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Issued: 15 April 2019

JRC MARS Bulletin
Crop monitoring in Europe
April 2019

Winter crops faring well in most of Europe

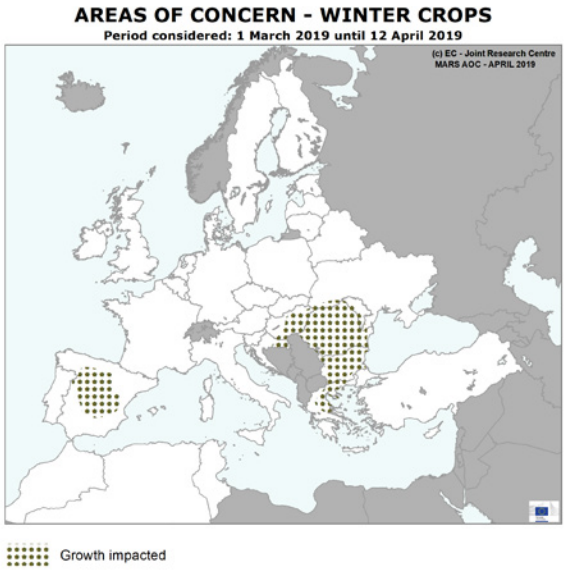
Rain deficit impacts crops in Spain and south-eastern Europe

Winter crops in most of Europe have benefited from the predominantly mild weather conditions and show advanced development. Spring sowing is progressing well in most regions. However, in large parts of Spain and south-eastern Europe, persistent rain deficits negatively impacted crop growth and field operations.

Dry weather conditions persisted in central-eastern and south-eastern Europe. In eastern Croatia, Hungary, Romania, Bulgaria, and Greece, winter crops, which had already been weakened due to suboptimal conditions when they were sown, were further impacted by the persistent dry weather. Yield forecasts for these countries were revised downwards. Spring sowing was also affected in these regions.

Dry conditions continued in central and northern Spain, Italy and Portugal, particularly impacting crops in central Spain. The yield forecast for Spain was revised downward. Water levels in reservoirs in Spain are still below capacity, which could eventually limit the irrigation of summer crops.

Abundant rainfall was experienced in Ireland, the western half of the United Kingdom, the Benelux countries, Denmark and Sweden. The precipitation and associated soil wetness temporarily hampered spring sowing but was mostly beneficial overall.



Crop	Yield (t/ha)				
	Avg 5yrs	March Bulletin	MARS 2019 forecasts	% Diff 19/5yrs	% Diff March
TOTAL CEREALS	5.56	5.62*	**5.58**	+0.3	-0.8
Total Wheat	5.70	5.81	**5.77**	+1.2	-0.7
soft wheat	5.94	6.04	**6.01**	+1.2	-0.5
durum wheat	3.46	3.51	**3.42**	-1.2	-2.6
Total Barley	4.86	--	**4.95**	+1.8	--
spring barley	4.17	--	**4.16**	-0.3	--
winter barley	5.78	6.02	**6.00**	+3.7	-0.3
Rye	3.79	3.93	**3.93**	+3.7	+0.0
Triticale	4.13	4.20	**4.19**	+1.6	-0.2
Rape and turnip rape	3.23	3.19	**3.19**	-1.3	+0.0

Issued: 12 April 2019

* Only winter cereals are included in the calculation

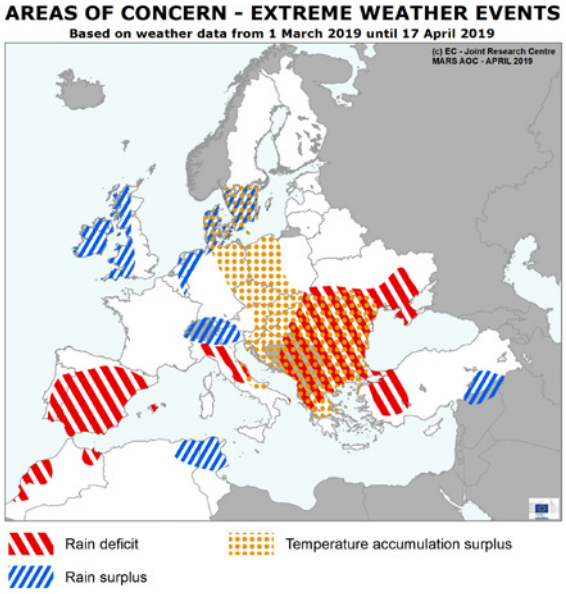
1. Agrometeorological overview

1.1. Areas of concern

The analysis period was substantially warmer than usual in **central** and **eastern Europe**. The largest temperature anomalies occurred in the central belt extending from southern Sweden to northern Greece. In these regions, the average daily maximum temperatures for the period as a whole were up to 6 °C above the long-term average (LTA), meaning accelerated crop development and early opportunities for spring sowing in central and northern Europe where soil moisture conditions are favourable.

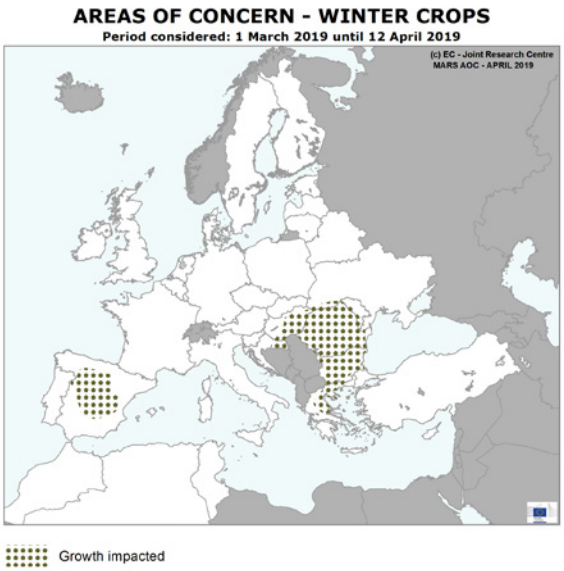
Dry weather conditions persisted in central-eastern and south-eastern Europe (eastern **Croatia, Hungary**, **Romania**, **Bulgaria**, **Greece** and southern **Ukraine**). Soil moisture levels in these regions are significantly reduced. No effect on crop canopy has been observed in **Ukraine** yet. However, winter crops in Croatia, Hungary, Romania, Bulgaria and Greece, which had already been weakened due to suboptimal conditions around sowing, were further impacted resulting in the yield outlook being revised downwards. Spring sowing was also affected in these regions. Impacts so far are moderate and the situation cannot be qualified as drought. Abundant precipitation (around 50 mm) is forecast in the coming days so soil moisture conditions are expected to improve.

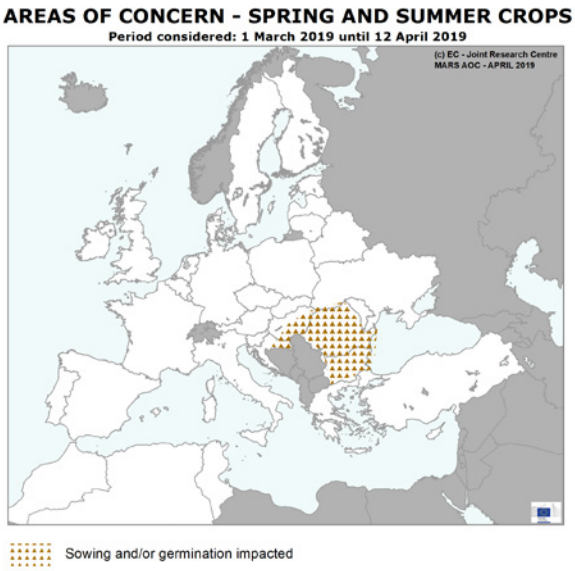
Dry conditions also persisted in central and northern **Italy**, **Spain, Portugal** and parts of **Morocco**. Crops in central **Spain** started to be impacted and yield potentials decreased. Water levels in reservoirs are still well below capacity, which could eventually limit water supply for the irrigation of summer crops later in the season. Some rain in northern Italy at the beginning of April mitigated the problem and an additional 20-40 mm of rain is forecast for the coming days, which, if it falls, will lift soil water contents to safer levels.



A substantial precipitation surplus was recorded in the *alpine regions*, **Ireland**, the western half of the **United Kingdom,** the **Benelux** countries, **Denmark** and **Sweden**. The precipitation was mostly beneficial in restoring the soil moisture at greater depths and/or groundwater levels in these regions, which were still suboptimal due to last year's drought.

A surplus of precipitation has also been observed in south-eastern **Turkey** and in **Tunisia**.





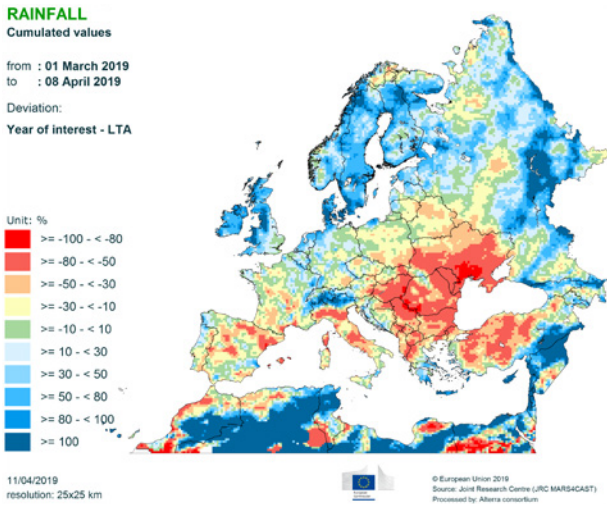
1.2. Meteorological review (1 March to 6 April)

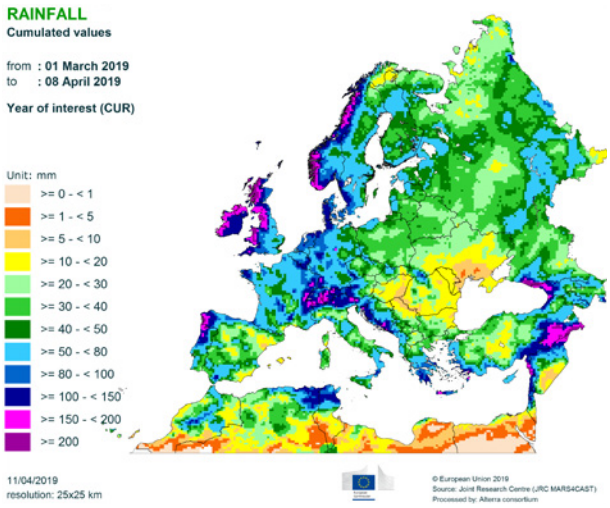
The analysis period was **substantially warmer than usual** in large parts of Europe. Maximum recorded temperatures reached more than 21 °C in southern Europe, and regionally above 25 °C on the Iberian peninsula and in south-eastern Europe. The most pronounced warm anomalies (between 2 °C and 4 °C above LTA) were observed in central and eastern Europe. They contributed to the acceleration of the phenological development; temperature sums in these regions are generally 80 ^{0}Cd above the LTA for this period of the year.

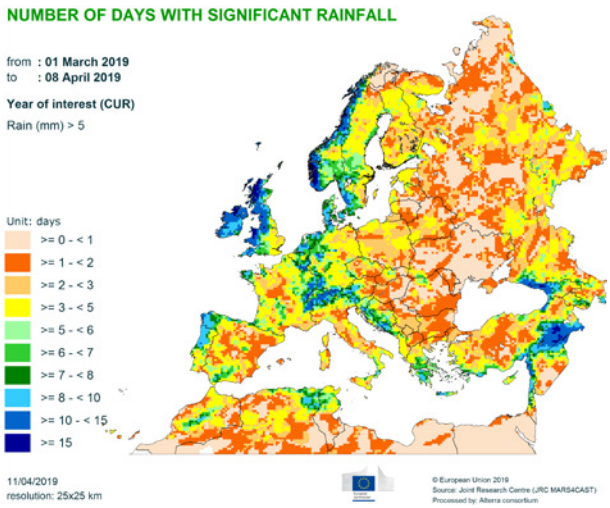
Even though no cold weather anomaly was recorded, **minimum temperatures were still below 0 °C** in large parts of northern, eastern and central Europe. The temperatures dropped below 0 °C during the second half of March and at the beginning of April, but frost damage to winter cereals has largely been absent. However, if unusually cold weather arrives in the coming weeks, it might induce some cold-related damage caused by the early onset of vegetation this year.

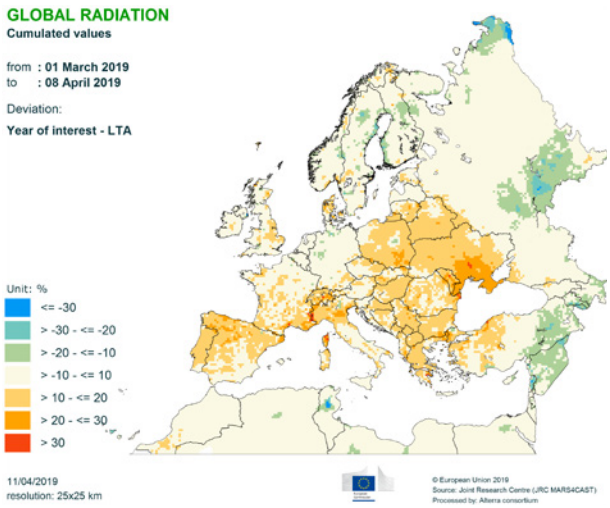
With less than half of the LTA rainfall recorded, the analysis period was **significantly drier than usual** in south-eastern Europe, Ukraine, large parts of Italy, and the northern Iberian peninsula. These regions generally experienced less than 40 mm of rainfall. The central Balkans and north-western Black Sea regions remained dry.

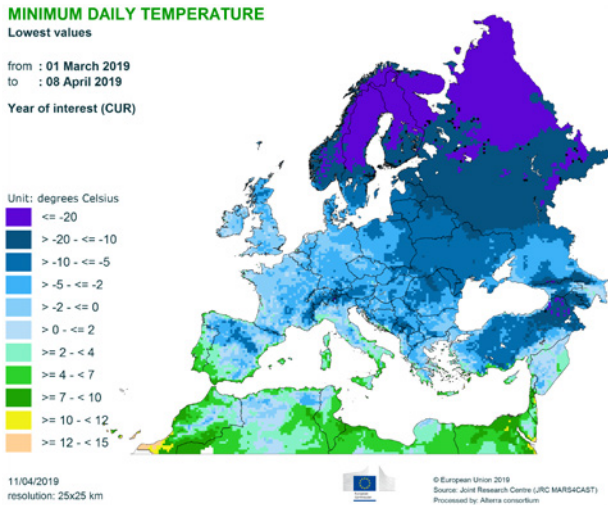
Above-average precipitation was recorded in the Alps, the Benelux countries, northern Germany, the Scandinavian countries, the British Isles, and central parts of European Russia. Many of these regions recorded a total rainfall of more than 100 mm.

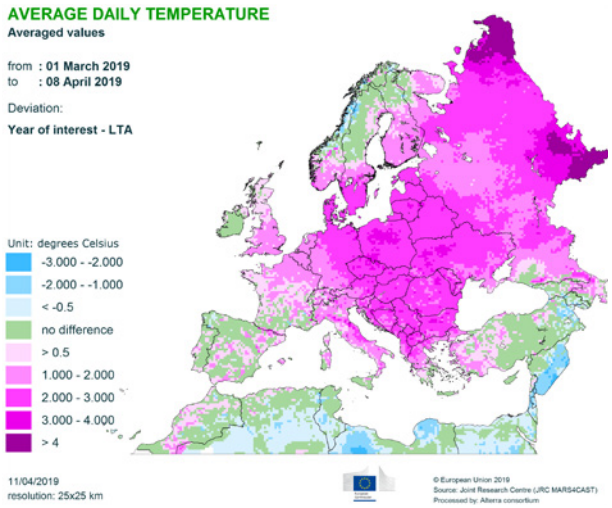


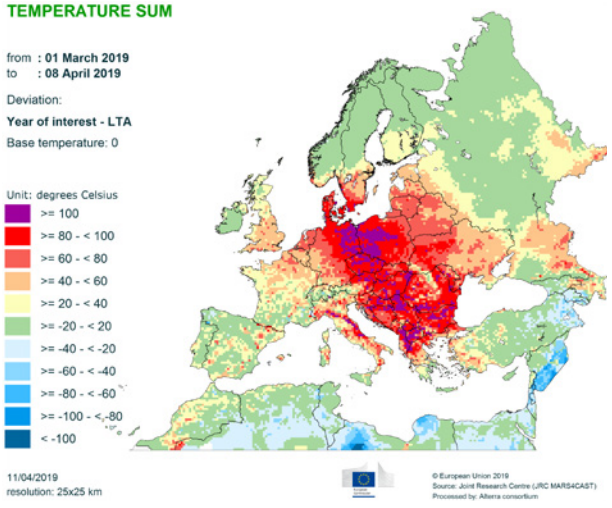


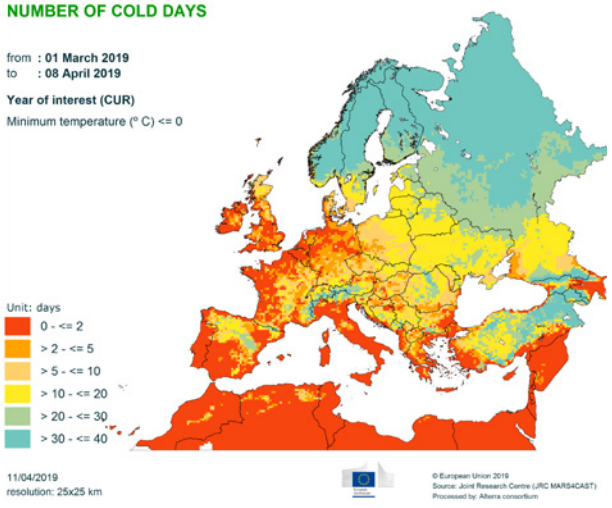





MINIMUM DAILY TEMPERATURE
Lowest values
from : 01 March 2019
to : 08 April 2019
Year of interest (CUR)
Unit: degrees Celsius
<= -20
> -20 - <= -10
> -10 - <= -5
> -5 - <= -2
> -2 - <= 0
> 0 - <= 2
>= 2 - < 4
>= 4 - < 7
>= 7 - < 10
>= 10 - < 12
>= 12 - < 15
11/04/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

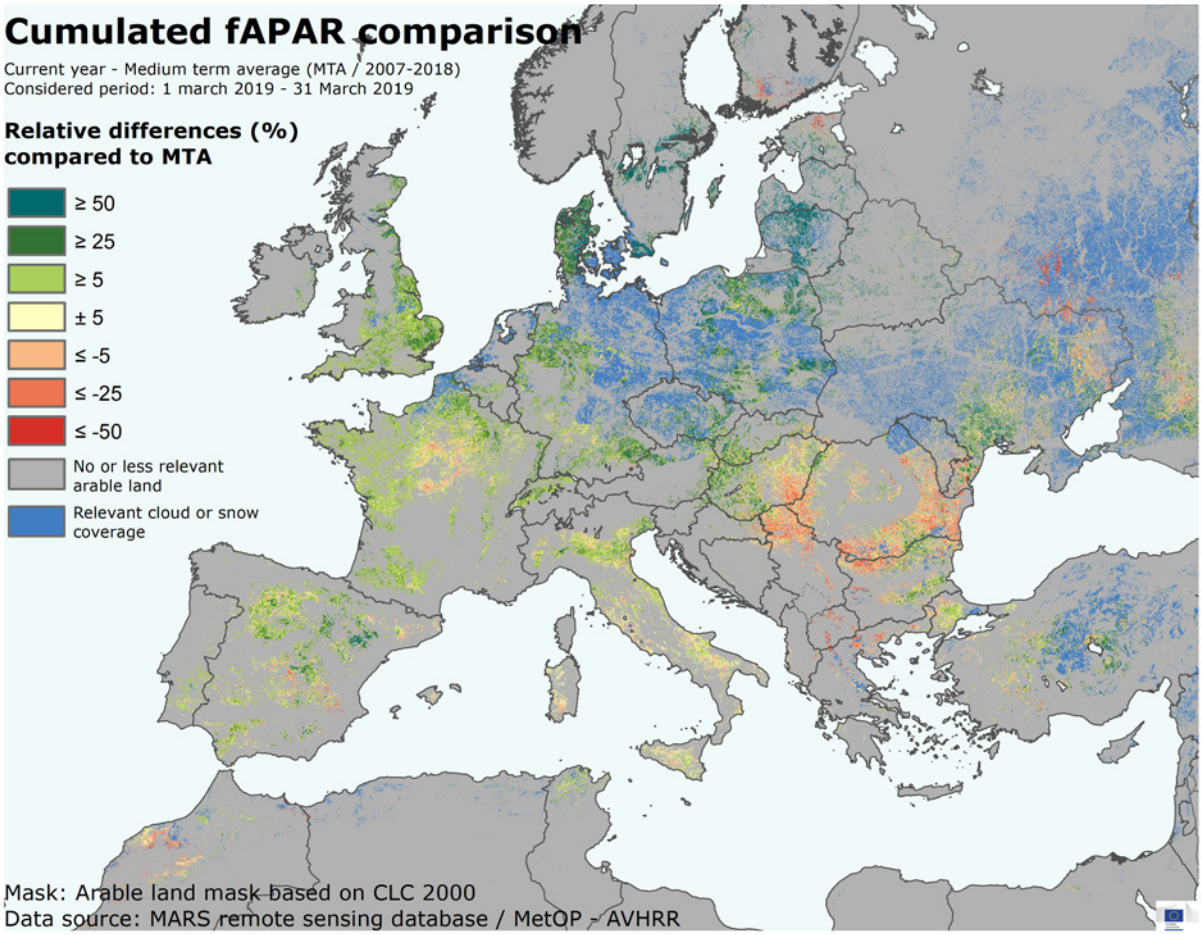

AVERAGE DAILY TEMPERATURE
Averaged values
from : 01 March 2019
to : 08 April 2019
Deviation:
Year of interest - LTA
Unit: degrees Celsius
-3.000 - -2.000
-2.000 - -1.000
< -0.5
no difference
> 0.5
1.000 - 2.000
2.000 - 3.000
3.000 - 4.000
> 4
11/04/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium


TEMPERATURE SUM
from : 01 March 2019
to : 08 April 2019
Deviation:
Year of interest - LTA
Base temperature: 0
Unit: degrees Celsius
>= 100
>= 80 - < 100
>= 60 - < 80
>= 40 - < 60
>= 20 - < 40
>= -20 - < 20
>= -40 - < -20
>= -60 - < -40
>= -80 - < -60
>= -100 - < -80
< -100
11/04/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium


NUMBER OF COLD DAYS
from : 01 March 2019
to : 08 April 2019
Year of interest (CUR)
Minimum temperature (° C) <= 0
Unit: days
0 - <= 2
> 2 - <= 5
> 5 - <= 10
> 10 - <= 20
> 20 - <= 30
> 30 - <= 40
11/04/2019
resolution: 25x25 km
© European Union 2019
Source: Joint Research Centre (JRC MARS4CAST)
Processed by: Alterra consortium

2. Remote sensing — observed crop conditions

Unfavourable spring in eastern Europe



The map displays the differences between the fraction of Absorbed Photosynthetically Active Radiation (fAPAR) cumulated from 1 March to 31 March 2019 and the medium-term average (MTA, 2007-2018) for the same period. Positive anomalies (in green) reflect above-average canopy density or early crop development, while negative anomalies (in red) reflect below-average biomass accumulation or late crop development.

In northern **Spain**, winter crops benefited from a warm winter, which resulted in advanced development by almost 1 month (*Castilla y León*). Nevertheless, the persistent rain deficit is exposing crops to drought damage. Winter crops in southern Spain are around the flowering stage.

In southern **Italy**, the main durum wheat-producing regions (*Puglia*) display advanced biomass accumulation thanks to the warmer-than-usual temperatures in March and favourable soil moisture conditions. In northern Italy, biomass still displays above-average development despite the persistent rain deficit.

In **France**, the negative anomalies in the main map refer to areas with crop development that was delayed but has recently progressed rapidly to advanced stages (*Centre*). This is attributed to favourable rains and positive temperature anomalies since mid-February, which have determined a boost to the leaf area expansion of winter crops after a difficult start to the season.

Wet and warm conditions in **Denmark**, **Sweden** and the **United Kingdom** in the last 2 months have led to spring growth starting early.

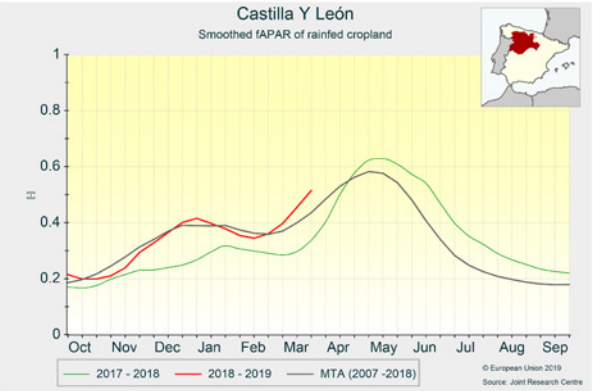
Satellite observations of **Germany**, **Poland** and most **northern countries** are unreliable due to persistent cloud coverage throughout March.

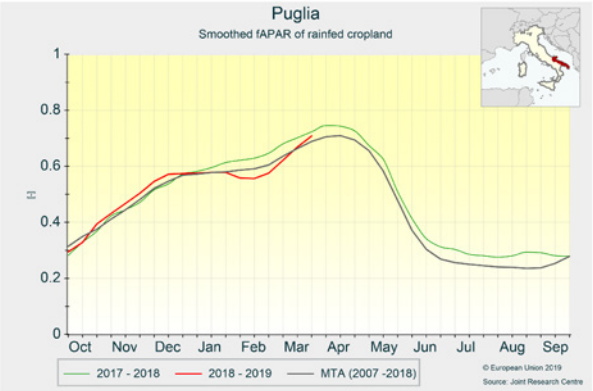
In **Hungary**, the low soil moisture — due to the persistent dry spell — caused weak biomass accumulation, especially in southern regions (*Dél-Alföld*).

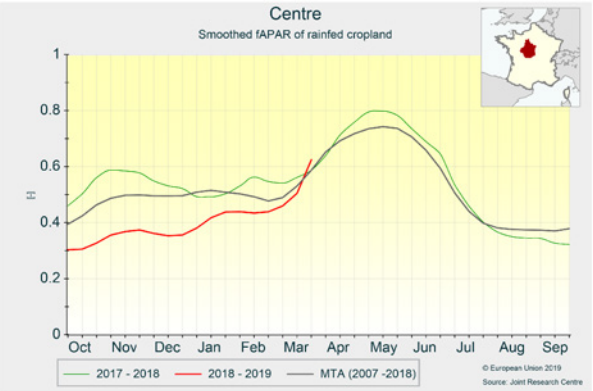
In **Bulgaria** and **Romania**, the dry conditions that have prevailed since autumn have led to a generally unfavourable start to spring growth: winter crop development is generally delayed due to the late sowing and is less prominent than average due to the low precipitation (*Severozapaden*). Similar conditions are observed in **Greece**, especially in northern regions (*Kentriki Makedonia*).

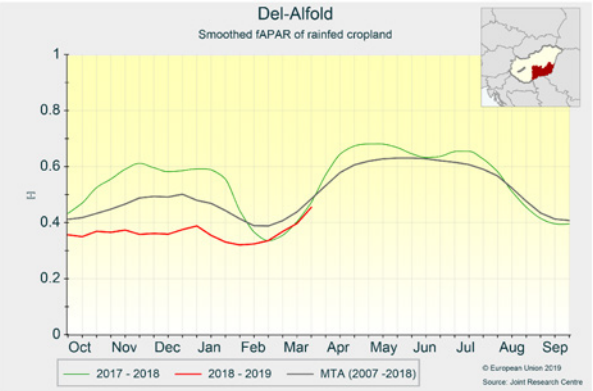
Positive biomass development can be observed in **Turkey** (*Ankara*) and in southern **Ukraine**, that is, in parts that are not too affected by cloud coverage.

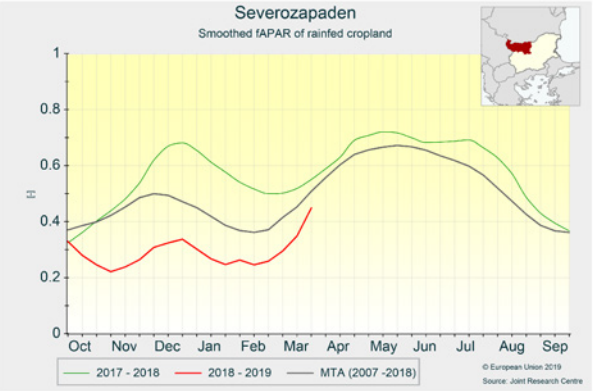
The winter crop season in the **Maghreb** region is advanced and crops are now in the grain-filling stage; overall biomass development is average or slightly above average (e.g. *Centre*).

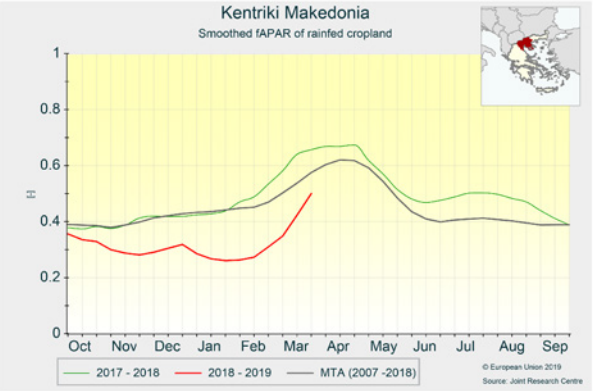

Castilla Y León
Smoothed fAPAR of rainfed cropland
fAPAR
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2017 - 2018
2018 - 2019
MTA (2007 -2018)
© European Union 2019
Source: Joint Research Centre

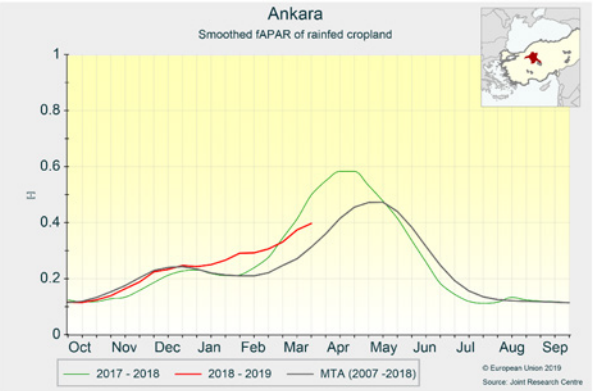

Puglia
Smoothed fAPAR of rainfed cropland
fAPAR
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2017 - 2018
2018 - 2019
MTA (2007 -2018)
© European Union 2019
Source: Joint Research Centre

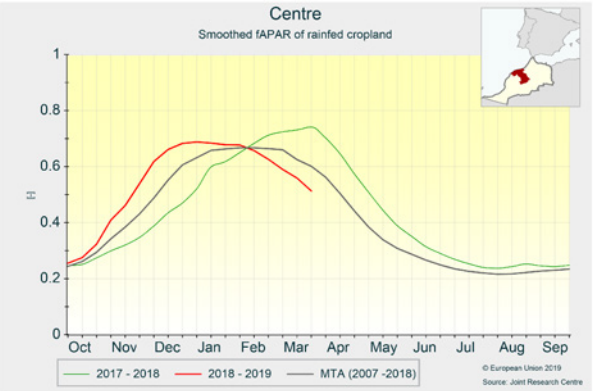

Centre
Smoothed fAPAR of rainfed cropland
fAPAR
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2017 - 2018
2018 - 2019
MTA (2007 -2018)
© European Union 2019
Source: Joint Research Centre


Del-Alfold
Smoothed fAPAR of rainfed cropland
fAPAR
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2017 - 2018
2018 - 2019
MTA (2007 -2018)
© European Union 2019
Source: Joint Research Centre


Severozapaden
Smoothed fAPAR of rainfed cropland
fAPAR
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2017 - 2018
2018 - 2019
MTA (2007 -2018)
© European Union 2019
Source: Joint Research Centre


Kentriki Makedonia
Smoothed fAPAR of rainfed cropland
fAPAR
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2017 - 2018
2018 - 2019
MTA (2007 -2018)
© European Union 2019
Source: Joint Research Centre


Ankara
Smoothed fAPAR of rainfed cropland
fAPAR
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2017 - 2018
2018 - 2019
MTA (2007 -2018)
© European Union 2019
Source: Joint Research Centre


Centre
Smoothed fAPAR of rainfed cropland
fAPAR
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2017 - 2018
2018 - 2019
MTA (2007 -2018)
© European Union 2019
Source: Joint Research Centre

3. Pastures in Europe — regional monitoring

Favourable conditions in most of the EU

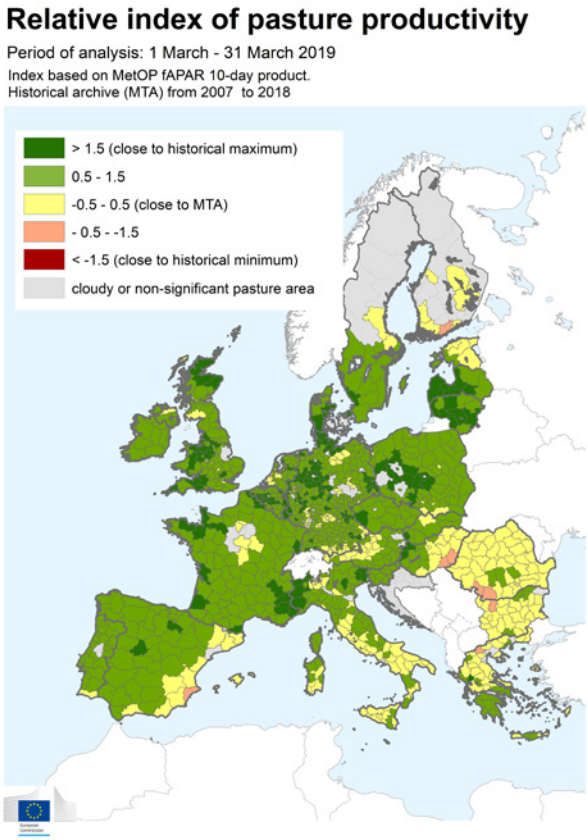
Overall, pastures are in good condition across the EU and are currently in the initial stages of development after a predominantly mild winter.

In **Spain** and **Portugal**, the favourable autumn conditions are still reflected in the pasture biomass accumulation, which remains above the MTA. The persistent lack of precipitation is not yet reflected in reduced biomass accumulation, but more rain is necessary to sustain good growth during the coming weeks.

Weather conditions in **France** have been favourable for pasture growth. Mild temperatures from early February to mid-March led to the early development of grasslands, especially along the Atlantic coastline and the English Channel.

In northern and north-western regions (**Belgium**, **Denmark**, **Germany**, **Ireland**, **the Netherlands** and **the United Kingdom**), where grasslands were strongly affected by the 2018 drought, pasture biomass has now fully recovered thanks to the winter rains and mild temperatures. Pasture productivity in many places is now among the highest in the time series (2007–2018).

Pasture regrowth in **Bulgaria**, **Hungary** and **Romania** is conditioned by two opposing influences: on the one hand, regrowth was accelerated by the mild temperatures in March, but on the other hand it was hampered by the reduced soil moisture levels. The overall result is that the season has started with around-average biomass accumulation.



4. Country analysis

4.1. Sowing conditions

Spring barley

Sowing generally advanced

In Spain, the EU's largest spring barley producer, sowing was completed by the end of December and crops are at a slightly advanced stage and in fair condition.

Because of the mild winter weather, the sowing of spring barley started around 3 weeks earlier than usual in most European countries (e.g. Belgium, Germany, France, Luxembourg, the Netherlands, Poland, Slovakia and the United Kingdom) and has almost been concluded.

In Denmark, the EU's third-largest spring barley producer after Spain and the United Kingdom, high precipitation since the beginning of March has caused some delay to the sowing of spring barley, which normally starts by mid-March. However, the improved weather conditions at the end of March opened a favourable window for sowing.

Sowing in Croatia, Hungary and Romania is ongoing under favourable thermal conditions, but soils are dry, which might compromise germination and emergence, particularly in the east of Croatia and of Hungary as well as in southern Romania.

In the Baltic Sea region, spring barley sowing has not started yet as it usually takes place from the second half of April.

Compared to 2018, the area of spring barley is expected to decrease this year in many areas of northern Europe (United Kingdom, Germany, the Baltic countries, etc.), which is mainly attributed to the increase in the area sown under winter cereals.

In Ukraine, the sowing campaign started earlier than usual, with around 20 % of the area having been sown by the end of March.

Sugar beet and potatoes

Sowing is progressing well

In March, adequate thermal and top soil moisture conditions allowed for a timely start to the sugar beet sowing campaign in most of Europe. Sowing in France (north-eastern regions) started in mid-March under favourable conditions and has now been completed. Precipitation was above average in Belgium, Denmark, the Netherlands and north-eastern Germany and was mainly concentrated during the first half of March. The resulting excessive wetness hampered sowing, but favourable conditions at the end of March and in April so far have allowed for the acceleration of sowing. In Belgium and the Netherlands, more than 50 % of the area was sown by 8 April, which more or less corresponds to an average season. Sugar beet drilling in the United Kingdom started in the southern areas in the second half of March, ahead of the usual time due to positive temperature anomalies and rain-free periods, and to date (10 April) sowing has been completed in about 90 % of the area. The drilling of sugar beet is in full swing in Germany and Poland. In Poland, sowing started earlier than usual (in certain places even in the first week of March) due to above-average temperatures, and accelerated from the beginning of April, resulting in approximately 80 % of the sowing being completed to date. Precipitation has been below average in Hungary and Romania, and very dry top soils hampered sowing in some regions. Nevertheless, sowing has been completed, and some rain recently improved the situation in Hungary, but more rain is needed in Romania to sustain sugar beet emergence and early development.

With regard to potatoes, the sowing of early varieties experienced the same conditions as those described above for sugar beet. The main sowings have just started.

Maize

Sowing mostly under favourable conditions

Soil conditions in the warmer maize-growing regions of south-eastern Europe, the Carpathian basin and the Iberian peninsula have been favourable for sowing during March and April. Substantial rainfall is forecast for Bulgaria, Greece, Croatia, Hungary, Romania and Slovenia in the next few days, which is expected to bring the dry period in these countries to an end and so benefit germination and emergence. In the coming dekad less rainfall is expected in the maize-growing areas of the Iberian peninsula. Sowing has also started in the main maize-growing regions of Italy (*Pianura Padana* and *Veneto*), where thermal conditions have been favourable since the end of March. Sowing was often postponed due to a lack of rain, but precipitation at the beginning of April delivered the necessary humidity for germination/emergence. A delay in sowing is expected for the main French maize-growing area (*Aquitaine*), where temperatures were cooler than usual after mid-March, and rain in the first dekad of April is adding to the unfavourable conditions. Warmer temperatures are expected from mid-April onwards.

Soil temperatures in the cooler maize-growing regions in Belgium, Germany, France, Austria and Slovakia have just reached or are about to reach favourable levels, and maize sowing has just started. Maize sowing in southern Poland will start in the next few weeks.

Sunflowers

Dry weather facilitates good progress

The sunflower-sowing campaign has started in southern Europe and is progressing well. However, emergence and early crop development could be problematic due to low moisture content in the top soils in some regions of Bulgaria, Spain, Hungary and Romania.

In Bulgaria and southern Romania, sowing started in the last dekad of March and is proceeding much faster than last year thanks to dry weather conditions and near-average temperatures. Topsoils are drier than usual due to low rainfall in March and early April. In several places current soil moisture levels are below optimal for sprouting and early crop development, but the medium-range weather forecast indicates abundant precipitation, which will mitigate the situation.

The sowing campaign has just begun in Croatia and southern Hungary. After the low rainfalls of March, some precipitation fell in early April, thereby creating favourable conditions for sprouting. However, the lower soil layers are still relatively dry, which could cause crop water supply problems later on.

The sowing of sunflowers in Italy will only be in full swing during the second half of April.

The sowing campaign in France started in late March, but progress was hampered in southern regions by abundant rainfall in early April. In northern regions, temperatures decreased in early April, causing delays to emergence on early sown fields, exposing the seeds to bird damage. As it is still early, it is probable that farmers will wait a few days for more favourable weather before resuming sowing.

In Spain, sowing has nearly been completed in *Andalucía*; despite being somewhat hampered by recent rain, which, however, is crucial for emergence and early crop development. Sowing is expected to start on schedule in the next few days in *Castilla y León* and in *Castilla-La Mancha*.

Sowing in the other sunflower-producing countries and regions further to the north will start later in spring.

Soybeans

Sowing usually starting mid-April

Most sowing of soybean in Europe starts mid-April and extends until the end of May. Sowing has only recently started in Bulgaria and is currently ongoing but, since the beginning of March, rainfall has been low and the rain expected in the next few days will be needed for plants to emerge in good conditions. In Italy, the main European producer of soybean, soils are dry, and the recent rain will favour the start of the season. The recent rains in Romania will also favour emergence, although sowing has not started yet.

4.2. European Union

France

Conditions for winter cereals continue to improve

In the northern half of the country, substantial rainfall was observed during the first 2 dekads of March, allowing the condition for winter cereals to improve even though crops remain in relatively poor shape on the shallowest soils of the departments of *Centre* and *Bourgogne* due to the dry conditions observed last autumn and the presence of weeds. A dry period was observed at the end of March, which reduced the development of diseases on winter cereals. Rapeseed has started flowering, while temperatures are forecast to decrease, possibly leading to some frost events. Conditions are currently heterogeneous and a high pest pressure before flowering was reported (cabbage stem weevil — *Ceutorhynchus pallidactylus*, and pollen beetles — *Meligethes aeneus F.*), which was already a concern during the autumn. Added to the dry conditions at the beginning of the season, the yield potential is already impacted in some fields.

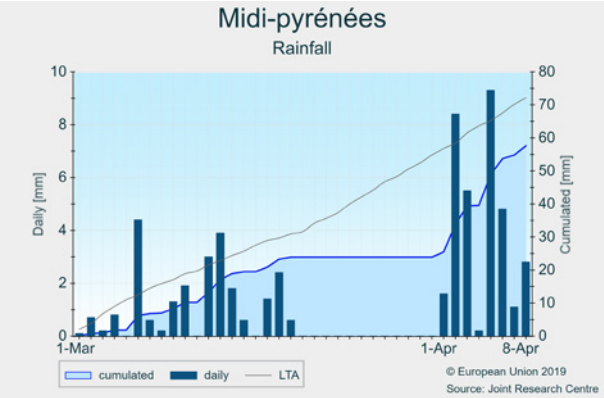
In the south, rainfall in March was substantially below the LTA in the departments of *Midi-Pyrénées*, *Languedoc-Roussillon* and *Provence-Alpes-Côte d'Azur,* with negative effects on durum wheat. This was followed by a period of intense rainfall during the first dekad of April, so cumulative rainfall for the period of analysis is now close to average.

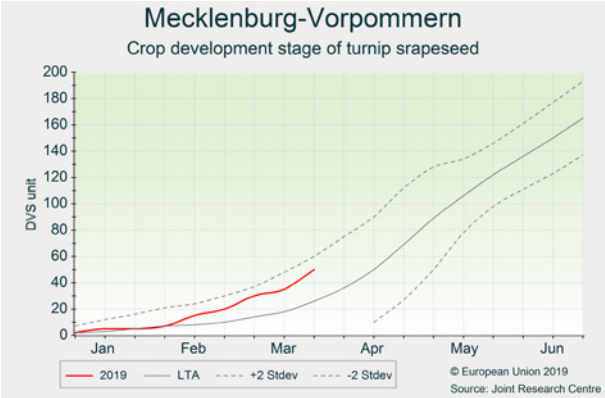
The yield forecasts remain on trend considering that most of the yield variability of winter cereals in France is explained by growing conditions during the flowering and grain-filling stage. In the case of rapeseed, the flowering period will be determinant for the yield. Although the abovementioned conditions have degraded the potential, the current estimate of just below the 5-year average is still attainable.

Germany

Mild period leads to advanced crop development

Crop-growth conditions continue to be generally favourable. March was a very mild month with average sunshine duration and plentiful precipitation, especially in the north-west (*Schleswig-Holstein*), whereas *Mecklenburg-Vorpommern* was rather dry. The number of rainy days for most of Germany was average and sowing activities are in full swing or about to start, as in the case of maize. Local damage and flooding were caused by a series of heavy storms. Overall, soil moisture levels are now satisfactory and no constraints to good crop growth have been detected. The pronounced positive temperature anomaly and fewer-than-normal cold days led to advanced crop growth development, especially for rapeseed. Forecasts at this stage of the season are mostly estimated as averages of the past 5 years' yields. No irregularities have been detected yet from crop model results and a good yield potential is expected for winter cereals.





Poland

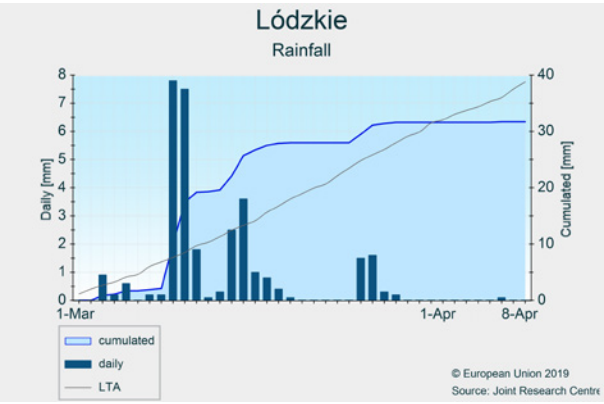
Winter cereals are advanced and in good condition

The weather was warmer than usual (by approx. 3 °C) through the period of analysis. Rainfall continued to be around the LTA during the first half of March. Since then, there has been no significant rain in most of the country, which, together with winds and warmer-than-usual temperatures, has resulted in rapidly drying topsoil in the fields with no vegetation cover, especially in central and southern regions.

Winter crops are generally in good condition and are advanced in development (2-3 weeks) compared to an average year. However, the mild autumn and winter has increased pressure from pests and disease.

The sowing campaign of spring cereals began earlier than usual and is now almost complete. Most spring cereals were sown by mid-March when soil water conditions were satisfactory. The sugar beet-sowing campaign began earlier than usual (mid-March) and is still ongoing.

Yield forecasts are close to the historical trend, mostly just above the 5-year average. Rain will be needed in the next few weeks for the positive outlook to continue.



Ireland and United Kingdom

Spring sowing almost concluded in optimal conditions

Temperatures were mostly above average during the review period (1 March–8 April). However, two short periods with colder-than-usual conditions occurred in March when the minimum temperature reached – 1.7 °C in *Scotland* (around 10 March) and – 0.7 °C in *South East England* (around 26 March).

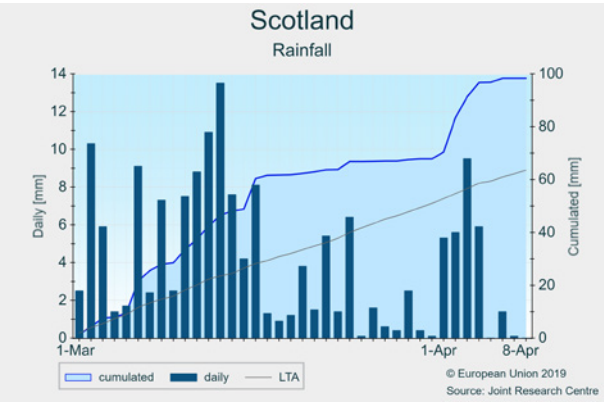
Rainfall was generally above average and was mostly concentrated during the first 2 weeks of March, especially in Ireland, *North West England* and *Wales*.

Crops need to be closely monitored for pests and diseases. Due to the above-average winter temperatures and limited options for control, oilseed rape crops in southern United Kingdom are affected by the cabbage stem flea beetle, with larvae moving into the stems, albeit still below threshold levels. Development of oil seed rape crops is advanced and approaching the flowering stage when the level of danger from this pest decreases.

Spring sowing started earlier than usual. Most of the spring barley was sown in good conditions by March and is already emerging. Sowing is still ongoing in Ireland and *Scotland* where field work was interrupted due to the wet and relatively cold conditions during the first 2 weeks of March. The first drilling of sugar beet started in southern areas in the second half of March.

Winter cereals are in good condition. Development is around 10 days in advance, having reached stem elongation.

Our yield forecasts are maintained close to the 5-year average.



Spain and Portugal

More rain needed

Rainfall in the first dekad of April has somewhat improved the hydrological situation on the Iberian peninsula, which has been characterised by dry conditions interrupted by sparse rainfall events since 1 March. More abundant rainfall was recorded along the Cantabrian ridge in northern Spain.

Temperatures presented strong fluctuations around the LTA, with minimum temperatures occasionally dropping below 0 °C. However, no major damage was reported.

The rain has benefited the rain-fed winter crops — which were at risk of irreversible damage by water scarcity in the most affected regions — as well as the start of the summer crop-sowing campaign. However, the recent rainfall may not be sufficient everywhere; crops remain vulnerable particularly in the south of the Iberian peninsula and in large parts of the region of *Castilla y León*, where soil moisture levels remain low and there is little rain forecast for the next 10 days. The water reservoirs are currently reported to be on average 57 % full at national level (www.embalses.net), which is well below the LTA. The distinctly lower reservoir levels in many southern regions (*Murcia, Almería, Comunidad Valenciana* and eastern parts of *Castilla-La Mancha*) are aggravating the nonetheless serious hydrological situation, adding to the risk of irrigation restrictions.

Biomass formation in wheat crops is below average in *Castilla y León, Catalunya, Comunidad Valenciana* and parts of *Castilla-La Mancha,* and close to average or above average in most other regions (e.g. *Aragón*), including in Portugal.

Barley is generally in slightly better conditions. Yields of both crops are expected to be at a lower-than-5-year-average level.

Italy

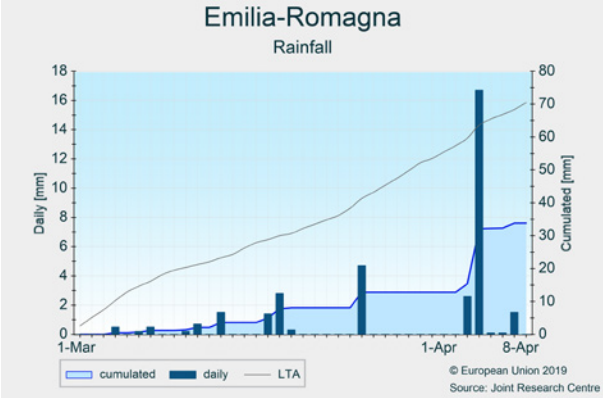
Dry conditions mitigated

Rainfall remained low (< 30 mm) in northern and central Italy and the islands during March. The dry spell was broken by 20 mm to 50 mm of rainfall in most regions at the beginning of April.

Temperatures in large parts of the peninsula started with warm anomalies (+ 2 °C to + 4 °C). From mid-March, temperatures gradually converged on average values.

In northern regions, the April rainfall was fundamental in sustaining winter crop growth. Crop development is well advanced and biomass accumulation is above the average. More rainfall (as forecast), especially in *Emilia-Romagna*, is needed to maintain the good yield potential. In southern regions, well-distributed rainfall from March sustained soil moisture and improved the condition of the crops.

Maize sowing in northern regions started in April (locally in late March) with the arrival of the spring rains. The outlook for germination and early development is positive as more rain is forecast for the next few days.



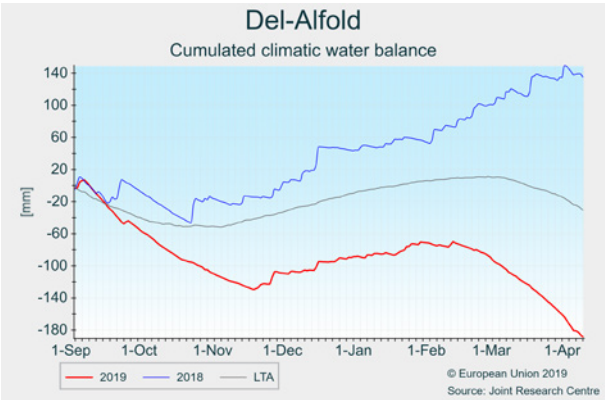
Hungary

Risk of drought

After a mild February, warm weather continued through March and in the first few days of April, resulting in a positive 2-3 °C thermal anomaly. Rainfall was sparse during March, and the central and eastern regions of Hungary received only 3-10 mm rainfall, while 15-30 mm were recorded in the wetter western and south-western areas. The spring sowing campaign progressed well, but the dry seedbed hampered emergence. After 5 April, topsoil moisture conditions improved due to the arrival of 5-15 mm of rain.

Evaluated from 1 October 2018 until early April 2019, the climatic water balance indicates a severe moisture deficit (80-200 mm). This period has been the second driest in Hungary since 1975. Low winter precipitation did not replenish soil moisture levels and so the risk of drought formation is considerable, primarily in eastern Hungary.

Winter crops are advanced in development by 5-15 days but have a below-average leaf area expansion and biomass accumulation due to unfavourable weather conditions last autumn and inadequate water supply since. The yield forecast for winter crops was revised down while the yield outlook for summer crops is on trend.



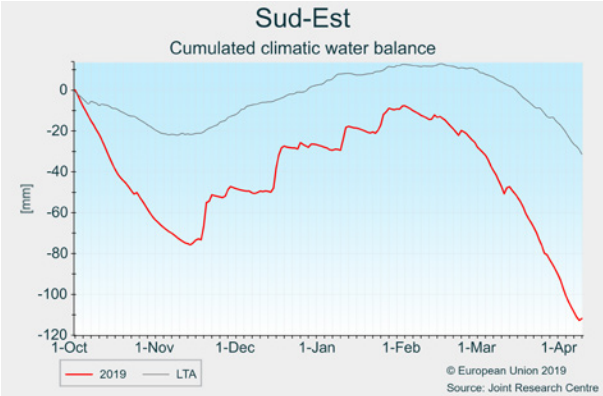
Romania

Reduced yield outlook for winter crops

This review period (1 March–8 April) ranks as the second warmest in our weather archive. Daily temperatures exceeded the LTA by 2-4 °C. Precipitation in the first dekad of March followed the seasonal trend, but since then little rain has fallen.

The mild conditions in March facilitated the regrowth of winter crops and accelerated phenological development. However, water supply to crops remains problematic due to low precipitation during the recharge period and the especially dry conditions since 1 February. Biomass accumulation of winter crops remains typically below average in most of the country. Remote-sensing images confirm that winter crops are in a weak condition. Even if the substantial rain forecast is realised, recovery will be limited. Therefore, the yield forecast has been revised downward.

Dry weather facilitated good progress of the spring sowing campaign, and the warm temperatures allowed an early start to maize and sunflower sowing in the southern and western regions. However, low topsoil moisture can hamper both emergence and early growth in some places in south-eastern and eastern regions.

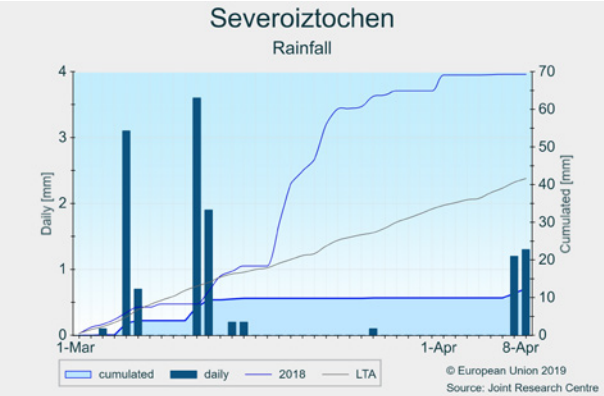


Bulgaria

Need of rainfall

In March, daily temperatures mainly fluctuated between 2 and 4 °C above the LTA, though the first dekad of April was slightly colder than usual. During the review period (1 March-8 April), Bulgaria experienced a considerable precipitation deficit of 50-90 % compared to the LTA, with only 10-20 mm rainfall in the northern half of the country and less than 10 mm in the southern half.

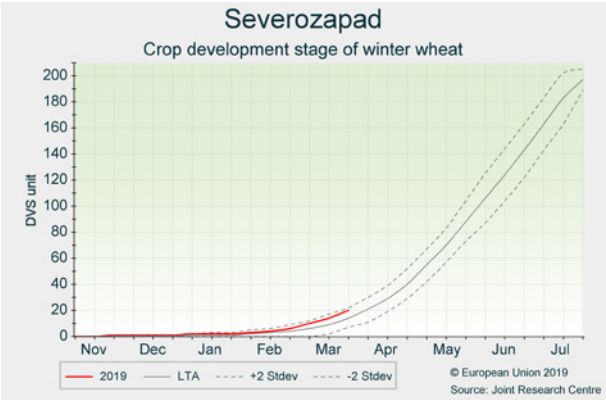
Sowing of sunflowers has progressed well under the dry conditions, while the maize and soybean campaigns have only just started in the last few days, for which the arrival of rainfall will be critical. Winter cereals present moderately advanced development stages. Soil moisture content under winter crops has decreased to below-average levels and will soon no longer fulfil plant water requirements. The dry autumn and the current water shortage could have compromised the biomass accumulation and canopy expansion of winter crops in the north-eastern and western regions. Considering the developing drought, the yield forecast for winter crops was revised downwards, while the yield forecast for summer crops is based on the historical trend.



Czechia, Austria and Slovakia

Warm weather anomaly accelerating crop development

The review period presented a continued pronounced warm weather anomaly (+ 2 °C to + 4 °C, compared to LTA) resulting in the advanced phenological development of winter crops. Rainfall was below average in Czechia, eastern Austria and eastern Slovakia; the most-affected regions received less than 40 mm of rainfall. The lack of rainfall in these regions contributed to a mild soil moisture deficit, but with limited impact on winter crops so far. Warm weather conditions also led to advanced preparations for sowing of spring and summer crops. The yield outlook for winter crops remains in line with the historical trend.

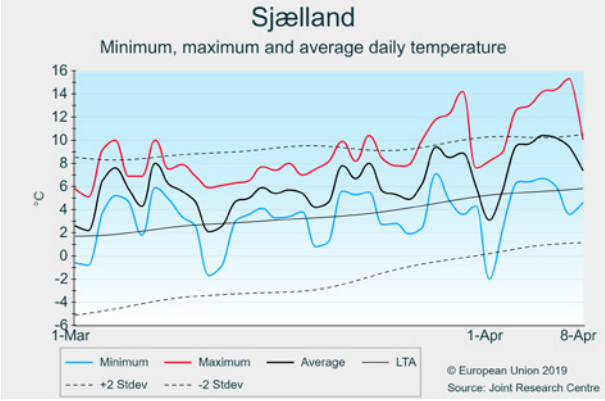


Denmark and Sweden

Exceptionally warm temperatures speeding up crop growth

Rainfall was twice the LTA during the period of analysis and only occurred during the first 2 dekads of March. This is positive considering the drought observed last year, as it has replenished the soils. In the meantime, temperatures were 2.5 °C above the average during the period of analysis. As a result, the phenological development of winter cereals is advanced compared to an average year, and biomass is well above average. Winter crops are in good condition and the outlook is positive. Our yield forecast has been revised upwards and is now above the 5-year average for soft wheat, winter barley, triticale and rye, considering that most of the inter-annual yield variability of these crops in Denmark and Sweden depends on the temperatures in March, and that the substantial rainfall will ensure adequate water supply during the coming weeks.

There has been no rain since 17 March, which has allowed farmers to start the sowing of spring crops.



Estonia, Latvia, Lithuania and Finland

Advanced development of winter crops in Latvia and Lithuania

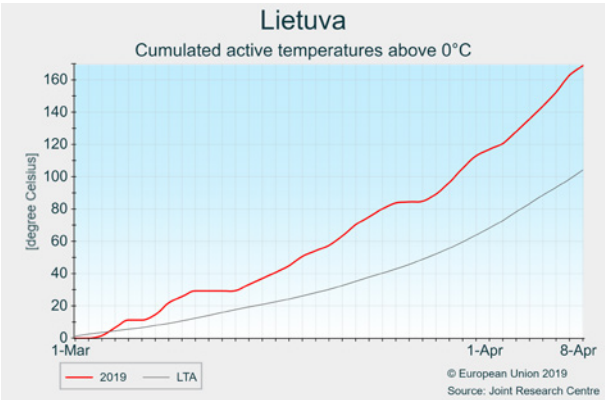
Temperatures were generally above the LTA during the period under review (1 March–8 April). Nevertheless, several cold events also occurred, during which minimum temperatures fell below zero in the Baltic countries — and close to – 20 °C in Finland —, whereas for the rest of the period they remained above zero.

Precipitation was generally above average in all countries.

In the Baltic countries, these weather conditions permitted accelerated growth and good development of winter crops, particularly in Latvia and Lithuania.

In Finland, the regrowth after winter dormancy, which typically starts in mid-April, has not started yet, as there was still some snow on the fields in March and soils were frozen, even in the southern regions. In Estonia, regrowth has just started or is about to start.

The rainy March did not allow the spring sowing campaign to advance. This usually starts in the second half of April. Our yield forecast maintains the values of the March bulletin.



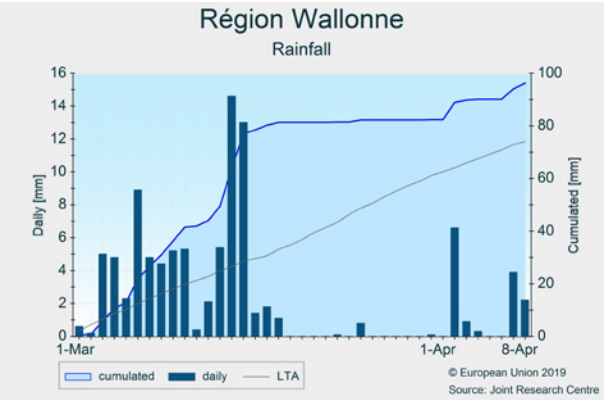
Belgium, Luxembourg and the Netherlands

Overall favourable conditions

The period of review as a whole was slightly warmer than usual. Maximum temperatures occasionally reached 20 °C. Frost events were few and mild. Rainfall was above average. Most rain was concentrated in the first half of March, when rainfall events practically occurred every day and totals exceeded the LTA by more than 100 %. The period since mid-March has been relatively dry with few rainy days.

Winter crops are in good condition and advanced development thanks to the prevailing mild conditions since autumn.

After a very early start in February, spring sowing was seriously hampered by the abundant rainfall in the first half of March. Sowing resumed at full speed by the end of March only, after excess water had drained from the fields. Nevertheless, more than 50 % of the sowing of sugar beet had been completed in Belgium and the Netherlands at the end of the review period, more or less corresponding to an average year. Dry weather forecast in the coming days will facilitate the finalisation of the campaign well within the normal window. The main potato sowing has just started.

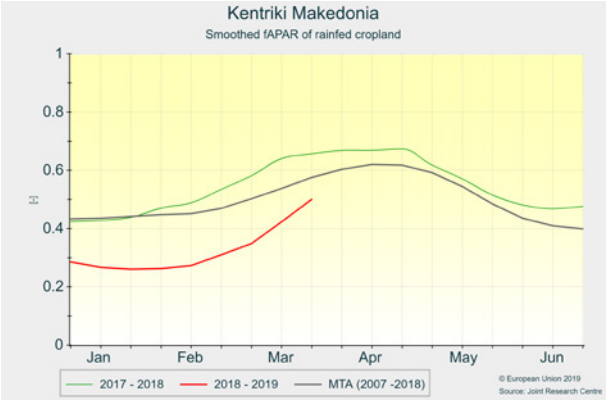


Greece and Cyprus

Below-average yield expected in Greece, positive outlook in Cyprus

Rainfall has been low in northern and north-western Greece since last autumn, whereas other regions in Greece, and Cyprus, have received frequent and abundant rainfall. The regions most affected by the dry conditions are *Dytiki* and *Kentriki Makedonia*. Rainfall at the beginning of April has somewhat improved the situation in the regions concerned and should allow for a good start for the summer crops, but winter crops are irreversibly damaged at this stage.

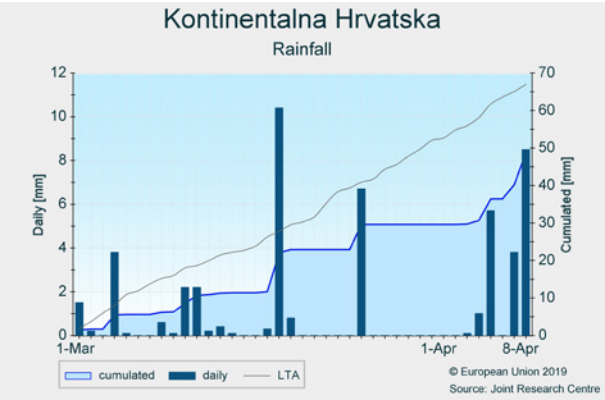
Temperatures have been close to the LTA in Cyprus and central and southern Greece, and slightly above the LTA in northern Greece. This has led to advanced crop development in the northern regions of Greece. In Cyprus, winter crops have reached maturity after an extended grain-filling phase, promising good yields. Winter crops in Greece's main agricultural regions are approaching the heading state; yields are expected to be lower than average due to weak biomass formation caused by the low rainfall since last autumn.



Croatia and Slovenia

Emerging drought conditions in eastern Croatia

A strong warm weather anomaly has prevailed, with temperatures ranging between 2 °C and 4 °C above the LTA. Consequently, the phenological development of winter crops is slightly advanced. Negative rainfall anomaly has affected eastern Croatia; in combination with high evaporative demand, the soil moisture in upper soil layers has been depleting. Winter crops are therefore experiencing moderate drought stress, and the yield outlook for winter crops has been revised slightly downwards for Croatia. The yield outlook for winter crops in Slovenia remains in line with the historical trend. Warm weather conditions in both countries have also allowed for early sowing of spring and summer crops.

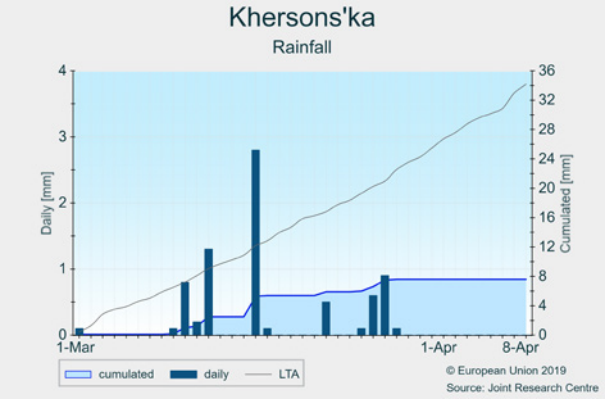


4.3. Black Sea area

Ukraine

Rain deficit increasing in the south

The rain deficit observed in the southern oblasts continued during the period of analysis, but no major impacts on crop growth are currently observed. The soil water storage is depleting in the oblasts of *Odes'ka*, *Mykolayivs'ka*, *Khersons'ka*, *Zaporiz'ka* and *Donets'ka*. In the coming weeks, the long dry period might become a concern for the crops that were sown in dry conditions last autumn with an underdeveloped root system. Farmers have started fertilising, but the efficiency of the nitrogen uptake will depend on the coming rainfall. The warm temperatures observed in March allowed farmers to sow spring crops earlier than usual, which is beneficial, but some rain will be needed for a good yield in southern oblasts. Considering the currently good conditions, our yield forecast remains on trend.



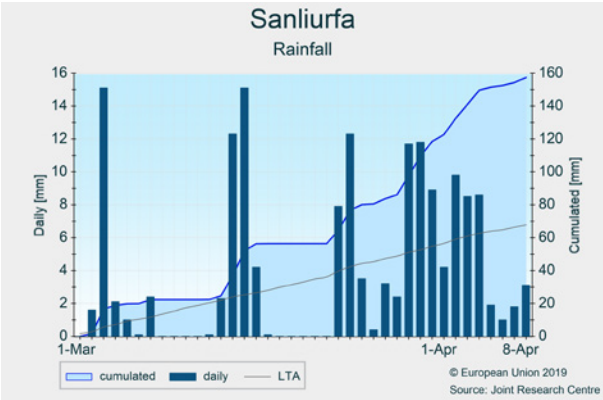
Turkey

Favourable start to spring

In the central-western Anatolian regions (e.g. *Ankara* and *Konya*), March was slightly warmer than usual (up to + 2 °C compared with LTA) with average maximum temperatures below 15 °C. A dry period started in mid-March, which is likely to finish in the next few days according to the weather forecast. Remote-sensing profiles indicate that crop development remains advanced by around 20 days.

In the central-eastern Anatolian regions (e.g. *Kirikkale* and *Kayseri*), winter crops in late March started regrowth after winter dormancy, sustained by mild temperatures and reduced (– 50 % against LTA) but well-distributed precipitation.

In south-eastern regions (e.g. *Dyakarbak* and *Şanlıurfa*), the warm and humid winter weather conditions observed during winter continued. The effects of the late autumn sowing are still reflected in the delayed development of winter crops, while the precipitation surplus (+ 50 % to + 150 % against LTA) is overall still considered to be beneficial, even though this has caused some local damage.



4.4. European Russia and Belarus

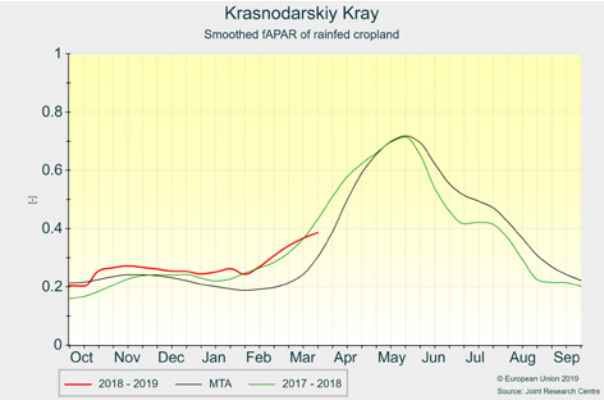
European Russia

Improving crop conditions and yield outlook

Exceptionally mild weather conditions started in early February and persisted throughout the current review period, which presented a positive 2-5 °C thermal anomaly compared with the LTA. Rainfall during the period of review was close to average (30-60 mm) in most of Russia, but some regions in the North Caucasus okrug and the Central Black Earth Region received 20-40 % below-average precipitation.

The above-average temperatures and beneficial rains were favourable for the re-greening of winter cereals after winter dormancy in the South and North Caucasus okrugs. Crop development and biomass accumulation are advanced in the main wheat-producing south-western regions (e.g. *Krasnodarskiy Kray*). Consequently, yield expectations are positive. However, some areas along the Caucasus Mountains (primarily in *Stavropolskiy Kray*) are lagging behind, most likely due to last autumn's difficult sowing campaign and below-average precipitation.

The warm weather also allowed an early start to the sowing of spring barley and spring wheat in the south-western regions, while the near-average precipitation has so far facilitated adequate progress of the sowing campaign.



Belarus

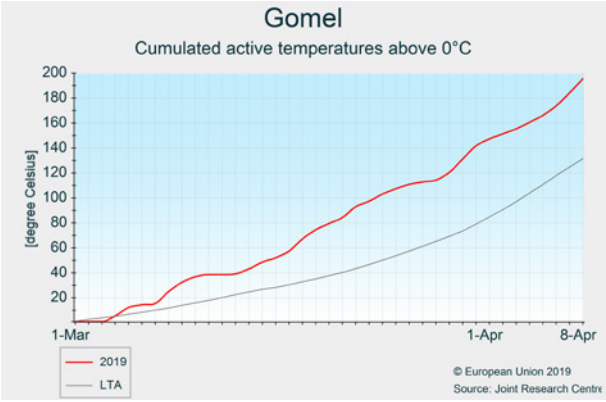
Warmer-than-usual conditions advance crop development

The period of analysis was characterised by warmer-than-usual temperatures (approximately + 2.5 °C compared to LTA), with some frost events during the night.

Precipitation was generally around the LTA during the first 2 dekads of March. No significant rainfall has occurred since then, which, combined with the warm temperatures, has resulted in the topsoil drying, especially in the *Gomel* and *Brest* regions. Soil water conditions were generally adequate for the development of winter crops.

As a consequence of the predominantly warm thermal conditions, the phenological development of winter crops is advanced. However, the same mild conditions may have increased pressure from pests and diseases. Both thermal and soil water conditions were favourable for the spring sowing campaign, which is in full swing in most regions. The overall outlook is positive.

As it is still very early in the season, our previous yield forecast (based on the historical trend) remains the same.



4.5. Maghreb

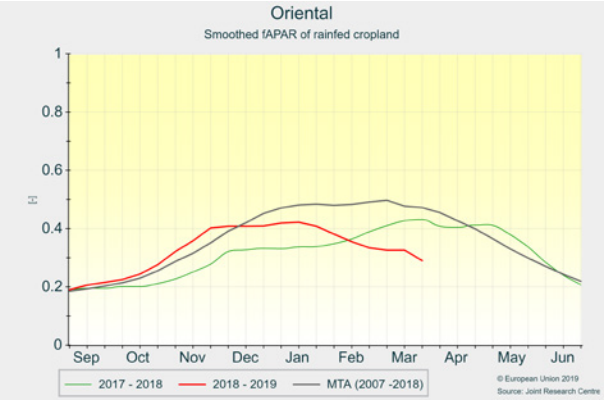
Morocco, Algeria and Tunisia

Average to positive outlook for wheat, some concerns about barley

In **Morocco**, the soil water content in agricultural areas benefited from rain during the last dekad of March, with the exception of the northern districts in the *Oriental* region, where a dry situation negatively affecting barley production is observed. Temperatures in general were moderately above average for all of the agricultural areas of Morocco. Remote-sensing indicators show generally advanced crop cycles of almost 2 weeks. The *Oriental* region exhibits below-average values of biomass accumulation (compared to 2008-2018). Cereals have completed grain filling and are generally approaching the initial phase of the senescence period.

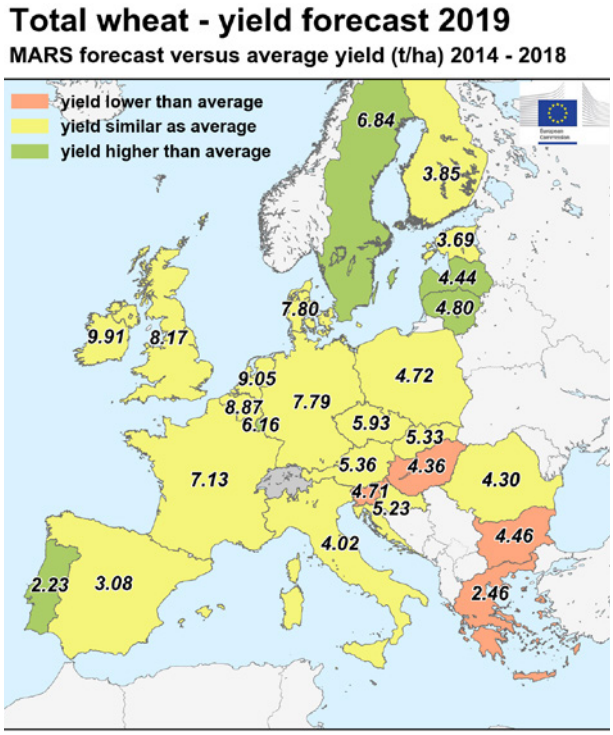
In **Algeria**, rainfall during the second half of March favoured the Mediterranean coastline regions more than the west-inland agricultural regions. Temperature cumulates were (fairly) above the long-term records in western agricultural districts and moderately below average in the eastern areas. Cereal biomass accumulation is advanced by almost 1 week and close to the long-term records in the western districts, while it follows average crop development in eastern districts with an above-average biomass accumulation since the start of season.

In **Tunisia**, a rainfall surplus is generally observed in the northern regions. Biomass cumulates have been above the MTA throughout the season. Remote-sensing and crop-modelling variables suggest that durum and soft wheat were not negatively impacted by this surplus, which was likely because of an even distribution of rain throughout the season. Barley production in the central region of *Kairouan* is likely to be negatively impacted by unfavourable dry and hot weather conditions. The barley yield forecast has therefore been revised downwards.



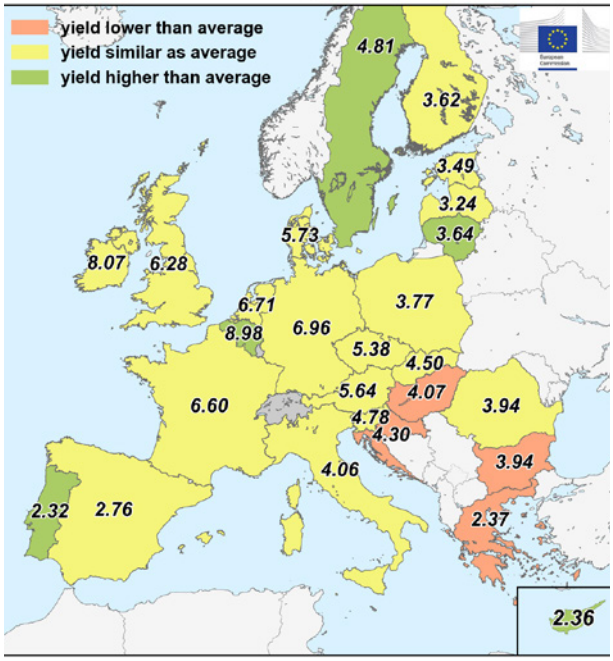
5. Crop yield forecasts

Country	TOTAL WHEAT (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	5.70	5.42	**5.77**	+1.2	+6.4
AT	5.49	4.67	**5.36**	-2.4	+15
BE	8.56	8.72	**8.87**	+3.7	+1.8
BG	4.73	4.81	**4.46**	-5.6	-7.3
CY	-	-	**-**	-	-
CZ	6.09	5.39	**5.93**	-2.5	+10
DE	7.75	6.67	**7.79**	+0.5	+17
DK	7.60	6.36	**7.80**	+2.6	+23
EE	3.75	2.91	**3.69**	-1.6	+27
ES	3.12	3.90	**3.08**	-1.3	-21
FI	3.83	2.79	**3.85**	+0.5	+38
FR	6.90	6.84	**7.13**	+3.2	+4.1
GR	2.69	2.48	**2.46**	-8.5	-1.1
HR	5.23	5.38	**5.23**	-0.1	-2.8
HU	5.15	5.10	**4.36**	-15	-14
IE	9.86	8.8	**9.91**	+0.6	+13
IT	3.87	3.81	**4.02**	+4.0	+5.7
LT	4.54	3.67	**4.80**	+5.8	+31
LU	5.80	6.05	**6.16**	+6.3	+1.9
LV	4.20	3.43	**4.44**	+5.9	+30
MT	-	-	**-**	-	-
NL	8.88	8.82	**9.05**	+1.9	+2.6
PL	4.59	4.06	**4.72**	+2.9	+16
PT	2.13	2.32	**2.23**	+4.8	-3.9
RO	4.20	4.80	**4.30**	+2.4	-11
SE	6.42	4.34	**6.84**	+6.6	+58
SI	5.00	4.38	**4.71**	-5.8	+7.5
SK	5.25	4.77	**5.33**	+1.6	+12
UK	8.28	7.76	**8.17**	-1.3	+5.3



MARS Bulletin Vol. 27 No.4 (2019)

Country	TOTAL BARLEY (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	4.86	4.61	**4.95**	+1.8	+7.4
AT	5.62	4.99	**5.64**	+0.5	+13
BE	8.30	8.30	**8.98**	+8.3	+8.2
BG	4.22	4.25	**3.94**	-6.6	-7.3
CY	1.41	1.81	**2.36**	+68	+31
CZ	5.38	4.95	**5.38**	-0.1	+8.7
DE	6.77	5.77	**6.96**	+2.9	+21
DK	5.57	4.53	**5.73**	+2.9	+26
EE	3.38	2.49	**3.49**	+3.4	+40
ES	2.87	3.51	**2.76**	-3.8	-21
FI	3.63	3.29	**3.62**	-0.3	+9.9
FR	6.36	6.28	**6.60**	+3.8	+5.0
GR	2.61	2.64	**2.37**	-9.2	-11
HR	4.52	4.53	**4.30**	-4.9	-5.2
HU	4.85	4.67	**4.07**	-16	-13
IE	7.89	6.61	**8.07**	+2.4	+22
IT	3.92	4.05	**4.06**	+3.7	+0.3
LT	3.48	2.74	**3.64**	+4.5	+33
LU	-	-	**-**	-	-
LV	3.24	2.58	**3.24**	+0.0	+25
MT	-	-	**-**	-	-
NL	6.57	6.58	**6.71**	+2.1	+2.1
PL	3.67	3.12	**3.77**	+2.8	+21
PT	2.22	2.48	**2.32**	+4.8	-6.2
RO	3.84	4.60	**3.94**	+2.8	-14
SE	4.59	3.04	**4.81**	+4.8	+59
SI	4.64	4.20	**4.78**	+2.9	+14
SK	4.65	3.90	**4.50**	-3.4	+16
UK	6.18	5.72	**6.28**	+1.7	+9.8

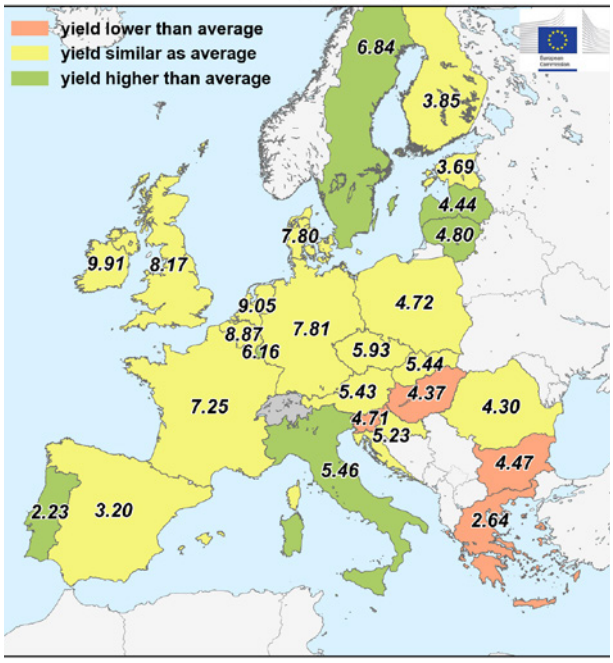


MARS Bulletin Vol. 27 No.4 (2019)

Country	SOFT WHEAT (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	5.94	5.63	**6.01**	+1.2	+6.8
AT	5.55	4.71	**5.43**	-2.3	+15
BE	8.56	8.72	**8.87**	+3.7	+1.8
BG	4.73	4.82	**4.47**	-5.6	-7.3
CY	-	-	**-**	-	-
CZ	6.09	5.39	**5.93**	-2.5	+10
DE	7.77	6.69	**7.81**	+0.5	+17
DK	7.60	6.36	**7.80**	+2.6	+23
EE	3.75	2.91	**3.69**	-1.6	+27
ES	3.22	3.98	**3.20**	-0.5	-20
FI	3.83	2.79	**3.85**	+0.5	+38
FR	7.02	6.98	**7.25**	+3.2	+3.9
GR	2.80	2.51	**2.64**	-5.7	+5.2
HR	5.23	5.38	**5.23**	-0.1	-2.8
HU	5.16	5.11	**4.37**	-15	-15
IE	9.86	8.77	**9.91**	+0.6	+13
IT	5.16	5.13	**5.46**	+5.9	+6.4
LT	4.54	3.67	**4.80**	+5.8	+31
LU	5.80	6.05	**6.16**	+6.3	+1.9
LV	4.20	3.43	**4.44**	+5.9	+30
MT	-	-	**-**	-	-
NL	8.88	8.82	**9.05**	+1.9	+2.6
PL	4.59	4.06	**4.72**	+2.9	+16
PT	2.13	2.32	**2.23**	+4.8	-3.9
RO	4.20	4.80	**4.30**	+2.4	-11
SE	6.42	4.34	**6.84**	+6.6	+58
SI	5.00	4.38	**4.71**	-5.8	+7.5
SK	5.30	4.77	**5.44**	+2.7	+14
UK	8.28	7.76	**8.17**	-1.3	+5.3

Soft wheat - yield forecast 2019

MARS forecast versus average yield (t/ha) 2014 - 2018



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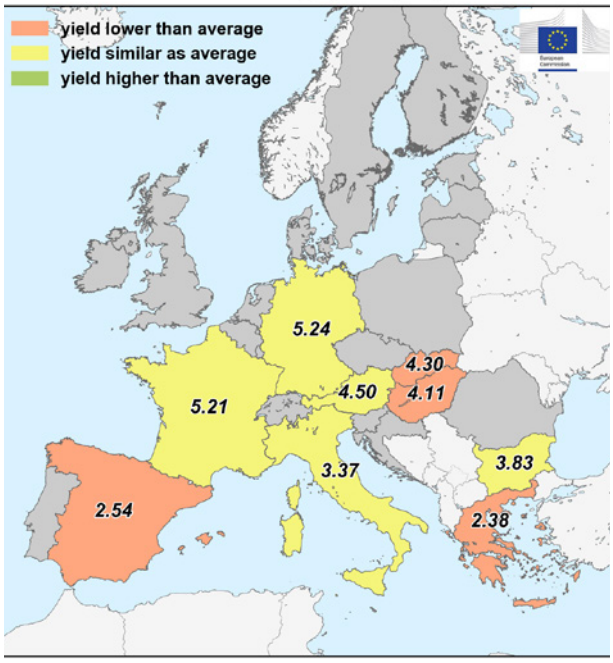
Country	DURUM WHEAT (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	3.46	3.54	**3.42**	-1.2	-3.5
AT	4.57	4.17	**4.50**	-1.6	+7.7
BE	-	-	**-**	-	-
BG	3.88	4.01	**3.83**	-1.3	-4.6
CY	-	-	**-**	-	-
CZ	-	-	**-**	-	-
DE	5.25	4.57	**5.24**	-0.1	+15
DK	-	-	**-**	-	-
EE	-	-	**-**	-	-
ES	2.69	3.54	**2.54**	-5.7	-28
FI	-	-	**-**	-	-
FR	5.13	5.05	**5.21**	+1.4	+3.2
GR	2.64	2.47	**2.38**	-9.8	-3.9
HR	-	-	**-**	-	-
HU	4.80	4.70	**4.11**	-14	-13
IE	-	-	**-**	-	-
IT	3.34	3.24	**3.37**	+1.1	+4.0
LT	-	-	**-**	-	-
LU	-	-	**-**	-	-
LV	-	-	**-**	-	-
MT	-	-	**-**	-	-
NL	-	-	**-**	-	-
PL	-	-	**-**	-	-
PT	-	-	**-**	-	-
RO	-	-	**-**	-	-
SE	-	-	**-**	-	-
SI	-	-	**-**	-	-
SK	4.63	4.82	**4.30**	-7.2	-11
UK	-	-	**-**	-	-

Durum wheat - yield forecast 2019

MARS forecast versus average yield (t/ha) 2014 - 2018

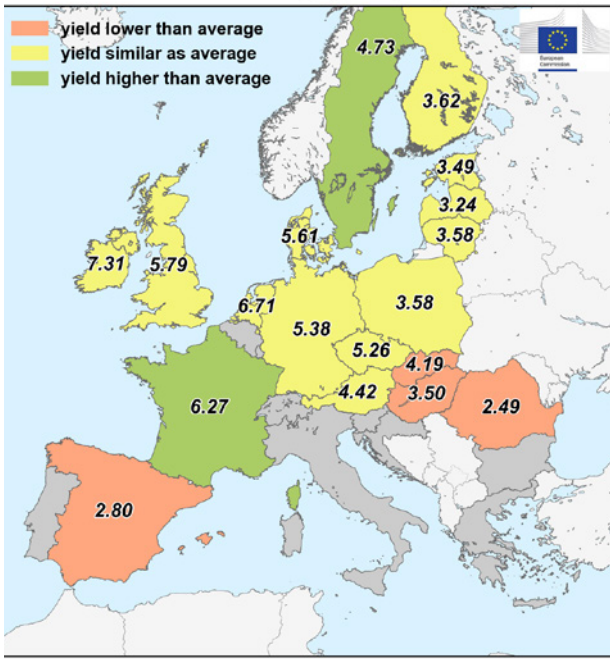


MARS Bulletin Vol. 27 No.4 (2019)

Country	SPRING BARLEY (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	4.17	4.00	**4.16**	-0.3	+4.0
AT	4.53	3.44	**4.42**	-2.3	+29
BE	-	-	**-**	-	-
BG	-	-	**-**	-	-
CY	-	-	**-**	-	-
CZ	5.28	4.93	**5.26**	-0.3	+6.7
DE	5.38	4.95	**5.38**	+0.0	+8.5
DK	5.40	4.42	**5.61**	+3.9	+27
EE	3.38	2.49	**3.49**	+3.4	+40
ES	2.96	3.59	**2.80**	-5.5	-22
FI	3.63	3.29	**3.62**	-0.3	+9.9
FR	6.00	6.21	**6.27**	+4.5	+0.9
GR	-	-	**-**	-	-
HR	-	-	**-**	-	-
HU	3.87	2.69	**3.50**	-10	+30
IE	7.22	5.62	**7.31**	+1.4	+30
IT	-	-	**-**	-	-
LT	3.46	2.72	**3.58**	+3.2	+32
LU	-	-	**-**	-	-
LV	3.24	2.58	**3.24**	+0.0	+25
MT	-	-	**-**	-	-
NL	6.57	6.58	**6.71**	+2.1	+2.1
PL	3.48	2.95	**3.58**	+2.9	+21
PT	-	-	**-**	-	-
RO	2.65	2.56	**2.49**	-6.2	-2.9
SE	4.53	3.01	**4.73**	+4.3	+57
SI	-	-	**-**	-	-
SK	4.47	3.63	**4.19**	-6.4	+15
UK	5.66	5.17	**5.79**	+2.3	+12

Spring barley - yield forecast 2019

MARS forecast versus average yield (t/ha) 2014 - 2018

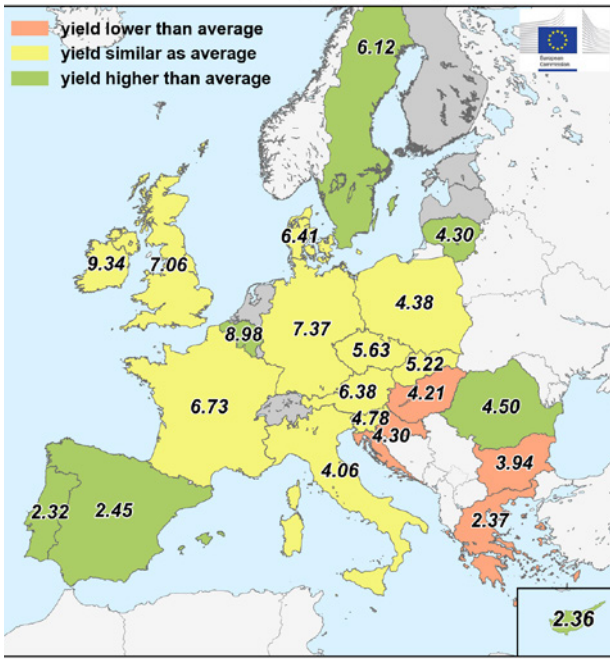


MARS Bulletin Vol. 27 No.4 (2019)

Country	WINTER BARLEY (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	5.78	5.49	**6.00**	+3.7	+9.3
AT	6.31	5.77	**6.38**	+1.1	+11
BE	8.30	8.30	**8.98**	+8.3	+8.2
BG	4.22	4.25	**3.94**	-6.6	-7.3
CY	1.41	1.81	**2.36**	+68	+31
CZ	5.63	4.98	**5.63**	+0.0	+13
DE	7.18	6.06	**7.37**	+2.6	+22
DK	6.44	5.48	**6.41**	-0.4	+17
EE	-	-	**-**	-	-
ES	2.30	2.94	**2.45**	+6.5	-17
FI	-	-	**-**	-	-
FR	6.49	6.31	**6.73**	+3.6	+6.5
GR	2.61	2.64	**2.37**	-9.2	-11
HR	4.52	4.53	**4.30**	-4.9	-5.2
HU	5.09	4.92	**4.21**	-17	-14
IE	9.22	8.80	**9.34**	+1.4	+6.2
IT	3.92	4.05	**4.06**	+3.7	+0.3
LT	3.97	3.43	**4.30**	+8.5	+26
LU	-	-	**-**	-	-
LV	-	-	**-**	-	-
MT	-	-	**-**	-	-
NL	-	-	**-**	-	-
PL	4.32	3.78	**4.38**	+1.3	+16
PT	2.22	2.48	**2.32**	+4.8	-6.2
RO	4.22	5.12	**4.50**	+6.6	-12
SE	5.75	3.74	**6.12**	+6.3	+64
SI	4.64	4.20	**4.78**	+2.9	+14
SK	5.17	4.48	**5.22**	+0.8	+17
UK	7.03	6.79	**7.06**	+0.4	+4.1

Winter barley - yield forecast 2019

MARS forecast versus average yield (t/ha) 2014 - 2018

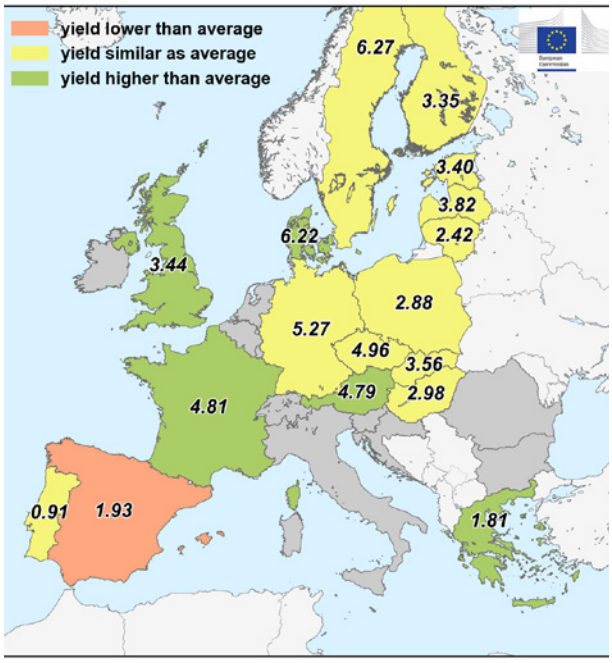


MARS Bulletin Vol. 27 No.4 (2019)

Country	RYE (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	3.79	3.24	**3.93**	+3.7	+21
AT	4.48	4.36	**4.79**	+6.8	+9.9
BE	-	-	**-**	-	-
BG	-	-	**-**	-	-
CY	-	-	**-**	-	-
CZ	4.93	4.74	**4.96**	+0.5	+4.6
DE	5.31	4.30	**5.27**	-0.8	+23
DK	5.98	5.50	**6.22**	+4.1	+13
EE	3.30	2.72	**3.40**	+3.2	+25
ES	2.05	2.85	**1.93**	-6.1	-33
FI	3.35	2.48	**3.35**	+0.0	+35
FR	4.55	4.58	**4.81**	+5.5	+4.8
GR	1.70	1.77	**1.81**	+6.5	+2.5
HR	-	-	**-**	-	-
HU	3.02	3.26	**2.98**	-1.4	-8.8
IE	-	-	**-**	-	-
IT	-	-	**-**	-	-
LT	2.41	2.07	**2.42**	+0.3	+17
LU	-	-	**-**	-	-
LV	3.79	3.76	**3.82**	+0.7	+1.5
MT	-	-	**-**	-	-
NL	-	-	**-**	-	-
PL	2.88	2.41	**2.88**	+0.2	+20
PT	0.89	0.93	**0.91**	+1.3	-3.0
RO	-	-	**-**	-	-
SE	6.07	4.53	**6.27**	+3.2	+38
SI	-	-	**-**	-	-
SK	3.57	3.39	**3.56**	-0.1	+5.0
UK	2.59	3.05	**3.44**	+33	+13

Rye - yield forecast 2019

MARS forecast versus average yield (t/ha) 2014 - 2018



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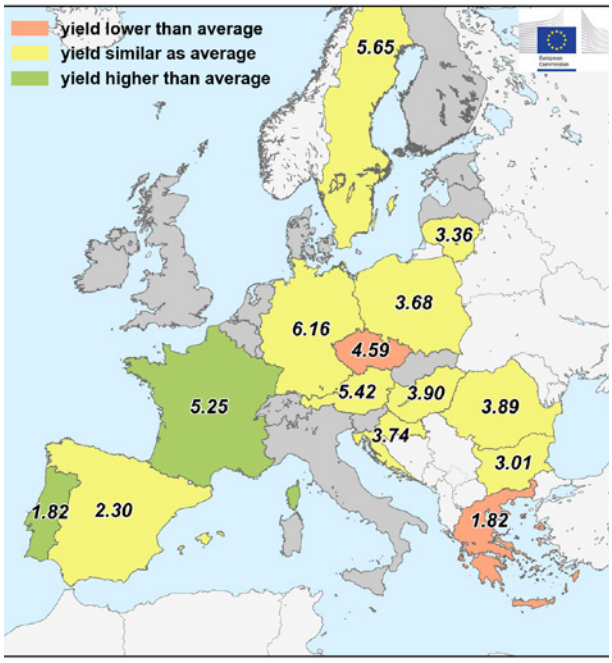
Country	TRITICALE (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	4.13	3.76	**4.19**	+1.6	+12
AT	5.43	4.91	**5.42**	-0.2	+10
BE	-	-	**-**	-	-
BG	3.03	2.66	**3.01**	-1.0	+13
CY	-	-	**-**	-	-
CZ	4.82	4.55	**4.59**	-4.9	+0.9
DE	6.23	5.41	**6.16**	-1.1	+14
DK	-	-	**-**	-	-
EE	-	-	**-**	-	-
ES	2.35	3.08	**2.30**	-1.9	-25
FI	-	-	**-**	-	-
FR	5.00	4.87	**5.25**	+4.9	+7.7
GR	2.13	2.11	**1.82**	-15	-14
HR	3.86	3.66	**3.74**	-3.3	+2.0
HU	3.96	3.76	**3.90**	-1.6	+3.8
IE	-	-	**-**	-	-
IT	-	-	**-**	-	-
LT	3.35	2.69	**3.36**	+0.1	+25
LU	-	-	**-**	-	-
LV	-	-	**-**	-	-
MT	-	-	**-**	-	-
NL	-	-	**-**	-	-
PL	3.65	3.17	**3.68**	+0.9	+16
PT	1.68	1.80	**1.82**	+8.3	+1.1
RO	3.85	4.44	**3.89**	+1.2	-12
SE	5.46	3.38	**5.65**	+3.4	+67
SI	-	-	**-**	-	-
SK	-	-	**-**	-	-
UK	-	-	**-**	-	-

Triticale - yield forecast 2019

MARS forecast versus average yield (t/ha) 2014 - 2018



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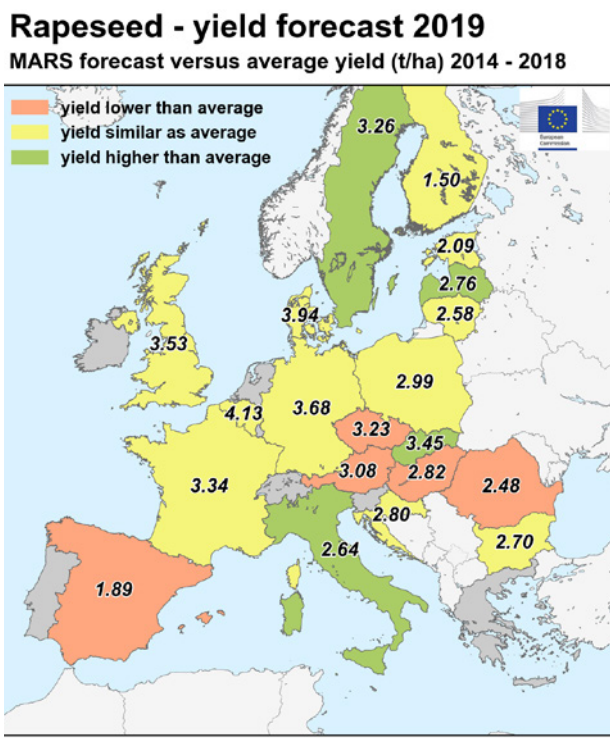
Country	RAPE AND TURNIP RAPE (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
EU	3.23	2.85	**3.19**	-1.3	+12
AT	3.27	2.98	**3.08**	-5.7	+3.4
BE	4.06	3.50	**4.13**	+1.6	+18
BG	2.74	2.49	**2.70**	-1.4	+8.2
CY	-	-	**-**	-	-
CZ	3.42	3.36	**3.23**	-5.5	-3.8
DE	3.64	2.99	**3.68**	+1.2	+23
DK	3.86	3.28	**3.94**	+2.0	+20
EE	2.04	1.64	**2.09**	+2.4	+28
ES	2.13	2.26	**1.89**	-11	-16
FI	1.50	1.32	**1.50**	+0.0	+14
FR	3.43	3.06	**3.34**	-2.4	+9.2
GR	-	-	**-**	-	-
HR	2.88	2.84	**2.80**	-3.1	-1.4
HU	3.09	2.88	**2.82**	-8.8	-2.1
IE	-	-	**-**	-	-
IT	2.49	2.45	**2.64**	+5.7	+7.8
LT	2.54	2.20	**2.58**	+1.4	+17
LU	-	-	**-**	-	-
LV	2.57	1.93	**2.76**	+7.4	+43
MT	-	-	**-**	-	-
NL	-	-	**-**	-	-
PL	2.90	2.58	**2.99**	+3.0	+16
PT	-	-	**-**	-	-
RO	2.60	2.32	**2.48**	-4.8	+6.9
SE	3.13	2.24	**3.26**	+4.1	+46
SI	-	-	**-**	-	-
SK	3.11	3.08	**3.45**	+11	+12
UK	3.60	3.41	**3.53**	-1.9	+3.4



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Country	WHEAT (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
BY	3.71	3.71	**3.78**	+1.8	+1.9
DZ	1.55	NA	**1.71**	+11	NA
MA	1.94	2.16	**2.08**	+7.5	-3.6
TN	1.75	1.75	**1.79**	+2.4	+2.4
TR	2.69	2.74	**3.01**	+12	+10
UA	3.98	3.73	**4.03**	+1.2	+8.0

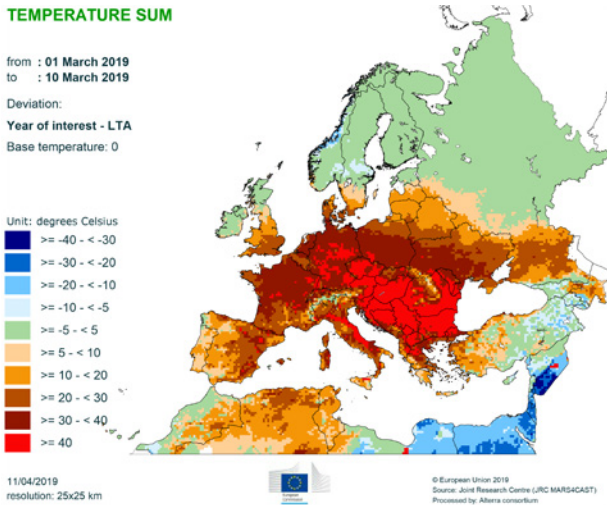
Country	BARLEY (t/ha)				
	Avg 5yrs	2018	MARS 2019 forecasts	%19/5yrs	%19/18
BY	3.35	3.40	**3.51**	+4.6	+3.1
DZ	1.25	NA	**1.37**	+9.4	NA
MA	1.23	1.45	**1.07**	-13	-26
TN	0.80	0.60	**0.73**	-9.3	+21
TR	2.62	2.67	**2.85**	+8.9	+6.7
UA	3.10	2.96	**3.04**	-2.0	+2.7

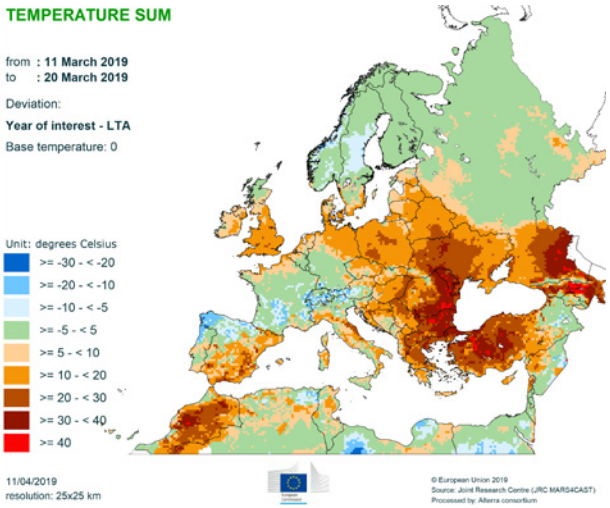
Note: Yields are forecast for crops with more than 10 000 ha per country.

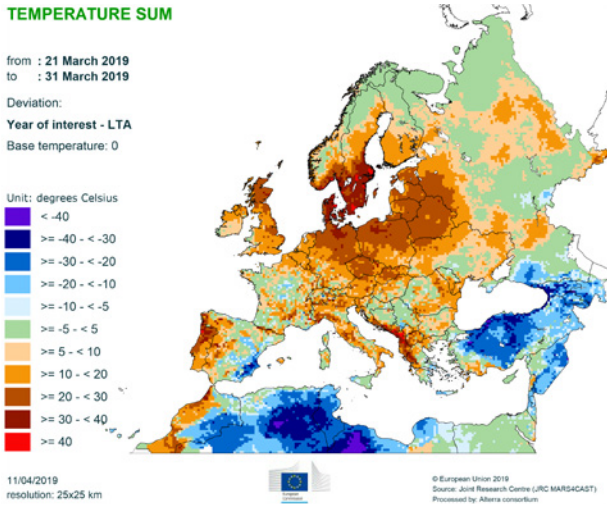
Sources: 2014-2019 data come from DG Agriculture and Rural Development short-term Outlook data (dated March 2019, received on 29.3.2019), EUROSTAT Eurobase (last update: 2.4.2019) and EES (last update: 15.11.2017).
2014-2018 data come from USDA, DSASI-MADR Algeria , INRA Maroc, CNCT Tunisie, Turkish Statistical Institute (TurkStat), EUROSTAT Eurobase (last update: 2.4.2019), State Statistics Service of Ukraine, FAO and PSD-online.
2019 yields come from MARS Crop Yield Forecasting System (output up to 31.3.2019).
NA = Data not available.

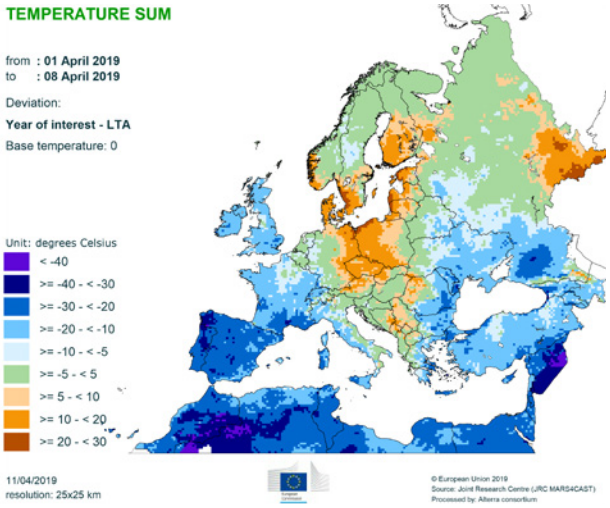
6. Atlas

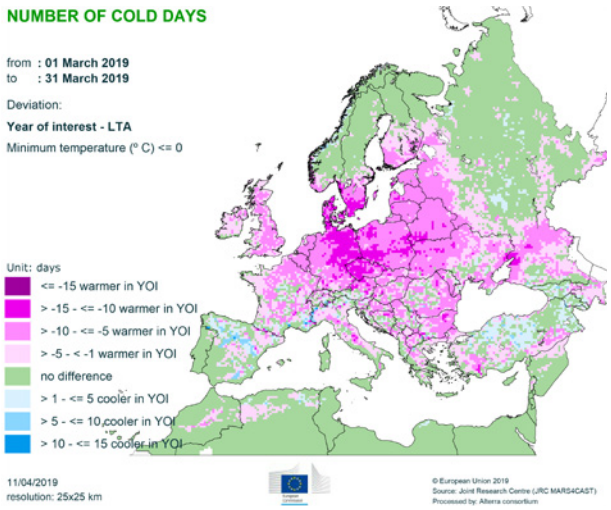
Temperature regime

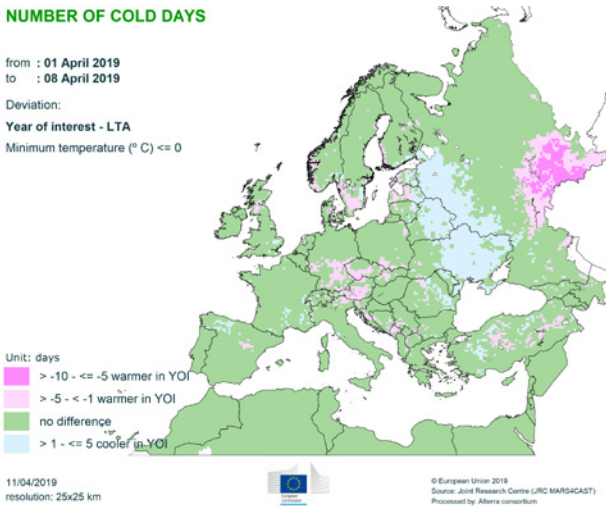




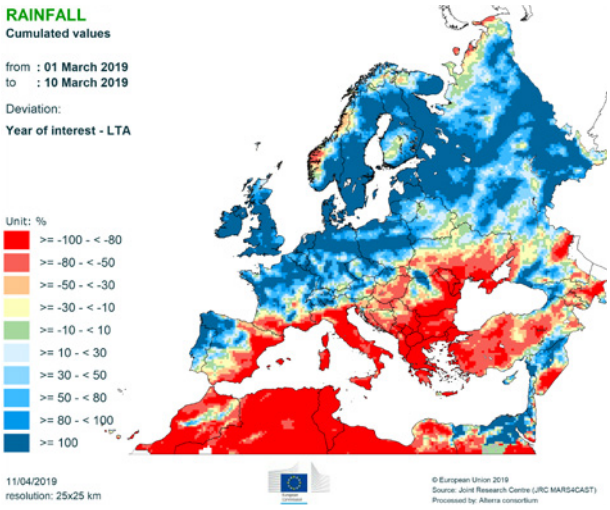


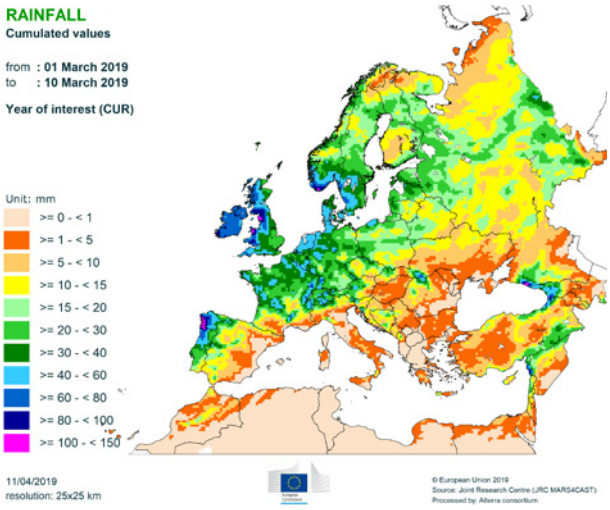


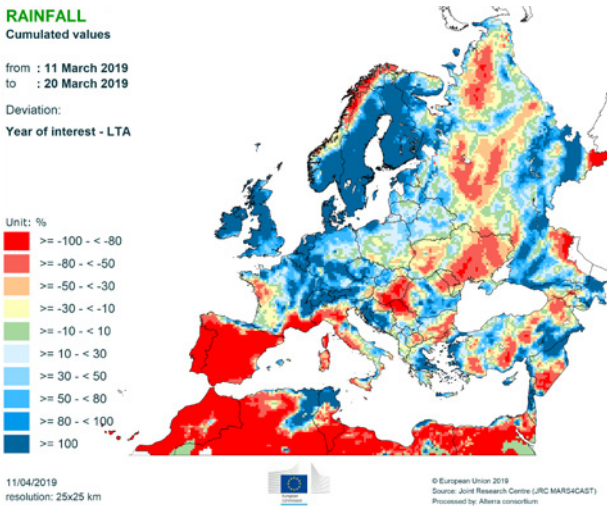


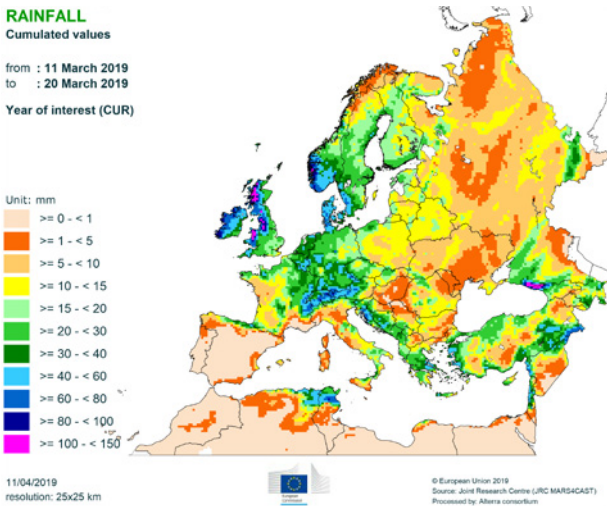


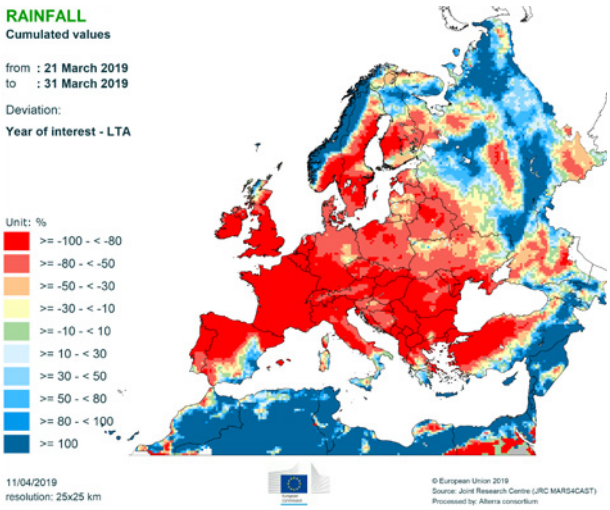
Precipitation

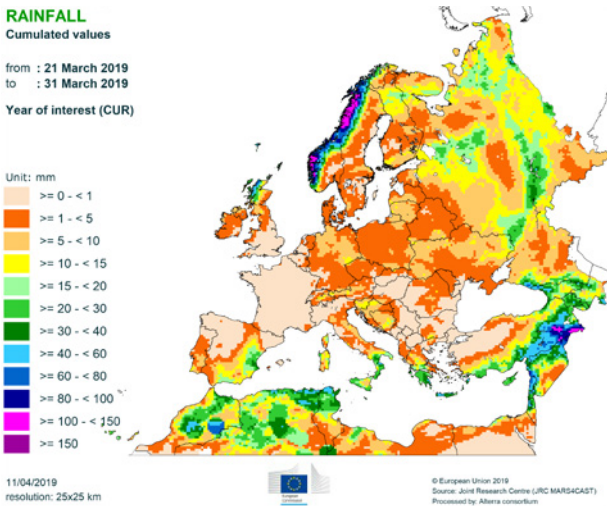


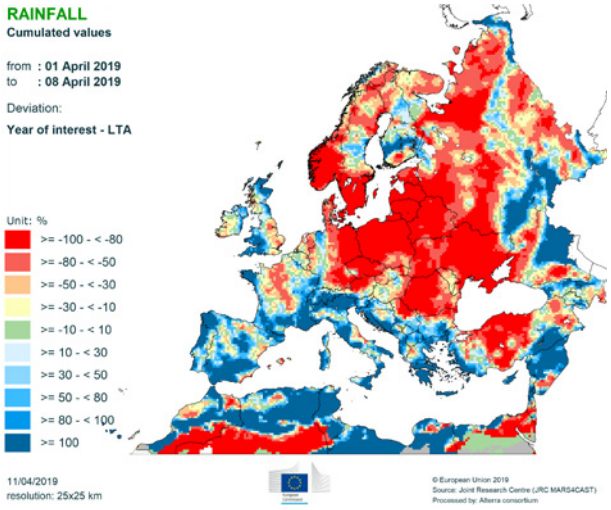


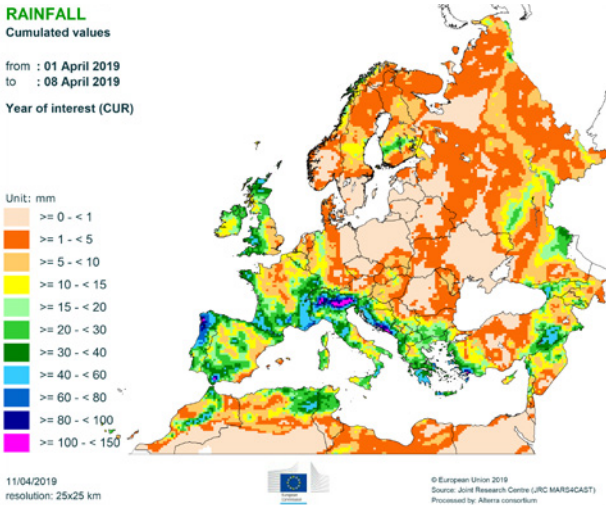


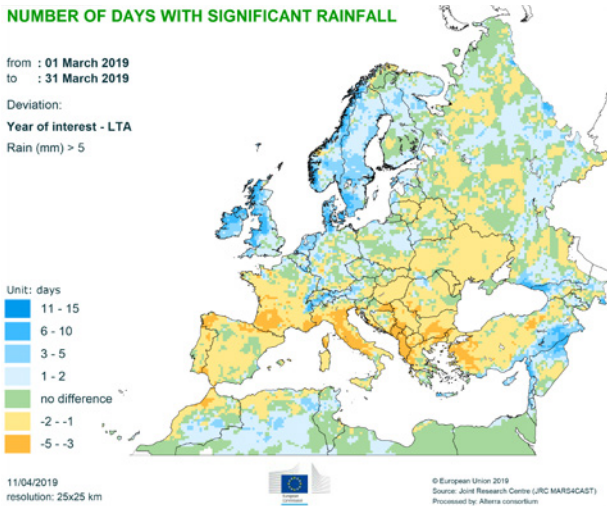


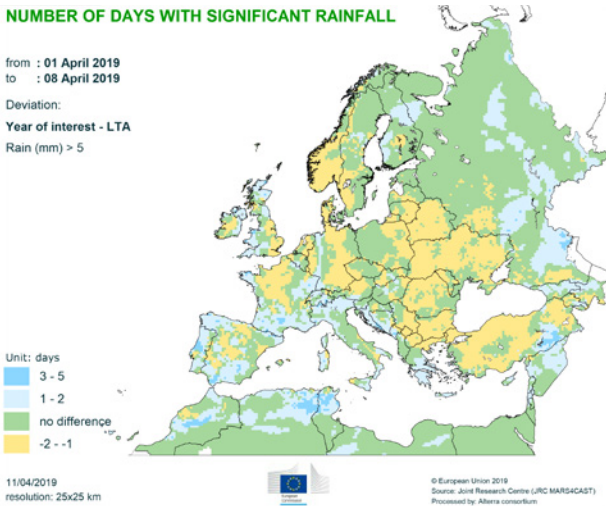




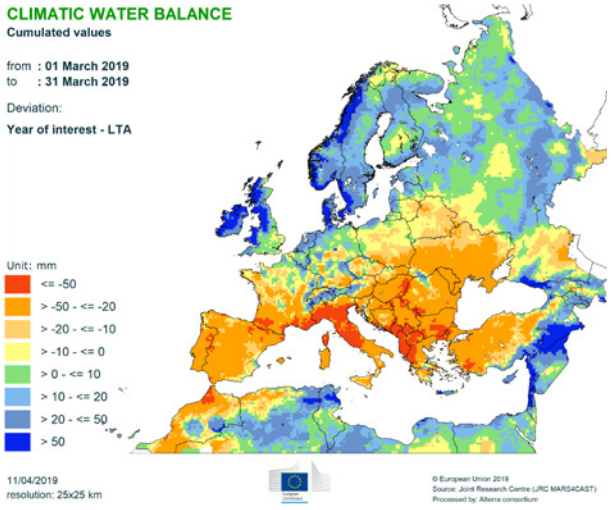


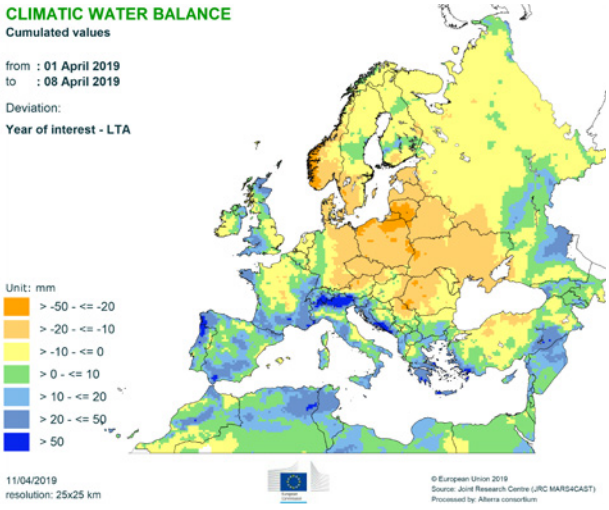




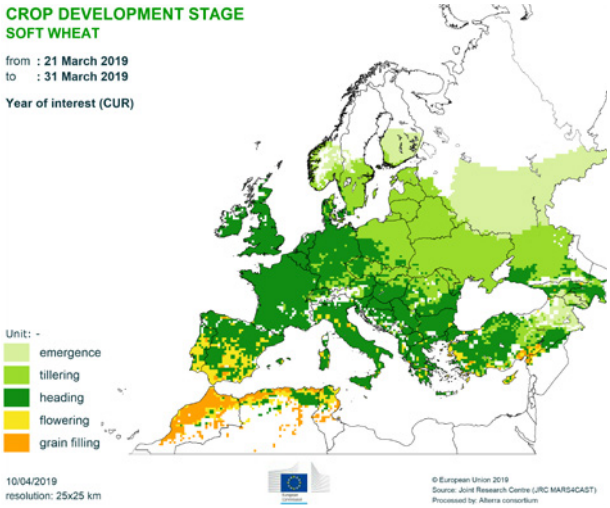


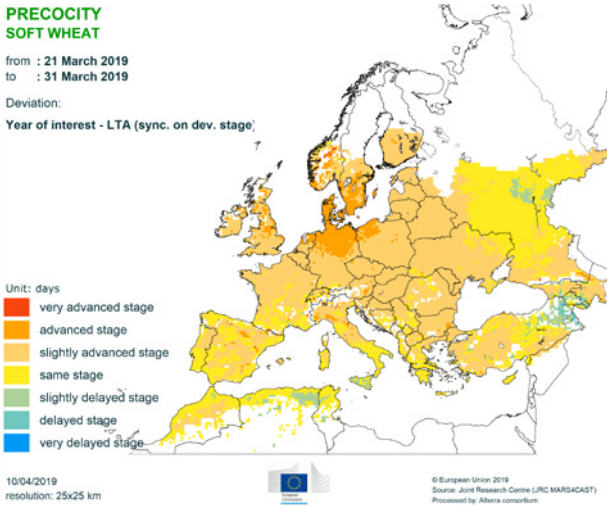
Climatic water balance

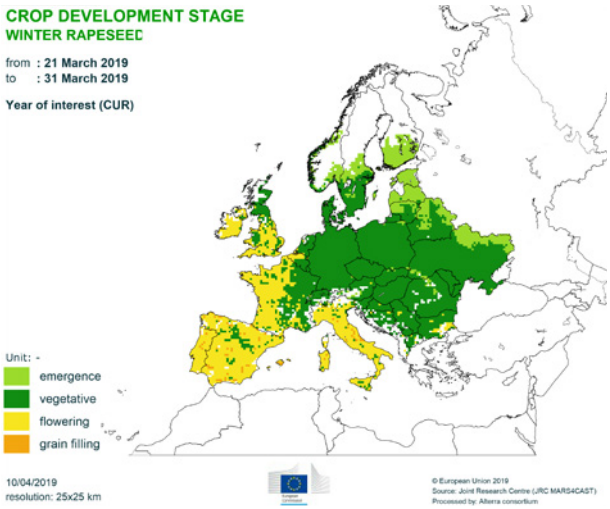


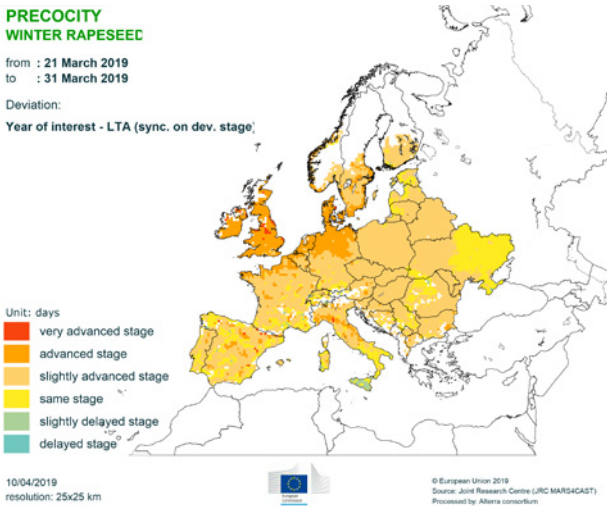


Crop-development stages and precocity

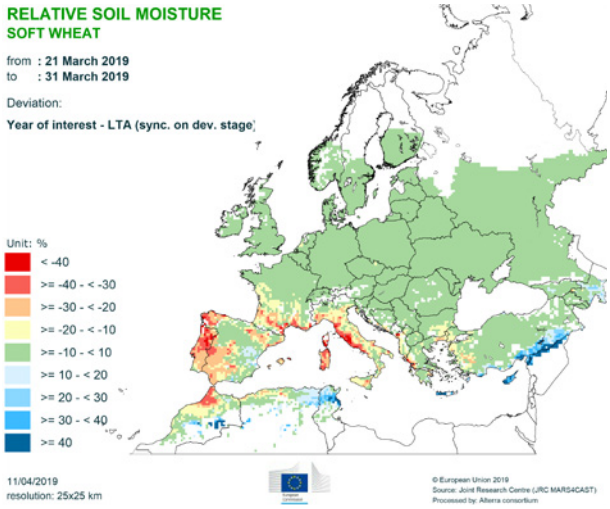


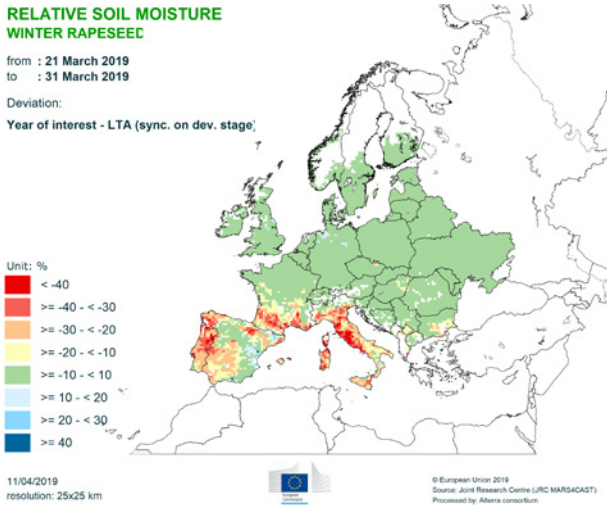






Relative soil moisture





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JRC MARS Bulletins 2019

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

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Technical note
The long-term average (LTA) used within this bulletin as a reference is based on an archive of data covering 1979-2018.

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