected to have affected the development and productivity of grasslands, as satellite-derived indicators suggest close to or slightly above seasonal growth..



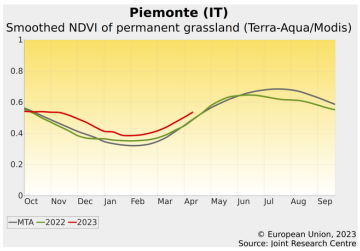



## Italy

Reference period: 01 Apr to 10 May 2023

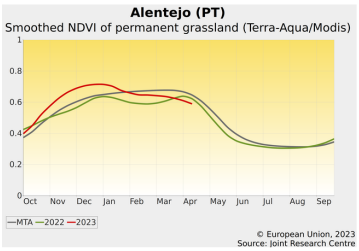



BULLETIN ISSUE

| | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT |
|---|---|---|---|---|---|---|---|---|
| RAINFALL | | | | | | | | |
| TEMPERATURE | | | | | | | | |
| RADIATION | | | | | | | | |

## Portugal

Reference period: 01 Apr to 10 May 2023




BULLETIN ISSUE

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| RAINFALL | | | | | | | | |
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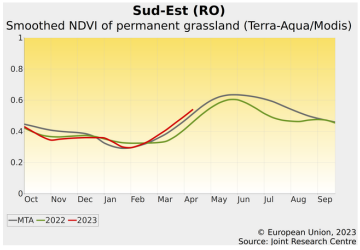
## Romania - East

Reference period: 01 Apr to 10 May 2023




BULLETIN ISSUE

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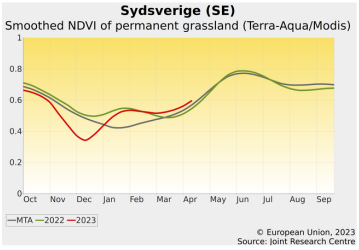
## Sverige

Reference period: 01 Apr to 10 May 2023




BULLETIN ISSUE

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# 4. Sowing conditions

## Spring barley

### Significant sowing delays in the north

*Sowing activities have been completed in most of the countries, generally followed by good crop establishment. The delay due to wet conditions remained significant in Denmark, Sweden, Ireland, the Benelux countries and the United Kingdom. Sowings progress well in the Baltic Sea region.*

In France and Germany, sowings were completed with optimal crop establishment, respectively in March and in early April. In Denmark, Sweden, Ireland, the Benelux countries and the United Kingdom, after a good start in February and the beginning of March, the wet weather hampered sowing progress. In many parts of these countries, the campaign could advance in April, which was somewhat less rainy than March. In these conditions sowing continued until May. Despite the delay, most of the crops have been sown. However, the originally planned areas might be not accomplished in some regions.

In Poland, Austria, Czechia, Slovakia, Slovenia and Croatia, the campaign was finalised despite the wet and cold conditions of April. However, in many areas of these countries, the cold conditions were not favourable for early development.

In Romania and Hungary, sowings were completed in April with an adequate emergence.

In the Baltic Sea region, spring barley sowing progressed well in April, and soil moisture was adequate for crop emergence.

In Finland, sowing started at the beginning of May in the southern areas, which is only slightly later than usual for this country, due to the colder than average temperatures of the end of April. In the central regions, sowing is expected to start after mid-May.

## Sugar beet

### Delayed sowing campaign

*This season sowing of sugar beet was much delayed in many production regions including NE France, Germany and Poland due to wet conditions and below-average temperatures. The relatively cold weather and low level of solar radiation were also sub-optimal for early season development.*

While sugar beet sowing started as early as the beginning of March in France, Belgium and the Netherlands, rainy conditions and narrow time windows for field operations resulted in very slow progress of the campaign. In France, about 90% of fields were sown by the end of April, profiting from more favourable temporal distribution of rainfall during the second half of the month. In the Netherlands and Belgium, only approximately 60% and 40% of planned areas were sown by then, respectively. In these countries, the campaign has extended well into May, making the current season significantly delayed in comparison with an average season (for Belgium and Netherlands, the most delayed one since 2001). Such significant delays are expected to have a negative impact on yield potentials. The extended sowing times resulted in uneven crop development across the regions. However, the emergence was generally good.

In Germany and Poland, after the slow start of the sowing campaign, sowing accelerated during the second half of April, and was concluded by the end of the month (2 weeks delay as compared with an average season). Also in these countries, the development stage of plants varies widely due to the extended sowing campaign. Soil moisture conditions were generally favourable for early development of seedlings. However, below-average temperatures (with frosts at the end of April/early May) and below-average solar radiation were sub-optimal for early development of sugar beet. Aphid infections have already been reported in several regions, and require careful monitoring and control.

In the sugar beet producing regions of north-eastern Austria and Czechia, the overly wet soils in April hampered field operations. However, more evenly distribution of precipitation since the second half of April, has been generally favourable for sowing to progress. In Hungary, sowing is almost finalised after the delayed campaign, while in Turkey, the campaign was concluded with some delays due to overly wet conditions in April.

# Grain maize

## Mixed progress

*Mixed progress of sowing among countries, most Eastern European countries face delays due to rainfall and/or low temperatures.*

In Germany, favourable weather conditions allowed the sowing campaign to progress rapidly; it is currently considered close to completion, with emerged plants in overall good condition. Also in Italy the campaign is close to an end, and recent rainfall has been sufficient to sustain early crop development. However, areas are expected to decrease by 6% compared to last year because of the drought conditions that prevailed in northern Italy. Despite delays related to recent rainfall events, the campaign in France and Hungary has fairly progressed and should be closed soon. In the Iberian Peninsula, the sowing campaign is over, and despite a very strong negative rainfall anomaly, good plant development is expected thanks to irrigation. In Croatia, most fields have been sown and the campaign should rapidly be concluded, while in Greece, the campaign is over, and plants are reported to be in good condition.

In the Benelux countries, Poland, Austria and Czechia, sowing is ongoing, yet delayed compared to previous years because of wet and relatively cold conditions. In Bulgaria and Romania, below-average temperatures led to consequent delays, yet sowings have recently been reported to accelerate in both countries. In Ukraine, sowing has been delayed by approximately one week compared to last year because of excessive rainfall in April. However, good progress has been made since early May, and the campaign could be concluded during the suitable time window.

# Sunflowers

## Delayed end of sowing campaign

In Romania and Bulgaria - the EU's main sunflower producing countries - sowing started within the usual window, in the second half of March. However, progress has been slow due to frequent rainfall and persistently colder-than-usual conditions. Around 80% of the planned area was sown by mid-May. The cool conditions also slowed emergence but emerged stands are in fair to good condition overall. The currently favourable soil water conditions provide a positive start to the season, but the delays incurred so far (up to 3 weeks) imply an increased risk of unfavourably hot and dry summer weather conditions during flowering.

In Hungary, sowing started in late March / early April. The campaign progressed slowly due to overly wet and cold soils, particularly in the first half of April. Conditions improved somewhat since then and sowing was completed or almost completed by the end of the review period. Similar delays due to frequent rains and relatively cold conditions in April were incurred in, Croatia, Austria, Czechia and westernmost parts of Slovakia.

In Spain, conditions for sunflower sowing have been very difficult due to the ongoing drought. It is expected that a substantial part of the originally planned area will not be sown at all, especially in the south. As sunflowers are predominantly a rainfed crop, the current yield prospects for areas that have already been sown are also poor.

In France and Germany, the main sunflower production areas presented favourable conditions during the sowing campaign, which allowed sowing to be completed mostly by the end of April with minor delays. Emerged stands are in good condition.

In Italy, sowing started in the second half of April, and weather conditions since then have been adequate for sowing and emergence, except in the parts of *Emilia Romagna* that were impacted by torrential rains in May.

In Greece, sunflower producers have reportedly stopped sowing [3] because it has become unprofitable, with production costs outweighing revenues.

In Ukraine, sunflower sowing was somewhat delayed compared with last year, because of abundant and frequent rainfall in April. The pace of sowing catched up in

[3] https://www.ot.gr/2023/04/30/agro/energeiaka-fyta-asfyktikos-kloios-gia-ton-iliantho-stamatisan-tis-spores-oi-agrotes/

May and 3966 kha were reportedly sown by 19 May[4]..

# Soybean

## Sowing campaign slightly delayed in central and eastern parts of Europe

*While sowing is in its final stage in Italy and France, a rainy and rather cold April slightly delayed the sowing campaign in central and eastern parts of Europe. More settled weather conditions since the beginning of May accelerated the sowing campaign, which is now approaching completion.*

The area sown with soybean has been slightly reduced throughout Europe after a "record-breaking" year 2022. Exceptions are Ukraine and Romania, where soybean has been sown on comparable areas as the previous year.
The soybean sowing campaign in France has finished with no notable impacts due to the widespread irrigation of soybean fields. Similarly, sowing in Italy is near to being finished and the fields generally cultivated in the north-eastern part of the country show promising growing conditions. Germany, Austria, Slovakia, Romania, Hungary and Croatia experienced similar weather patterns and the sowing campaign is currently ongoing with slight delays due to wet field conditions and low temperatures in April. However, favourable conditions for sowing returned in the beginning of May, soil moisture is sufficient for good emergence, and the current weather forecast is favourable for crop development. Ukraine has experienced delays in the sowing campaign as well, but ramped up the sowing efforts in May and is projected to finish the soybean sowing within the month of May.

[4] https://minagro.gov.ua/news/sivba-2023-v-ukrayini-posiyano-47-mln-ga-yarih-zernovih-ta-zernobobovih-kultur

# 5. Country analysis

## 5.1. European Union

## France

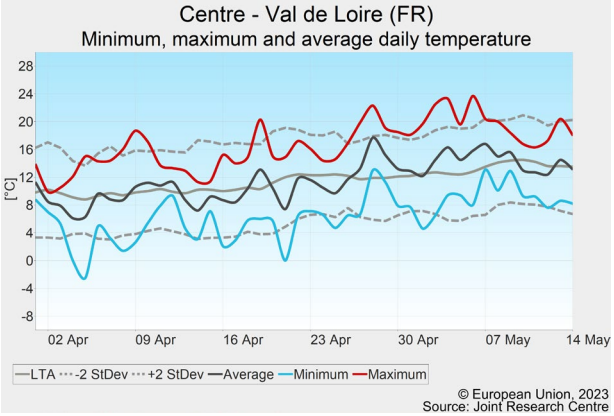
### Overall good crop conditions so far

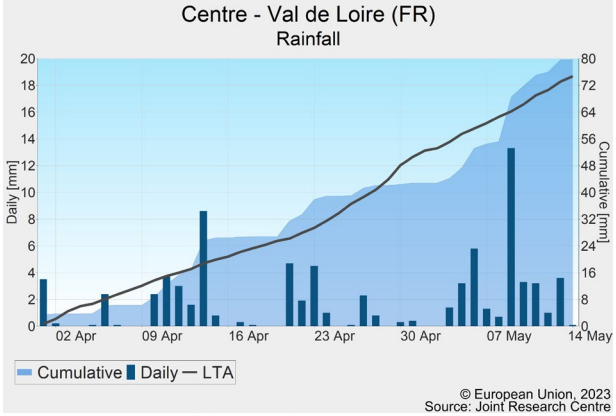
*Winter cereals are benefiting from the good spring conditions in most of the country, but the excessive rainfall in the North may pose problems if continued and has already disrupted the summer crop sowing campaign.*

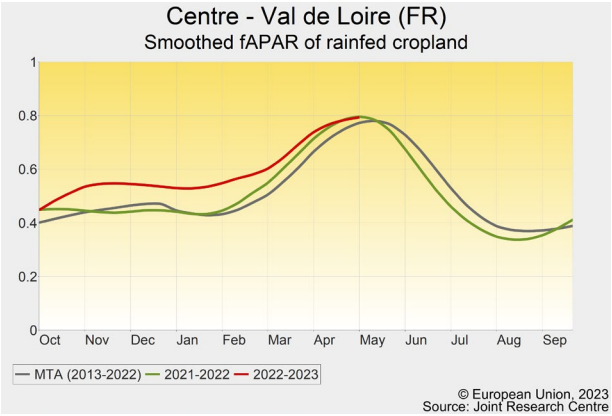
Following the wetter-than-usual March, most winter crops producing regions experienced intense rainfall during the review period. Significantly above-average rainfall (up to 70% above the LTA) was observed in the northern third of the country. However, the persistent rain deficit since winter is still a concern in the south of the country, particularly on the Mediterranean coast and to a lesser extent in the south-west. In terms of thermal conditions, the north and north-eastern regions presented slightly below-average temperatures and solar radiation (up to 12% below LTA), whereas the southern and western regions experienced above-average temperatures (up to 1°C on average above the LTA).

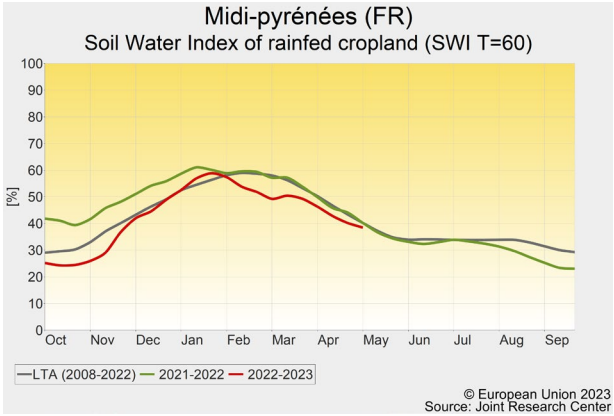
In general, winter cereals are in good condition, especially in the western part of the country. However, the risk of pests and diseases has increased in the north due to the abundant rainfall. Excessive wetness in the north may also pose a problem for rapeseed, which is currently flowering throughout the country. Spring barley was sown earlier than usual, but growth and development has been relatively slow, due to reduced temperature and radiation in the main production regions.

The sowing campaign of summer crops was disrupted by numerous rainfall events in the north, which reduced field accessibility. Consequently, maize emergence is delayed in over half of the country. The situation is different in the south-west, where the sowing campaign is slightly advanced compared to previous years, but the water deficit may impact rainfed crop conditions if it persists. According to the French Ministry of Agriculture, a significant drop in the grain maize area is expected this year (-7.6% as compared to last year).



# Germany

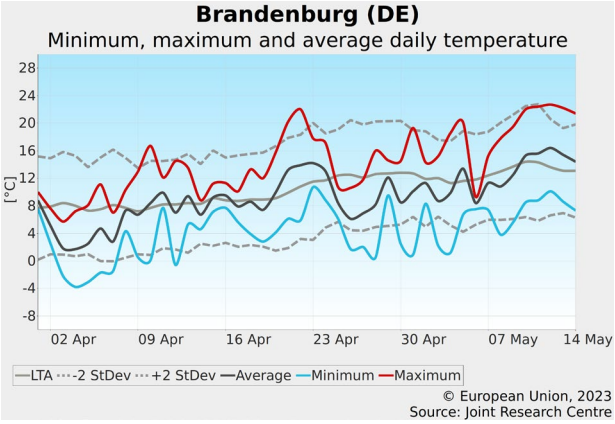
## Abundant precipitation and low temperatures delayed sowing, but overall yield outlook remains positive

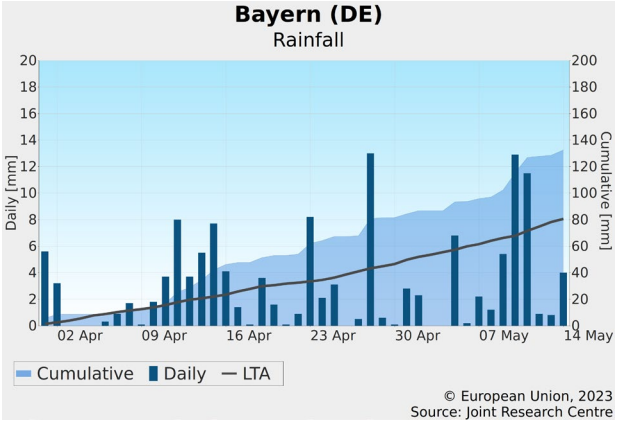
*Winter crop development remains advanced albeit slightly decelerated by colder-than-usual temperatures and a lack of incoming radiation during the reporting period. Summer crops experienced a delay in sowing but are profiting from good conditions during emergence.*

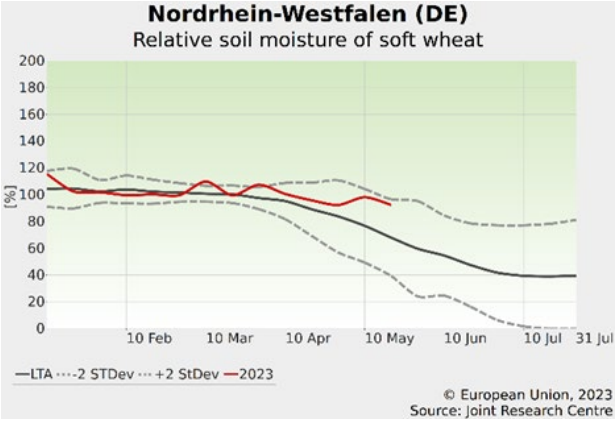
Overall temperatures in the reporting period have been lower than LTA nationwide. A cold spell at the beginning of April (minimum night temperatures around -3 °C) was followed by average conditions before another cold period at the end of April. Continuous cloud cover caused a radiation deficit of up to 30% in southern Germany. Rainfall throughout the country has been beneficial for soil moisture replenishment, especially in southern Germany with precipitation locally around 100% above the LTA and in the west with rates 60% above LTA. However, overly abundant rainfall has affected agricultural management practices and especially the sowing of summer crops. Noteworthy delays in April were reduced at the beginning of May due to rain-free days. As of mid-May, most summer crops have been sown or are in the final stages of sowing with a delay of approximately 1-2 weeks.

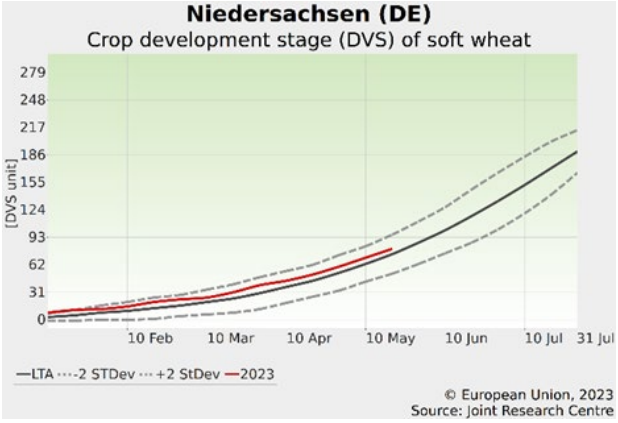
Winter crop development has ranged above the LTA since the start of the season, benefiting from early crop development. However, generally cold temperatures and persistent rainfall have led to reduced growth since April. Currently, soil moisture levels are high throughout the country and beneficial for the growth of both winter and summer crops. However, continued rainfall might further slowdown crop development, hinder access to fields for maintenance, and augment pest pressure.

The forecast for winter crop yields, based on crop model output, remains above the 5-year average, while the estimates for summer crops are based on historical trends.



# Poland

## Wet and cold April delayed crop development and sowing of summer crops

*The period of analysis was colder than usual, with abundant April precipitation in most of the country. Winter crops have slowed down growth, but are in good conditions. A cold and wet April delayed the development of spring crops as well as the sowing and establishment of summer crops.*

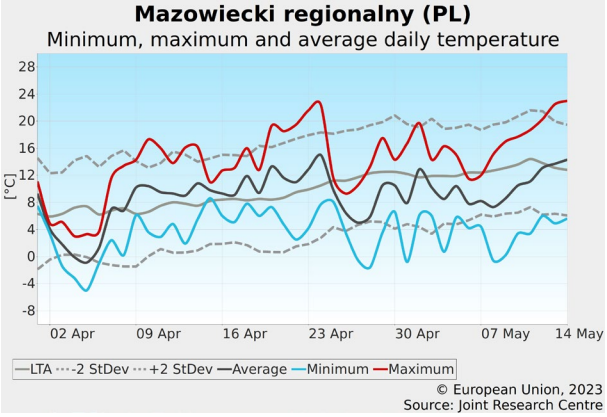
The period of review was colder than usual, except the second dekad of April that was warmer than usual. Night frosts prevailed at the beginning April (as reported last month) and at the end of April-beginning of May with minimum temperatures locally below -3 °C Towards the very end of the review period temperatures raised to around average levels.

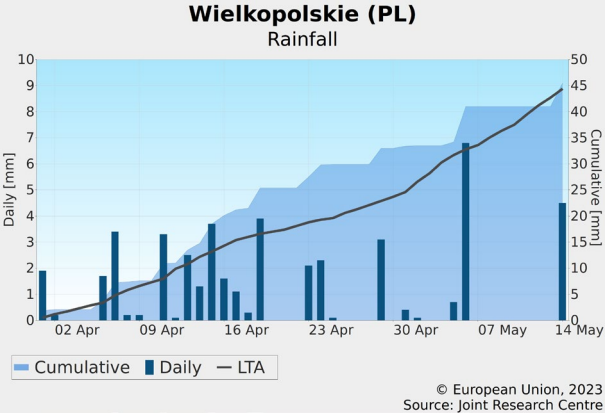
April precipitation was generally above or around the LTA, while remaining below average in the north (especially in *Zachodniopomorskie*). Rainfall was mostly concentrated during the first two dekads of April, resulting in locally excessively wet conditions and impairing field operations. In early May, rainfall was significantly below average so that top soils dried significantly across the country. Cumulated global radiation was below the average.

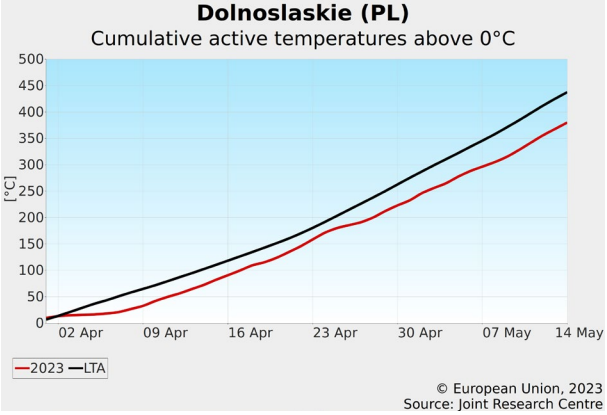
The wet and cold conditions caused delays in summer crop sowing. The sowing of sugar beet has concluded by early May, while maize and potato sowing have accelerated with the onset of warmer weather. Although soil moisture levels were generally adequate, below-average temperatures and radiation were not favourable for the establishment and early development of summer crops.

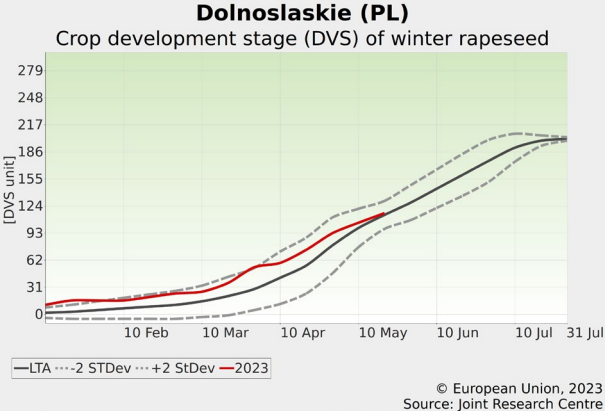
Winter crops are generally in good conditions and around the season average of crop development. Despite the cold April, rapeseed flowering has been in line with average timing. Winter crops have started a period of intense biomass accumulation with adequate soil moisture supply from lower soil levels; more rain is forecasted for the centre, south, and east of the country. Nevertheless, the overly wet April conditions might have increased disease pressure.

Overall, the current outlook for winter crops is positive, and the forecast for spring and summer crops is based on the historical trends.



# Romania

## Winter crops present high yield potential

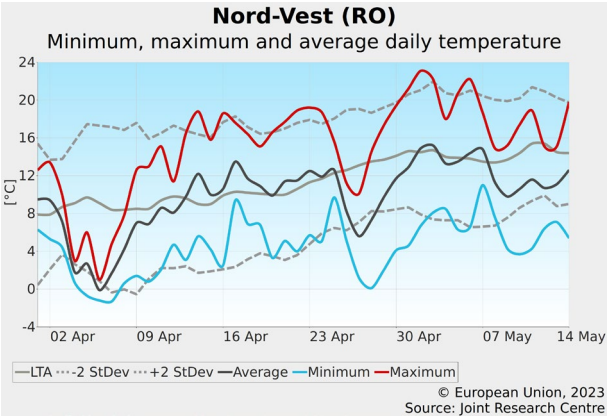
*The review period was characterised by below-average temperatures and above-average precipitation in most of Romania. Soil moisture reserves are restored to favourable levels. These conditions established positive yield expectations for winter cereals. However, the spring sowing campaign is substantially delayed.*

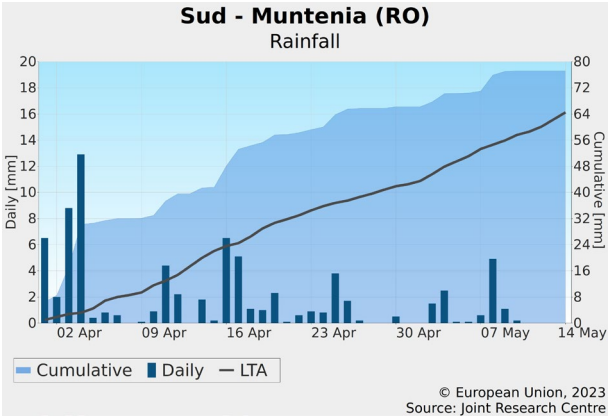
A perceptible negative thermal anomaly was typical in Romania during the review period. Daily temperatures mostly remained below the LTA; only the periods between 11 and 25 April and from 1 to 7 May presented near-average thermal conditions. The active temperature sum (Tbase=0°C) for the review period presented a deficit of 50-120 °Cd in most of the country.

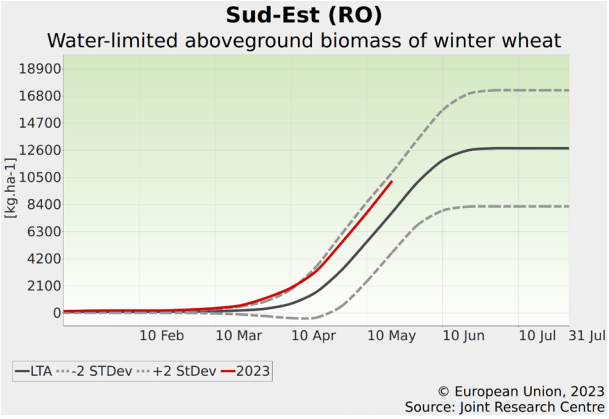
April started with abundant rains replenishing the soil moisture reserves. Since late-April, rain events became less frequent, but crop water supply remained adequate thanks to the relatively cool temperatures. Spatial distribution of the precipitation was variable. North-eastern and south-western regions received 80-120 mm, while some areas along the western border got just 30-50 mm rainfall. However, rainfall in the main agricultural regions ranged from 50 to 80 mm. Irradiation levels remained 10-20% below the LTA due to rainy and cloudy weather.

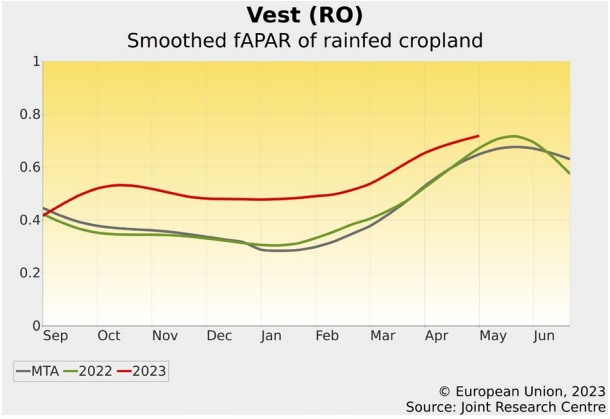
Spring sowing started later and progressed much slower than usual this year, due to the cool and rainy weather conditions, but the pace of sowing gained speed from late-April onward. In addition to the sowing delays, low soil temperatures constrained sprouting and delayed the emergence of the summer crops. Consequently, the phenological development of summer crops is adversely delayed by 1 to 3 weeks compared to an average season.

The previously accelerated development of winter cereals slowed down to its seasonal level in April. Rapeseed crops benefitted from the moderate temperatures, long-lasting flowering and plentiful water supply during early grain filling. Winter wheat and even more so winter barley had considerable above-average biomass accumulation thanks to adequate soil moisture levels. Our current yield outlook for winter crops is very positive, however, wet conditions have increased the risk of fungal infections. The yield forecast for summer crops was kept at the historical trend at this early stage of the cropping season.



# Spain and Portugal

## All main agricultural regions under drought

*From January onward, almost no meaningful rainfall events have happened in cropland areas throughout the Peninsula. Temperatures and solar radiation levels have been strongly above the LTA. Part of the winter crops will not be harvested as grain, and the areas sown with summer crops are substantially reduced.*

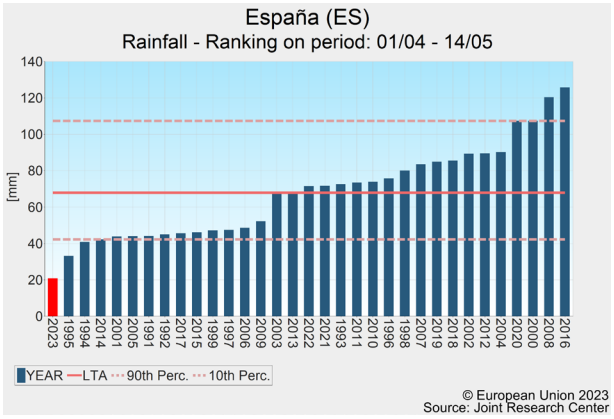
For the period of review, considering all arable land areas of the Iberian Peninsula, the average temperatures are the highest in our records, while cumulative rainfall is the lowest in our records (since 1991).

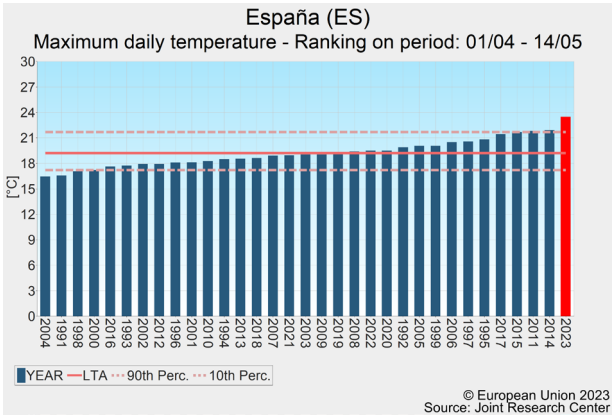
In an extreme turn of events, in central and southern regions, a part of winter crops has already been harvested as fodder, and if too small to harvest mechanically, given to livestock as grazing.

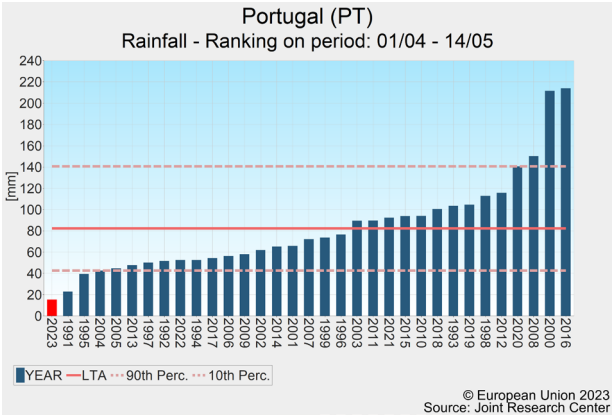
Water reservoirs in southern Spain have dropped below the drought level of 2022[5]. In Portugal, water levels are still close to capacity, with the exception of *Monte de Rocha* and *Bravura* in the south[6].

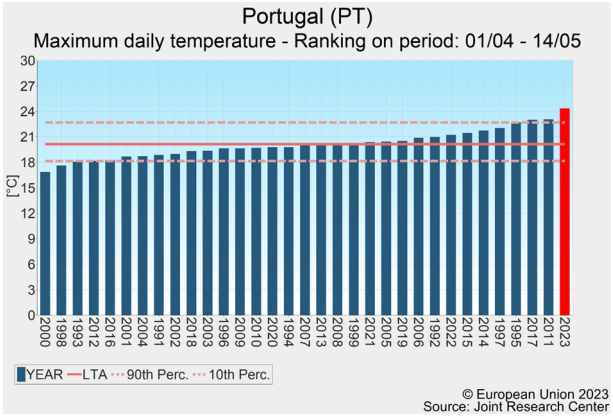
In *Castilla y Leon*, and other parts of central and northern Spain and Portugal where water use allowances are less restrictive, summer crops have been sown (potatoes, sugar beet, sunflowers and part of grain maize). This is not an easy decision in other regions, where irrigation water has been restricted to very low volumes per hectare. As a consequence, crop choices have changed in favour of less water demanding ones and farmers are pooling water allocation rights to crop smaller areas.

The yield forecasts for winter and spring crops have been revised substantially further downward, to below last year's level. The forecasts for summer crops have also been lowered, to below the 5-year average, while bearing in mind that actual impacts of the drought might be reflected more in areas sown and harvested than in the yields.




[5] www.embalses.net, 10 May 2023
[6] sir.dgadr.gov.pt/reservas, 10 May 2023

# Hungary

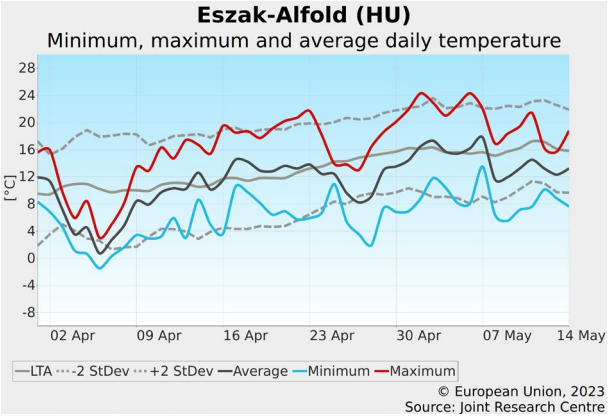
## Favourable winter crop conditions

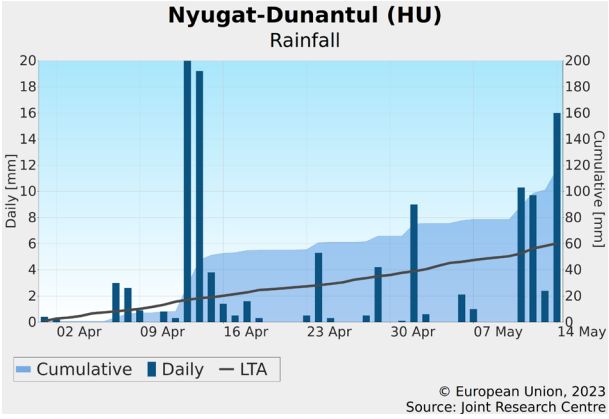
*Abundant rainfall maintained soil moisture at favourable levels for winter crops, while moderately colder-than-usual weather conditions slowed down crop development. At the same time, the wet soils delayed the sowing campaign of summer crops.*

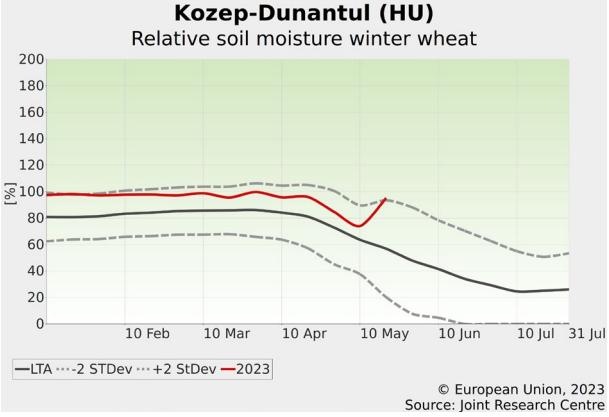
Daily temperatures fluctuated around the long-term average except for the first dekad and last days of April when below-seasonal thermal conditions prevailed, resulting in a 10-20% lower temperature sum (>0 °C) than usual for the review period (1 April- 14 May). Precipitation was abundant (locally destructively intense) in western and northern Hungary (70-150 mm), while in the eastern part of Hungary, rainfall reached just 30-50 mm, remaining 10-40% below the climatological norm. Rain was frequent and ample especially in the first half of April and after 10 May.

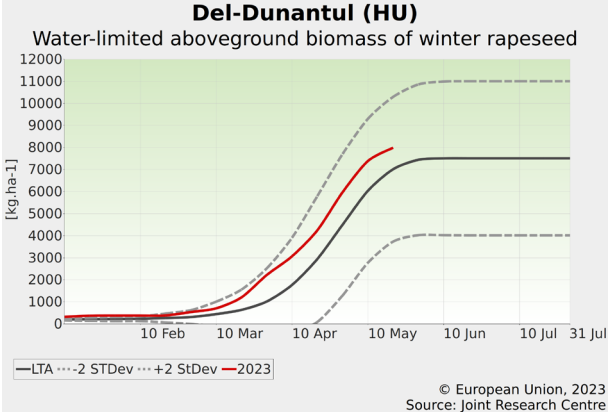
Winter crops are still in a slightly advanced phenological state gained during the mild winter. The cold conditions of April slowed down growth without compromising the overall conditions. The flowering of rapeseed started in mid-April. Water supply was nearly optimal during flowering and early grain-filling, which is crucial for the yield formation of rapeseed. Winter barley has been flowering throughout the country, while soft wheat is in the flowering stage in south-eastern Hungary, while still being in heading stage elsewhere. Soil moisture has been well replenished and is promising for the summer. However, the cool and moist conditions increased the pest and disease pressure.

The sowing campaign of summer crops started slowly due to the cold weather and wet top-soil conditions. After mid-April, progress in sowing accelerated thanks to the warming and drying soils but is still lagging behind. Our yield forecast for winter crops was revised upwards considering the adequate water supply and positive precipitation forecast for the next weeks. The yield outlook for summer crops is kept at trend level in this early phase of the season.



# Italy

## Rain in the north brings relief, but locally also heavy damage to crops

*Frequent rainfall events significantly improved soil moisture conditions in the north. Yield expectations for soft wheat and barley are still above average but slightly revised downward due to extreme precipitation events in Emilia-Romagna. Summer crops are generally faring well.*

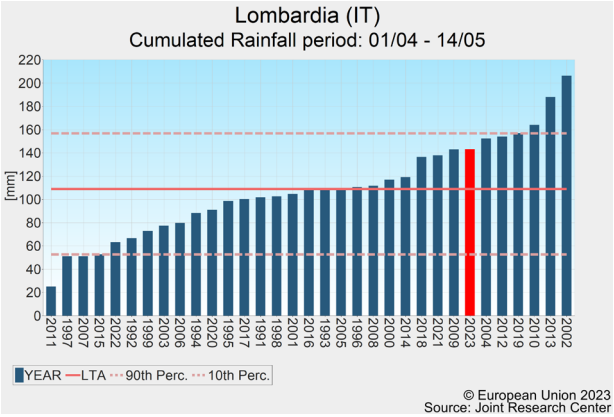
The period from 1 April to 10 May was wetter than usual, with precipitation cumulates 80% to 100% above the LTA from north (i.e. *Veneto* and *Emilia-Romagna*) to south (*Puglia* and *Campania*). Only in the north-west (*Piemonte)* did rainfall totals remain 18% below average.

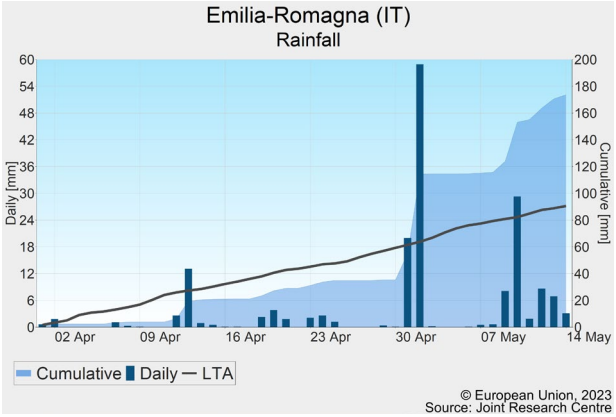
In the most drought-concerned regions of northern Italy (i.e. *Piemonte* and *Lombardia*), rainfall resumed from 10 April onward, replenishing soil moisture levels that had been depleted since winter 2022. Water levels in the *Po* valley (great northern lakes and the *Po* River) recovered to a large extent.

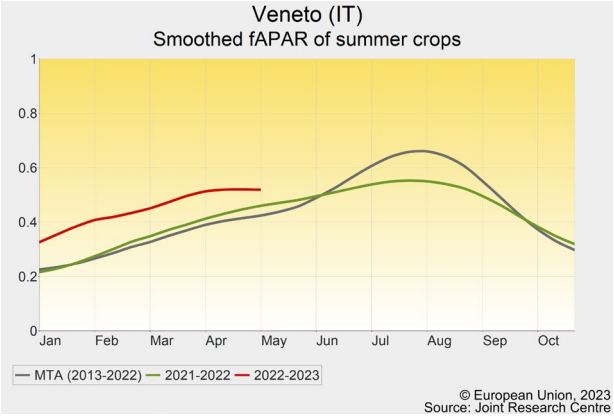
Extreme rain events occurred in *Emilia-Romagna* in early May, when 170-220 mm of rain was recorded in 48 hours. Many rivers burst their banks, damaging more than 1,200 ha of permanent crops[7]. For this area, an almost complete loss of production is feared for wheat and barley.

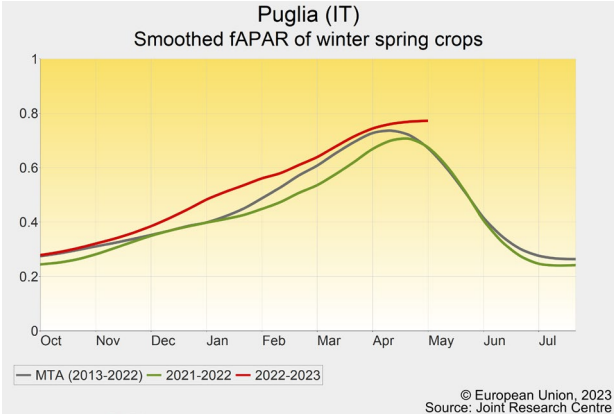
Currently, winter crops are entering the ripening phase and despite a slight downward revision in our forecasts for soft wheat and barley, expectations are overall above the 5-year-average.

Summer crops benefited from replenished soil moisture; they are currently at the vegetative stages and are generally faring well. To cope with the uncertainties brought on by the winter drought in the north, maize producers have mainly sown short cycle varieties. Accordingly, a moderate reduction is expected for the maize sown area, basically in line with the trend of the last 20 years, and for soybean, moderately replaced this season by winter cereals. Our forecasts for summer crops are in line with or moderately above the 5-year-average.




[7] https://emergency.copernicus.eu/mapping/list-of-components/EMSR659

# Czechia, Austria and Slovakia

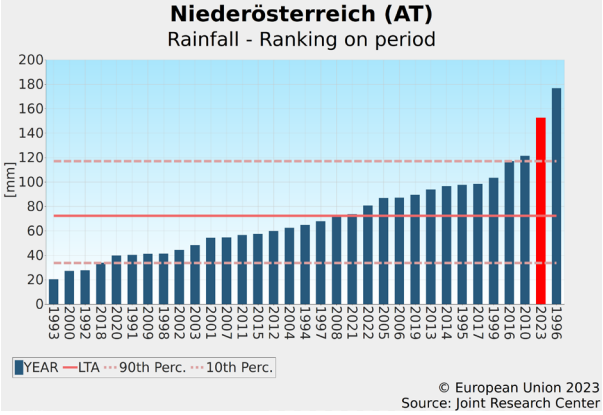
## Wet and cold April delayed summer crop sowing

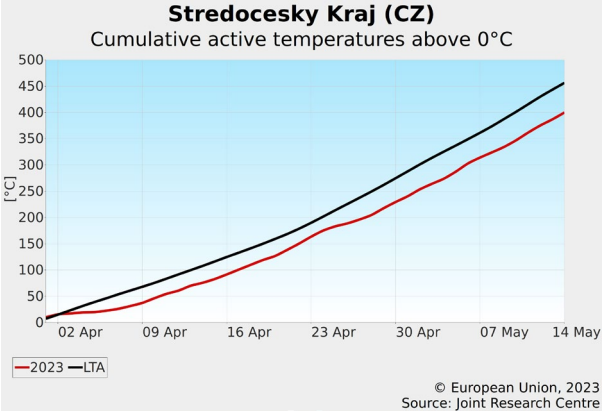
*The period of analysis was colder than usual, with record-high April precipitation in north-east Austria and south-east Czechia. The development and biomass accumulation of winter and spring crops has slowed down. However, crops are generally in good shape and our yield outlook remains positive. The sowing and emergence of summer crops was delayed by the wet and cold April, too.*

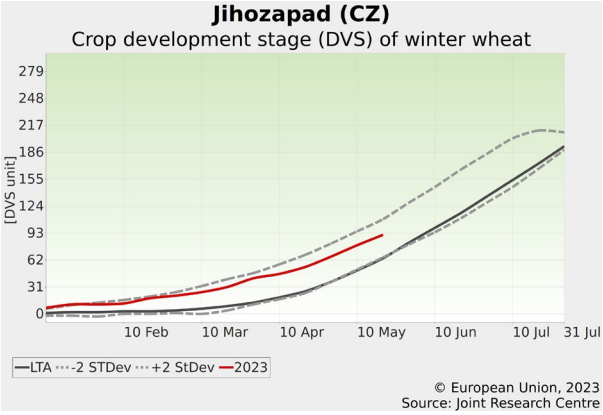
During the period of review, temperatures were predominantly below average, especially during the first dekad of April (as reported last month), with a resulting cumulative temperature sum (>0 °C) well below the LTA. April precipitation totals were significantly above the average in most of the regions and record-high (>150% above the LTA) in south-east Czechia (*Jihovychod*) and north-east Austria (*Niederösterreich*, *Oberösterreich*). The abundant rainfall in April was beneficial for the replenishment of soil and groundwater reserves (especially in north-east Austria). On the contrary, the first half of May was characterised by little rainfall. Over the period of analysis, the cumulated global radiation was very low and lowest on the records for north-east Austria and south-east Czechia.

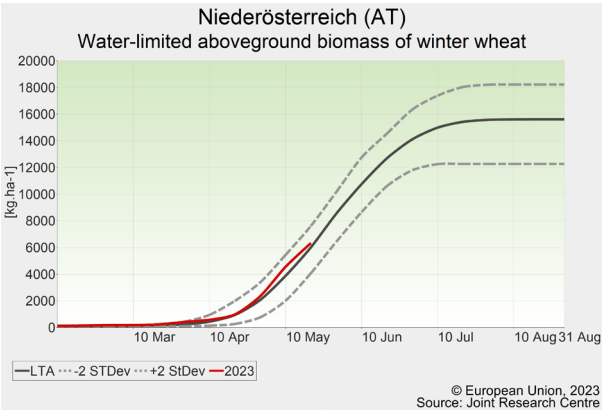
The current conditions of winter crops are considered favourable. As indicated by our model, winter wheat development has slowed down during the period of review and is now around or slightly behind the seasonal average. Similarly, biomass accumulation of winter wheat decelerated and in most regions is now close to average. The overly wet soils in April impaired timely field operations and delayed sowing of summer crops. However, the even distribution of precipitation since the second half of April, has been generally favourable for the sowing progress.

Currently, we maintain our positive yield forecast for winter crops, while the outlook for summer crops is based on trends..



# Bulgaria

## Significantly delayed spring sowing campaign

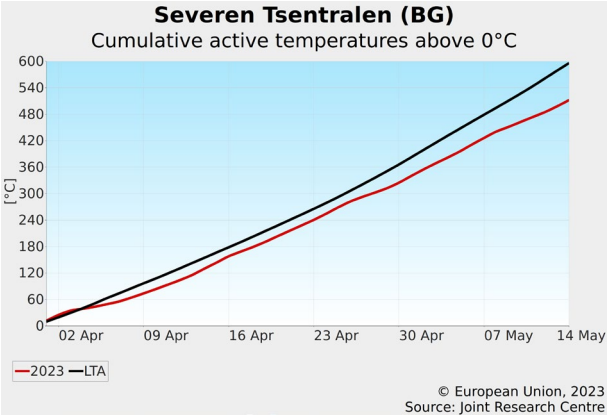
*At first, cold and rainy weather hampered the sowing campaign. More settled weather arrived after 20 April, accelerating the progress of the sowing, but it still remained delayed. Development and biomass accumulation of winter cereals is high and promising.*

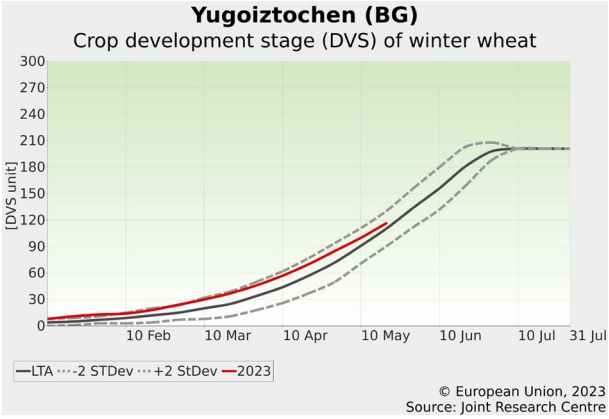
The first two dekads of April were significantly colder than usual (by 1-3°C), particularly in the northern and western regions of Bulgaria. The remainder of the review period was somewhat warmer, but below- or near-average temperatures continued to predominate. The temperature sum over the review period presents a significant deficit, between -30 and -100 °Cd.

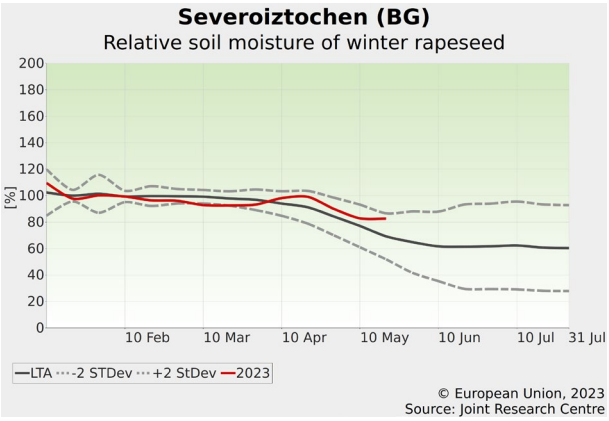
After a wet late March, rainfall remained abundant during the first two dekads of April, when more settled weather arrived. Considering the review period as a whole, precipitation sum reached 50-100 mm in most regions, but in the south-western regions 80-150 mm was recorded.

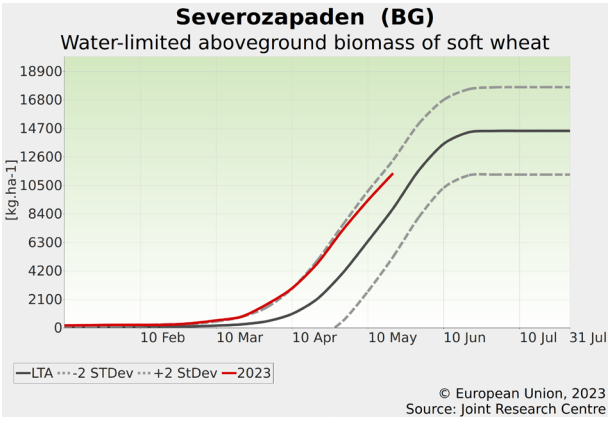
Soils were cold and overly wet during the beginning of the sowing window for summer crops, causing 1-3 weeks delay. The sowing of grain maize is particularly delayed. Low temperatures were also unfavourable for sprouting and emergence. On the positive side, soil moisture is currently at very favourable levels, while on the other hand, the delayed crop development implies that flowering is likely to also occur later than usual, when there will be an increased risk of unfavourably hot and dry summer weather conditions.

Development of winter crops was 1 to 2 weeks advanced in early April, but most of this precocity was lost due to the below-average thermal conditions since then. Crop model simulations show highly above-average biomass accumulation and canopy expansion for winter cereals as well as rapeseed. Remote sensing images confirm promising winter crop conditions and positive yield outlook. The yield forecast for summer crops remains based on the historical trend.



# Denmark and Sweden

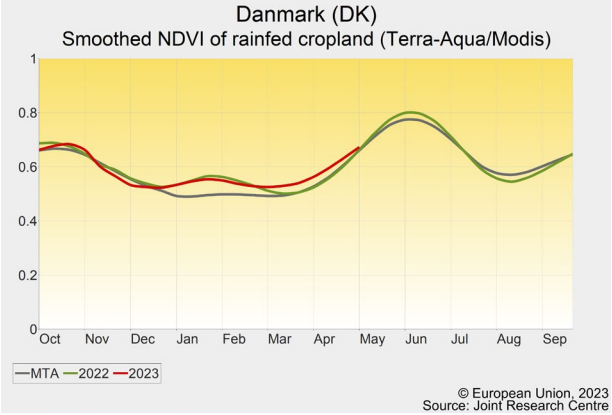
## Winter crops overwintered well, summer crop sowings are in full swing

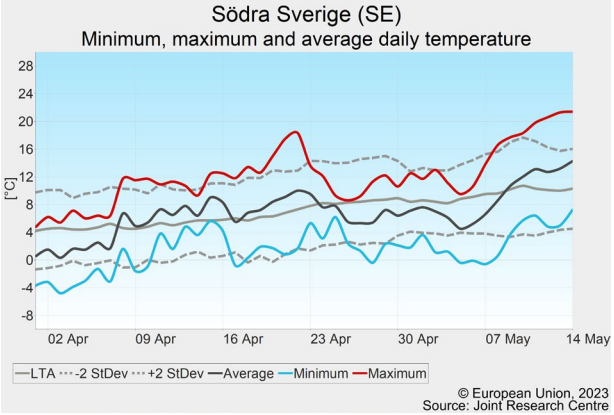
*After a relatively mild winter, autumn-sown crops exited winter in Scandinavia in fair conditions. Spring field works and sowing started with some minor delays due to rain locally in Denmark, while the overall outlook is positive.*

Throughout both countries, the first and last weeks of April, as well as the first week of May, have been colder than the LTA. For the rest of the review period, temperatures have been close to or slightly above average. Except for a negative anomaly in *Östra Sverige*, no significant deviation from the normal temperature accumulation (base 0 °C) has been observed. Rainfall has been relatively scarce, with no precipitation recorded in southern Sweden since the beginning of May. This resulted in an overall rainfall deficit of around 50 mm in *Småland* and *Västsverige*, whereas the situation was close to normal for Denmark. Global radiation levels remained close to the long-term average in Sweden and slightly higher in Denmark.

Overall, autumn-sown crops have overwintered well, yet minor damages have been reported for rapeseed in the *Skåne* County in southern Sweden. Our models indicate that winter wheat development is close to the LTA; MODIS-derived NDVI time series confirm that vegetation growth has closely followed the mean trend in Sweden and Denmark. Despite delays due to rainfall, spring sowings are completed, and overall yield expectations should not be affected. The sowing of summer crops is in full swing in both countries.

The yield outlook is positive in both countries. Forecasts are based on trends for spring crops and on scenarios for winter crops..



# Estonia, Latvia, Lithuania, Finland

## Fair crop conditions despite sowing delays

*The period of review was characterised by drier than usual conditions. Spring and summer crop sowings are ongoing, and despite frost damages locally reported for rapeseed, the outlook is positive.*

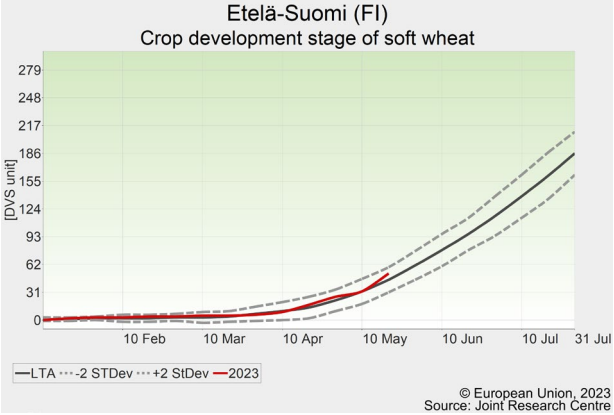
Temperatures fluctuated during the period of review; during the first and last days of April and early May, our records indicate temperatures below the LTA, while the rest of the period was warmer than average. Cumulative temperatures (base 0 °C) are close to normal.

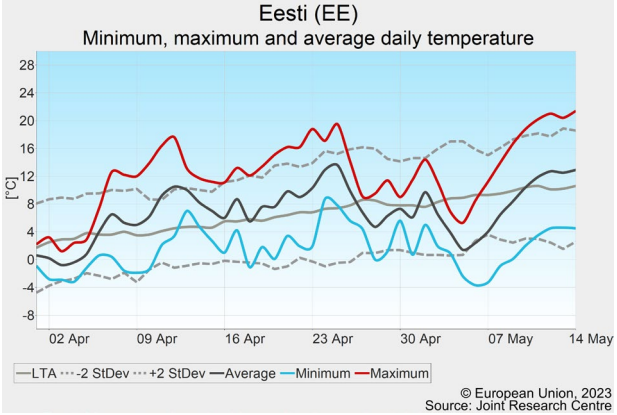
The period of review has been drier than usual, with only two days of significant rainfall (>5 mm per day) in Finland and Estonia during the cold spell end of April, and none for Latvia and Lithuania. A resulting rain deficit was reported in all countries, from ca. -20 mm in Finland and Estonia to up to -40 mm in Latvia and Lithuania for the period of review. Radiation was close to seasonal values in Latvia and Lithuania, above average in Finland and Estonia.

In Finland, MODIS-derived NDVI is below the LTA but similar to last year, while in the Baltic countries, NDVI is above the seasonal values. This is confirmed by our models, which suggest that soft wheat is ahead in development in these countries.

Frost losses have been reported in Finland and Lithuania for rapeseed, which is being replaced with spring rapeseed and barley. Despite good progress in late April in the Baltic countries, the sowing campaign is still ongoing, as the cold conditions during early May have delayed the campaign by approximately one week. In Finland, sugar beet and spring wheat sowings have been reported to have started in early May.

Overall, despite delays reported earlier, crops are in good condition and our yield forecasts remain aligned with the historical trend.



# Greece and Cyprus

## Good yield prospects for Greece, less so for Cyprus

*Abundant rain consolidated yield expectations, but locally giving rise for concern regarding pests and diseases.*

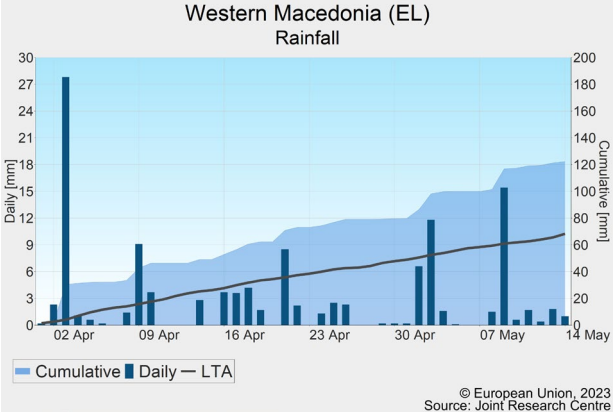
Greece saw abundant rainfall during the period of analysis with more than 120 mm in the north and often >50% compared to the LTA across the country. Also Cyprus received plenty of rainfall[8], above average in the north, around the LTA in the south. Temperatures ranged around the norm for both Greece and Cyprus.

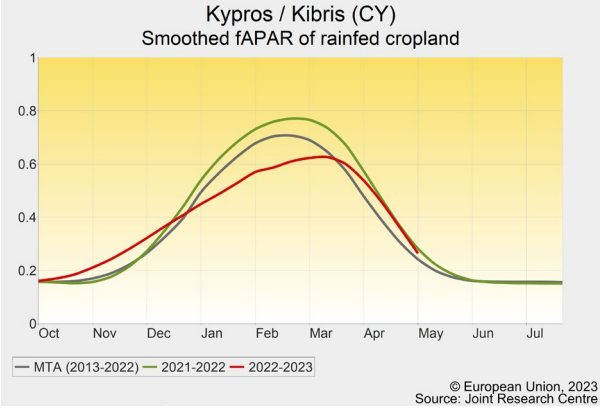
Remote sensing analysis shows an above-average vegetation development in northern Greece, and our crop model confirms a biomass accumulation of winter crops which is well advanced and above the LTA. However, the sometimes-excessive rain might increase disease pressure and insect infestations in some areas in Greece[9].

The sowing of spring crops has been completed, and the current weather is supporting emergence.

In Cyprus, rain arrived too late to compensate for the negative impact of the dry winter so that biomass accumulation for winter crops remains below average, as confirmed by remote sensing analysis. Abundant rainfall in the north might cause quality issues with barley and could delay the harvest; however, beneficial dry weather is forecast over the coming days for Cyprus.

For Greece, our yield forecast for winter crops remains above the 5-year average, but below-average for barley in Cyprus. The forecast for summer crops in Greece follows the trend, with good expectations due to sufficient moisture supply and the good start to the season.




[8] https://www.dom.org.cy/CLIMATOLOGY/English/index.html

[9] https://www.agro24.gr/agrotika/proionta/georgia/sitira-kai-sporoi/prosvoles-sitiron-tis-thessalias-apo-vromoyses

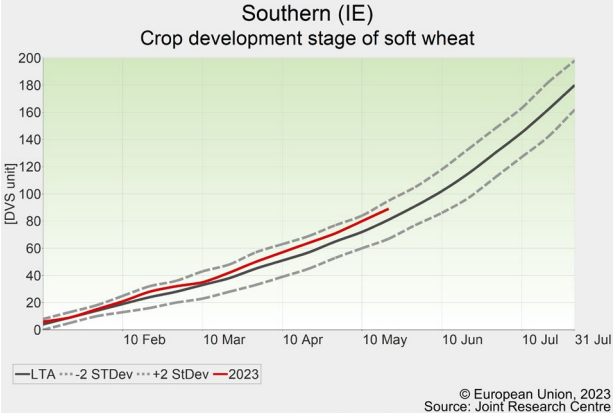
# Ireland

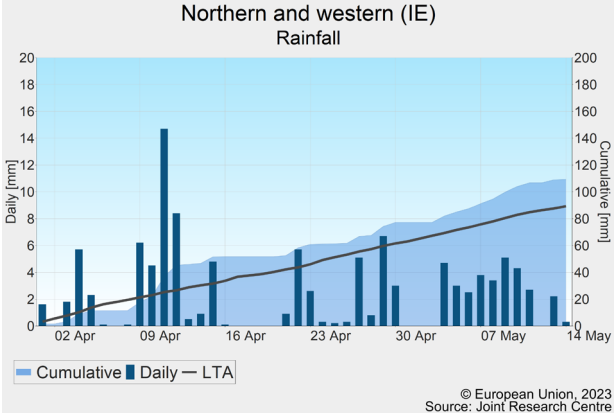
## Crops are in good condition, spring sowings continued in May

*Above-average temperatures and rainfall prevailed during the period of review. Despite some delays due to excessive rainfall, the sowing campaign for spring cereals is completed and the summer crops sowings have started or are about to start. The overall outlook is positive.*

Temperatures prevailed above average in the country, resulting in a slightly positive anomaly for temperature accumulation (base 0 °C). Total rainfall for the period of interest was close to average in southern Ireland and above average in the rest of the country, well distributed over time, but with locally varying totals. The associated continuous cloud cover resulted in below-average levels of radiation.

Winter and spring cereals are in good conditions, although the wet weather increased pest and disease pressure. Winter cereals have reached the flag leaf stage ahead of normal crop development. Spring barley sowing is completed, and because of interruptions due to rainfall, the crop has now reached various phenological stages across the country, from emergence for late-sown fields to tillering for early-sown fields. Oilseed crops have reached flowering. Potato and maize planting are delayed, particularly in the north-east due to abundant rainfall, while sugar beet planting continues across the country. Yield forecasts remain positive for winter and spring crops above the 5-year average.



# Belgium, Luxembourg and the Netherlands

## Continued wetness further delayed field operations

*Above-average rainfall continued to hamper spring sowing and other field operations. Our yield forecasts for sugar beet were revised slightly downward.*

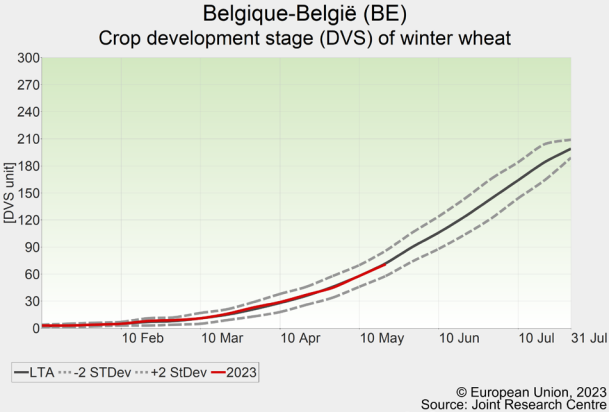
Throughout the Benelux, the review period (1 April to 14 May) was characterised by frequent and abundant rainfall, with the largest surplus (>+75% compared with the LTA) in western Belgium and central Netherlands; south-eastern Belgium received only slightly above-average precipitation.

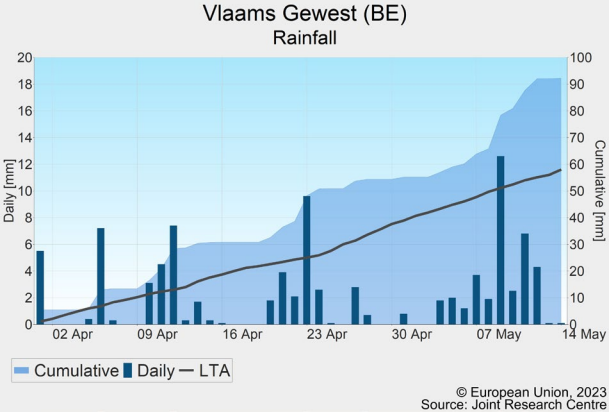
Overall Temperatures were close to the LTA in the Netherlands and slightly below the LTA in Belgium and Luxembourg, with the strongest anomalies (just below -1°C) in south-eastern Belgium and Luxembourg. Minimum temperatures at the end of April and beginning of May were among the lowest in our records (since 1991), but remained above -5°C, and we found no reports of damage to staple crops.

Winter crops remain in fair to good condition. However, incidence of pests and diseases is increasing and more settled weather is needed as flowering is approaching, and to allow farmers to properly conduct field operations.

Despite less rain than in March, soil conditions remained unfavourable for summer crop sowing during most of the time. The sugar beet sowing campaign, currently coming to an end, has been the latest one since 2001. Emergence has been fair but a yield penalty seems unavoidable, as canopy closure will be too late to optimally benefit from the long days in June. Pest pressure is also a concern for summer crops. For potatoes, sowing is still ongoing, but the delay could be still compensated by an extended crop cycle.

Our yield forecasts for sugar beet were revised downward, but remain at (for Belgium) or above (for the Netherlands) the 5-year average. The forecasts for other crops were essentially maintained at the level of the historical trend.



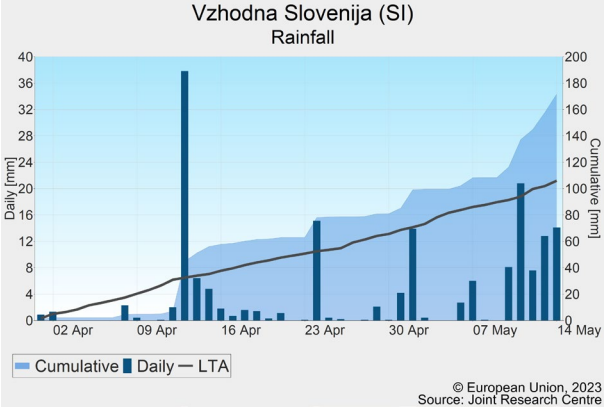
# Slovenia and Croatia

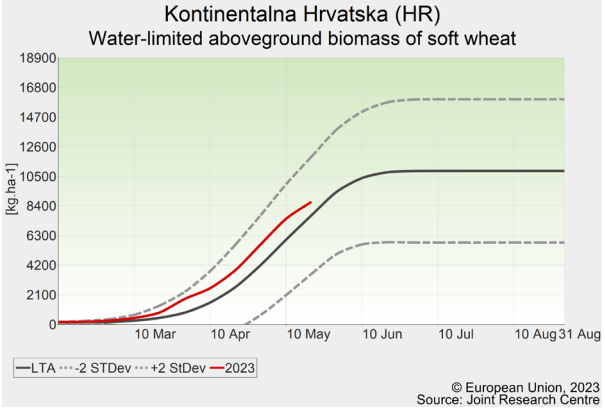
## Good yield outlook for winter crops

*Slightly below-average temperatures were typical during the review period for both countries. Precipitation highly exceeded the long-term average. Winter crops are in good shape; however, the colder-than-usual weather decelerated development. The abundant rainfall also delayed the current sowing campaign of summer crops.*

April began with colder-than-usual weather, but later recorded temperatures around LTA. The overall negative temperature anomalies remained between -2 °C and -1 °C below the climatological norm. High rainfall totals (in the range of 120-200 mm) were observed in Slovenia and major parts of Croatia, locally excessive with devastating impacts. Contrarily, eastern *Kontinentalna Hrvatska* received only 70-100 mm precipitation, still exceeding the LTA by 20-50%. The abundant rainfall improved soil moisture and eliminated any previously exiting soil water deficit. However, the saturated soils, together with low temperatures, hampered progressing the spring sowing campaign and led to mentionable delays in emergence. This delay in phenological development could move the sensitive flowering phase to later in summer, increasing the exposure to water stress and high temperatures later in the season.

Low temperatures decelerated also the development of winter crops. Nevertheless, soft wheat has already entered the flowering stage in major parts of Croatia, while it is still in heading stage in most of Slovenia. While moderate temperatures and adequate water supply provided favourable conditions for biomass accumulation, the wet weather has also been favourable for spreading pests and diseases among winter cereals and turnips. Nevertheless, our winter crop yield outlook was revised upwards and is now above the five-year average in both countries. The yield forecast of summer crops is kept at the long-term trend.



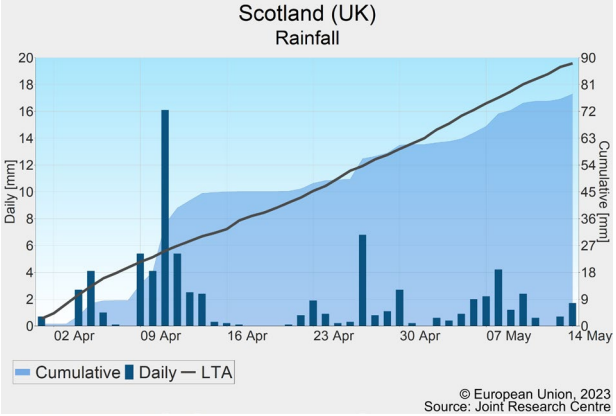
# 5.2 United Kingdom

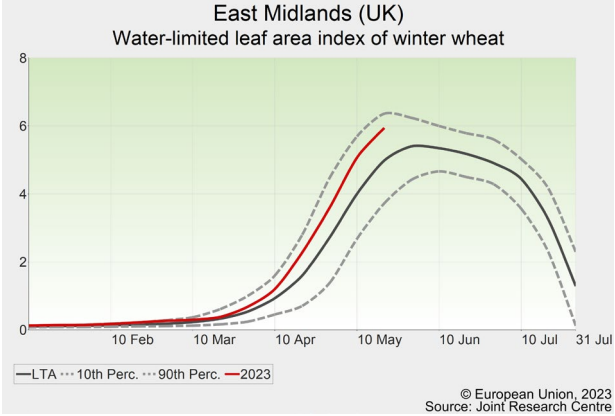
## Wet weather increases disease pressure

*Winter and spring cereals are generally faring well. The wet period sustained establishment of spring crops and yield potential for winter cereals but increased disease pressure.*

Temperatures prevailed close to the LTA, except for two distinct cold anomalies at the beginning and at the end of April. Although in most of the country rainfall continued to be above the LTA, the month of April was drier than March and characterised by some dry days. Scotland and the North West presented cumulated rainfall close to the seasonal values. Radiation levels were close to the LTA to slightly below the LTA.

Winter cereals are faring well, with winter barley at flag leaf stage. The dry days allowed to partly catch up with field work. However, pest and disease pressure remains high due to the wet conditions, which locally caused also some crop damage. Most of the sowing of spring barley was concluded in the second half of April, and the latest fields in early May. The earliest sown crops (which were sown in February) have reached the stem extension phase. Our yield forecasts are maintained close to the 5-year average.



# 5.3 Black Sea Area

# Ukraine

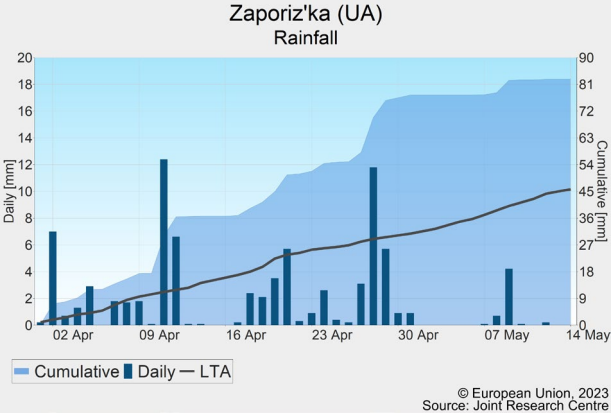
## Improved yield outlook for winter crops

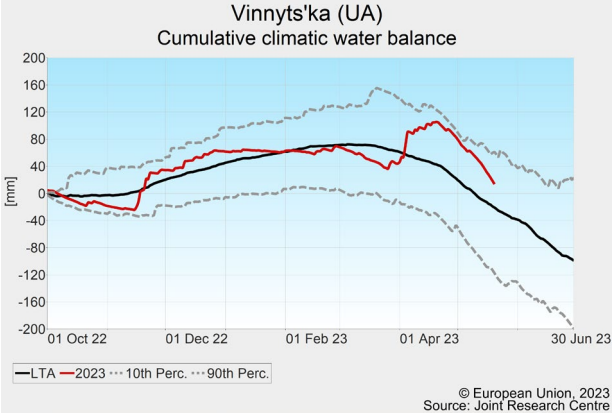
*Above-average rainfall combined with slightly colder-than-usual temperatures in most regions of Ukraine improved the condition of winter crops during the period under review. However, the record-wet conditions in April delayed the sowing of spring and summer crops.*

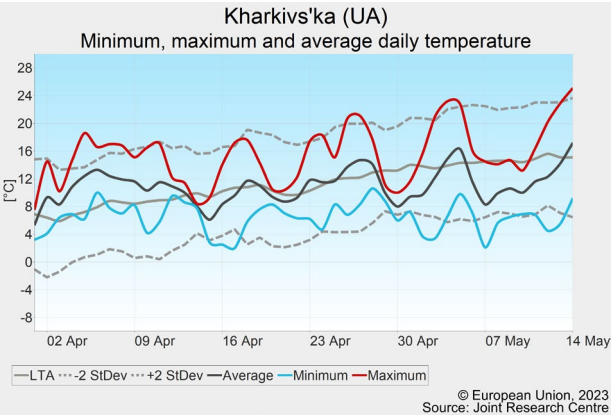
Ukraine experienced wetter-than-usual conditions during the review period. In most oblasts, rainfall exceeded the LTA by 50% or more. Rainfall was particularly frequent and abundant in April and resulted in comfortable soil moisture conditions. The first half of May was much drier than usual. Solar radiation was significantly below the LTA in the review period.

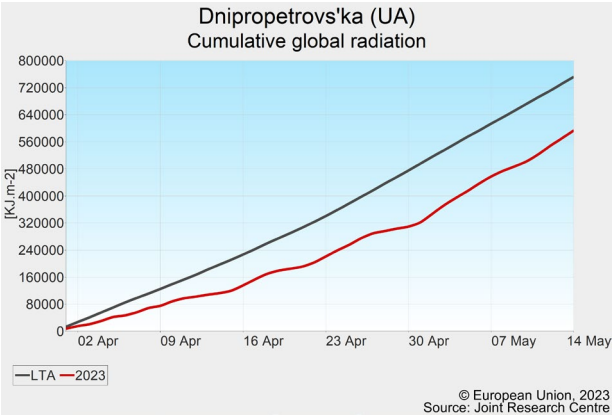
After several months with positive thermal anomalies, Ukraine experienced slightly cooler-than-usual temperatures during the current review period. Near-seasonal temperatures prevailed only in the northernmost oblasts. The most distinct temperature anomalies occurred in the first half of May, when temperatures remained 2°C to 4°C below the LTA throughout the country. Winter crops are entering the reproductive phase with sufficient soil moisture reserves and without any thermal stress, thus presenting a very high yield potential. In the absence of extreme weather conditions in the coming months, the realisation of this potential will mainly depend on crop management. A more detailed analysis will be provided in the upcoming June edition of the Bulletin on Ukraine in the Global Outlook Series[10].

The frequent rainfall in April delayed the start of spring and summer crop sowing. According to the Ukrainian Ministry of Agriculture[11], the currently dry conditions of May allowed an accelaration of work in the field.




[10] https://publications.jrc.ec.europa.eu/repository/handle/JRC133193

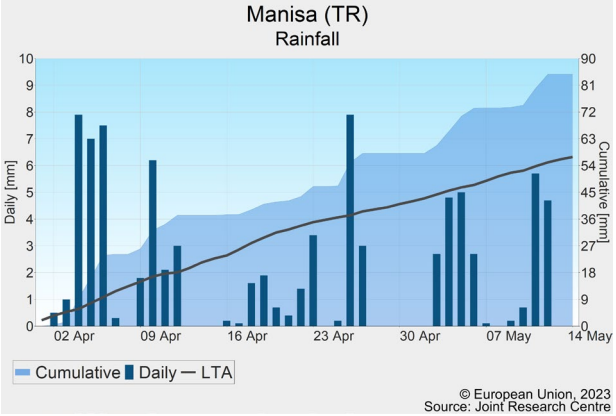
[11] https://minagro.gov.ua/news/sivba-2023-v-ukrayini-posiyano-47-mln-ga-yarih-zernovih-ta-zernobobovih-kultur

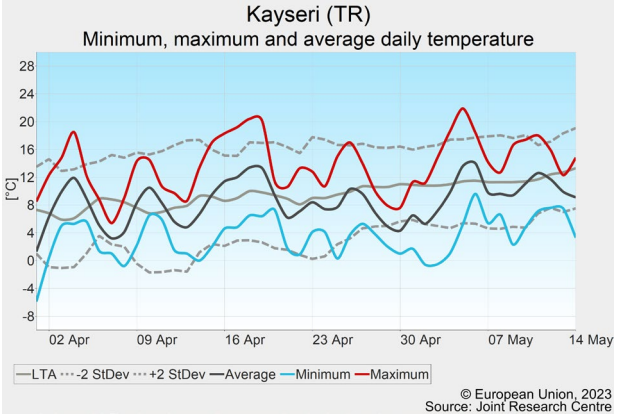
# Türkiye

## Frequent rainfall maintains improved soil moisture conditions

*Winter crops entered their reproductive phase under fair conditions thanks to improved soil moisture conditions and the absence of any thermal stress during the review period. Our yield forecast is maintained close to the 5-year average for winter crops.*

Frequent and abundant rainfall prevailed in most regions during the period under review. In April, Türkiye experienced 50% to 80% above-average precipitation. Since the beginning of May, wetter-than-usual conditions continued in the western regions of the country, while below-average (from 50% to 80% below the LTA) rainfall was registered in the central and south-eastern regions. Temperatures stayed around 1-2°C below the LTA in the west and in eastern parts of central Anatolia. In the south-west and central Anatolia temperature accumulation remained about 20% below the LTA. The rest of the country experienced near-seasonal thermal conditions. Consequently, sufficient rainfall sustained the improved soil moisture conditions since last month and resulted in continued fair growth and development of the winter crops. The latter benefited also from the absence of any thermal stress during flowering, and the moderate temperatures, continuing over the coming days according to the forecast, foster a good early phase of grain-filling. Our yield forecast remains around the 5-year average. Dry conditions in the south-east in early May should have enabled an acceleration of the sowing of summer crops.



# 5.4 European Russia and Belarus

## European Russia

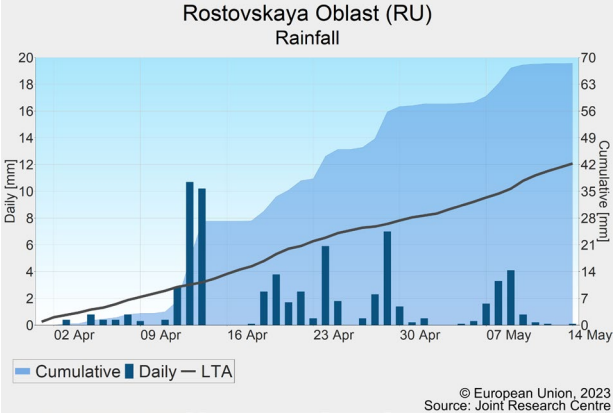
### Improved soil moisture conditions in the south-west; increased concern in the east

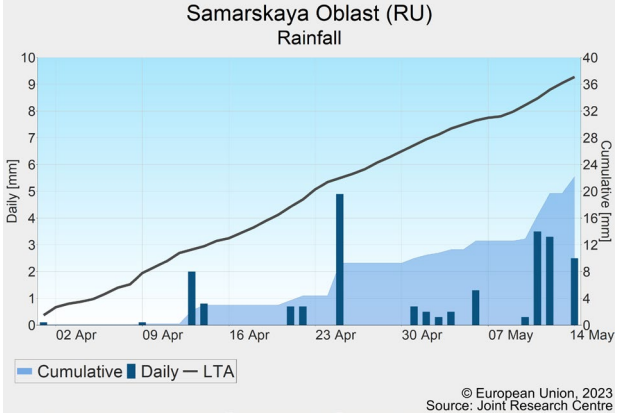
*Winter crops are in fair to good condition in the south-western parts of European Russia where abundant rainfall improved soil moisture conditions. However, more rainfall is needed in the Central okrug and the Volga okrug to avoid losses in yield potential.*

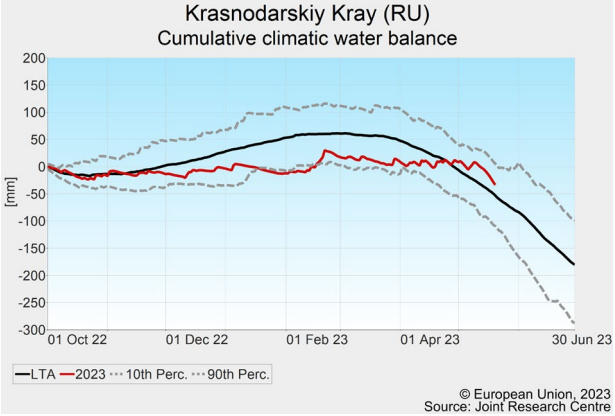
Mixed weather conditions prevailed in European Russia during the review period. Abundant and frequent rainfall (ranging from 30% to 50% above the LTA) prevailed in most parts of the Southern and the North-Caucasian okrugs (e.g. *Stavropol*), while the remaining okrugs experienced drier-than-usual conditions. The most distinct rainfall deficits were registered in the northern half of the Central okrug and in the eastern half of the Volga okrug (e.g. *Samara* and *Bashkorstan*) where precipitation was 50% to 80% below the LTA.

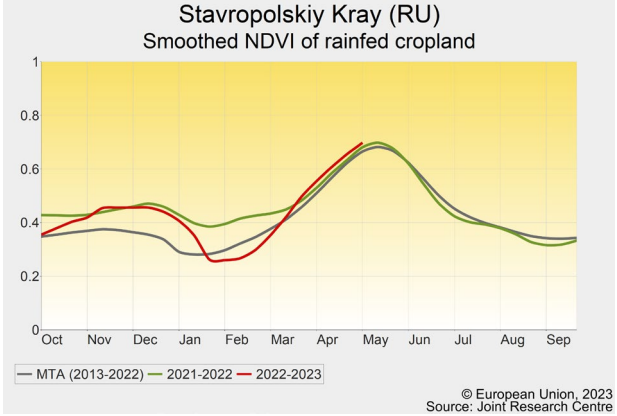
April was characterised by warmer-than-usual temperatures, in most regions, with daily average temperatures up to 2°C above the LTA in the south western oblasts, and 2-4°C above the LTA in the Volga okrug and in the northern half of the Central okrug. Temperatures dropped since early May, reaching 2°C to 4°C below the LTA in most producing regions.

Winter crops in the south-west benefitted from improved soil moisture conditions and cooler-than-usual temperatures to sustain fair to positive development. However, the lack of rainfall in parts of the Central okrug and the Volga okrug could compromise their yield potential.



# Belarus

## Fair conditions for winter crops

*Winter crops are generally in good condition. A cold start into May slowed down crop development as well as the sowing of summer crops. Scarce precipitation during the first half of May resulted in a progressing depletion of soil moisture levels.*

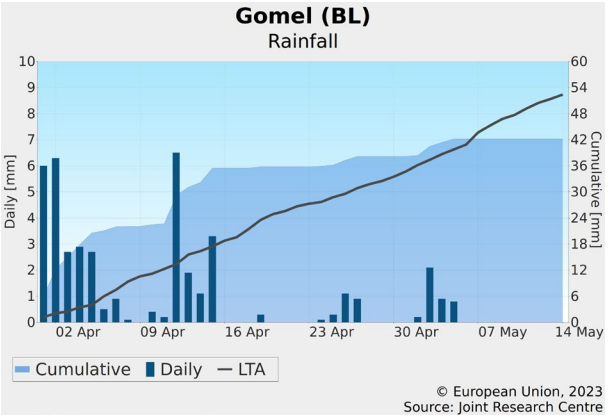
April was slightly warmer than average, while the first dekad of May was considerably colder than usual with frequent night frosts (<-2°C). Temperatures went up above the average at the end of the review period.

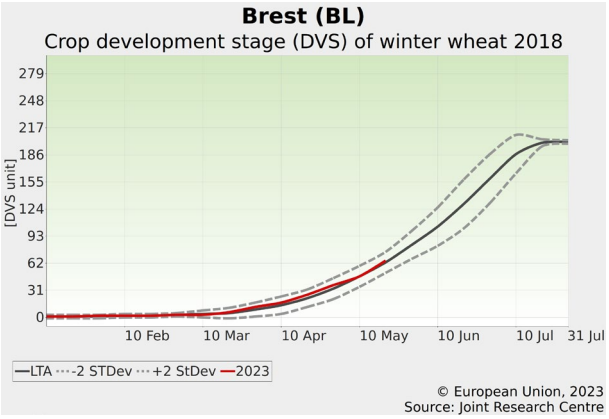
April rain varied from slightly above average in southern regions (*Brest*, *Gomel*), to below average in the north-east (e.g. -20% in *Vitebsk*), and for many areas rainfall was mostly concentrated during the first dekad of April. So far in May, hardly any precipitation was recorded throughout the country, resulting, together with rising spring temperatures, in a rapid depletion of top-soil moisture levels.

Winter wheat shows close to average seasonal development. Simulated biomass accumulation is above average in the south and slightly above average in the rest of the country, and also the remote sensing analysis points show an above-average canopy development, so that the overall conditions of winter crops are considered favourable.

The sowing of grain maize was delayed due to the cold period at the end of April and early May. While the weather is currently favourable for the ongoing sowing campaign with little rainfall forecast for the coming days, more precipitation would be beneficial during the coming weeks for good crop establishment.

We maintain our positive outlook for winter crops as well as for grain maize.



# 5.5 Maghreb

# Morocco, Algeria and Tunisia

## A compromised season is confirmed

*The yield outlook is revised downward for both wheat and barley. The combined effect of a long-lasting drought and hot temperatures in most of the Maghreb's cereal producing areas, hampered crops during flowering and grain-filling, thus deteriorating an already unfavourable season.*

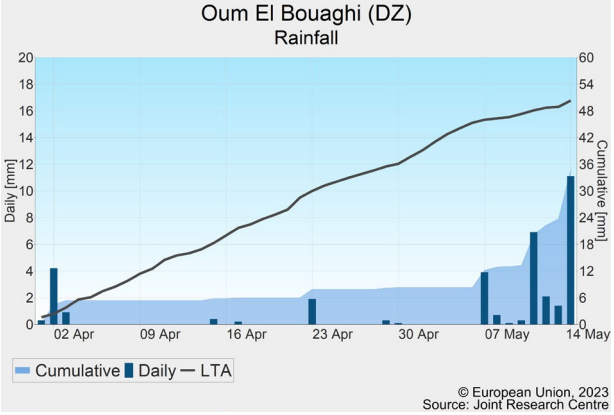
In **Morocco**, the review period worsened an already-poor agricultural season, presenting almost no rain and remaining consistently warmer than usual. Moreover, a heatwave occurred from 25 to 30 April, with maximum daily temperatures reaching > 35°C in the central and northern regions. The hot and dry condition hampered crops during vegetative and reproductive stages and accelerated crop senescence.

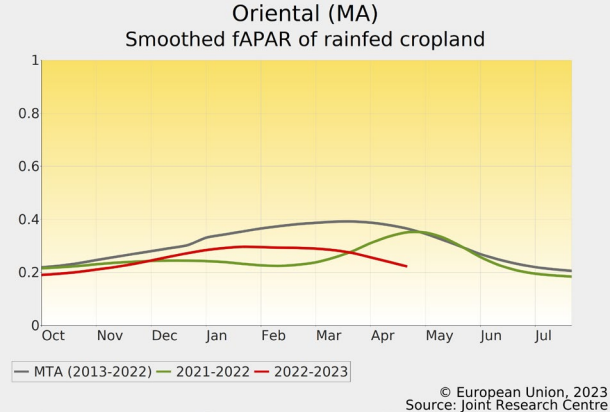
Severe drought also affected the main cereal production regions of **Algeria**. Rainfall cumulates during the review period were the lowest in our archive (since 1979), and exceptionally high temperatures were recorded in the last ten days of April in the western parts of the country (Tmax up to 37°C). Crops were accordingly impacted during flowering and grain-filling, deteriorating an already unfavourable season.

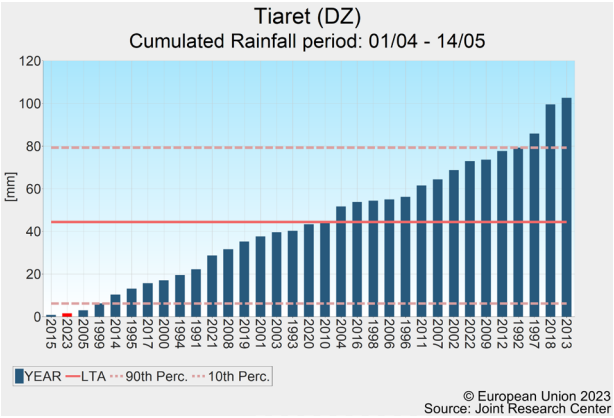
**Tunisia** has also been markedly affected by drought. Rainfall occurred at the beginning of April in low-intensity events. Cumulative precipitation during the review period was the lowest of the 1979-2022 historical series, thus, providing the conditions for irreversible crop damage during flowering and grain filling.

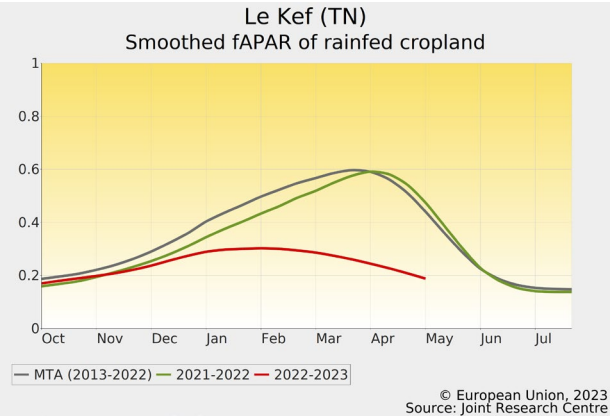
Our yield forecasts for the Maghreb countries are revised further down and are far below the 5-year average for both wheat and barley.

A more detailed overview is given in the JRC MARS Bulletin on North Africa in the Global outlook series [12].



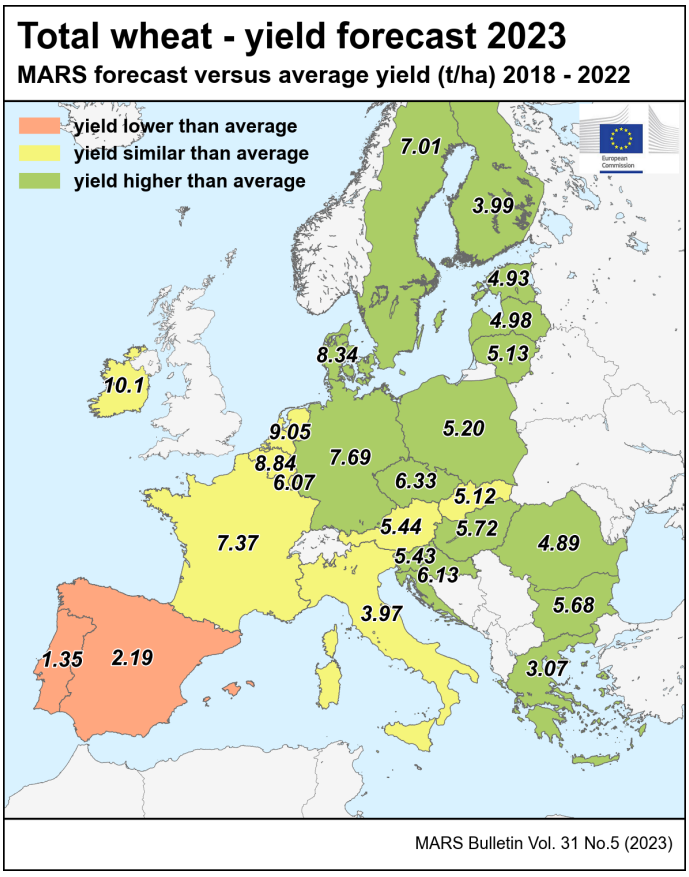



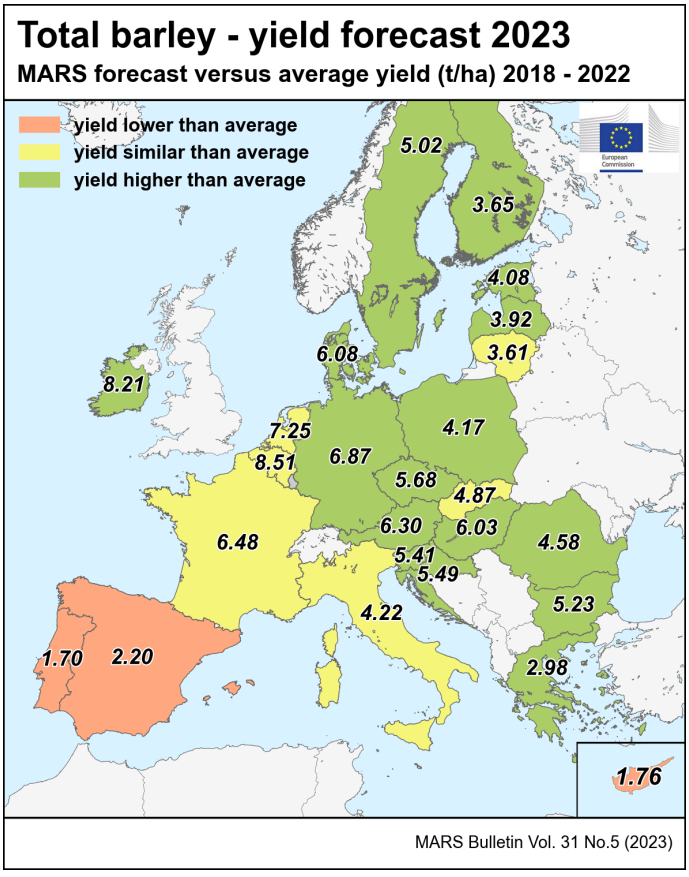

[12] https://publications.jrc.ec.europa.eu/repository/handle/JRC133197

# 6. Crop yield forecast

| Country | Total wheat (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| **EU** | 5.59 | 5.56 | **5.79** | + 4 | + 4 |
| AT | 5.52 | 5.73 | **5.44** | – 1 | – 5 |
| BE | 8.77 | 9.30 | **8.84** | + 1 | – 5 |
| BG | 4.99 | 5.17 | **5.68** | + 14 | + 10 |
| CY | — | — | **—** | — | — |
| CZ | 5.93 | 6.07 | **6.33** | + 7 | + 4 |
| DE | 7.35 | 7.58 | **7.69** | + 5 | + 2 |
| DK | 7.80 | 8.47 | **8.34** | + 7 | – 2 |
| EE | 4.38 | 4.72 | **4.93** | + 13 | + 4 |
| EL | 2.93 | 2.72 | **3.07** | + 5 | + 13 |
| ES | 3.52 | 2.79 | **2.19** | – 38 | – 22 |
| FI | 3.56 | 3.76 | **3.99** | + 12 | + 6 |
| FR | 7.18 | 7.08 | **7.37** | + 3 | + 4 |
| HR | 5.87 | 5.95 | **6.13** | + 4 | + 3 |
| HU | 5.23 | 4.40 | **5.72** | + 9 | + 30 |
| IE | 9.79 | 10.7 | **10.1** | + 3 | – 6 |
| IT | 3.83 | 3.63 | **3.97** | + 4 | + 9 |
| LT | 4.54 | 4.74 | **5.13** | + 13 | + 8 |
| LU | 6.04 | 6.21 | **6.07** | + 0 | – 2 |
| LV | 4.59 | 4.72 | **4.98** | + 8 | + 6 |
| MT | — | — | **—** | — | — |
| NL | 8.98 | 9.60 | **9.05** | + 1 | – 6 |
| PL | 4.84 | 5.34 | **5.20** | + 7 | – 3 |
| PT | 2.36 | 1.82 | **1.35** | – 43 | – 26 |
| RO | 4.30 | 4.18 | **4.89** | + 14 | + 17 |
| SE | 6.53 | 6.99 | **7.01** | + 7 | + 0 |
| SI | 4.83 | 4.90 | **5.43** | + 12 | + 11 |
| SK | 5.06 | 4.69 | **5.12** | + 1 | + 9 |



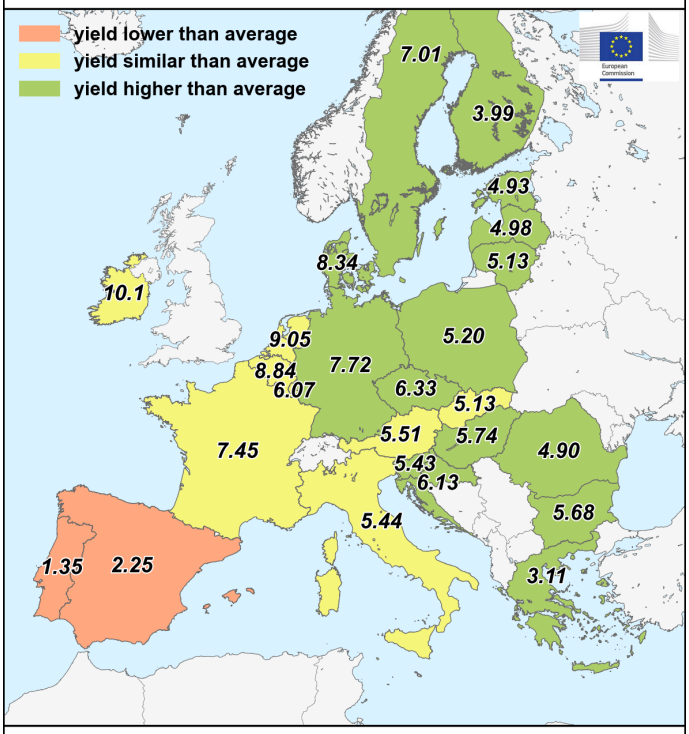

| Country | Total barley (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| **EU** | 4.90 | 5.03 | **4.89** | – 0 | – 3 |
| AT | 5.92 | 6.19 | **6.30** | + 6 | + 2 |
| BE | 8.21 | 8.71 | **8.51** | + 4 | – 2 |
| BG | 4.76 | 4.97 | **5.23** | + 10 | + 5 |
| CY | 1.84 | 2.26 | **1.76** | – 4 | – 22 |
| CZ | 5.35 | 5.61 | **5.68** | + 6 | + 1 |
| DE | 6.56 | 7.08 | **6.87** | + 5 | – 3 |
| DK | 5.83 | 6.79 | **6.08** | + 4 | – 10 |
| EE | 3.67 | 4.20 | **4.08** | + 11 | – 3 |
| EL | 2.82 | 2.44 | **2.98** | + 6 | + 22 |
| ES | 3.33 | 2.77 | **2.20** | – 34 | – 21 |
| FI | 3.50 | 3.79 | **3.65** | + 4 | – 4 |
| FR | 6.27 | 6.12 | **6.48** | + 3 | + 6 |
| HR | 5.04 | 5.10 | **5.49** | + 9 | + 8 |
| HU | 5.41 | 4.80 | **6.03** | + 11 | + 26 |
| IE | 7.89 | 8.32 | **8.21** | + 4 | – 1 |
| IT | 4.13 | 4.20 | **4.22** | + 2 | + 1 |
| LT | 3.48 | 3.92 | **3.61** | + 4 | – 8 |
| LU | — | — | **—** | — | — |
| LV | 3.22 | 3.67 | **3.92** | + 22 | + 7 |
| MT | — | — | **—** | — | — |
| NL | 7.11 | 7.98 | **7.25** | + 2 | – 9 |
| PL | 3.83 | 4.43 | **4.17** | + 9 | – 6 |
| PT | 2.97 | 2.47 | **1.70** | – 43 | – 31 |
| RO | 3.97 | 4.25 | **4.58** | + 15 | + 8 |
| SE | 4.51 | 5.50 | **5.02** | + 11 | – 9 |
| SI | 5.00 | 4.99 | **5.41** | + 8 | + 9 |
| SK | 4.73 | 4.72 | **4.87** | + 3 | + 3 |



| Country | Soft wheat (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| **EU** | 5.81 | 5.79 | **6.01** | + 4 | + 4 |
| AT | 5.58 | 5.78 | **5.51** | – 1 | – 5 |
| BE | 8.77 | 9.30 | **8.84** | + 1 | – 5 |
| BG | 4.99 | 5.17 | **5.68** | + 14 | + 10 |
| CY | — | — | **—** | — | — |
| CZ | 5.93 | 6.07 | **6.33** | + 7 | + 4 |
| DE | 7.37 | 7.61 | **7.72** | + 5 | + 1 |
| DK | 7.80 | 8.47 | **8.34** | + 7 | – 2 |
| EE | 4.38 | 4.72 | **4.93** | + 13 | + 4 |
| EL | 2.98 | 3.01 | **3.11** | + 4 | + 3 |
| ES | 3.62 | 2.87 | **2.25** | – 38 | – 22 |
| FI | 3.56 | 3.76 | **3.99** | + 12 | + 6 |
| FR | 7.29 | 7.18 | **7.45** | + 2 | + 4 |
| HR | 5.87 | 5.95 | **6.13** | + 4 | + 3 |
| HU | 5.26 | 4.43 | **5.74** | + 9 | + 30 |
| IE | 9.79 | 10.7 | **10.1** | + 3 | – 6 |
| IT | 5.36 | 5.12 | **5.44** | + 1 | + 6 |
| LT | 4.54 | 4.74 | **5.13** | + 13 | + 8 |
| LU | 6.04 | 6.21 | **6.07** | + 0 | – 2 |
| LV | 4.59 | 4.72 | **4.98** | + 8 | + 6 |
| MT | — | — | **—** | — | — |
| NL | 8.98 | 9.60 | **9.05** | + 1 | – 6 |
| PL | 4.84 | 5.34 | **5.20** | + 7 | – 3 |
| PT | 2.36 | 1.82 | **1.35** | – 43 | – 26 |
| RO | 4.30 | 4.18 | **4.90** | + 14 | + 17 |
| SE | 6.53 | 6.99 | **7.01** | + 7 | + 0 |
| SI | 4.83 | 4.90 | **5.43** | + 12 | + 11 |
| SK | 5.07 | 4.65 | **5.13** | + 1 | + 10 |

## Soft wheat - yield forecast 2023

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

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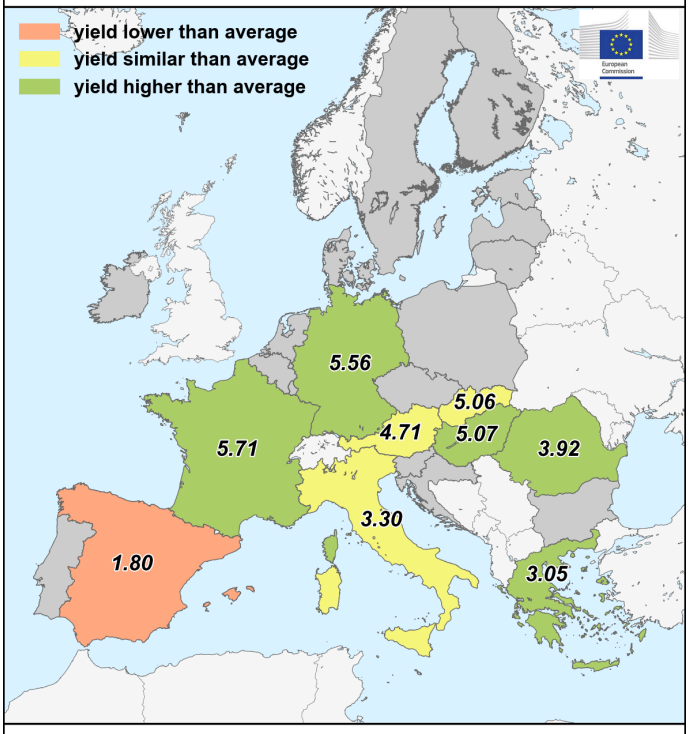
| Country | Durum wheat (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| **EU** | 3.50 | 3.25 | **3.48** | – 0 | + 7 |
| AT | 4.68 | 5.09 | **4.71** | + 1 | – 8 |
| BE | — | — | **—** | — | — |
| BG | — | — | **—** | — | — |
| CY | — | — | **—** | — | — |
| CZ | — | — | **—** | — | — |
| DE | 5.18 | 5.35 | **5.56** | + 7 | + 4 |
| DK | — | — | **—** | — | — |
| EE | — | — | **—** | — | — |
| EL | 2.91 | 2.59 | **3.05** | + 5 | + 18 |
| ES | 2.92 | 2.26 | **1.80** | – 38 | – 21 |
| FI | — | — | **—** | — | — |
| FR | 5.41 | 5.30 | **5.71** | + 6 | + 8 |
| HR | — | — | **—** | — | — |
| HU | 4.53 | 3.72 | **5.07** | + 12 | + 37 |
| IE | — | — | **—** | — | — |
| IT | 3.18 | 2.98 | **3.30** | + 4 | + 11 |
| LT | — | — | **—** | — | — |
| LU | — | — | **—** | — | — |
| LV | — | — | **—** | — | — |
| MT | — | — | **—** | — | — |
| NL | — | — | **—** | — | — |
| PL | — | — | **—** | — | — |
| PT | — | — | **—** | — | — |
| RO | 3.24 | 2.92 | **3.92** | + 21 | + 34 |
| 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**

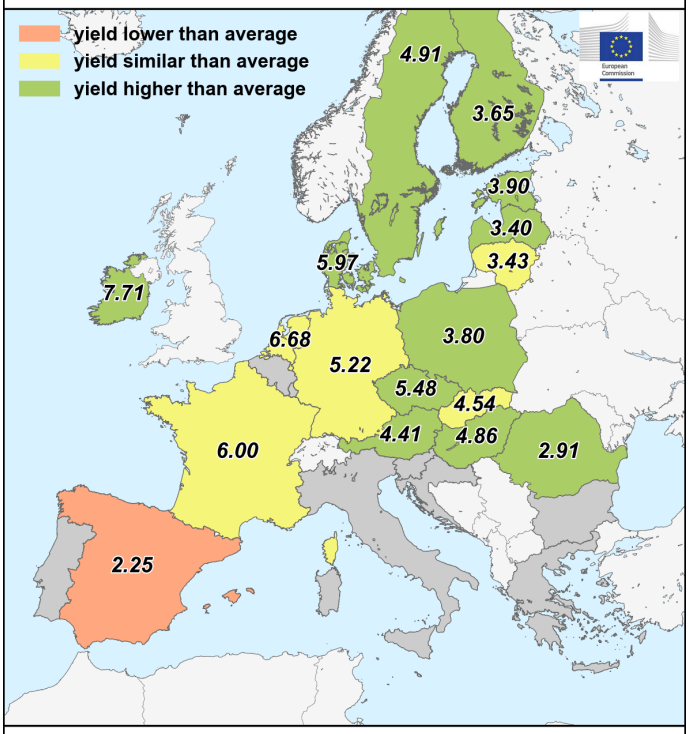



MARS Bulletin Vol. 31 No.5 (2023)

| Country | Spring barley (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| **EU** | 4.19 | 4.21 | **3.90** | – 7 | – 7 |
| AT | 4.17 | 4.38 | **4.41** | + 6 | + 1 |
| BE | — | — | — | — | — |
| BG | — | — | — | — | — |
| CY | — | — | — | — | — |
| CZ | 5.11 | 5.31 | **5.48** | + 7 | + 3 |
| DE | 5.19 | 5.32 | **5.22** | + 1 | – 2 |
| DK | 5.71 | 6.74 | **5.97** | + 5 | – 11 |
| EE | 3.43 | 3.99 | **3.90** | + 14 | – 2 |
| EL | — | — | — | — | — |
| ES | 3.38 | 2.81 | **2.25** | – 34 | – 20 |
| FI | 3.50 | 3.79 | **3.65** | + 4 | – 4 |
| FR | 5.83 | 5.16 | **6.00** | + 3 | + 16 |
| HR | — | — | — | — | — |
| HU | 4.13 | 4.30 | **4.86** | + 18 | + 13 |
| IE | 7.28 | 8.10 | **7.71** | + 6 | – 5 |
| IT | — | — | — | — | — |
| LT | 3.37 | 3.81 | **3.43** | + 2 | – 10 |
| LU | — | — | — | — | — |
| LV | 2.99 | 3.24 | **3.40** | + 14 | + 5 |
| MT | — | — | — | — | — |
| NL | 6.69 | 7.61 | **6.68** | – 0 | – 12 |
| PL | 3.44 | 3.95 | **3.80** | + 11 | – 4 |
| PT | — | — | — | — | — |
| RO | 2.61 | 2.83 | **2.91** | + 12 | + 3 |
| SE | 4.41 | 5.44 | **4.91** | + 11 | – 10 |
| SI | — | — | — | — | — |
| SK | 4.41 | 4.26 | **4.54** | + 3 | + 7 |

## Spring barley - yield forecast 2023

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

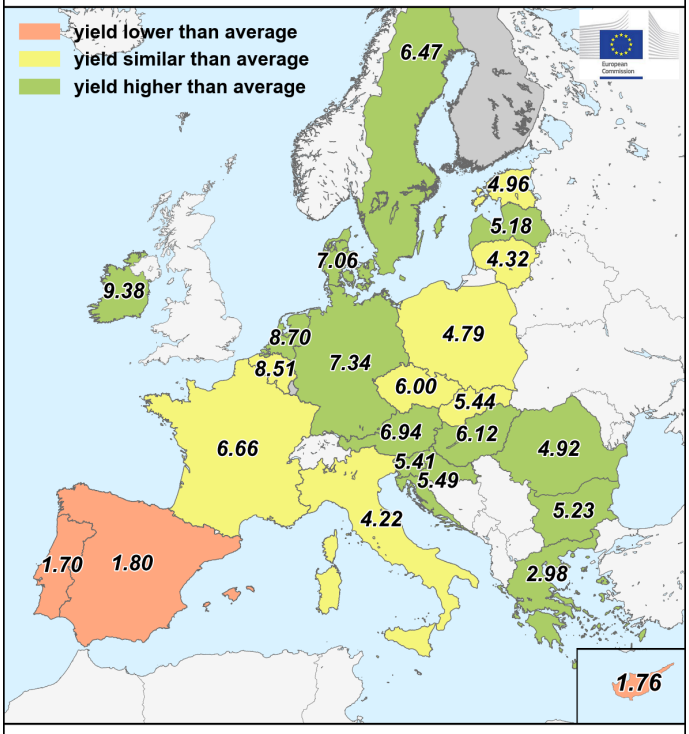



MARS Bulletin Vol. 31 No.5 (2023)

| Country | Winter barley (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| **EU** | 5.77 | 5.92 | **6.00** | + 4 | + 1 |
| AT | 6.54 | 6.66 | **6.94** | + 6 | + 4 |
| BE | 8.21 | 8.71 | **8.51** | + 4 | – 2 |
| BG | 4.76 | 4.97 | **5.23** | + 10 | + 5 |
| CY | 1.84 | 2.26 | **1.76** | – 4 | – 22 |
| CZ | 5.83 | 6.13 | **6.00** | + 3 | – 2 |
| DE | 6.96 | 7.62 | **7.34** | + 6 | – 4 |
| DK | 6.63 | 7.22 | **7.06** | + 6 | – 2 |
| EE | 4.89 | 4.68 | **4.96** | + 1 | + 6 |
| EL | 2.82 | 2.44 | **2.98** | + 6 | + 22 |
| ES | 2.86 | 2.41 | **1.80** | – 37 | – 25 |
| FI | — | — | — | — | — |
| FR | 6.49 | 6.55 | **6.66** | + 3 | + 2 |
| HR | 5.04 | 5.10 | **5.49** | + 9 | + 8 |
| HU | 5.54 | 4.84 | **6.12** | + 10 | + 27 |
| IE | 8.98 | 8.68 | **9.38** | + 4 | + 8 |
| IT | 4.13 | 4.20 | **4.22** | + 2 | + 1 |
| LT | 4.19 | 4.26 | **4.32** | + 3 | + 1 |
| LU | — | — | — | — | — |
| LV | 4.81 | 4.85 | **5.18** | + 8 | + 7 |
| MT | — | — | — | — | — |
| NL | 8.22 | 8.90 | **8.70** | + 6 | – 2 |
| PL | 4.65 | 4.95 | **4.79** | + 3 | – 3 |
| PT | 2.97 | 2.47 | **1.70** | – 43 | – 31 |
| RO | 4.27 | 4.43 | **4.92** | + 15 | + 11 |
| SE | 5.90 | 6.17 | **6.47** | + 10 | + 5 |
| SI | 5.00 | 4.99 | **5.41** | + 8 | + 9 |
| SK | 5.30 | 5.32 | **5.44** | + 3 | + 2 |

## Winter barley - yield forecast 2023

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

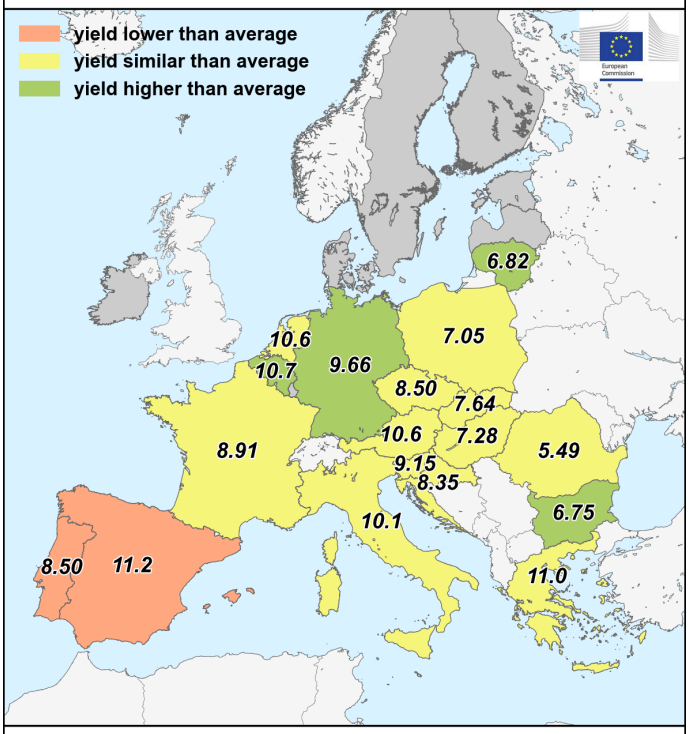



MARS Bulletin Vol. 31 No.5 (2023)

| Country | Grain maize (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| **EU** | 7.48 | 5.90 | **7.64** | + 2 | + 29 |
| AT | 10.6 | 9.82 | **10.6** | – 0 | + 8 |
| BE | 10.1 | 9.50 | **10.7** | + 6 | + 13 |
| BG | 6.08 | 4.80 | **6.75** | + 11 | + 41 |
| CY | — | — | — | — | — |
| CZ | 8.35 | 7.95 | **8.50** | + 2 | + 7 |
| DE | 9.06 | 8.40 | **9.66** | + 7 | + 15 |
| DK | — | — | — | — | — |
| EE | — | — | — | — | — |
| EL | 10.8 | 9.75 | **11.0** | + 2 | + 13 |
| ES | 12.1 | 11.7 | **11.2** | – 7 | – 4 |
| FI | — | — | — | — | — |
| FR | 8.61 | 7.54 | **8.91** | + 4 | + 18 |
| HR | 8.06 | 6.11 | **8.35** | + 4 | + 37 |
| HU | 7.04 | 3.42 | **7.28** | + 3 | + 113 |
| IE | — | — | — | — | — |
| IT | 10.0 | 8.31 | **10.1** | + 1 | + 21 |
| LT | 6.40 | 5.31 | **6.82** | + 7 | + 29 |
| LU | — | — | — | — | — |
| LV | — | — | — | — | — |
| MT | — | — | — | — | — |
| NL | 10.3 | 9.74 | **10.6** | + 3 | + 9 |
| PL | 6.79 | 6.98 | **7.05** | + 4 | + 1 |
| PT | 9.43 | 9.44 | **8.50** | – 10 | – 10 |
| RO | 5.39 | 3.01 | **5.49** | + 2 | + 82 |
| SE | — | — | — | — | — |
| SI | 9.09 | 6.68 | **9.15** | + 1 | + 37 |
| SK | 7.37 | 4.47 | **7.64** | + 4 | + 71 |

## Grain maize - yield forecast 2023

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

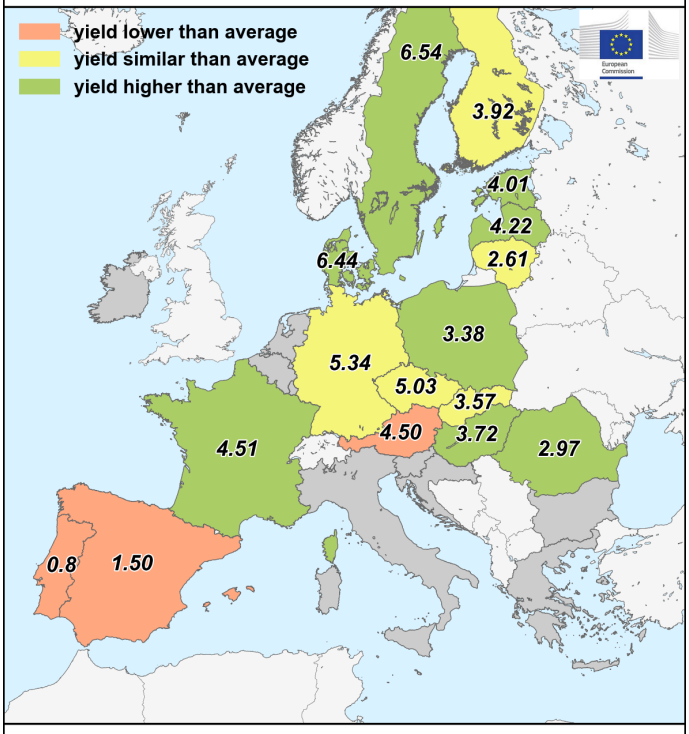



MARS Bulletin Vol. 31 No.5 (2023)

| Country | Rye (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| **EU** | 3.98 | 4.29 | **4.26** | + 7 | – 1 |
| AT | 4.72 | 4.87 | **4.50** | – 5 | – 8 |
| BE | — | — | — | — | — |
| BG | — | — | — | — | — |
| CY | — | — | — | — | — |
| CZ | 5.14 | 5.31 | **5.03** | – 2 | – 5 |
| DE | 5.16 | 5.32 | **5.34** | + 3 | + 0 |
| DK | 6.06 | 6.42 | **6.44** | + 6 | + 0 |
| EE | 3.75 | 3.85 | **4.01** | + 7 | + 4 |
| EL | — | — | — | — | — |
| ES | 2.42 | 1.87 | **1.50** | – 38 | – 20 |
| FI | 3.84 | 3.35 | **3.92** | + 2 | + 17 |
| FR | 4.30 | 3.84 | **4.51** | + 5 | + 17 |
| HR | — | — | — | — | — |
| HU | 3.29 | 3.01 | **3.72** | + 13 | + 24 |
| IE | — | — | — | — | — |
| IT | — | — | — | — | — |
| LT | 2.56 | 2.41 | **2.61** | + 2 | + 8 |
| LU | — | — | — | — | — |
| LV | 4.05 | 3.66 | **4.22** | + 4 | + 15 |
| 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 | **2.97** | + 9 | + 15 |
| SE | 5.99 | 6.22 | **6.54** | + 9 | + 5 |
| SI | — | — | — | — | — |
| SK | 3.60 | 3.84 | **3.57** | – 1 | – 7 |

## Rye - yield forecast 2023

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

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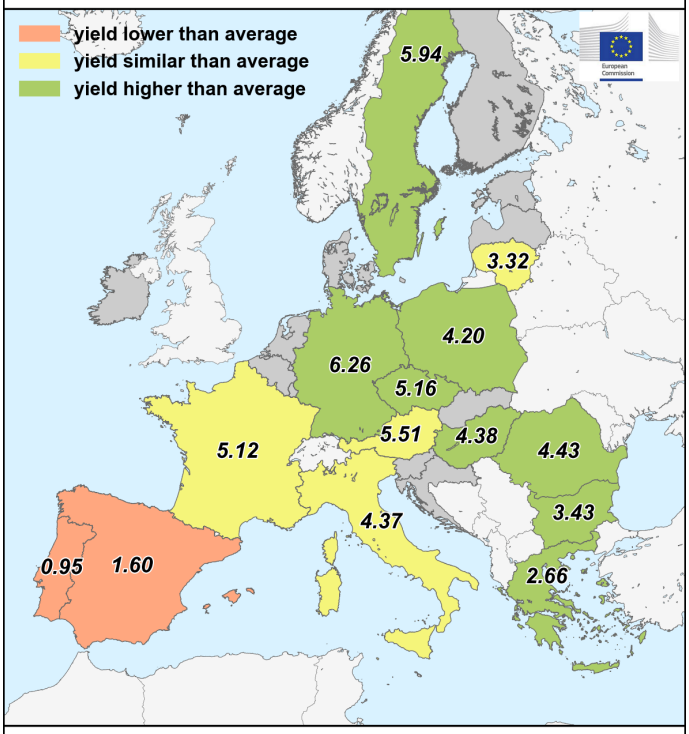
| Country | Triticale (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| **EU** | 4.22 | 4.42 | **4.32** | + 2 | – 2 |
| AT | 5.44 | 5.62 | **5.51** | + 1 | – 2 |
| BE | — | — | — | — | — |
| BG | 2.96 | 3.00 | **3.43** | + 16 | + 14 |
| CY | — | — | — | — | — |
| CZ | 4.88 | 5.12 | **5.16** | + 6 | + 1 |
| DE | 5.85 | 5.95 | **6.26** | + 7 | + 5 |
| 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 | **4.38** | + 10 | + 28 |
| IE | — | — | — | — | — |
| IT | 4.42 | 4.31 | **4.37** | – 1 | + 1 |
| LT | 3.25 | 3.24 | **3.32** | + 2 | + 2 |
| LU | — | — | — | — | — |
| LV | — | — | — | — | — |
| MT | — | — | — | — | — |
| NL | — | — | — | — | — |
| PL | 3.98 | 4.51 | **4.20** | + 6 | – 7 |
| PT | 1.54 | 1.25 | **0.95** | – 38 | – 24 |
| RO | 3.86 | 3.80 | **4.43** | + 15 | + 17 |
| SE | 5.55 | 5.68 | **5.94** | + 7 | + 4 |
| SI | — | — | — | — | — |
| SK | — | — | — | — | — |

## Triticale - yield forecast 2023

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

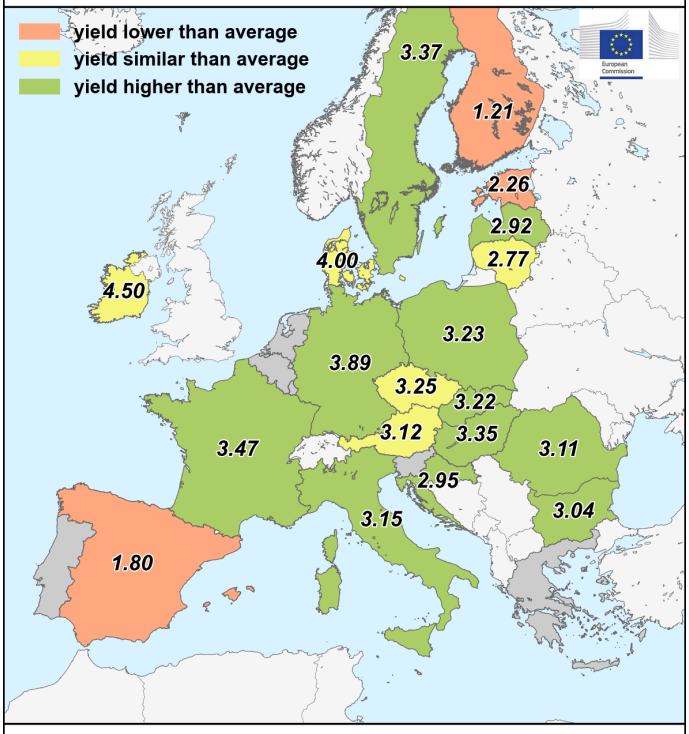



MARS Bulletin Vol. 31 No.5 (2023)

| Country | Rape and turnip rape (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| **EU** | 3.10 | 3.33 | **3.34** | + 8 | + 0 |
| AT | 3.06 | 3.21 | **3.12** | + 2 | – 3 |
| BE | — | — | — | — | — |
| BG | 2.57 | 2.29 | **3.04** | + 18 | + 32 |
| CY | — | — | — | — | — |
| CZ | 3.25 | 3.39 | **3.25** | + 0 | – 4 |
| DE | 3.47 | 3.95 | **3.89** | + 12 | – 1 |
| DK | 4.08 | 4.49 | **4.00** | – 2 | – 11 |
| EE | 2.47 | 2.53 | **2.26** | – 9 | – 11 |
| EL | — | — | — | — | — |
| ES | 2.35 | 2.16 | **1.80** | – 23 | – 17 |
| FI | 1.31 | 1.37 | **1.21** | – 8 | – 12 |
| FR | 3.24 | 3.68 | **3.47** | + 7 | – 6 |
| HR | 2.72 | 2.59 | **2.95** | + 8 | + 14 |
| HU | 2.88 | 2.50 | **3.35** | + 16 | + 34 |
| IE | 4.44 | 4.92 | **4.50** | + 1 | – 9 |
| IT | 2.84 | 2.85 | **3.15** | + 11 | + 11 |
| LT | 2.80 | 2.57 | **2.77** | – 1 | + 8 |
| LU | — | — | — | — | — |
| LV | 2.62 | 2.21 | **2.92** | + 12 | + 32 |
| MT | — | — | — | — | — |
| NL | — | — | — | — | — |
| PL | 3.05 | 3.38 | **3.23** | + 6 | – 5 |
| PT | — | — | — | — | — |
| RO | 2.56 | 2.62 | **3.11** | + 21 | + 19 |
| SE | 3.20 | 3.35 | **3.37** | + 6 | + 1 |
| SI | — | — | — | — | — |
| SK | 3.03 | 3.12 | **3.22** | + 6 | + 3 |

## Rapeseed - yield forecast 2023

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

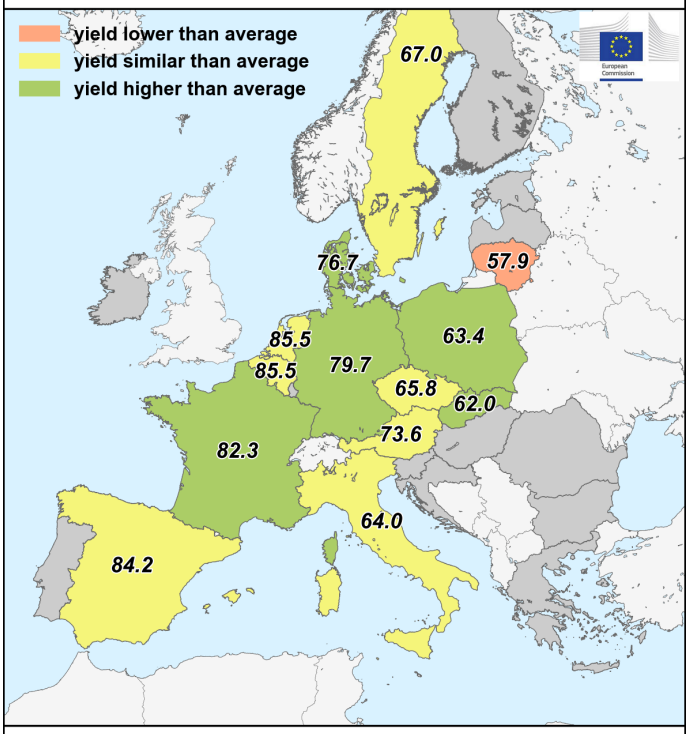



MARS Bulletin Vol. 31 No.5 (2023)

| Country | Sugar beets (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| **EU** | 72.6 | N/A | **76.7** | + 6 | N/A |
| AT | 75.9 | 79.7 | **73.6** | – 3 | – 8 |
| BE | 85.3 | 89.3 | **85.5** | + 0 | – 4 |
| BG | — | — | — | — | — |
| CY | — | — | — | — | — |
| CZ | 63.5 | 69.6 | **65.8** | + 4 | – 6 |
| DE | 72.5 | 71.2 | **79.7** | + 10 | + 12 |
| DK | 73.6 | 72.3 | **76.7** | + 4 | + 6 |
| EE | — | — | — | — | — |
| EL | — | — | — | — | — |
| ES | 85.8 | 84.1 | **84.2** | – 2 | + 0 |
| FI | — | — | — | — | — |
| FR | 78.7 | 78.6 | **82.3** | + 5 | + 5 |
| HR | — | — | — | — | — |
| HU | — | — | — | — | — |
| IE | — | — | — | — | — |
| IT | 63.1 | N/A | **64.0** | + 1 | N/A |
| LT | 63.2 | 62.5 | **57.9** | – 8 | – 7 |
| LU | — | — | — | — | — |
| LV | — | — | — | — | — |
| MT | — | — | — | — | — |
| NL | 82.4 | 88.8 | **85.5** | + 4 | – 4 |
| PL | 59.4 | 57.3 | **63.4** | + 7 | + 11 |
| PT | — | — | — | — | — |
| RO | — | — | — | — | — |
| SE | 66.5 | 64.7 | **67.0** | + 1 | + 3 |
| SI | — | — | — | — | — |
| SK | 59.4 | 56.3 | **62.0** | + 4 | + 10 |

## Sugar beet - yield forecast 2023

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

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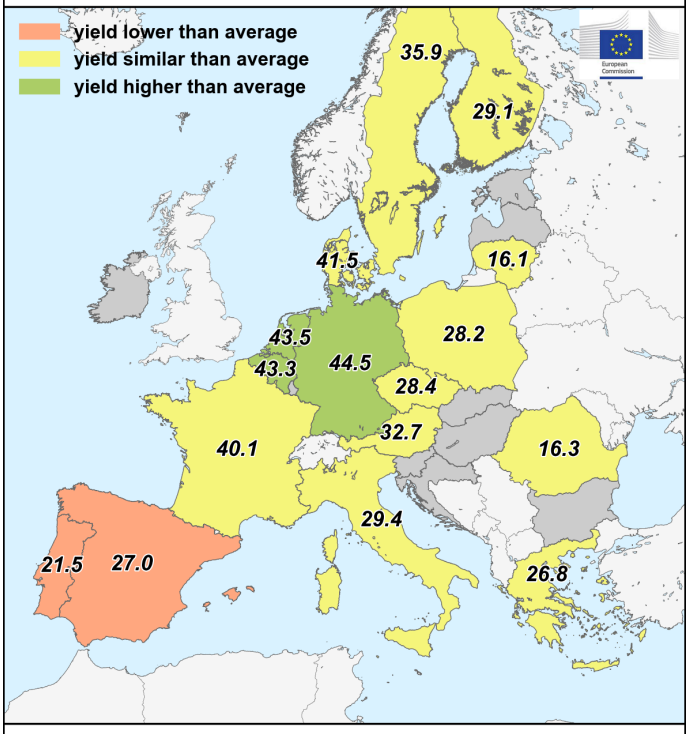
| Country | Potato (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| **EU** | 34.1 | 35.3 | **36.4** | + 7 | + 3 |
| AT | 32.7 | 32.0 | **32.7** | + 0 | + 2 |
| BE | 39.1 | 38.6 | **43.3** | + 11 | + 12 |
| BG | — | — | — | — | — |
| CY | — | — | — | — | — |
| CZ | 28.3 | 30.2 | **28.4** | + 0 | – 6 |
| DE | 40.3 | 40.1 | **44.5** | + 11 | + 11 |
| DK | 41.7 | 44.2 | **41.5** | – 1 | – 6 |
| EE | — | — | — | — | — |
| EL | 27.3 | 26.5 | **26.8** | – 2 | + 1 |
| ES | 31.7 | 30.5 | **27.0** | – 15 | – 11 |
| FI | 28.6 | 28.1 | **29.1** | + 2 | + 4 |
| FR | 40.2 | 38.0 | **40.1** | – 0 | + 6 |
| HR | — | — | — | — | — |
| HU | — | — | — | — | — |
| IE | — | — | — | — | — |
| IT | 29.2 | 28.3 | **29.4** | + 1 | + 4 |
| LT | 15.6 | 14.9 | **16.1** | + 3 | + 8 |
| LU | — | — | — | — | — |
| LV | — | — | — | — | — |
| MT | — | — | — | — | — |
| NL | 41.2 | 42.6 | **43.5** | + 6 | + 2 |
| PL | 27.8 | 30.8 | **28.2** | + 2 | – 9 |
| PT | 23.1 | 24.0 | **21.5** | – 7 | – 10 |
| RO | 16.2 | 15.9 | **16.3** | + 1 | + 3 |
| SE | 34.7 | 36.3 | **35.9** | + 3 | – 1 |
| SI | — | — | — | — | — |
| SK | — | — | — | — | — |

## Potato - yield forecast 2023

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

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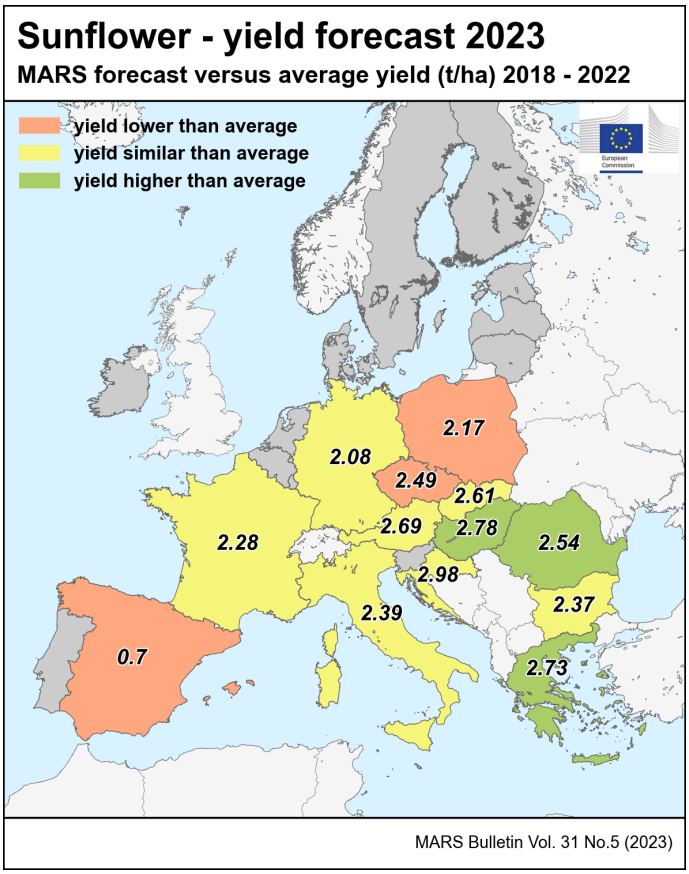
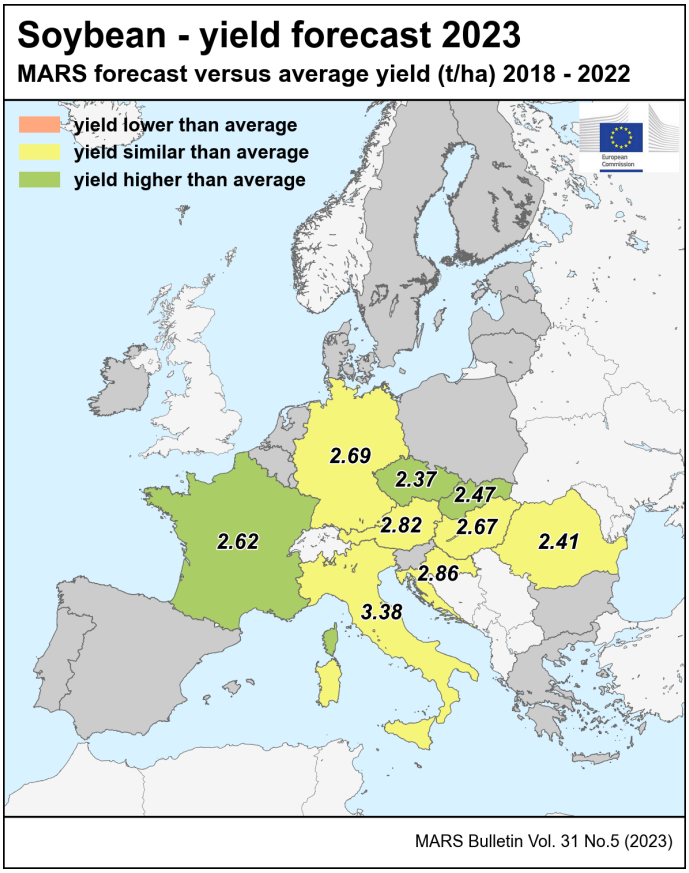
| Country | Sunflower (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| **EU** | 2.21 | 1.87 | **2.22** | + 0 | + 18 |
| AT | 2.70 | 2.32 | **2.69** | – 0 | + 16 |
| BE | — | — | — | — | — |
| BG | 2.32 | 2.31 | **2.37** | + 2 | + 2 |
| CY | — | — | — | — | — |
| CZ | 2.60 | 2.65 | **2.49** | – 4 | – 6 |
| DE | 2.07 | 1.88 | **2.08** | + 1 | + 11 |
| 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 | **2.28** | + 1 | + 10 |
| HR | 3.02 | 2.99 | **2.98** | – 1 | – 0 |
| HU | 2.64 | 1.84 | **2.78** | + 5 | + 51 |
| IE | — | — | — | — | — |
| IT | 2.42 | 2.39 | **2.39** | – 1 | + 0 |
| LT | — | — | — | — | — |
| LU | — | — | — | — | — |
| LV | — | — | — | — | — |
| MT | — | — | — | — | — |
| NL | — | — | — | — | — |
| PL | 2.27 | 2.40 | **2.17** | – 5 | – 10 |
| PT | — | — | — | — | — |
| RO | 2.43 | 1.92 | **2.54** | + 5 | + 32 |
| SE | — | — | — | — | — |
| SI | — | — | — | — | — |
| SK | 2.62 | 2.33 | **2.61** | – 1 | + 12 |




| Country | Soybean (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| **EU** | 2.76 | 2.24 | **2.85** | + 3 | + 27 |
| AT | 2.88 | 2.62 | **2.82** | – 2 | + 8 |
| BE | — | — | — | — | — |
| BG | — | — | — | — | — |
| CY | — | — | — | — | — |
| CZ | 2.26 | 2.30 | **2.37** | + 5 | + 3 |
| DE | 2.67 | 2.34 | **2.69** | + 1 | + 15 |
| DK | — | — | — | — | — |
| EE | — | — | — | — | — |
| EL | — | — | — | — | — |
| ES | — | — | — | — | — |
| FI | — | — | — | — | — |
| FR | 2.44 | 2.05 | **2.62** | + 8 | + 28 |
| HR | 2.83 | 2.16 | **2.86** | + 1 | + 32 |
| HU | 2.58 | 1.85 | **2.67** | + 3 | + 44 |
| IE | — | — | — | — | — |
| IT | 3.30 | 2.64 | **3.38** | + 2 | + 28 |
| LT | — | — | — | — | — |
| LU | — | — | — | — | — |
| LV | — | — | — | — | — |
| MT | — | — | — | — | — |
| NL | — | — | — | — | — |
| PL | — | — | — | — | — |
| PT | — | — | — | — | — |
| RO | 2.33 | 1.80 | **2.41** | + 3 | + 34 |
| SE | — | — | — | — | — |
| SI | — | — | — | — | — |
| SK | 2.22 | 1.45 | **2.47** | + 11 | + 71 |



| Country | Wheat (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| BY | 3.42 | 3.48 | **3.66** | + 7 | + 5 |
| DZ | 1.70 | N/A | **1.28** | – 25 | N/A |
| MA | 1.79 | 1.11 | **1.48** | – 17 | + 34 |
| TN | 2.00 | 2.42 | **1.62** | – 19 | – 33 |
| TR | 2.83 | 2.99 | **2.94** | + 4 | – 2 |
| UA | 4.07 | 4.12 | **4.35** | + 7 | + 6 |
| UK | 8.10 | 8.60 | **8.28** | + 2 | – 4 |

| Country | Barley (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| BY | 2.76 | 2.75 | **3.03** | + 10 | + 10 |
| DZ | 1.22 | N/A | **1.06** | – 14 | N/A |
| MA | 1.21 | 0.62 | **0.99** | – 18 | + 60 |
| TN | 1.05 | 1.72 | **0.74** | – 30 | – 57 |
| TR | 2.48 | 2.63 | **2.55** | + 3 | – 3 |
| UA | 3.38 | 3.47 | **3.45** | + 2 | – 1 |
| 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 | **5.82** | + 4 | + 5 |
| DZ | — | — | **—** | — | — |
| MA | — | — | **—** | — | — |
| TN | — | — | **—** | — | — |
| TR | 9.32 | 9.33 | **9.37** | + 1 | + 0 |
| UA | 6.99 | 6.69 | **7.19** | + 3 | + 7 |
| UK | — | — | **—** | — | — |

| Country | Soybean (t/ha) | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | 2022 | MARS 2023 forecasts | %23/5yrs | %23/22 |
| BY | — | — | **—** | — | — |
| DZ | — | — | **—** | — | — |
| MA | — | — | **—** | — | — |
| TN | — | — | **—** | — | — |
| TR | 4.23 | 4.08 | **4.57** | + 8 | + 12 |
| UA | 2.40 | 2.43 | **2.43** | + 1 | + 0 |
| UK | — | — | **—** | — | — |

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

*Sources:* 2018-2023 data come from DG Agriculture and Rural Development short-term-outlook data (dated April 2023, received on 27.04.2023), Eurostat Eurobase (last update: 02.05.2023), ELSTAT, Statistics Netherlands (CBS) and EES (last update: 15.11.2017).

Non-EU 2018-2022 data come from USDA, INRA Maroc, ONICL Maroc, Ministère de l'agriculture des ressources hydrauliques et de la pêche Tunisie, MED-Amin baseline DB, DSASI-MADR Algeria, Turkish Statistical Institute (TurkStat), Eurostat Eurobase (last update: 02.05.2023), Department for Environment, Food & Rural Affairs of UK (DEFRA), Ministry for Development of Economy, Trade and Agriculture of Ukraine, FAO and PSD-online.

2023 yields come from MARS Crop Yield Forecasting System (output up to 10.05.2023).

EU aggregate after 12.2020 is reported.

N/A = Data not available.

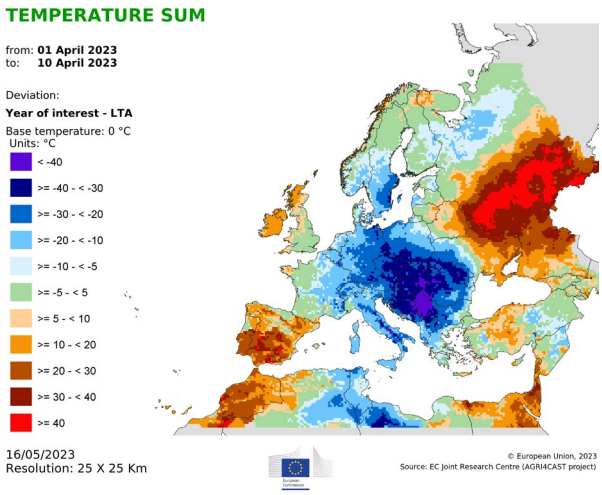
The column header '%23/5yrs' stands for the 2023 change with respect to the 5-year average(%). Similarly, '%23/22' stands for the 2023 change with respect to 2022(%).

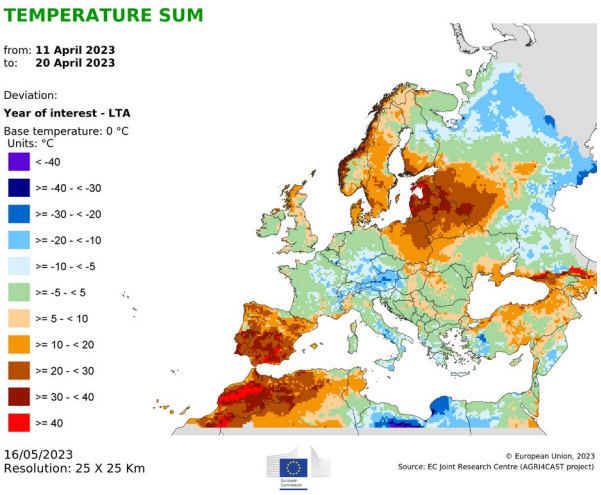
| Cop name | Eurostat Crop name | Eurostat Crop Code | Official Eurostat Crop definition* |
|---|---|---|---|
| Total wheat | Wheat and spelt | C1100 | Common wheat (*Triticum aestivum* L. emend. Fiori et Paol.), spelt (*Triticum spelta* L.), einkorn wheat (*Triticum monococcum* L.) and durum wheat (*Triticum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

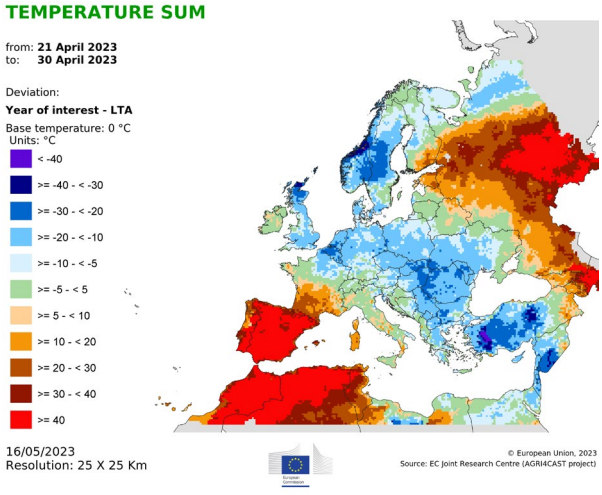
** Source:* Eurostat - Annual crop statistics (Handbook 2020 Edition)

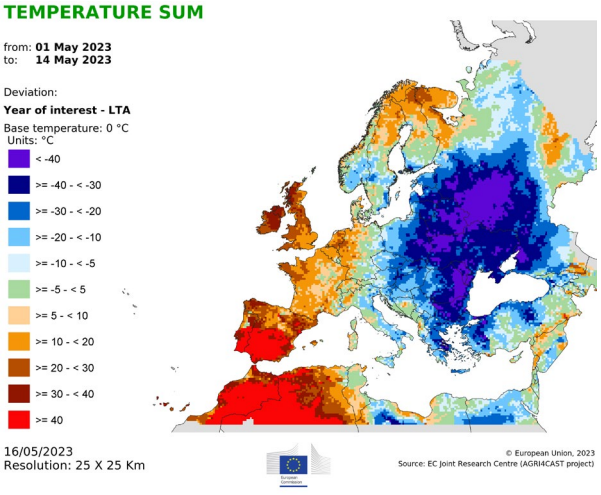
# 7. Atlas

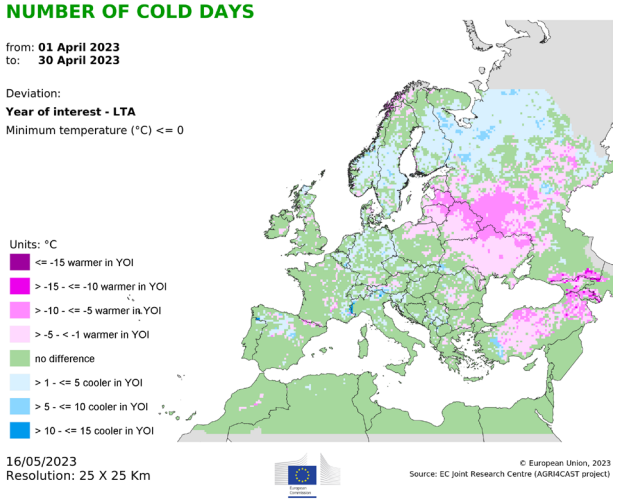
## Temperature regime

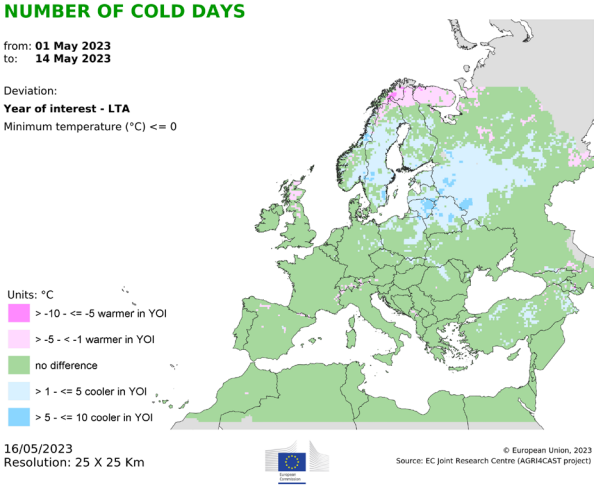


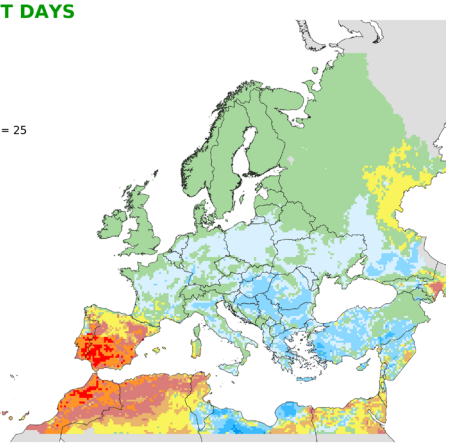



**NUMBER OF HOT DAYS**

from: **01 April 2023**
to: **30 April 2023**

Deviation:
**Year of interest - LTA**
Maximum temperature (°C) >= 25

Units: days
- > -15 - <= -10
- > -10 - <= -5
- > -5 - <= -2
- > -2 - < 0
- no difference
- > 0 - <= 2
- > 2 - <= 5
- > 5 - <= 10
- > 10 - <= 15
- > 15



16/05/2023
Resolution: 25 X 25 Km

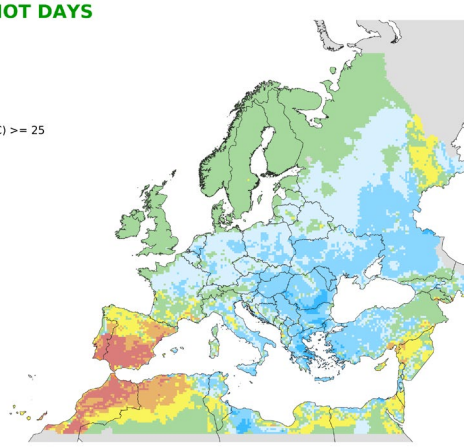

Source: EC Joint Research Centre (AGRI4CAST project)

**NUMBER OF HOT DAYS**

from: **01 May 2023**
to: **14 May 2023**

Deviation:
**Year of interest - LTA**
Maximum temperature (°C) >= 25

Units: days
- > -10 - <= -5
- > -5 - <= -2
- > -2 - < 0
- no difference
- > 0 - <= 2
- > 2 - <= 5
- > 5 - <= 10
- > 10 - <= 15



16/05/2023
Resolution: 25 X 25 Km


Source: EC Joint Research Centre (AGRI4CAST project)

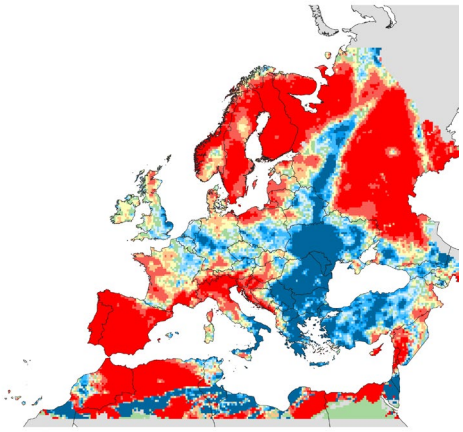
# Precipitation

**RAINFALL**
**Cumulative values**

from: **01 April 2023**
to: **10 April 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



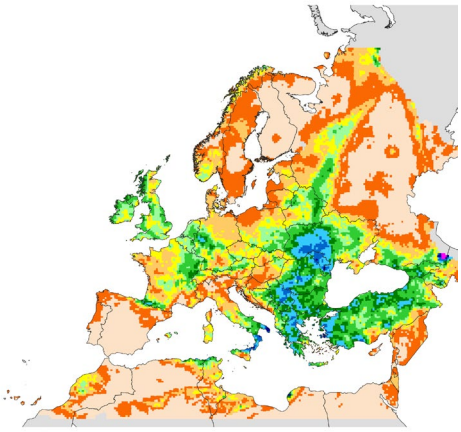
16/05/2023
Resolution: 25 X 25 Km


Source: EC Joint Research Centre (AGRI4CAST project)

**RAINFALL**
**Cumulative values**

from: **01 April 2023**
to: **10 April 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



16/05/2023
Resolution: 25 X 25 Km

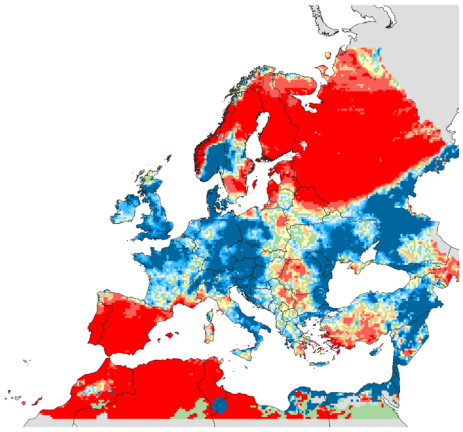

Source: EC Joint Research Centre (AGRI4CAST project)

**RAINFALL**
**Cumulative values**

from: **11 April 2023**
to: **20 April 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



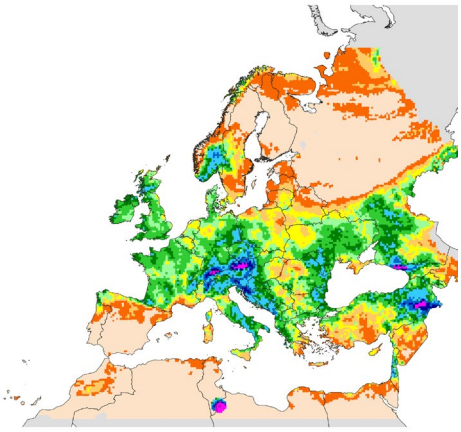
16/05/2023
Resolution: 25 X 25 Km


Source: EC Joint Research Centre (AGRI4CAST project)

**RAINFALL**
**Cumulative values**

from: **11 April 2023**
to: **20 April 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



16/05/2023
Resolution: 25 X 25 Km

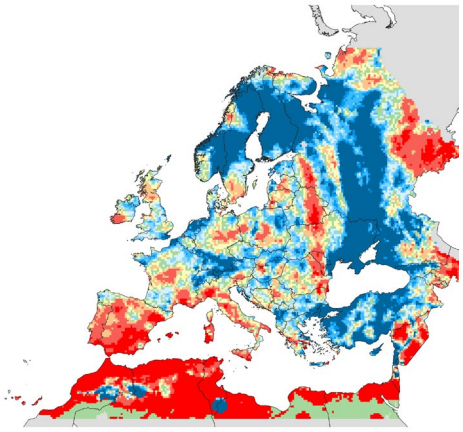

Source: EC Joint Research Centre (AGRI4CAST project)

## RAINFALL
**Cumulative values**

from: **21 April 2023**
to: **30 April 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



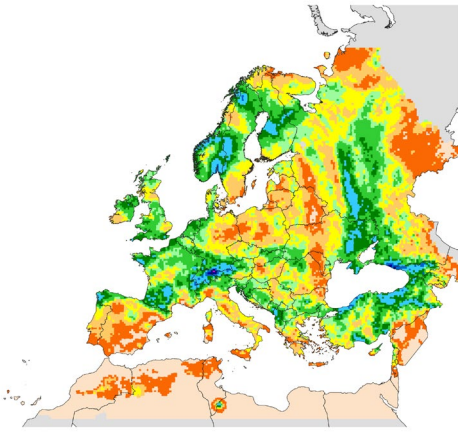
16/05/2023
Resolution: 25 X 25 Km



## RAINFALL
**Cumulative values**

from: **21 April 2023**
to: **30 April 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



16/05/2023
Resolution: 25 X 25 Km

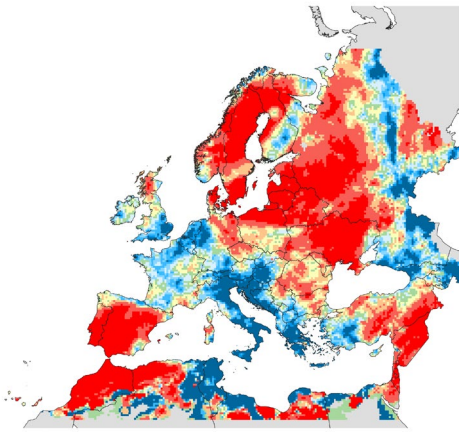


## RAINFALL
**Cumulative values**

from: **01 May 2023**
to: **14 May 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



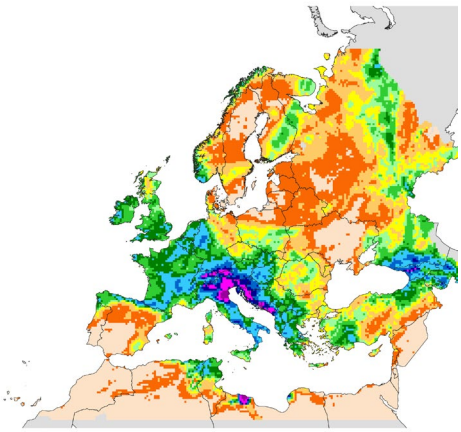
16/05/2023
Resolution: 25 X 25 Km



## RAINFALL
**Cumulative values**

from: **01 May 2023**
to: **14 May 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



16/05/2023
Resolution: 25 X 25 Km

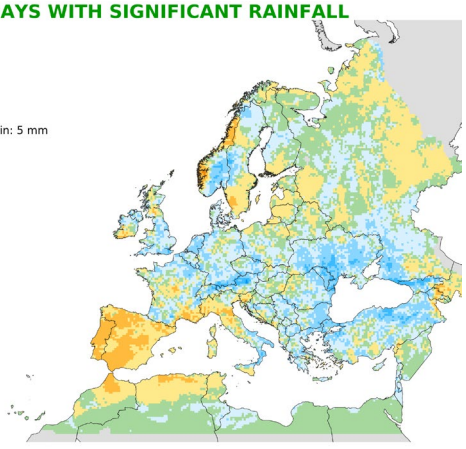


## NUMBER OF DAYS WITH SIGNIFICANT RAINFALL

from: **01 April 2023**
to: **30 April 2023**

Deviation:
**Year of interest - LTA**
Threshold for significant rain: 5 mm

Units: days
- 11 - 15
- 6 - 10
- 3 - 5
- 1 - 2
- no difference
- -2 - -1
- -5 - -3
- -10 - -3



16/05/2023
Resolution: 25 X 25 Km

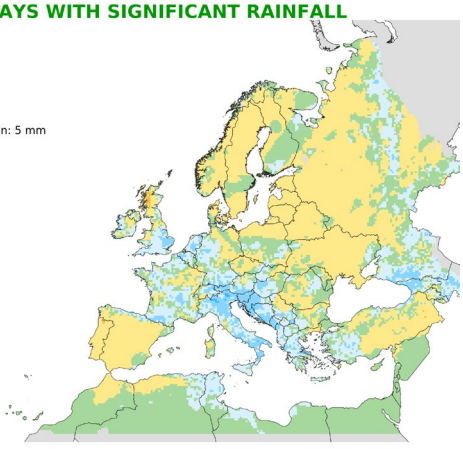


## NUMBER OF DAYS WITH SIGNIFICANT RAINFALL

from: **01 May 2023**
to: **14 May 2023**

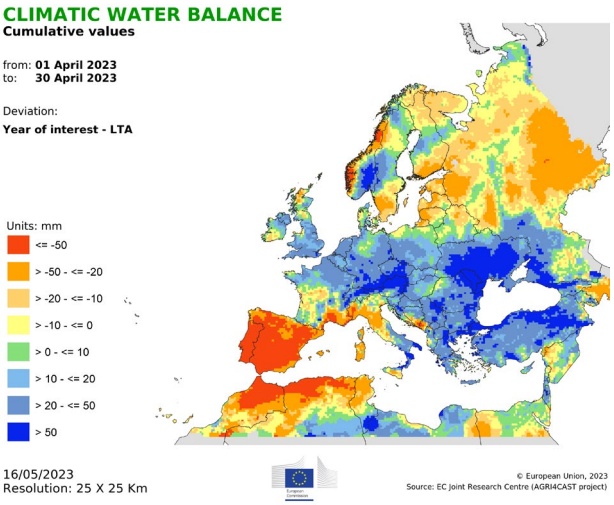
Deviation:
**Year of interest - LTA**
Threshold for significant rain: 5 mm

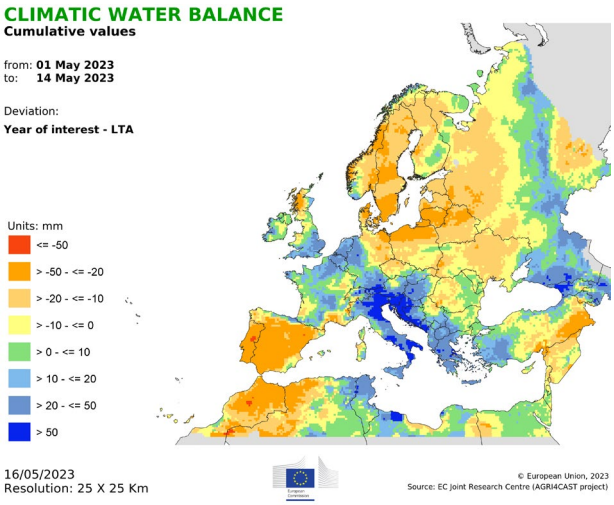
Units: days
- 6 - 10
- 3 - 5
- 1 - 2
- no difference
- -2 - -1
- -5 - -3



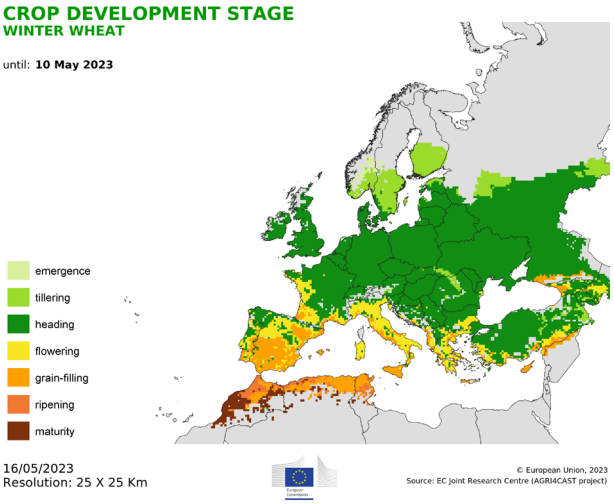
16/05/2023
Resolution: 25 X 25 Km

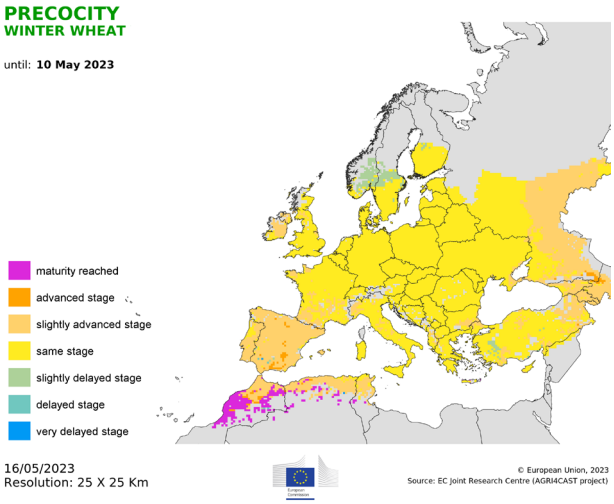
# Climatic water balance

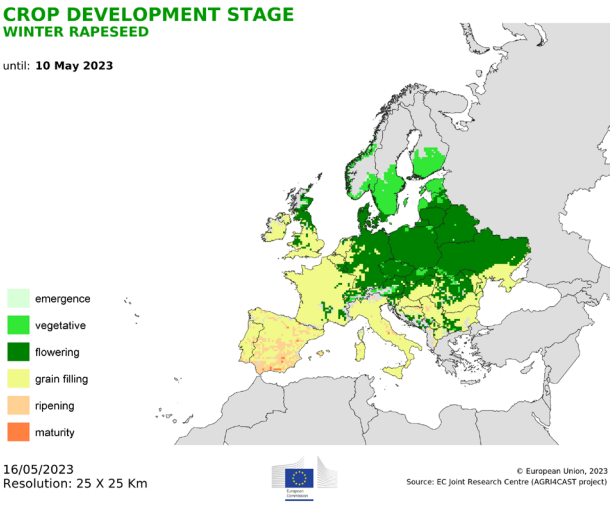


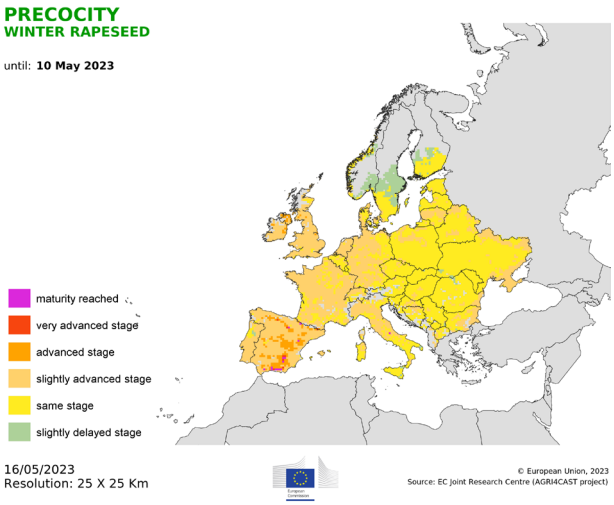



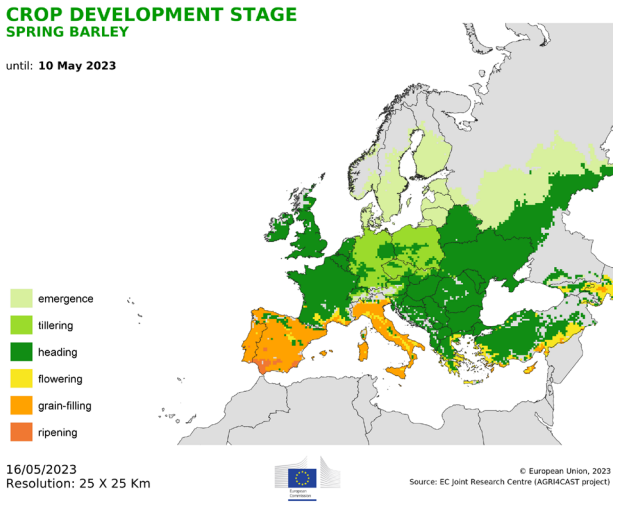

# Crop development stages and precocity

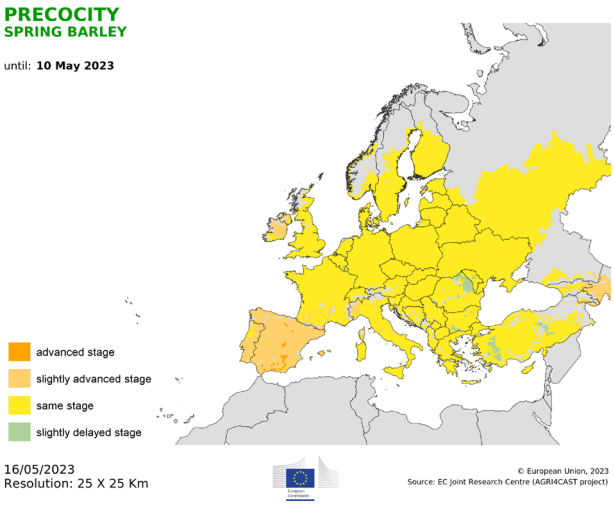


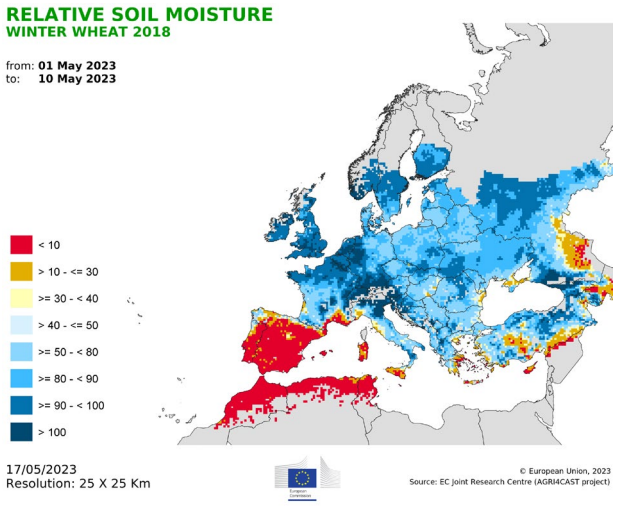



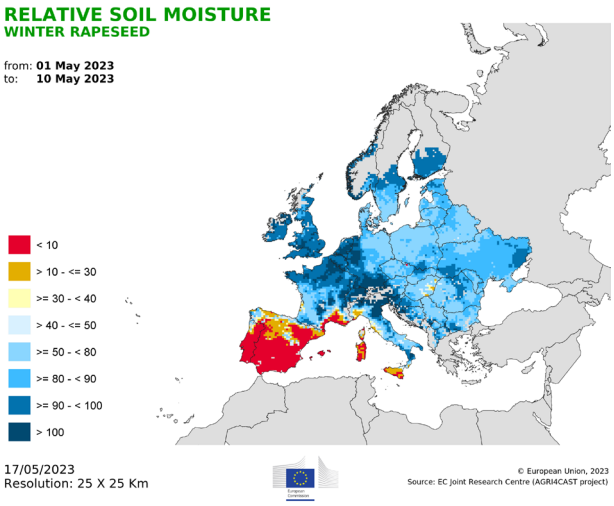





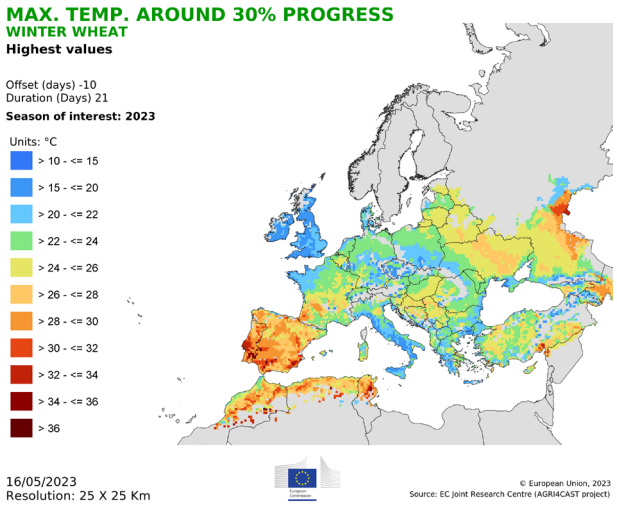



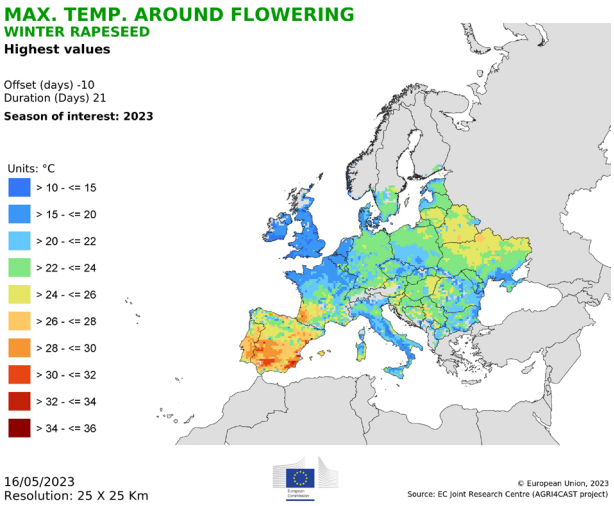

# Relative soil moisture



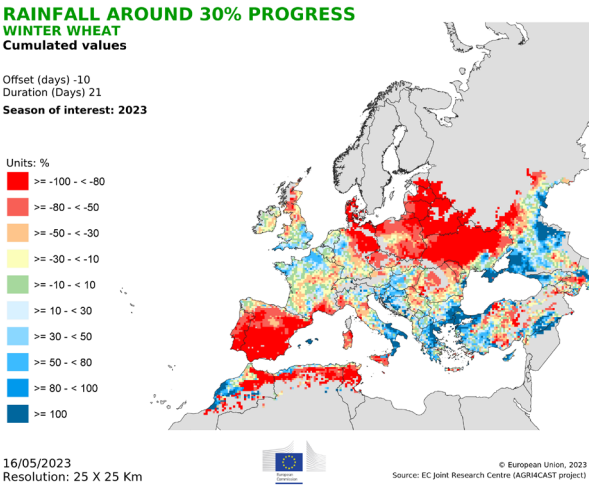



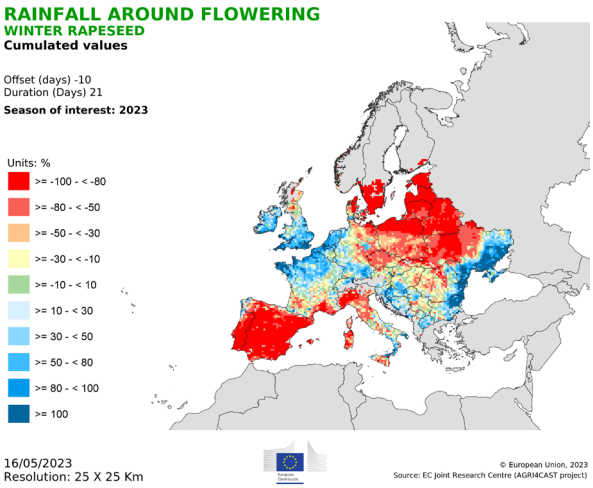

# Maximum temperature around crop development



# Precipitation around 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, grassland analysis, yield forecast | Vol. 31 No 3 |
| 24 Apr | Agromet analysis, remote sensing, grassland analysis, sowing conditions, yield forecast | Vol. 31 No 4 |
| 22 May | Agromet analysis, remote sensing, grassland analysis, sowing update, yield forecast | Vol. 31 No 5 |
| 19 Jun | Agromet analysis, remote sensing, grassland analysis, rice analysis, yield forecast | Vol. 31 No 6 |
| 24 Jul | Agromet analysis, remote sensing, grassland analysis, harvesting conditions, yield forecast | Vol. 31 No 7 |
| 21 Aug | Agromet analysis, remote sensing, grassland update, harvesting update, yield forecast | Vol. 31 No 8 |
| 18 Sep | Agromet analysis, remote sensing, grassland analysis, rice analysis, harvesting update, yield forecast | Vol. 31 No 9 |
| 23 Oct | Agromet analysis, grassland update, sowing conditions, harvesting update, yield forecast | Vol. 31 No 10 |
| 27 Nov | Agromet analysis, sowing update, harvesting update | Vol. 31 No 11 |
| 18 Dec | Agromet analysis | Vol. 31 No 12 |

### Mission statement

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

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

### Analysis and reports

B. Baruth, S. Bassu, W. Ben Aoun, A. Bussay, I. Biavetti, M. Bratu, I. Cerrani, Y. Chemin, M. Claverie, P. De Palma, D. Fumagalli, G. Manfron, J. Morel, L. Nisini, L. Panarello, M. Rossi, E. Tarnavsky, M. van den Berg, Z. Zajac, A. Zucchini

### Reporting support

SeproTec, I. Biavetti, G. Mulhern

### Edition

M. van den Berg, S. Niemeyer, B. Baruth

### Data production

AGRI4CAST (Food Security Unit JRC D5), MARSOP6 Consortium.

### Contact

JRCMARSBULLETIN@ec.europa.eu



### Technical note

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



Publications Office of the European Union